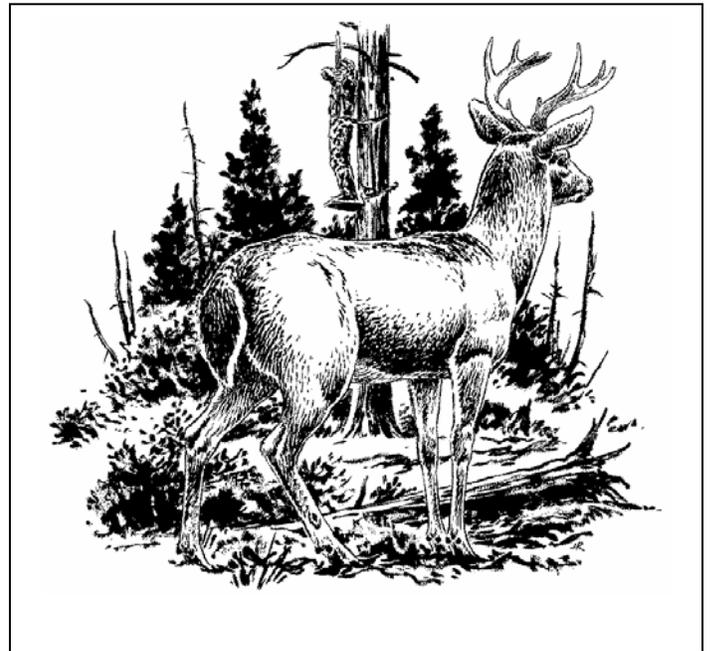


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# 2007 Statewide Deer Hunter Survey: Participation During the '06 Seasons, Opinions about Hot-Button Issues, and Trends in Characteristics of Hunters



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# EXECUTIVE SUMMARY

## Introduction

The main purposes of this research were: (1) assess hunters' attitudes and beliefs about the possibility of experimentally changing the buck bag limit and buck harvest standard used in the state, (2) assess deer hunters' interest in bear hunting opportunities, and (3) continue statewide, long-term monitoring of trends in deer hunter effort and field experiences. Specific research objectives are:

- (a) determine the degree to which reducing the buck bag limit to one antlered buck per license year for all deer hunters would affect hunters' satisfaction with buck-hunting opportunities in the state, and determine the degree to which deer hunters would support or oppose such a change.
- (b) determine the degree to which changing the buck harvest standard to try to protect most yearling bucks from harvest would affect hunters' satisfaction with buck-hunting opportunities in the state, and determine the degree to which deer hunters would support or oppose such a change.
- (c) identify positive and negative aspects of deer hunting that are impacts of great importance or concern to deer hunters, and determine whether experienced levels of these positive impacts are high enough for hunters to be satisfied and whether experienced levels of these negative impacts are low enough for hunters to still be satisfied.
- (d) assess the percentages of deer hunters who consider themselves to be bear hunters, who actively went bear hunting in 2006, and who would harvest a bear if they had a chance to do so legally.
- (e) assess trends in socio-demographic characteristics, hunter effort, and deer-hunting experiences of resident deer hunters.

## Methods

Survey implementation. We conducted a mail survey of 4,000 New York State residents who had purchased a license to hunt big game (required for hunting deer or black bear), out of a population of about 550,000 big game license buyers statewide. We stratified the sample into four geographic strata: (1) Metro NYC including Long Island (Regions 1 and 2, n = 1,200), (2) Southeastern NY (Regions 3 and 4, n = 1,200), (3) Northern NY (Regions 5 and 6, n = 800), and (4) Central-western NY (Regions 7-9, n = 800). We implemented the mail survey on 23 February 2007 using a standard four-wave procedure. Our last reminder letter was mailed to non-respondents on 23 March, and we included in our analysis all questionnaires returned by 10 April.

Weighting to address response bias. Because of different numbers of hunters living in the four geographic strata and slightly different response rates, we weighted the data when calculating statewide estimates. When we determined respondents' experiences during the 2006

hunting season and their attitudes based on those experiences, we used weighted data and aggregated respondents based on the geographic stratum in which they hunted rather than where they live.

Assessing possible non-response bias. To assess any non-response bias in our data from respondents, we contacted by telephone 50 non-respondents to the mail survey from each of the 4 geographic substrata. We administered a shortened version of the questionnaire to these persons, and compared their aggregated responses to those of respondents to the mail survey.

## **Results**

Response rates and assessment of non-response bias. The initial sample of 4,000 big game license buyers resulted in 3,834 deliverable questionnaires and 1,811 useable returns (47.2% response rate). Non-respondents differed from respondents in the various geographic strata for many of demographic variables we assessed, but not for in-season participation variables or satisfaction measures. In general, we did not adjust the data presented in this report to account for non-response bias, except for trends in hunter characteristics for comparisons with data from previous years in which data were adjusted for non-response bias.

### Deer-hunting characteristics of respondents.

- Respondents averaged  $\geq 25$  years of experience hunting deer in all strata.
- Average lifetime deer harvest was  $< 0.8$  deer/year of hunting experience.
- Deer hunting is “one of the most important” forms of recreation for a majority of hunters from all strata, and is “the most important” for  $\sim 25\%$ .
- Overall, the greater the importance placed on deer hunting, the higher percentage of hunters who said their interest in deer hunting either had increased or not changed over the last five years.
- Compared to hunters from other strata of the state, more hunters from the Southeastern stratum said they were less interested in deer hunting in 2007 compared to five years ago.

### Satisfaction and participation related to change in opening day of Southern Zone regular firearms season from Monday to Saturday.

- About three-quarters of hunters reported that the change in opening day had no effect on whether they could participate. However, 18% reported that the change has allowed them to hunt on opening day while only 8% said they no longer can hunt opening day.
- Most Northern NY hunters reported that their satisfaction was not affected by the change. In Central-Western NY, almost twice as many hunters said their satisfaction increased (29%) as said it decreased (17%), but in Southeastern NY the percentages indicating their satisfaction increased (22%) vs. decreased (23%) were nearly the same.
- Higher percentages of youth ( $\leq 18$  years old) and young adults (19-25 years old) compared to older adults ( $\geq 26$  years old) said they now can participate. However, few hunters of any age indicated that their hunting satisfaction had changed as a result of the opener being moved to Saturday.

#### Preseason preparation.

- Statewide, respondents reported an average total of 39.7 hours getting ready for the hunting season.
- Most of hunters' preparation was spent scouting (13.2 hrs) and practicing with their hunting implement (12.7 hrs). The least amount of time was spent seeking permission to hunt private land (1.5 hrs) and buying new equipment (2.7 hrs). Intermediate amounts of time were spent planning hunts by consulting maps, magazines, or websites (4.6 hrs), and gathering together, sorting, and cleaning equipment (5.1 hrs).
- About 7% of respondents statewide reported spending no time at all preparing for the hunting season. One-quarter (24.2%) reported spending 1-5 hrs in some kind of preparation. Another one-quarter (24.9%) reported spending more than 46 total hrs in preparation.

#### Application for and use of DMPs.

- Despite substantial differences in the availability of DMPs within the state, the mean number applied for (1.1), received (0.7), and filled (0.2) per hunter was the same for hunters in the Northern, Southeastern, and NYC-LI strata. Respondents from the Central-western stratum applied for (1.5), received (1.1) and used (0.4) more DMPs than hunters in the other parts of the state.

#### **Participation during and perceptions about the hunting season:**

##### Purchasing a license vs. going hunting.

- Statewide, 7.5% of licensed buyers did not hunt during the 2006 season.
- Respondents who said their interest in deer hunting had decrease over the last five years were less likely to hunt.
- This effect was striking in the Southeastern and NYC-LI strata, where 24% and 33% of respondents with decreasing interest in those strata, respectively, did not hunt for deer in 2006.

##### When had non-hunting license buyers last hunted deer?

- Most (63%) of the 7.5% of license holders who did not hunt deer during 2006 had hunted deer within the previous three years (i.e., since 2003). An additional 15% had hunted between 2000 and 2002, 17% during the 1990s, 3% during the 1980s, and 1% during the 1970s or 1960s.

##### Primary WMU for hunting deer.

- Most respondents (70%) reported a wildlife management unit (WMU) that they considered their primary place to hunt.
- However, 24% of respondents did not answer the question, and 6% responded with letters or numbers that did not correspond to a known WMU. The existence of this last group raises the issue of whether some hunters know the WMU in which they hunt.
- Among those indicating a primary WMU, 66% of hunters from the three up-state strata reported that they lived in that WMU. One-quarter (25%) of respondents from the NYC-LI stratum reported living in their primary WMU for deer hunting.

- Among hunters who did not live in their primary WMU, 94% still hunted relatively nearby, within their home geographic stratum. For hunters living in the NYC-LI area, 73% said their primary WMU was in Southeastern NY, 18% said it was on Long Island, and 7% said it was in Central-Western NY.

#### Days of effort.

- About 85% of respondents hunted during either (or both) the NZ or SZ regular firearms season, about 40% bowhunted, and 35% hunted during a muzzleloader season.
- NZ bowhunters spent about four fewer days afield than SZ bowhunters (7 vs. 11 days).
- NZ firearms hunters spent more days afield (12 days) than in the SZ (10 days).
- Muzzleloader hunters spent 3-4 days afield regardless of which Zone or season (early vs. late in the NZ).
- Deer hunters spent an average of 19 days afield combined during the 2006 seasons.

#### Hours of effort on opening day vs. others days.

- Hunters spent about 5 hrs afield on opening day during the regular firearms season in the NZ compared to about 7 hrs in the SZ. They spent 4-5 hrs on opening day of early archery seasons and opening day of late muzzleloader seasons in both Zones.
- In general, hunters spent about the same number of hours afield on opening day as on other days during the various seasons.
- Most hunters (>74%) participating in any of the six deer seasons we examined hunted on opening day, but only <13% hunted *only* on opening day.

#### Hunting styles.

- Respondents spent 60% of their time afield hunting from a stationary stand, 27% of their hunting time stalking or still-hunting, and 13% of their time putting on deer drives.

#### Types of properties used for deer hunting.

- Respondents spent 77% of their time hunting on private property where they did not have to pay, 16% of their time hunting on public land, and 7% of their time hunting on property where they had to pay a fee (e.g., lease, or hunt club).

#### Perceptions of the deer sex ratio and buck age ratio.

- Hunters' estimates of the deer sex ratio differed by region of the state, from a high of 24% antlered bucks and 76% antlerless deer in Central-Western NY to a low of 19% antlered bucks and 81% antlerless deer in Northern NY.
- Throughout upstate NY, hunters estimated the buck segment of the population to contain on average ~69% younger bucks and ~30% older bucks with larger antlers.

#### Total deer seen, shot at, and harvested.

- Hunters reported seeing about 2-3 deer per day afield regardless of where they hunted in the state. Most of these were antlerless deer.
- About 45% of antlerless deer seen were vulnerable to the hunters (could have been shot at legally and safely).

- Hunters in all strata demonstrated relatively low willingness to shoot at an antlerless deer that was vulnerable, with those in the Southeast being the least willing (i.e., took shots at only 8% of vulnerable antlerless deer).
- About 53% of hunters in Northern and in Central-Western NY harvested at least one deer during the regular firearms season while only 39% of hunters took a deer during the firearms season in the Southeastern area.
- We found no differences between strata with respect to vulnerability or willingness to shoot younger antlered bucks, and no geographic differences for older antlered bucks.
- Overall, younger bucks were reported by hunters in all geographic regions as the most vulnerable type of deer, followed by antlerless deer, and finally older bucks.
- Hunters in all strata expressed the greatest willingness to shoot at older bucks, followed by younger bucks, and finally antlerless deer.
- On average, similar percentages of hunters from all strata took at least one buck, but hunters from the Southeastern stratum took fewer antlerless deer.

#### Importance of potential positive aspects.

- More than 90% of all hunters said seeing healthy deer was “very important.”
- Four additional aspects were “very important” for >53% of hunters: (1) freedom of choice to shoot the buck of my preference, (2) having a natural mix of bucks and does (i.e., sex ratio), (3) seeing antlered bucks of any age while hunting, and (4) seeing older bucks with larger antlers.
- Being considered as a “good or expert” deer hunter was very important to ~43% of hunters, and ~30% indicated it was very important to be considered a “good or expert” buck hunter.

#### Experienced level of potential positive aspects.

- More than 40% of hunters indicated that five buck-hunting aspects of their experiences during the 2006 hunting season were “too low” for them to be satisfied.
- About one-third of hunters said the total number of deer (not just bucks) was “too low” for them to be satisfied.
- Relatively few hunters indicated that various buck-hunting aspects of their experiences were “more than enough for me to be satisfied.”

#### Importance of potential negative aspects.

- Overall, respondents placed less concern (i.e., importance) on negative aspects of hunting compared to positive aspects.
- In general, 33-42% of hunters were “very concerned” about: (1) seeing that some sub-legal bucks have been shot by mistake, (2) fear of being shot by people who shoot unsafely at deer, and (3) feeling crowded by too many hunters.
- Between 11-20% of hunters reported being “very concerned” about (1) feeling a sense of urgency to shoot the first legal buck they see, and (2) having difficulty figuring out if a buck they see is legal.

Experienced level of potential negative aspects.

- In general, between one-third and one-half of hunters each geographic stratum said that the various negative aspects of hunting were “too high” for them to be satisfied.

**Satisfaction with current buck-hunting opportunities:**

- Respondents hunting deer in Northern and Central-Western NY were split with respect to whether they were satisfied (44% and 40%, respectively) or dissatisfied (40% and 45%, respectively) with their buck-hunting opportunities during 2006, whereas most respondents (56%) hunting deer in Southeastern NY were dissatisfied.
- Age of deer hunter (i.e.,  $\leq 18$  years of age, 19-25 years of age,  $\geq 26$  years of age) and type of property hunted most of the time (i.e., public, private-free, private-pay, generalist) had no influence on the proportion who were satisfied or dissatisfied.

Satisfaction is tied to experienced levels of positive and negative impacts.

- The percentage of hunters who were dissatisfied increased as the number of positive impacts increased that were “too low.”
- If just (any) two positive impacts were “too low” for hunters to be satisfied, the percentage who were dissatisfied overall with their buck-hunting opportunities was higher than the percentage who were satisfied.
- Even when 0 negative impacts (out of the 5 about which we asked) were “too high,” just as many respondents were dissatisfied with their buck-hunting opportunities (45%) as were satisfied (43%). This suggests either that (a) some other negative impacts about which we did not ask were “too high,” or (b) some positive impacts were “too low.” The percentage who said they were satisfied dropped off substantially if they believed  $\geq 3$  negative impacts were “too high.”

**Attitudes about “hot-button” issues:**

Standardizing the buck bag limit.

- Reducing the buck bag limit to one antlered buck, regardless of how many hunting implements were used, would decrease hunting satisfaction for ~46% of hunters and increase satisfaction for only ~32%.
- Also, ~52% of hunters opposed the idea while only ~33% supported it.
- Type of property hunted most of the time had no effect on level of support or opposition for this possible change.
- Youth and young adults tended to think such a regulation change would decrease their satisfaction more than older hunters, but most hunters of all ages opposed the idea.

Protecting most yearling bucks from harvest.

- Protecting yearling bucks would increase hunting satisfaction for ~53% of hunters and decrease satisfaction for ~30%.
- Reflecting this, ~59% supported such a change whereas 29% opposed it.
- Neither the type of property hunted most of the time, nor age, affected the percentage of hunters who supported or opposed the idea of protecting most yearling bucks from harvest.

## **Attitudes and behaviors related to bear hunting:**

### Identity vs. participation.

- In Southeastern and Northern NY, ~23% of deer hunters considered themselves to be a bear hunter, whereas in Central-Western NY 14% did so.
- Smaller percentages actively hunted for bear during the 2006 season
  - In the Southeastern area, 10% hunted for bear (most in the Catskill bear range, some in the Adirondack bear range).
  - In the Northern area, 8% hunted bears (all in the Adirondack bear range).
  - In the Central-Western area, 3% hunted bears (most in the Adirondack range, the remainder in the Allegany bear range).
- Despite so few active bear hunters and <25% of deer hunters saying they consider themselves to be a bear hunter, ~68% of deer hunters said they would harvest a bear if they had the opportunity to do so

## **Trends over time in deer hunter characteristics and behaviors:**

- Gender. Percent of males among deer hunters remained relatively stable at 92-95% from 1987 through 2006.
- Age. Average age of deer hunters increased from 42.6 years in 1987 and 41.4 years in 1989, to 45.6 years in 1993 and 46.3 in 1996, to 48.0 in 2006.
- A smaller proportion of deer hunters were aged 25-45 years in 2006 compared to earlier surveys, and 62% of deer hunters in 2006 were over 45 years of age.
- Recruitment.
  - Comparison of the number of hunters by age category in 1989, 1996, and 2006 revealed that only 12% of the number of young hunters (<25 years old) in 1989 were recruited into the hunter population from 1996 to 2006.
  - Similarly, only 4% of the number of hunters who were 26-35 years old in 1989 were recruited into the hunter population from 1996 to 2006.
- Retention.
  - About 22,000 young adults (26-35 years old) dropped out of deer hunting from 1989 to 2006, resulting in a retention rate of about 87% for this age group.
  - About 66,400 middle-aged adults (36-45 years-old) dropped out of deer hunting from 1989 to 2006, yielding a retention rate of about 41% for this age group.
  - About 20,300 older adult hunters (>45 years-old, but <85 years-old) dropped out of deer hunting from 1989 to 2006, yielding a retention rate of 83% for this age group.
- Where hunters live. The percentage of deer hunters living in rural strata increased from 45% in 1989 to 47% in 1993, to 54% in 1996, and 61% in 2006. The percentage living in cities >25,000 residents decreased from 20% to 18% to 17% to 9% in the same years. The percentage living in villages and smaller cities was 35%, 35%, 29%, and 30% in the survey years.
- Hunting vs. license buying. The proportion of active hunters as a percentage of license buyers was 93% in 1989, 94% in 1993, 93% in 1996, and 92% in 2006.

- Participation by implement type.
  - The percentage of deer hunters participating in archery hunting increased from 26% in 1989 to 34% in 1993 and 33% in 1996 to 40% in 2007.
  - The percentage of deer hunters participating in the regular firearms season (either NZ, SZ, or both) has varied from 87% in 1989 to 92% in 1993 to 90% in 1996 to 84% in 2006.
  - The percentage of deer hunters taking part in late special seasons (bowhunting or muzzleloader hunting) increased substantially from 4% in 1989 to 13% 1993 and 14% in 1996 to 31% in 2006.
  
- Days of hunting effort. No data exist for 1996. Trend in days of participation do not mirror the apparent increase in popularity of archery and late special seasons.
  - The average number of days hunted during the early archery season decreased 35-40% from 1989 (10 days) and 1993 (11 day) to 2006 (6.5 days) while the percentage of hunters participating increased >150%.
  - Similarly, while the percentage of hunters participating in late special seasons increased 775%, the average days of participation by those hunters remained virtually unchanged (2-3 days during each survey period).
  - The average number of days of participation during the regular firearms season showed a very slight increase from 9 days in 1989 to 10 days in 1993 to 11 days in 2006.
  
- Hours of hunting effort. These data were assessed only in 1989 and 2006.
  - Effort on opening day was 7.4 hours afield in 1989 and 7.3 hours afield in 2006.
  - Effort on subsequent days of the season was 5.9 hours per day in 1989 vs. 6.2 hours per day in 2006).
  
- Application and use of DMPs.
  - In part because of opportunity, the percentage of deer hunters applying for at least one DMP has varied substantially over the years: 59% in 1989, 32% in 1993, 61% in 1996, and 77% in 2006.
  - The percentage of deer hunters with DMPs who fill at least one has remained remarkably stable over the years: 26% in 1989, 25% in 1993, 26% in 1996, and 23% in 2006.
  
- Types of land hunted. These data were assessed only in 1989 and 2006.
  - The percentage of hunters primarily hunting on public land decreased from 17% in 1989 to 12% in 2006.
  - The percentage of hunters primarily hunting on private land for free increased from 62% in 1989 to 75% in 2006.
  - The percentage of hunters primarily hunting on private land for pay (leases, hunt clubs) remained about the same: 5% in 1989 and 7% in 2006.
  - The percentage of generalist hunters (i.e., do not hunt at least one-half of their time on one type of property) decreased from 16% in 1989 to 6% in 2006.

## Discussion

Survey respondents were relatively experienced, long-term deer hunters who expressed high levels of avidity and interest in hunting deer. Coupled with an aging deer hunter population, these characteristics reflect poor recruitment and moderate retention of hunters since the late 1980s and early 1990s. These trends in recruitment and retention of deer hunters are a major concern for the future of deer management in New York State, given the self-imposed restraint hunters consistently have shown for harvesting antlerless deer. The challenge for the future may be greatest in the Southeastern part of the state where the highest percentages of hunters expressed a combination of low avidity and low interest in deer hunting.

Neither of the possible, experimental regulations we asked about are likely to increase satisfaction enough to improve the situation in the Southeastern stratum, or elsewhere. The idea of standardizing the buck bag limit at one antlered buck for all hunters regardless of the number of hunting implements used (to improve equitable distribution of opportunity and harvest of bucks) was soundly opposed and generally would decrease hunter satisfaction. Conversely, the idea of protecting most yearling bucks from harvest (i.e., increasing the buck harvest standard) was more positively received by hunters. Nonetheless, our analysis indicated that implementing antler restrictions would not likely be a “carrot” that would improve retention of less avid, less interested hunters.

Typical categories of analysis (e.g., age, area of residence, type of land hunted, amount of hunting effort) proved unimportant for explaining any differences in support or opposition for the idea of protecting yearling bucks. Instead, support or opposition was tied strongly to the level of importance or concern that hunters placed on some possible deer-hunting outcomes (i.e., impacts) they anticipated if the regulations were changed. These findings support the concept of adaptive impact management or AIM as a useful foundation for making management decisions. In general, a higher percentage of hunters supported protecting most yearling bucks from harvest if they believed protecting young bucks would increase positive impacts that were “too low” for hunters to be satisfied, or decrease negative impacts that were “too high” for hunters to tolerate.

We caution that although the impacts concept provides a useful foundation for explaining likely changes in hunters’ satisfaction with, and support/opposition toward, protecting most yearling bucks from harvest, the current study did not identify all deer-related impacts (positive or negative) that hunters apparently associate with this possible change in the buck harvest standard. For those hunters who believe that several buck-related impacts are “high enough” under the current situation, we do not know the impacts that led high percentages of those hunters to oppose protecting yearling bucks. More research based on AIM could be very beneficial.

This study also obtained information that will help in the context of bear management. As black bears continue to expand their ranges outside of the traditional three areas (i.e., Adirondacks, Catskills, and Allegany region), DEC will be able to count on deer hunters to help harvest more bears. Although only 3-8% of deer hunters actively hunted bears during the 2006 season, about one-quarter of deer hunters have a self-perception that they are a bear hunter. In

addition, more than two-thirds of all deer hunters said they would try to harvest a bear if they had the legal opportunity to do so.

Finally, this study provided an important opportunity to continue monitoring long-term trends in deer hunter characteristics. In general, the hunter population continues to increase in average age and proportion who live in rural areas. More specifically, recruitment and retention of deer hunters may need to become a major focus of DEC if hunters are to be relied upon to assist with managing deer at the landscape level.

## **Conclusions and Implications**

Across New York State, deer hunters reported remarkably similar experiences in general, and have relatively similar attitudes about those experiences. Deer hunters have more opportunities now than they ever had, and large numbers are taking advantage of those opportunities and hunting with a bow and/or muzzleloader in addition to a rifle or shotgun. More hunters than ever before also are applying for DMPs to use during the special implement seasons as well as during the regular season. However, having these opportunities has not maintained high levels of buck-hunting satisfaction.

Overall, most hunters are dissatisfied with their buck-hunting experiences and some changes may be warranted in the regulations affecting those opportunities. One possible change that likely would be widely supported is some kind of regulation to protect most yearling bucks from harvest. Not only do most hunters in all geographic areas of the state believe such a change would increase their hunting satisfaction and would support the idea of protecting yearling bucks, but their reasons for supporting the idea seem to be based on reasonable expectations about changes in their hunting experiences.

However, neither standardizing the buck bag limit nor improving the buck harvest standard would improve the poor recruitment and retention rates experienced in New York over the last two decades. If DEC decides to target those concepts for management interventions or research, the greatest benefit would be to do so outside of the realm of deer management. Such an effort likely would be a long-term process requiring substantial collaborative efforts with many partners.

Of more immediate benefit would be continued monitoring of trends in characteristics of hunters and continued research into trade-offs among impacts of importance to hunters. This study has provided greater understanding about impacts than DEC has had previously. It also assessed experienced levels of some impacts that were not expected to be particularly salient to hunters under current regulations (e.g., difficulty deciding if an encountered buck was legal to shoot), but which could be quite salient under a regulation to protect yearling bucks from harvest. Substantial decision-making benefit could be reaped by continuing to measure both experienced levels and desirable/tolerable levels of impacts.

Nationally, a few states exist where hunting license sales are stable. Among those, Minnesota and Oklahoma have credited strong recruitment programs as an important factor. We suggest that DEC investigate these programs.

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## INTRODUCTION

Deer biologists with the New York State Department of Environmental Conservation (DEC) are responsible for managing white-tailed deer (*Odocoileus virginianus*) in New York. The general goal of deer management in the state is to ensure the benefits of deer to people (e.g., viewing, hunting) can be achieved while minimizing concerns or problems that deer may cause (Riehlman et al. No Date). DEC addresses this goal in a variety of ways including promulgation of deer-hunting regulations aimed at providing safe and satisfying experiences for deer hunters.

To monitor deer hunters' interests and satisfaction levels, DEC sponsors periodic statewide (e.g., Decker and Connelly 1988; Enck and Decker 1991, 1995; Lauber and Brown 2000) and regional (e.g., Enck et al. 2003, Brown 2006) surveys of deer hunters. These surveys make DEC aware of any changes in hunter participation levels or other hunting characteristics. DEC also uses these surveys to assess levels of support for or opposition to possible changes in hunting regulations. The most recent statewide survey was conducted in 1999 (Lauber and Brown 2000). DEC asked staff with the Human Dimensions Research Unit (HDRU) in the Department of Natural Resources at Cornell University to develop a new survey to be implemented in early 2007.

In addition to monitoring trends in participation, harvest, and hunting satisfaction, DEC is especially interested at this time in assessing hunters' interest in an alternative deer harvest strategy commonly referred to as "Quality Deer Management" or QDM. In public meetings and through informal communication channels, some individual hunters and organized groups have advocated adoption of QDM by DEC (e.g., CNY Whitetails 2006). According to information on DEC's deer management website (available at <http://www.dec.state.ny.us/website/dfwmr/wildlife/deer/fodhupd1.htm>

Among other things, QDM focuses on control of overall deer numbers and a more balanced herd condition. With the creation of a fuller age structure in the herd, a smaller overall population with more mature bucks is the desired result. Under QDM guidelines, younger bucks with smaller antlers are passed up by hunters. This eventually results in an increased number of older bucks in both the population and the harvest and is often accompanied by an increased level of hunter satisfaction. Currently QDM is practiced in New York in about 150 locations and includes about 400,000 acres, [most] of which occur on private lands.

DEC's interest in understanding hunters' attitudes about QDM started in 2001. That year DEC staff worked with 36 private landowners and many hunters who typically hunted on those properties to establish a 12,000ac QDM cooperative near King Ferry, NY. DEC and HDRU staff monitored implementation of the cooperative from 2001-05 to better understand landowners' and hunters' attitudes and beliefs, and identified some challenges to the implementation of voluntary compliance with antler restrictions (Enck et al. 2003). Then in 2005, DEC established QDM by regulation in Wildlife Management Units (WMUs) 3C and 3J, changing the legal buck harvest standard from an antler  $\geq 3$  inches long to an antler with 3 or more points, each at least an inch long. A survey conducted after the 2005 season in those WMUs found divergent attitudes toward the change and some concerns about hunter compliance with the new regulation (Brown 2006).

Evaluations of both the King Ferry QDM cooperative and the regulatory changes in WMUs 3C and 3J indicated a need to better understand hunters' attitudes and beliefs before management decisions could be made about whether to implement QDM-like regulations in other parts of the state. Informally, many deer hunters have expressed opinions, some very strongly held, about various aspects of QDM in general and buck harvest standards in particular. Yet, for DEC biologists to make the best possible management decisions, they need insights about the informed opinions of hunters. Of particular interest is knowledge about how changes in the buck harvest standard might affect hunters' experiences while deer hunting because those experiences both affect hunter satisfaction (Enck and Decker 1991) and DEC's ability to achieve deer management objectives (Brown et al. 2000).

In 2006, a sportsmen's group called Central New York Whitetails asked DEC to implement QDM at the WMU-scale in central New York. In turn, DEC asked HDRU to conduct a rapid-response, phone survey of deer hunters in WMUs 7F, 7H, and 7J to assess their attitudes about, and possible levels of support for, two experimental regulation changes that could affect buck-hunting. One experiment would be to reduce the buck limit to one for all hunters regardless of how many implements they used (e.g., bow, modern firearm, muzzleloader). The second experimental change would be to try to protect most yearling bucks from harvest by redefining the buck harvest standard, or definition of which bucks are legal to harvest. The phone survey (Enck and Brown 2007) revealed split opinions and various beliefs about the possible outcomes of either of the experimental changes.

Consideration about whether to enact either possible, experimental regulation will depend on a variety of factors. These include not only level of support, but also: hunters' beliefs about likely changes in buck-related hunting experiences, importance of those experiences, and their influence on hunters' satisfaction. According to DEC deer biologists, majority support by itself would be insufficient to warrant enacting the experimental regulations, especially if substantial percentages of hunters either oppose the experimental regulations or are ambivalent toward them. Also needed would be for most hunters to believe that positive and "very important" (i.e., highly valued) changes would occur in their buck-related hunting experiences, and that these changes would maintain or improve hunter satisfaction. Given no clear preference or set of beliefs about consequences of the possible experimental changes, DEC maintained the existing buck-hunting regulations.

The main purposes of this research were: (1) assess hunters' attitudes and beliefs about the possibility of experimentally changing the buck bag limit and buck harvest standard used in the state, and (2) assess deer hunters' interest in bear hunting opportunities, and (3) continue statewide, long-term monitoring of trends in deer hunter effort and field experiences. Specific research objectives are:

- (a) determine the degree to which reducing the buck bag limit to one antlered buck per license year for all deer hunters would affect hunters' satisfaction with buck-hunting opportunities in the state, and determine the degree to which deer hunters would support or oppose such a change.

(b) determine the degree to which changing the buck harvest standard to try to protect most yearling bucks from harvest would affect hunters' satisfaction with buck-hunting opportunities in the state, and determine the degree to which deer hunters would support or oppose such a change.

(c) identify positive and negative aspects of deer hunting that are impacts of great importance or concern to deer hunters, and determine whether experienced levels of these positive impacts are high enough for hunters to be satisfied and whether experienced levels of these negative impacts are low enough for hunters to still be satisfied.

(d) assess the percentages of deer hunters who consider themselves to be bear hunters, who actively went bear hunting in 2006, and who would harvest a bear if they had a chance to do so legally.

(e) assess trends in socio-demographic characteristics, hunter effort, and deer-hunting experiences of resident deer hunters.

## **METHODS**

### **Sampling Frame**

We conducted a mail survey of 4,000 New York State residents who had purchased a big game license, out of a population of about 550,000 big game license buyers statewide. We stratified the sample into four geographic strata: (1) Metro NYC including Long Island (Regions 1 and 2, n = 1,200), (2) Southeastern NY (Regions 3 and 4, n = 1,200), (3) Northern NY (Regions 5 and 6, n = 800), and (4) Central-western NY (Regions 7-9, n = 800). These sub-sample sizes were based on: (1) our desire to obtain  $\geq 400$  useable responses from each stratum to provide precise and reliable area-specific findings; (2) knowledge that most deer hunters hunt in the stratum where they live indicating different populations of hunters among the different strata; and (3) typically lower response rates from hunters in southeastern New York and the New York City metropolitan and Long Island compared to other zones (Enck and Decker 1990).

DEC provided us with an electronic file of names, addresses, and telephone numbers of persons in the sample. We implemented the mail survey on 23 February 2007 following Dilman's (2000) four-wave procedure. Our last reminder letter was mailed to non-respondents on 23 March, and we included in our analysis all questionnaires returned by 10 April.

### **Questionnaire Development**

#### **General Deer-hunting Characteristics:**

We first assessed overall deer-hunting experience, including the number of years they had hunted deer, whether they had hunted for the first time in 2006, and their lifetime harvest of deer. Next, we asked recipients how important deer hunting is to them, from (1) it is my most important recreational activity to (4) it is one of my least important recreational activities. Finally, we asked whether their interest in deer-hunting had increased, decreased, or not changed over the last five years.

We asked two questions about a regulatory change in 2005 that had moved opening day of the Southern Zone regular firearms season from a Monday to a Saturday. First we asked how the change affected their ability to hunt on opening day (I could hunt on a Monday but not Saturday, the change had no effect on whether I could hunt opening day, or I could not hunt on Monday but now can on Saturday). Then we asked how the change in opening day affected their overall deer-hunting satisfaction.

### **Experiences During the 2006 Hunting Season:**

We asked recipients whether they hunted deer during the 2006 hunting season. We also asked how many deer management permits (DMPs) they had applied for, received, and filled. To assess hunters' pre-season scouting efforts, we asked how many hours they spent before opening day on each of six activities including scouting, practicing with hunting implements, gaining hunting permission, and buying equipment.

We developed typologies of deer hunters based on the hunting techniques they used during the 2006 season, and type of land they had accessed to hunt. First, we asked recipients to indicate what percentage of their hunting time was spent using each of three techniques: (1) stationary stand, (2) deer drives, and (3) still-hunting, stalking, or tracking. Then we asked what percentage of their time was spent deer hunting on: (1) public land, (2) private land for free, and (3) land where they had to pay. We characterized hunters based on the method or type of land they used for >50% of their time.

We assessed hunting effort in three ways. First, we asked how many days they hunted during each of 13 deer-hunting seasons in New York. Then we asked how many total hours they hunted on opening day of: (a) early archery in the Northern Zone, (b) rifle in the Northern Zone, (c) late muzzle loader in the Northern Zone, (d) early archery in the Southern Zone, (e) regular firearms season in Southern Zone, and (f) late muzzle loader in Southern Zone. Finally, we asked how many hours on average they hunted other days during each of those six seasons.

### **Attitudes and Beliefs about Current Buck-hunting Opportunities and Experiences:**

Prior to asking opinions about possible changes in regulations, we ascertained current, experienced level of satisfaction with buck-hunting opportunities in the wildlife management unit (WMU) primarily hunted. First we asked hunters to estimate the percent of antlered bucks vs. antlerless deer in that unit before the start of the 2006 deer hunting season. We also asked them to estimate the percent of antlered bucks were yearlings with smaller antlers vs. the percent of older bucks with larger antlers. Finally, we asked (from greatly dissatisfied to greatly satisfied) how satisfied they were with their buck-hunting opportunities in their primary WMU during the 2006 hunting season.

We asked hunters about their sightings and harvest of deer while hunting to calibrate their level of buck-hunting satisfaction with their hunting experiences. Specifically, for antlerless deer, younger bucks, and older bucks, we asked (a) how many deer of this type they saw while hunting, (b) how many they could have shot at (had an unfilled tag and deer was in range), (c) how many they shot at, (d) how many they harvested, and (e) how many total shots they took.

Next, we asked hunters to consider how their overall hunting satisfaction was affected by each of six possible positive aspects of deer hunting. For each, we asked them to indicate whether what they experienced was “too low for me to be satisfied,” “just about the minimum level I need to be satisfied,” or “more than enough for me to be satisfied.” We also asked them to consider how their satisfaction was affected by each of five possible negative aspects of deer hunting. For each of these, we asked them to indicate whether what they experienced was “too high for me to be satisfied,” “just about the maximum level I can tolerate,” or “low enough for me to still be satisfied.”

### **Attitudes About Possible, Experimental Changes in Buck-hunting Regulations:**

We investigated two possible, experimental changes: (1) reducing the buck bag limit for all hunters to one antlered buck, and (2) increasing the buck harvest standard that defines which bucks can legally be harvested. For both of these possible changes, we asked (from greatly increase to greatly decrease) how the change would affect their overall satisfaction with their buck-hunting opportunities. In addition, we asked (from greatly support to greatly oppose) the extent hunters would support or oppose the experimental change.

### **Interests and Behaviors Pertaining to Bear Hunting:**

New York State has no specific bear-hunting license, and thus, no way of determining the number of bear hunters in the state. We asked three questions to fill this void. First, we asked if recipients considered themselves to be bear hunters. Then we asked if they had actively hunted bears as their primary target animal during the 2006 big game seasons, and if so, in which bear range (Adirondacks, Catskills, or Allegany). Finally, we asked whether they would harvest a bear if they had the opportunity to do so.

### **Social and Demographic Characteristics:**

We asked hunters to indicate the highest level of education they had obtained, to indicate their type of residence category (from rural to large city), and to indicate their gender. We accessed data about the year in which they were born from license records, yielding an average age for all hunters in the sample (not only respondents).

### **Data Analysis and Addressing Response Bias:**

We analyzed all survey data using SPSS-X (Version 15.0), and used  $p = 0.05$  as the significance threshold for all analyses. We used one-way analysis of variance with Scheffe’s multiple-comparison t-test to compare means among geographic substrata. We used Pearson Chi-square tests or Fisher’s Exact Tests (identical to Chi-square analysis, but robust enough to handle cells with values  $<5$ ) to compare categorical data.

Because different numbers of hunters live in each of the geographic strata and we obtained slightly different response rates, we weighted the data used for statewide estimates to address response bias. Weighting factors for the geographic strata were: NYC-LI = 0.273146, Southeastern = 0.620162, Northern = 0.965531, and Central-Western = 1.261001. Results for

any particular geographic stratum were produced by analyzing un-weighted data. When we determined respondents' statewide experiences or attitudes, we used weighted data and aggregated respondents based on the geographic stratum in which they hunted rather than where they live.

### **Assessment of Non-response Bias:**

To assess any non-response bias in our data from respondents, we contacted by telephone 50 non-respondents to the mail survey from each of the 4 geographic substrata. We administered a shortened version of the questionnaire to these persons, and compared their aggregated responses to those of respondents to the mail survey. We used t-tests to compare mean values and the Fisher Exact to compare proportional data.

When reporting results for respondents, we adjust findings to account for non-response bias only for demographic and trend data (to compare with previous studies that adjusted data). We decided not to adjust the findings from 400-500 responses by findings from 50 non-respondents. Doing so would give too much weight or importance to each non-respondent (i.e., the "weight" of each non-respondent would be ~10 times the weight of each respondent).



## **RESULTS**

### **Survey Response Rates and Data Accuracy**

The initial sample of 4,000 big game license buyers resulted in 3,834 deliverable questionnaires and 1,811 useable returns (47.2% response rate). We achieved  $\geq 400$  responses in all geographic strata except the Northern area. Total numbers of useable returns and associated response rates for each geographic stratum were: 493 (43.0%) for Metro NYC, 564 (49.6%) for Southeastern NY, 354 (46.9%) for Northern NY, and 400 (53.1%) for Central-western NY.

Any survey based on a sample of persons from a large population has a margin of error associated with its findings. This margin of error varies according to the number of respondents and the percentage of respondents giving a particular answer to each question. In this study, the maximum expected margin of error at the 95% confidence level was  $\pm 5.2\%$  for Northern NY. For aggregated data reported at the statewide level, the maximum expected margin of error is 2.3% (Table 1).

**Table 1. Maximum margin of error at the 95% confidence level<sup>a</sup> for responses to any question pertaining to proportions of hunters choosing a particular response category – for the geographic stratum with the smallest number of respondents and for statewide data – in a mail survey of big game hunters in New York State conducted in 2007.**

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	Northern NY n = 354	Southeastern NY n = 564	Statewide n = 1,811
Response <u>percentage</u>	Margin <u>of error</u>	Margin <u>of error</u>	Margin <u>of error</u>
10% or 90%	± 3.1%	± 2.5%	± 1.4%
20% or 80%	± 4.2%	± 3.3%	± 1.8%
30% or 70%	± 4.8%	± 3.8%	± 2.1%
40% or 60%	± 5.1%	± 4.0%	± 2.2%
50%	± 5.2%	± 4.1%	± 2.3%

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<sup>a</sup>Consider, for example, a variable for which 70% of the respondents from Northern NY possess a characteristic and 30% do not, and assuming random sampling with no measurement error, one can have 95% confidence that the percent of the sample proportion possessing the characteristic will be between 65.2% and 74.8% (i.e., +/- 4.8%). Thus, the percentage of deer hunters from Northern NY who have the characteristic would fall between 65.2% and 74.8% 95 times out of every 100 that a sample of 800 deer hunters was drawn from the population of deer hunters in that stratum and a similar response rate was experienced. The margin or error is smaller for the other strata because of higher numbers of respondents in those strata.

---

### **Non-response Bias**

As is typically the case, non-respondents differed from respondents in the various geographic strata for many of the variables we assessed.

- Non-respondents tended to be younger, to have hunted deer for fewer years, and to have harvested fewer deer in their lifetimes.
- Non-respondents were less likely to have hunted deer in 2006, but those who did hunt went afield about the same number of days and same number of hours per day as respondents.
- Non-respondents and respondents reported similar effects on their deer-hunting satisfaction with respect to the changing of opening day of the Southern Zone regular firearms season from a Monday to a Saturday.
- In the Northern and Southeastern strata, non-respondents were more likely to be satisfied with their buck-hunting opportunities.
- In general, non-respondents and respondents placed the same importance on seeing bucks of any age or size.
- However, non-respondents from the three upstate strata (not LI-NYC) placed less importance on seeing older bucks with larger antlers.

- Non-respondents generally did not differ from respondents with respect to whether reducing the buck bag limit would affect their hunting satisfaction.
- More non-respondents indicated that enacting a regulation to protect most yearling bucks from harvest would have no influence on their satisfaction.
- Non-respondents did not differ from respondents in whether they supported or opposed either changing the buck bag limit or protecting yearling bucks from harvest.
- We found no differences between non-respondents and respondents from any of the strata with respect to whether they considered themselves to be bear hunters, or whether they actively hunted bears during the 2006 season.
- However, non-respondents from both the Northern and Southeastern strata were more likely than respondents to say they would harvest a bear if they had the chance.

## General Deer-hunting Characteristics of Respondents

### Lifetime Experience and Harvest:

Respondents averaged  $\geq 25$  years of deer hunting in all strata (Table 2). Very few respondents (0.5-3.3%) reported that they had hunted deer for the first time in 2006. This suggests that little recruitment of new deer hunters is occurring anywhere in the state. Recruitment is discussed in much more detail later in the results section under trend data.

**Table 2. Selected deer-hunting characteristics of deer hunters living in various geographic strata of New York State, from a mail survey conducted in 2007.**

Characteristic <sup>a</sup>	Geographic strata							
	Central-western		Northern		Southeastern		NYC-LI	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Years hunted deer	28.8A	0.77	29.2A	0.85	29.5A	0.67	25.8B <sup>b</sup>	0.67
Antlered bucks harvested in lifetime	11.7A	0.64	12.5A	0.71	12.3A	0.57	6.8B <sup>c</sup>	0.41
Antlerless deer harvested in lifetime	12.0A <sup>d</sup>	0.65	8.9B	0.57	9.4B	0.47	6.6C <sup>d</sup>	0.38
Total number of deer harvested in lifetime	22.9A	1.13	20.6A	1.05	20.8A	0.86	12.7B <sup>e</sup>	0.67

<sup>a</sup>For any given characteristic, means sharing a letter do not differ ( $p > 0.05$ ).

<sup>b</sup>NYC-LI lower than means for other strata.  $F = 5.853$ ,  $p = 0.001$

<sup>c</sup>NYC-LI lower than means for other strata.  $F = 23.648$ ,  $p < 0.001$

<sup>d</sup>Central-western greater and NYC-LI lower than other means.  $F = 18.279$ ,  $p < 0.001$

<sup>e</sup>NYC-LI lower than means for other strata.  $F = 24.970$ ,  $p < 0.001$

Respondents from the Central-Western stratum averaged the greatest lifetime deer harvest per year hunted (0.8 deer/year) and those from the NYC-LI stratum averaged the lowest (0.5 deer/year). Lifetime harvest of antlered bucks averaged about 12 by hunters living upstate, but only about seven by hunters from the NYC-LI stratum (see Table 2). Central-Western hunters had harvested the most antlerless deer in their lifetimes, and NYC-LI hunters the least.

**Importance of and Interest in Deer Hunting:**

The activity of deer hunting is one of the most important forms of recreation for more than one-half of respondents from all geographic strata, and is the most important activity for about one-quarter of deer hunters (Table 3). Despite this similarity in importance across the state ( $X^2 = 5.043$ ,  $df = 9$ ,  $p = 0.831$ ), recent changes in interest in the activity differed geographically. Specifically, a higher proportion of hunters from Southeastern NY, compared to hunters from other areas, was less interested in deer hunting in 2007 compared to five years ago state ( $X^2 = 21.061$ ,  $df = 6$ ,  $p = 0.002$ ).

**Table 3. Importance of the activity of deer hunting, and change over the last five years in interest in deer hunting, reported by hunters living in various strata of New York State, from a mail survey conducted in 2007.**

Importance of deer hunting as a recreational activity	Geographic strata							
	Central-western		Northern		Southeastern		NYC-LI	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Most important activity	113	28.3	97	27.9	139	24.7	128	26.4
One of most important	208	52.1	195	56.0	307	54.6	266	54.8
No more important than others	64	16.0	43	12.4	91	16.2	73	15.1
One of least important	14	3.5	13	3.7	25	4.4	18	3.7

Change in interest in deer hunting over last 5 years	Geographic strata							
	Central-western		Northern		Southeastern		NYC-LI	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Less interested	82	20.6	65	18.6	143	25.5	78	16.1
No change	201	50.5	205	58.6	295	52.6	281	57.9
More interested	115	28.9	80	22.9	123	21.9	126	26.0

When we compared the importance of the activity of deer hunting with changes in interest over the last five years, we found no differences among geographic strata. Overall, the greater importance placed on the activity, the higher percentage of hunters who said their interest had not changed or had increased (Table 4). For example, most hunters (57%) who indicated that deer hunting is their most important recreational activity said their interest in deer hunting had not changed. However, three times as many said their interest had increased (32%) as said it had decreased (11%). Conversely, 52% of those who said that deer hunting was one of their least important activities indicated that their interest had decreased over the last five years. This is more than three times as many as said their interest had increased (15.9%).

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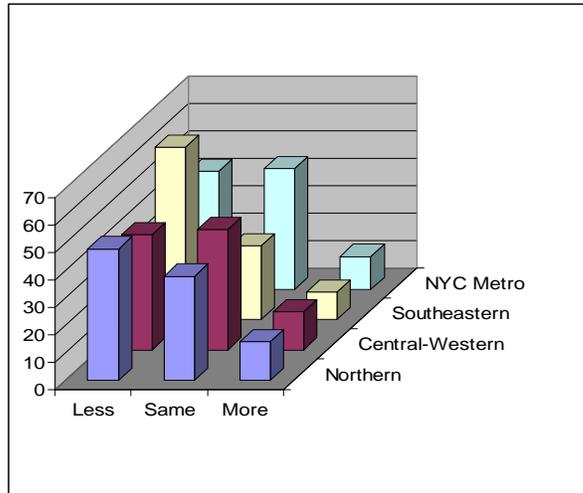
**Table 4. Comparison of change in interest in deer hunting over the last five years with the importance of deer hunting as a recreational activity for deer hunters in New York State, from a mail survey conducted in 2007 (numbers in table are percents for each row).**

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Importance of deer hunting as a recreational activity	Change in interest over last 5 years		
	<u>more</u>	<u>no change</u>	<u>less</u>
most important	32.3%	56.6%	11.1%
one of most important	27.3%	56.6%	16.1%
no more important than other activities	12.6%	40.9%	46.5%
one of least important	15.9%	31.7%	52.4%

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This expected relationship is most extreme in the Southeastern stratum. Examining just hunters who indicated that the activity of deer hunting is not very important (i.e., either their least important recreational activity or no more important than any others), we found a substantial erosion of interest among current deer hunters in the Southeastern part of the state over the past five years compared to other geographic strata (Figure 1). Whereas 42-48% of hunters from other strata who reported that deer hunting was not very important to them also said their interest had decreased, the percentage whose interest had decreased was much higher (63%) for hunters from the Southeastern area. This finding could point to decreasing future retention of deer hunters in that geographic stratum compared to hunters living in other parts of the state, and warrants continued monitoring.



**Figure 1. Change in interest in deer hunting over last five years among deer hunters in New York state who said that the activity of deer hunting was either their least important activity or no more important than any others, from a mail survey conducted in 2007.**

### **Changes in Satisfaction and Participation in Opening Day of Regular Firearms Season in the Southern Zone:**

For the 2005 hunting season, opening day of the regular firearms season in the Southern Zone was changed to a Saturday from the traditional Monday following the 15<sup>th</sup> of November. To assess how this change affected hunters' satisfaction and participation, we aggregated respondents based on the geographic part of the state where they hunted. Separating the Northern NY stratum from the combined Central-Western and Southeastern strata provides an approximation of the geographic split between the Northern and Southern Zones for deer hunting.

We found no difference in change in participation between hunters who hunt primarily in Northern NY vs. Central-Western or Southeastern NY ( $X^2 = 5.354$ ,  $df = 4$ ,  $p = 0.253$ ). Regardless of where respondents primarily hunt, about three-quarters (75-77%) reported that the change in opening day had no effect on whether they could participate (Table 5, top). However, more hunters reported that the change has allowed them to hunt on opening day (16-19%) as said the change has meant they no longer can hunt opening day (6-9%).

On the other hand, the change to a Saturday opener in the Southern Zone had an effect on hunter satisfaction, depending on where respondents primarily hunt ( $X^2 = 33.176$ ,  $df = 4$ ,  $p < 0.001$ ). As might be expected, a higher percentage of respondents who hunt primarily in Northern NY reported that their satisfaction did not change (Table 5, bottom), compared to respondents hunting in either Central-Western or Southeastern NY. Further, among respondents hunting primarily in Central-Western NY, almost twice as many said their satisfaction increased (29%) as said it decreased (17%). However, among hunters in Southeastern NY, similar percentages indicated their satisfaction increased (22%) vs. decreased (23%).

**Table 5. Influence of changing opening day of the Southern Zone regular firearms season in New York State from a Monday to a Saturday on hunter participation and satisfaction, depending on primary location for deer hunting, from a mail survey conducted in 2007.**

	<u>Stratum where primary WMU for hunting is located</u>		
	<u>Cent-West</u>	<u>Northern</u>	<u>Southeastern</u>
<u>Influence on participation</u>	<u>% of hunters</u>	<u>% of hunters</u>	<u>% of hunters</u>
Previously could hunt on Monday, but now cannot on Saturday	5.6	5.9	9.0
No effect on participation	75.0	76.6	74.9
Could not hunt on Monday, but now can hunt on Saturday	19.4	17.6	16.1

Percentages do not differ by stratum  $X^2 = 5.354$ ,  $df = 4$ ,  $p = 0.253$

<u>Influence on satisfaction</u>	<u>% of hunters</u>	<u>% of hunters</u>	<u>% of hunters</u>
Increased satisfaction	29.4	18.8	21.7
No effect on satisfaction	53.7	72.3	55.3
Decreased satisfaction	16.9	8.9	23.0

Percentages do not differ by stratum  $X^2 = 33.176$ ,  $df = 4$ ,  $p < 0.001$

We found some geographic differences within our approximation of the Southern Zone with respect to the relationship between hunters' ability to hunt on opening day (because of the change from Monday to Saturday) and corresponding changes in satisfaction (Table 6). A higher proportion of hunters in Southeastern NY (vs. Central-Western NY) said their satisfaction decreased because they cannot hunt on opening day since it has been changed to Saturday. Conversely, a smaller proportion of respondents who hunt in Southeastern NY said their satisfaction increased because they now can hunt on opening day since it is on a Saturday.

**Table 6. Influence of changing opening day of the Southern Zone regular firearms season in NY from a Monday to a Saturday on hunters' ability to hunt on opening day and associated change in hunting satisfaction, by geographic location of respondents' primary place to hunt deer, from a mail survey conducted in 2007.**

<u>Influence on participation</u>	<u>Influence on hunting satisfaction</u>								
	<u>Increase</u>			<u>No effect</u>			<u>Decrease</u>		
	<u>N<sup>a</sup></u>	<u>CW<sup>b</sup></u>	<u>SE<sup>c</sup></u>	<u>N</u>	<u>CW</u>	<u>SE</u>	<u>N</u>	<u>CW</u>	<u>SE</u>
Could hunt opening day when it was Monday, now cannot since it is Saturday	0 <sup>d</sup>	0	3	33	30	10	67	70	86
Ability to participate unchanged by moving opening day to Saturday	6	18	14	87	65	66	6	17	20
Could not hunt opening day when it was Monday, now can since it is Saturday	78	79	66	22	19	30	0	2	4

<sup>a</sup>N = Primary place to hunt is in Northern stratum

<sup>b</sup>CW = Primary place to hunt is in Central-Western stratum

<sup>c</sup>SE = Primary place to hunt is in Southeastern stratum

<sup>d</sup>Numbers in table are percentages of respondents whose primary place to hunt is in the indicated geographic stratum.

We also examined how the change in opening day affected younger deer hunters in particular because that was the age group at whom the change had been targeted. We found some differences among youth ( $\leq 18$  years old), younger adults (19-25 years old), and older adults ( $\geq 26$  years old), with respect to change in participation ( $X^2 = 16.124$ ,  $df = 4$ ,  $p = 0.003$ ; Table 7). Although in all age groups much higher percentages indicated that they could now participate with opening day on Saturday than said they could no longer participate on opening day, nine times as many young adults said they now can participate as said they no longer can participate. Overall, higher percentages of youth and young adults than older adults said they now can participate.

**Table 7. Influence of changing opening day of the Southern Zone regular firearms season in NY from a Monday to a Saturday on hunters' ability to hunt on opening day, by age-class of hunters, from a mail survey conducted in 2007.**

<u>Influence on participation</u>	Youth <18 years n = 58	Young adults 19-25 years n = 63	Older adults ≥26 years n = 1,532
Could hunt opening day when it was Monday, now cannot since it is Saturday	12 <sup>a</sup>	3	7
Ability to participate unchanged by moving opening day to Saturday	55	70	76
Could not hunt opening day when it was Monday, now can since it is Saturday	32	27	17

<sup>a</sup>Numbers in table are percentages of respondents by age class who gave that particular response.

We found no differences among age groups with respect to whether the change in opening day influenced hunting satisfaction ( $X^2 = 8.063$ ,  $df = 4$ ,  $p = 0.089$ ; Table 8). Between 46-61% in each age class said their satisfaction had not changed. In all age classes a higher percentage indicated that their satisfaction had increased than said it had decreased.

**Table 8. Influence of changing opening day of the Southern Zone regular firearms season in NY from a Monday to a Saturday on hunting satisfaction, by age-class of hunters, from a mail survey conducted in 2007.**

<u>Influence on satisfaction</u>	Youth <18 years	Young adults 19-25 years old	Older adults ≥26 years old
Increased	31 <sup>a</sup>	33	24
No effect	50	46	61
Decreased	19	21	16

<sup>a</sup>Numbers in table are percentages of respondents by age class who gave that particular response.

### **Preparing for the Hunting Season:**

Statewide, respondents reported an average total of 39.7 hours getting ready for the 2006 deer hunting season. We found no differences in the average number of hours reported among the four geographic strata (either in aggregate, or when we examined six specific ways of preparing for the season). Most of hunters' preparation was spent scouting (13.2 hours) and practicing with their hunting implement (12.7 hours). The least amount of time was spent seeking permission to hunt private land (1.5 hours) and buying new equipment (2.7 hours). Intermediate amounts of time were spent planning hunts by consulting maps, magazines, or websites (4.6 hours), and gathering together, sorting, and cleaning equipment (5.1 hours).

About 7% of respondents statewide reported spending no time at all preparing for the hunting season. One-quarter (24.2%) reported spending 1-5 hours in some kind of preparation. Another one-quarter (24.9%) reported spending more than 46 total hours in preparation.

### **Application and Use of DMPs:**

Despite substantial differences in the availability of DMPs within the state, especially between the Northern Zone and Southern Zone, we found great consistency in application for, and use of, DMPs among hunters in the various geographic zones. Indeed, the mean number applied for, received, and filled per hunter was nearly identical for hunters in the Northern, Southeastern, and NYC-LI strata (Table 9). Respondents from the Central-western stratum applied for and used more DMPs than hunters in the other parts of the state. Further, a smaller proportion of hunters from Central-Western NY applied for no DMPs, and a higher proportion applied for two DMPs, compared to hunters from other strata ( $X^2 = 1, 011$ ,  $df = 6$ ,  $p < 0.001$ ).

Assuming that each hunter could apply for a maximum of two DMPs to use somewhere in the state, Central-Western hunters had the highest application rate. Those hunters applied for about three-quarters (76%) of the possible DMPs for which they could have applied, compared with slightly over one-half (53-58%) of possible DMPs by hunters in the other strata. Overall, hunters from Southeastern and NYC-LI strata were less likely to fill DMPs they had received (i.e., 25-27%), compared to hunters from Northern and Central-Western strata (31-32%).

### **Participation During the Hunting Season:**

Purchasing a license vs. going hunting. Statewide, 7.5% of licensed deer hunters did not hunt during the 2006 hunting season. This proportion of non-hunting license holders differed by strata ( $X^2 = 12.654$ ,  $df = 3$ ,  $p = 0.005$ ). Nearly twice the percentage of license holders from the NYC-LI stratum (12.6%) as the Central-Western stratum (6.1%) did not hunt during any of the 2006 deer hunting seasons. As expected, decreasing interest in deer hunting over the last five years negatively affected hunting participation by hunters living in all parts of state (Table 10). However, the effect was particularly strong in the Southeastern and NYC-LI strata, where 24% and 33% of respondents with decreasing interest, respectively, did not hunt for deer in 2006.

**Table 9. Number of deer management permits (DMPs) applied for, received, and filled during the 2006 hunting season by deer hunters living in different geographic strata of New York State, from a mail survey conducted in 2007.**

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Variable	Area							
	Cent-West		Northern		Southeastern		NYC-LI	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Number DMPs applied for/hunter	1.5	0.04	1.1	0.05	1.1	0.04	1.1	0.04
n, % applied for 0	56	15.1	107	31.8	157	30.3	133	29.4
n, % applied for 2	252	68.1	143	42.6	237	45.7	161	35.6
Percent of all possible DMPs these hunters applied for	76%		55%		58%		53%	
Number DMPs received/hunter	1.1	0.04	0.6	0.04	0.7	0.03	0.7	0.03
Number DMPs filled/hunter	0.4	0.03	0.2	0.02	0.2	0.02	0.2	0.02
Percent of received DMPs filled	31%		32%		27%		25%	

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**Table 10. Comparison of change in interest in deer hunting over the last five years with whether license holders actually hunted deer during the 2006 hunting season in New York, from a mail survey conducted in 2007.**

Variable	Area							
	Cent-West		Northern		Southeastern		NYC-LI	
Change in interest over last 5 years	Hunted in 06-07							
	No	Yes	No	Yes	No	Yes	No	Yes
	n	%	n	%	n	%	n	%
Less interest	14	17.1	11	17.2	33	24.5	27	35.5
No change	6	3.0	11	5.4	11	3.8	21	7.7
More interest	4	3.5	4	5.0	4	4.1	11	8.9
	192	97.0	191	94.6	277	96.2	252	92.3
	110	96.5	76	95.0	117	95.9	113	91.1

When had non-hunting license buyers last hunted deer? Of the 7.5% of license holders who did not hunt deer during 2006, 63% had hunted deer within the previous three years (i.e., since 2003). An additional 15.4% had hunted between 2000 and 2002, 16.7% during the 1990s, 2.6% during the 1980s, and 1.3% during the 1970s or 1960s. Many reasons may exist for nonparticipation by those who hunted most recently during 2003-05, and many of those respondents may be sporadic participants. Those who have not hunted since 2002 probably can safely be considered permanent dropouts in terms of their participation afield.

Primary WMU for hunting deer. Most respondents (70.3%) indicated a wildlife management unit (WMU) that they considered their primary place to hunt. However, 23.8% of respondents did not answer the question, and 5.8% responded with letters or numbers that did not correspond to a known WMU. The existence of this last group raises the issue of whether some hunters know the WMU in which they hunt.

Among those indicating a primary WMU for hunting, about two-thirds of hunters from the Northern (62.1%), Central-Western (63.0%), and Southeastern (67.6%) strata reported that they lived in that WMU. Not surprisingly, only one-quarter (25.0%) of respondents living in the NYC-LI stratum reported living in their primary WMU for deer hunting. Even if hunters did not live in the WMU they reported as their primary place to hunt, most still hunted relatively close to home. Only 4% of hunters living in the Central-Western NY and 6% from Southeastern NY reported that their primary WMU was outside their home geographic region. Slightly more hunters living in Northern NY said their primary WMU was outside their home geographic area, with 12% hunting primarily in Southeastern NY and 7% in Central-Western NY. For hunters living in the NYC-LI area, 73% said their primary WMU was in Southeastern NY, 18% said it was on Long Island, and 7% said it was in Central-Western NY.

Days of effort. Overall, 84.7% of deer hunters participated for  $\geq 1$  day during either the Northern Zone or Southern Zone regular firearms season. More than one-third (39.7%) of all hunters participated in  $\geq 1$  of the several archery seasons, and only slightly fewer (35.1%) participated in  $\geq 1$  of the muzzleloader seasons. On average, bowhunters in the Northern Zone spent about five fewer days afield than bowhunters in the Southern Zone (6.8 days v. 11.4 days; Table 11). Conversely, firearms hunters spent more days afield on average in the Northern Zone (12.3 days) than in the Southern Zone (9.6 days). Muzzleloader hunters spent about three to four days afield on average regardless of which Zone or season (early vs. late in the NZ). All seasons combined, deer hunters spent an average of 18.8 days afield hunting for deer during the 2006 seasons.

Hunters participating in the limited-geographic archery seasons (i.e., Westchester, Suffolk County) hunted just slightly more days on average than bowhunters in the broader Southern Zone (12-15 days vs. 11 days) despite much longer seasons providing many more days of opportunity. Hunters participating in the Suffolk County shotgun season hunted substantially fewer days than firearms hunters participating in the Southern Zone regular firearms season (4 vs. 10) of comparable length. Interestingly, more respondents (4.3% of the total) hunted in the Region 3 pilot stratum with antler restrictions (i.e., WMUs 3C, 3J, 3H, 3K) than hunted in Westchester County archery season and Suffolk County archery and firearms seasons combined (3.9% of all respondents).

**Table 11. Mean number of days hunted and distribution of hunting effort among the 2006 deer-hunting seasons in New York State, from a mail survey conducted in 2007.**

2006 deer-hunting season	length (in days)	<sup>a</sup>		Percent of respondents hunting this season	Distribution of effort within each season			
		days hunted (S.E.)	Mean		% of hunters participating in this season who hunted...			
					1-7 days	8-14 days	15-21 days	22+ days
Days hunted in NZ								
Early muzzle	7	3.6	0.1	22.8	100.0	NA	NA	NA
Archery	24	6.8	0.5	11.5	67.6	17.3	15.1	NA
Rifle	44	12.3	0.5	37.7	39.8	24.9	19.1	15.1
Season muzzle	7	2.9	0.2	10.0	100.0	NA	NA	NA
Days hunted in SZ								
Early arch	34	11.4	0.3	47.1	38.0	31.2	20.4	10.4
Reg gun	22	9.6	0.2	85.1	41.3	37.1	16.9	4.7
Muzzle	9	3.8	0.1	35.6	88.9	11.1	NA	NA
Late arch	9	2.8	0.2	10.4	93.0	7.0	NA	NA
Suffolk archery	92	14.6	3.2	2.6	45.7	20.5	11.3	22.5
Suffolk gun	24	4.0	0.9	1.5	83.5	12.8	3.7	NA
Westchester bow	78	11.8	3.7	1.0	29.8	33.4	30.5	6.3
3C, 3J, 3H, or 3K (archery, reg gun, muzzle)	71	10.8	1.4	4.3	48.9	19.7	19.5	11.6
All seasons combined	NA	18.8	0.4		23.8	25.2	15.5	35.5

<sup>a</sup>Means are for those hunters who participated in that season (i.e., 0s were eliminated).

Hours of effort on opening day vs. others days. We also examined hours of effort by aggregating hunters by the seasons in which they participated, rather than by geographic strata because hunters can hunt anywhere in the state and can participate in more than one of the various deer-hunting seasons. On average, hunters spent more hours afield on opening day during the regular firearms season in both the Northern Zone and Southern Zone than on opening days of either early archery or late muzzleloader seasons in those Zones (Table 12). Also, hunters participating in the Southern Zone seasons spent about one hour longer hunting per day on opening day than hunters participating in the same seasons in the Northern Zone. Similar patterns were reported by hunters for days other than opening day in the various seasons. Finally, although the vast majority (i.e., >74%) of hunters participating in any of the six deer seasons we examined hunted on opening day, relatively few (<13%) hunted *only* on opening day.

**Table 12. Hours of effort by deer hunters in New York State participating in the various 2006 deer-hunting seasons, from a mail survey conducted in 2007.**

<u>Deer-hunting season in NY</u>	<u>Total hours hunted on opening day</u>		<u>Percent hunting this season who hunted on opening day</u>	<u>Percent who hunted only on opening day</u>	<u>Average hours hunted on other days during season</u>	
	<u>Mean</u>	<u>SE</u>			<u>Mean</u>	<u>SE</u>
NZ bow	4.3	0.3	74.1	12.8	4.5	0.3
NZ rifle	5.3	0.2	82.0	6.0	5.3	0.2
NZ late muzzle	4.8	0.2	84.9	11.8	4.6	0.2
SZ bow	5.4	0.1	80.1	6.6	5.1	0.1
SZ gun	6.9	0.1	92.9	5.0	5.7	0.1
SZ muzzle	5.3	0.2	83.0	8.0	5.0	1.0

Hunting styles. We analyzed hunters' experiences in the field based on the geographic stratum of the state containing the WMU that is their primary place to hunt, rather than the geographic stratum where they live. This aggregation of respondents provides sufficient sample sizes to compare hunters in all three up-state strata (Central-Western, Northern, and Southeastern). However, we cannot confidently report findings about the hunting styles used by hunters whose primary hunting WMU is on Long Island because of low numbers of respondents using that stratum as their primary hunting location.

Respondents in each of the three up-state strata spent most of their time afield hunting from a stationary stand like a ground blind or tree stand (Table 13, top), although hunters in Northern NY spent less of their time on-stand than hunters in Central-Western or Southeastern NY. Hunters in all parts of the state spent about one-quarter of their hunting time stalking deer. In all strata, hunters spent the least amount of their time participating in deer drives although hunters in Northern NY spent more time driving than hunters in the other two strata.

We categorized each respondent as primarily using a stand, primarily driving deer, or primarily stalking deer if they spent >50% of their time using a single style. Otherwise, we categorized them as a style generalist. One-half or more of hunters in all parts of the state were primarily stand hunters (Table 13, bottom). Style generalists were the second most prevalent group in all strata. However, hunters in Northern NY differed from the other strata of the state in that fewer of them hunted from a stationary stand, and more of them used deer drives and were categorized as style generalists compared with hunters elsewhere.

**Table 13. Average percent of time spent deer hunting using various hunting styles during the 2006 hunting season by respondents hunting in different geographic strata of New York State, and percent of hunters in those strata who spent more than half their time using a particular hunting style, from a mail survey conducted in 2007.**

Hunting style <sup>a</sup>	Stratum where primary WMU for hunting is located						F	p
	Cent-West		Northern		Southeastern			
Percent of time...	Mean	SE	Mean	SE	Mean	SE		
...hunting from a stationary stand	62.9A	1.3	56.0B	2.2	65.1A	1.8	5.260	0.005
...participating in a deer drive	11.5A	0.7	17.2B	1.7	8.2A	0.9	13.653	<0.001
...stalking deer	26.8A	1.1	25.8A	1.8	26.7A	1.6	0.171	0.843

<sup>a</sup>For hunting styles, means sharing a letter do not differ ( $p > 0.05$ ).

Categories of deer hunting styles	Stratum where primary WMU for hunting is located		
	Cent-West	Northern	Southeastern
Primarily...	% of hunters	% of hunters	% of hunters
...use a stand	62.5	52.6	64.3
...drive deer	3.7	8.6	2.6
...stalk deer	12.4	12.4	13.2
...are generalists	19.2	26.3	19.9

Percentages differ among strata  $X^2 = 19.674$ ,  $df = 6$ ,  $p = 0.003$

Types of properties used for deer hunting. Respondents hunting in each up-state stratum spent most time hunting on private property where they did not have to pay (Table 14, top). However, hunters in Northern NY spent less time, and hunters in Central-Western NY spent more time, on private land for free than hunters in Southeastern NY. Hunters in Central-Western NY also spent the greatest proportion of time hunting on property where they had to pay a fee (e.g., lease, or hunt club), with hunters in Southeastern NY also spending more of their time on this type of property compared to hunters in Central-Western NY.

We categorized hunters by the type of property they hunted if they >50% of their time using that type. Otherwise, we called them generalists. A majority of hunters in all strata primarily used private land for free (Table 14, bottom). Hunters from Northern NY were the most variable as a group, with >12% in each of the categories. Hunters from Central-Western NY were the least variable, with >80% being categorized as primarily using private land for free.

**Table 14. Average percent of time spent deer hunting on various types of properties during the 2006 hunting season by respondents hunting in different geographic strata of New York State, and percent of hunters who spent more than half their time on one type of property, from a mail survey conducted in 2007.**

Type of property used for hunting <sup>a</sup>	Stratum where primary WMU for hunting is located						F	p
	Cent-West		Northern		Southeastern			
Percent of time...	Mean	SE	Mean	SE	Mean	SE		
...use public land	13.8A	1.1	22.2B	2.3	16.6AB	1.7	6.288	0.002
...use private land for free	81.5C	1.3	61.8A	2.8	73.8B	2.1	25.139	<0.001
...use land where hunter had to pay	4.0A	0.7	15.3C	2.2	9.3B	1.5	20.982	<0.001

<sup>a</sup>For types of property, means sharing a letter do not differ ( $p > 0.05$ ).

Primarily...	Stratum		
	Cent-West	Northern	Southeastern
	% of hunters	% of hunters	% of hunters
...hunt public land	10.5	15.7	12.5
...hunt private land for free	82.1	58.1	72.4
...pay a fee to hunt	2.9	13.8	8.3
...are generalists	4.5	12.4	6.7

Percentages differ by stratum  $X^2 = 63.979$ ,  $df = 6$ ,  $p < 0.001$

## Experiences with Deer During the Hunting Season:

Perceptions of deer sex ratio. On average, respondents hunting in Central-Western NY perceived a deer sex ratio with more antlered bucks and fewer antlerless deer than other respondents (Table 15, top). However, the magnitude of the difference was not great, and the vast majority (90-95%) of respondents hunting in each of the up-state strata believed the deer population in the WMU they primarily hunted was skewed toward antlerless deer (i.e., >60% antlerless deer). Indeed, we found no geographic difference in hunters' perceptions of whether the deer population in their primary WMU was skewed to antlerless deer, toward antlered bucks, or about equal (Table 15, bottom).

**Table 15. Sex ratio of the deer population, before the 2006 hunting season, perceived by respondents hunting deer in different geographic strata in New York State, and proportion of hunters by stratum who perceived the deer sex ratio to be skewed (>60% antlerless deer or antlered bucks), from a mail survey conducted in 2007).**

Percent of deer that were this type <sup>a</sup>	<u>Stratum where primary WMU for hunting is located</u>						F	p
	Cent-West		Northern		Southeastern			
	Mean	SE	Mean	SE	Mean	SE		
Antlerless deer	75.6A	0.8	80.6B	1.4	79.9B	1.1	7.859	<0.001
Antlered bucks	24.3A	0.8	19.3B	1.4	20.1B	1.1	7.859	<0.001

<sup>a</sup>For types of deer, means sharing a letter do not differ ( $p > 0.05$ ).

Overall perception of deer sex ratio	<u>Stratum where primary WMU for hunting is located</u>		
	Cent-West	Northern	Southeastern
	<u>% of hunters</u>	<u>% of hunters</u>	<u>% of hunters</u>
Skewed <sup>b</sup> toward antlerless deer	89.6	94.6	91.8
Sex ratio about equal	5.0	1.6	4.9
Skewed toward antlered bucks	5.5	3.8	3.4

Percentages do not differ by stratum  $X^2 = 6.272$ ,  $df = 4$ ,  $p = 0.180$

<sup>b</sup>Skewed means that hunters perceived  $\geq 60\%$  of the population to be of this type of deer.

Perceptions of buck age ratio. We found no geographic differences with respect to hunters' perceptions of the buck age ratio where they hunt (Table 16, top). Respondents hunting in each of the three up-state strata reported that slightly more than two-thirds (69%) of all antlered bucks in their primary place to hunt were younger bucks with smaller antlers, and slightly fewer than one-third (30%) were older, more mature bucks with larger antlers. Further, we found no geographic difference in the proportion of respondent who believed that the buck population was skewed toward younger bucks, toward older bucks, or about equal (Table 16, bottom).

**Table 16. Buck age ratio of the deer population, before the 2006 hunting season, perceived by respondents hunting deer in different geographic strata in New York State, and proportion of hunters by stratum who perceived the buck age ratio to be skewed (>60% younger bucks with small antlers or older bucks with larger antlers), from a mail survey conducted in 2007).**

Percent of deer that were this type <sup>a</sup>	<u>Stratum where primary WMU for hunting is located</u>						<u>F</u>	<u>p</u>
	<u>Cent-West</u>		<u>Northern</u>		<u>Southeastern</u>			
	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>		
Younger bucks with smaller antler	69.0A	1.0	68.8A	2.0	68.8A	1.8	0.007	0.993
Older bucks with larger antler	29.7A	1.0	30.0A	1.9	30.4A	1.7	0.064	0.938

<sup>a</sup>For types of deer, means sharing a letter do not differ ( $p > 0.05$ ).

Overall perception of buck age ratio	<u>Stratum where primary WMU for hunting is located</u>		
	<u>Cent-West</u>	<u>Northern</u>	<u>Southeastern</u>
	<u>% of hunters</u>	<u>% of hunters</u>	<u>% of hunters</u>
Skewed <sup>b</sup> toward younger bucks	76.1	71.9	74.7
Age ratio about equal	13.7	16.9	10.5
Skewed toward older bucks	10.2	11.2	14.8

Percentages do not differ by stratum  $X^2 = 6.172$ ,  $df = 4$ ,  $p = 0.187$

<sup>b</sup>Skewed means that hunters perceived  $\geq 60\%$  of the population to be of this type of deer.

Total deer seen, shot at, and harvested. Respondents who hunted deer in various parts of New York during the respective regular firearms seasons reported seeing approximately the same total number of deer per day while hunting ( $F = 1.383$ ,  $p = 0.251$ ). However, respondents hunting in the different strata reported differences in terms of whether they harvested a deer ( $X^2 = 16.375$ ,  $df = 2$ ,  $p < 0.001$ ) during the 2006 regular firearms season. Slightly more than one-half of respondents hunting in either Northern NY (52%) or Central-Western NY (53.1%) reported harvesting at least one deer. However, only 39% of respondents hunting in Southeastern NY harvested a deer during the regular firearms season. The difference between harvest of deer by hunters in the Southeastern stratum compared to Central-Western and Northern NY was in take of antlerless deer ( $X^2 = 20.160$ ,  $df = 2$ ,  $p < 0.001$ ). We found no geographic differences in whether hunters took an antlered buck ( $X^2 = 3.819$ ,  $df = 2$ ,  $p = 0.148$ ), a younger buck with smaller antlers ( $X^2 = 3.782$ ,  $df = 2$ ,  $p = 0.151$ ), or an older buck with larger antlers ( $X^2 = 0.209$ ,  $df = 2$ ,  $p = 0.901$ ).

The main reason for lower harvest of antlerless deer in Southeastern NY was less willingness to shoot an antlerless deer (Table 17) when they have a chance to do so (i.e., have a tag, deer is in-range, have a clear shot). Indeed, hunters across the state saw about the same number of antlerless deer per day of hunting. About the same proportion of those deer were vulnerable to the hunters, regardless of strata. Respondents statewide demonstrated relatively low willingness to shoot at an antlerless deer that was vulnerable, but respondents hunting in Southeastern NY were willing to shoot at only about 8% of vulnerable antlerless deer.

On the other hand, respondents hunting in the different strata reported a similar degree of willingness to shoot at young bucks with smaller antlers. However, such bucks were less vulnerable to harvest in Central-Western NY compared to either Northern or Southeastern NY (Table 18). Respondents hunting in each stratum reported about the same vulnerability of older bucks with larger antlers and about the same willingness to shoot at those deer (Table 19). Overall, younger bucks were reported by hunters statewide as the most vulnerable type of deer, followed by antlerless deer, and finally older bucks. Hunters statewide expressed the greatest willingness to shoot at older bucks, followed by younger bucks, and finally antlerless deer.



**Table 17. Numbers of antlerless deer that were observed, perceived as potential targets, shot at, and harvested by deer hunters hunting in various parts of the state during the 2006 regular firearms deer season in New York, from a mail survey conducted in 2007.**

Hunter actions by age and sex of deer	Stratum where primary WMU for hunting is located								
	Cent-West		Northern		Southeastern		F	p	
	Mean	SE	Mean	SE	Mean	SE			
<b>Antlerless deer</b>									
<b># seen per day while hunting</b>	2.38A <sup>a</sup>	0.11	2.01A	0.23	2.67A	0.38	1.426	0.241	
<b>% vulnerable</b> (of seen, % that could have been shot at; hunter had tag, in-range)	40.5A	1.4	45.9A	2.8	43.7A	2.3	1.835	0.160	
<b>index to willingness to shoot</b> (of vulnerable, % that were shot at)	19.5B	1.4	12.1AB	2.2	7.8A	1.5	13.434	<0.001	
<b>index to shooting effectiveness</b> (of those shot at, % harvested)	55.9A	2.6	66.7A	5.3	67.2A	5.5	2.760	0.064	
<b>index to shooting efficiency</b> (total shots taken per antlerless deer harvested)	1.58B	0.09	1.27AB	0.12	1.13A	0.13	4.555	0.011	
<b># harvested</b>	0.46B	0.03	0.33AB	0.03	0.23A	0.03	11.991	<0.001	
% harvested 0	67.2		72.1		81.6				
% harvested 1	22.8		22.8		14.6				
% harvested 2	7.4		5.2		3.4				
% harvested 3	2.1		0.0		0.3				
% harvested 4	0.0		0.0		0.1				
% harvested 5	0.4		0.0		0.0				

<sup>a</sup>Means followed by the same capital letter did not differ at p = 0.05.

**Table 18. Numbers of younger bucks with smaller antlers that were observed, perceived as potential targets, shot at, and harvested by deer hunters hunting in various parts of the state during the 2006 regular firearms deer season in New York, from a mail survey conducted in 2007.**

Hunter actions by age and sex of deer	<u>Stratum where primary WMU for hunting is located</u>							
	Cent-West		Northern		Southeastern		F	p
	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>		
<b>Younger bucks with smaller antlers # seen per day while hunting</b>	0.4A	0.02	0.3A	0.04	0.4A	0.09	1.309	0.271
<b>% vulnerable</b> (of seen, % that could have been shot at; hunter had tag, in-range)	48.4A	1.8	64.5B	3.4	60.5B	3.0	11.518	<0.001
<b>index to willingness to shoot</b> (of vulnerable, % that were shot at)	27.4A	2.2	27.8A	3.9	21.4A	3.1	1.334	0.264
<b>index to shooting effectiveness</b> (of those shot at, % harvested)	51.5A	3.8	62.9A	6.0	69.8A	5.7	3.802	0.023
<b>index to shooting efficiency</b> (total shots taken per antlerless deer harvested)	1.23A	0.09	1.26A	0.12	1.18A	0.13	0.187	0.898
<b># harvested</b>	0.18A	0.02	0.26A	0.04	0.18A	0.02	2.761	0.064
% harvested 0	82.9		77.0		82.9			
% harvested 1	17.1		23.0		17.1			

<sup>a</sup>Means followed by the same capital letter did not differ at p = 0.05.

**Table 19. Numbers of older bucks with larger antlers that were observed, perceived as potential targets, shot at, and harvested by deer hunters hunting in various parts of the state during the 2006 regular firearms deer season in New York, from a mail survey conducted in 2007.**

Hunter actions by age and sex of deer	<u>Stratum where primary WMU for hunting is located</u>							
	Cent-West		Northern		Southeastern		F	p
	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>		
<b>Older bucks with larger antlers # seen per day while hunting</b>	0.2A	0.01	0.2A	0.03	0.1A	0.02	2.280	0.103
<b>% vulnerable</b> (of seen, % that could have been shot at; hunter had tag, in-range)	30.2A	2.1	39.1A	4.8	33.7A	3.6	1.827	0.162
<b>index to willingness to shoot</b> (of vulnerable, % that were shot at)	56.5A	3.3	63.8A	6.6	51.4A	5.7	0.993	0.372
<b>index to shooting effectiveness</b> (of those shot at, (% harvested)	50.6A	3.7	57.8A	6.3	55.3A	6.0	0.528	0.591
<b>index to shooting efficiency</b> (total shots taken per antlerless deer harvested	1.35A	0.09	1.59A	0.21	1.12A	0.13	2.362	0.097
<b># harvested</b>	0.17A	0.02	0.19A	0.03	0.16A	0.02	0.334	0.716
% harvested 0	83.9		81.6		85.2			
% harvested 1	16.1		18.4		14.8			

<sup>a</sup>Means followed by the same capital letter did not differ at p = 0.05.

## Influence of Hunting Experiences on Overall Deer-hunting Satisfaction:

Importance of potential positive aspects. The most important influence on overall deer-hunting satisfaction statewide was whether hunters saw healthy deer while they are hunting (Table 20). The vast majority of respondents (>90%) hunting in any stratum reported that “seeing healthy deer” was “very important.” Also “very important” for a majority of respondents (>53%) in all strata were: (1) “freedom of choice to shoot the buck of my preference,” (2) “having a natural mix of bucks and does” (i.e., sex ratio), (3) “seeing antlered bucks of any age while hunting,” and (4) “seeing older bucks with larger antlers.”

These four aspects were important to a majority of hunters in all strata, but some were “very important” to a higher percentage of hunters in some strata than in other. For example, freedom of choice to shoot the buck of their preference was “very important” to more hunters in Central-Western and Northern NY than in Southeastern NY. Seeing antlered bucks of any age was “very important” to more hunters in Northern NY than in either of the other strata.

Being considered as a “good” or “expert” deer hunter or a “good” or “expert” buck hunter was “very important” to a smaller proportion of respondents. However, a substantial proportion of hunters (42-45%) in each stratum said being considered a “good” deer hunter was “very important.” Smaller percentages of hunters in each stratum indicated it was “very important” to be considered a “good” buck hunter.

**Table 20. Mean importance of several, potential, positive aspects on overall deer-hunting satisfaction for respondents hunting deer in different geographic strata of New York State during the 2006 hunting season, from a mail survey conducted in 2007.**

	<u>Geographic stratum hunted</u>			<u>F</u>	<u>p</u>
	<u>Cent-West</u>	<u>Northern</u>	<u>Southeastern</u>		
<u>Potential positive influence on deer-hunting satisfaction</u>	<u>Mean<sup>a</sup></u> <u>SE</u>	<u>Mean</u> <u>SE</u>	<u>Mean</u> <u>SE</u>		
Seeing healthy deer	3.91A <sup>b</sup> 0.01	3.89A 0.02	3.89A 0.02	0.410	0.664
% not at all important	0.0%	0.5%	0.3%		
% very important	93.2%	90.5%	91.3%		
Freedom of choice to shoot the buck of my preference	3.46A 0.03	3.44AB 0.06	3.27B 0.05	5.260	0.005
% not at all important	2.9%	4.8%	6.8%		
% very important	63.5%	61.0%	55.0%		
Having a natural mix of bucks and does (sex ratio)	3.39A 0.03	3.51A 0.05	3.48A 0.04	2.828	0.060
% not at all important	2.3%	1.9%	1.6%		
% very important	53.9%	60.8%	59.9%		

Table 20. Continued.

	<u>Geographic stratum hunted</u>						<u>F</u>	<u>p</u>
	<u>Cent-West</u>		<u>Northern</u>		<u>Southeastern</u>			
<u>Potential positive influence on deer-hunting satisfaction</u>	<u>Mean<sup>a</sup></u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>		
Seeing antlered bucks of any age or size	3.34A	0.03	3.53B	0.05	3.42AB	0.04	4.604	0.010
% not at all important	3.7%		1.0%		2.6%			
% very important	53.4%		64.3%		55.0%			
Seeing older bucks with larger antlers	3.34A	0.03	3.33A	0.06	3.44A	0.05	1.701	0.183
% not at all important	3.7%		3.3%		3.8%			
% very important	52.9%		56.7%		60.9%			
Having a natural mix of older and younger bucks (buck age ratio)	3.22A	0.03	3.29A	0.06	3.34A	0.05	2.125	0.120
% not at all important	5.5%		3.3%		3.9%			
% very important	47.4%		51.2%		51.6%			
Being considered a “good” or “expert” deer hunter by others	2.88A	0.05	2.95A	0.08	2.90A	0.07	0.300	0.741
% not at all important	20.4%		17.1%		21.3%			
% very important	42.5%		42.9%		45.5%			
Being considered a “good” or “expert” buck hunter by others	2.44A	0.05	2.62B	0.08	2.65B	0.07	4.359	0.013
% not at all important	30.8 %		23.6%		25.2%			
% very important	24.5%		27.4%		33.7%			

<sup>a</sup>On scale from 1 = not at all important, 2 = slightly important, 3 = moderately important, and 4 = very important.

<sup>b</sup>Means followed by the same capital letter did not differ at p = 0.05.

Experienced level of potential positive aspects. A substantial proportion of respondents (i.e., >40%) hunting in any stratum indicated that various buck-hunting aspects of their experiences during the 2006 hunting season were “too low” for them to be satisfied (Table 21). Somewhat lower proportions of hunters in each stratum (28-41%) said the total number of deer (not just bucks) was “too low” for them to be satisfied. Relatively few respondents hunting in any stratum indicated that their various buck-hunting aspects of their experiences were “more than enough for me to be satisfied.”

We further examined level of satisfaction associated with hunters’ experiences by separately analyzing level of satisfaction for those who indicated that a particular aspect was “very important” versus those for whom it was of lesser importance. This analysis is based on the concept of Adaptive Impact Management (AIM) from which we developed the premise that hunters’ evaluations of their general satisfaction with buck-hunting opportunities will be related to the trade-offs among positive and negative impacts they associate with those opportunities (Riley et al. 2002, Enck et al. 2006). That is, if hunters perceive that positive impacts they associate with buck-hunting opportunities are above desirable levels and negative impacts are below intolerable levels, hunters will be satisfied with their buck-hunting opportunities. By definition (Riley et al. 2002), *impacts* are those positive effects of deer-related interactions (i.e., in this case, positive aspects of hunting) that are “very important” to hunters, and those negative effects (i.e., negative aspects) about which hunters are “very concerned.”

For each of the possible, positive aspects we examined, we developed two hypotheses:

H<sub>1</sub> – hunters’ experiences pertaining to an aspect of hunting will be similar regardless of how much importance hunters place on that aspect, and

H<sub>2</sub> – a higher proportion of hunters who say a given aspect of hunting is “very important” will be dissatisfied with their experiences relating to that aspect, compared to hunters who say that aspect is of lesser importance but who report similar levels of experiences.

H<sub>1</sub> and H<sub>2</sub> were supported for each of the six possible, positive aspects we examined (see Table 21). For example, within each of the three geographic strata of the state, hunters reported seeing similar (i.e., not significantly different) numbers of antlered bucks (from about 4 to 6, depending on the area), regardless of how important it was for them to see antlered bucks while they hunted. This supports H<sub>1</sub> because experiences were similar (i.e., on average hunters saw the same number of antlered bucks) regardless of how much importance hunters placed on seeing antlered bucks. However, within each area, the proportion of hunters who said the number of antlered bucks they saw was “too low” for them to be satisfied was higher than the proportion giving this response among hunters who said seeing bucks was of lesser importance. This supports H<sub>2</sub>. We found similar relationships for each of the positive aspects we examined.

**Table 21. Whether each of six, possible, positive aspects of hunting were too low, minimally high enough, or more than high enough for respondents hunting deer in different geographic strata of New York State, and comparing those who indicated that an aspect was “very important” or of lesser importance, from a mail survey conducted in 2007.**

	Stratum where primary WMU for hunting is located					
	Central-Western		Northern		Southeastern	
	Importance of aspect		Importance of aspect		Importance of aspect	
Possible positive influence on hunting satisfaction	<“Very” %	”Very” %	<“Very” %	”Very” %	<“Very” %	”Very” %
<b>Total number of bucks seen</b>						
Mean # bucks seen	<b>5.8 vs. 5.8</b>		<b>4.9 vs. 4.4</b>		<b>3.8 vs. 4.1</b>	
	t = 0.105		t = 0.513		t = 0.719	
	p = 0.917		p = 0.608		p = 0.720	
% Too low to be satisfied	<b>44.8</b>	<b>64.7</b>	<b>51.3</b>	<b>66.7</b>	<b>57.7</b>	<b>69.9</b>
% At minimum level for me to be satisfied	38.0	25.7	34.2	22.0	26.3	21.1
% More than enough for me to be satisfied	17.2	9.6	14.5	11.4	16.1	9.0
	$X^2 = 26.108$		$X^2 = 4.968$		$X^2 = 5.635$	
	p < 0.001		p = 0.083		p = 0.060	
<b>Number of older bucks seen</b>						
Mean # older bucks seen	<b>1.6 vs. 1.5</b>		<b>1.0 vs. 1.2</b>		<b>1.1 vs. 1.1</b>	
	t = 1.104		t = -0.897		t = -0.157	
	p = 0.270		p = 0.371		p = 0.875	
% Too low to be satisfied	<b>62.6</b>	<b>79.3</b>	<b>66.3</b>	<b>83.9</b>	<b>74.8</b>	<b>84.5</b>
% At minimum level for me to be satisfied	24.5	17.8	23.6	10.2	13.0	10.5
% More than enough for me to be satisfied	12.9	2.9	10.1	5.9	12.2	5.0
	$X^2 = 30.638$		$X^2 = 8.944$		$X^2 = 5.918$	
	p < 0.001		p = 0.011		p = 0.052	

Table 21. Continued.

	Stratum where primary WMU for hunting is located					
	Central-Western		Northern		Southeastern	
	Importance of aspect		Importance of aspect		Importance of aspect	
Possible positive influence on hunting satisfaction	<"Very" %	"Very" %	<"Very" %	"Very" %	<"Very" %	"Very" %
<b>Natural mix of older and younger bucks (buck age ratio)</b>						
% older bucks in buck pop.	<b>31.3</b>	vs. <b>28.1</b>	<b>32.7</b>	vs. <b>27.6</b>	<b>32.9</b>	vs. <b>27.2</b>
	t = 1.605		t = 1.305		t = 1.633	
	p = 0.109		p = 0.194		p = 0.104	
% Too low to be satisfied	<b>53.6</b>	<b>71.3</b>	<b>56.1</b>	<b>78.7</b>	<b>66.9</b>	<b>79.7</b>
% At minimum level for me to be satisfied	34.4	22.7	36.7	13.9	24.6	15.0
% More than enough for me to be satisfied	12.1	6.0	7.1	7.4	8.5	5.2
	$X^2 = 21.590$		$X^2 = 14.691$		$X^2 = 6.241$	
	p < 0.001		p = 0.001		p = 0.044	
<b>Natural mix of antlered bucks and antlerless deer (sex ratio)</b>						
% antlered bucks in deer pop.	<b>25.4</b>	vs. <b>23.7</b>	<b>19.6</b>	vs. <b>19.4</b>	<b>21.5</b>	vs. <b>18.9</b>
	t = 1.044		t = 0.066		t = 1.163	
	p = 0.297		p = 0.947		p = 0.246	
% Too low to be satisfied	<b>38.3</b>	<b>55.8</b>	<b>50.6</b>	<b>63.2</b>	<b>53.8</b>	<b>67.8</b>
% At minimum level for me to be satisfied	49.6	34.9	39.5	28.8	35.0	24.3
% More than enough for me to be satisfied	12.1	9.3	9.9	8.0	11.1	7.9
	$X^2 = 19.167$		$X^2 = 3.241$		$X^2 = 5.837$	
	p < 0.001		p = 0.198		p = 0.054	

Table 21. Continued.

	Stratum where primary WMU for hunting is located					
	Central-Western		Northern		Southeastern	
	Importance of aspect		Importance of aspect		Importance of aspect	
Possible positive influence on hunting satisfaction	<“Very” %	”Very” %	<“Very” %	”Very” %	<“Very” %	”Very” %
<b>Freedom of choice to shoot buck of my preference</b>						
(willingness to shoot a young buck [of vulnerable young bucks, % shot at])	<b>31%</b>	vs. <b>26%</b>	<b>28%</b>	vs. <b>27%</b>	<b>20%</b>	vs. <b>23%</b>
	t = 1.109		t = 0.094		t = -0.453	
	p = 0.269		p = 0.926		p = 0.651	
(willingness to shoot an older buck [of vulnerable older bucks, % shot at])	<b>57%</b>	vs. <b>56%</b>	<b>80%</b>	vs. <b>56%</b>	<b>52%</b>	vs. <b>48%</b>
	t = 0.105		t = 1.764		t = 0.339	
	p = 0.916		p = 0.085		p = 0.736	
% Too low to be satisfied	<b>55.7</b>	<b>47.1</b>	<b>46.8</b>	<b>62.2</b>	<b>53.7</b>	<b>61.6</b>
% At minimum level for me to be satisfied	28.1	27.8	35.1	15.0	33.1	18.9
% More than enough for me to be satisfied	16.2	25.1	18.2	22.8	13.2	19.5
	$X^2 = 7.322$		$X^2 = 11.115$		$X^2 = 8.465$	
	p = 0.026		p = 0.004		p = 0.015	
<b>Total number deer seen<sup>a</sup></b>						
Mean # deer seen in season	<b>30.7</b>		<b>28.6</b>		<b>24.1</b>	
Difference in means among strata		F = 2.496		p = 0.083		
% Too low to be satisfied	<b>35.0</b>		<b>28.2</b>		<b>41.5</b>	
% At minimum level for me to be satisfied	40.7		46.5		32.3	
% More than enough for me to be satisfied	24.2		25.4		26.3	
Difference in satisfaction among strata		$X^2 = 13.837$		p = 0.008		

<sup>a</sup>We did not ask about the importance of the total number of deer seen. Therefore, we cannot determine whether their assessment of satisfaction differed in relation to importance.

Concern about potential negative aspects. Overall, respondents placed less concern (i.e., importance) on the possible, negative aspects of hunting (Table 22), compared to the importance they placed on the possible positive aspects we examined (refer to Table 20). Statewide, one-third to one-half of the hunters identified three negative aspects about which they were “very concerned”: (1) “seeing that some sub-legal bucks have been shot by mistake,” (2) “fear of being shot by people who shoot unsafely at deer,” and (3) “feeling crowded by too many hunters.” We found no differences among strata in the amount of concern hunters indicated for these three aspects.

Fewer hunters statewide said they were “very concerned” about (1) “feeling a sense of urgency to shoot the first legal buck I see,” and (2) “having difficulty figuring out if a buck I see is legal.” However, more respondents hunting in Southeastern NY said they were “very concerned” about figuring out if a buck they see is legal to harvest. Given that only a small number of respondents who hunted deer in the Southeastern stratum hunted in one of the WMUs with pilot antler restrictions (3C, 3J, 3H, 3K), we do not attribute the higher concern about figuring out if a buck is legal to the pilot antler restrictions in those WMUs.

Experienced level of potential negative aspects. We found large differences statewide in the proportion of respondents who indicated that various negative aspects of their buck-hunting experiences during the 2006 hunting season were “too high” for them to be satisfied (Table 23). Further, these differences were related directly to the level of concern the respondents placed on each aspect. Specifically, a higher proportion of respondents who said they were “very concerned” about any negative aspect indicated that that aspect was “too high” for them to be satisfied, compared to respondents indicating lower levels of concern.

As with the possible, positive aspects of deer hunting, we developed two hypotheses for each possible, negative aspect:

H<sub>3</sub> – hunters’ experiences pertaining to an aspect of hunting will be similar regardless of how much concern hunters express about that aspect, and

H<sub>4</sub> – a higher proportion of hunters who say they are “very concerned” about a given aspect will be dissatisfied with their experiences relating to that aspect, compared to hunters who say that aspect is of lesser importance but who report similar levels of experiences.

We could examine H<sub>3</sub> for only three of the five possible negative aspects because we did not have estimates or indices of either (a) the number of shots heard or proximity of shots that might lead to fear about being shot by other hunters shooting unsafely at deer, or (2) the number of sub-legal “mistake” bucks that hunters saw harvested. H<sub>3</sub> was supported in all three strata for one negative aspect and supported in two of the three strata for the other two negative aspects. Statewide, respondents who said they were “very concerned” about “feeling crowded by other hunters,” and those who expressed less concern, reported similar experiences in terms of the percentage of their time spent hunting on public land (our index to crowding).

**Table 22. Mean concern for several, potential, negative aspects on overall deer-hunting satisfaction for respondents hunting deer in different geographic strata of New York State during the 2006 hunting season, from a mail survey conducted in 2007.**

	Geographic stratum hunted						<u>F</u>	<u>p</u>
	Cent-West		Northern		Southeastern			
Potential negative influence on deer-hunting satisfaction	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>	<u>Mean</u>	<u>SE</u>		
Feeling crowded by too many other deer hunters	2.73A	0.04	2.73A	0.07	2.88A	0.06	2.128	0.120
% not at all concerned	19.8%		16.6%		17.6%			
% very concerned	33.8%		33.2%		41.5%			
Feeling a sense of urgency to shoot the first legal buck I see instead of waiting for one I'd rather shoot	2.16A	0.04	2.12A	0.08	2.25A	0.07	1.042	0.353
% not at all concerned	38.5%		39.7%		37.7%			
% very concerned	16.4%		14.8%		19.7%			
Seeing that some sub-legal bucks have been shot by mistake	2.83A	0.04	2.92A	0.08	2.98A	0.06	1.906	0.149
% not at all concerned	16.8%		15.7%		12.4%			
% very concerned	38.9%		41.9%		42.3%			
Fear of being shot by people who shoot unsafely at deer	2.74A	0.04	2.81A	0.08	2.87A	0.06	1.379	0.252
% not at all concerned	18.1%		16.7%		16.0%			
% very concerned	37.1%		41.0%		41.0%			
Having difficulty figuring out if a buck I see is legal to shoot	1.85A	0.04	1.99AB	0.08	2.14B	0.07	7.898	<0.001
% not at all concerned	51.9%		48.6%		43.3%			
% very concerned	11.2%		15.7%		19.9%			

<sup>a</sup>On scale from 1 = not at all concerned, 2 = slightly concerned, 3 = moderately concerned, and 4 = very concerned.

<sup>b</sup>Means followed by the same capital letter did not differ at  $p = 0.05$ .

**Table 23. Whether each of five, possible, negative aspects of hunting were too high, maximally low enough, or more than low enough for respondents hunting deer in different geographic strata of New York State, and comparing those who indicated they were “very concerned” about that aspect or less concerned, from a mail survey conducted in 2007.**

	Stratum where primary WMU for hunting is located					
	Central-Western		Northern		Southeastern	
	<u>How concerned</u>		<u>How concerned</u>		<u>How concerned</u>	
<u>Possible negative influence on hunting satisfaction</u>	<“Very” %	”Very” %	<“Very” %	”Very” %	<“Very” %	”Very” %
<b>Feeling crowded by other deer hunters</b>						
Mean % of time spent hunting on public land as index to crowding	<b>14.9</b>	vs. <b>11.2</b>	<b>19.1</b>	vs. <b>29.3</b>	<b>16.1</b>	vs. <b>17.1</b>
	t = 1.646		t = -1.914		t = -0.278	
	p = 0.100		p = 0.058		p = 0.781	
% Too high to be satisfied	<b>7.5</b>	<b>40.2</b>	<b>6.0</b>	<b>36.5</b>	<b>7.6</b>	<b>30.6</b>
% At maximum level for me to be satisfied	32.9	22.0	24.8	17.5	24.0	27.4
% Low enough for me to be satisfied	59.6	37.8	69.2	46.0	68.4	41.9
	$X^2 = 95.121$		$X^2 = 29.870$		$X^2 = 31.212$	
	p < 0.001		p < 0.001		p < 0.001	
<b>Sense of urgency to shoot the first legal buck I see when I’d rather wait for a different one</b>						
Mean % of <i>vulnerable</i> small bucks shot at as index to urgency	<b>25</b>	vs. <b>41</b>	<b>28</b>	vs. <b>26</b>	<b>19</b>	vs. <b>36</b>
	t = -2.329		t = 0.181		t = -1.955	
	p = 0.023		p = 0.857		p = 0.053	
% Too high to be satisfied	<b>18.6</b>	<b>57.7</b>	<b>19.6</b>	<b>64.5</b>	<b>21.6</b>	<b>59.3</b>
% At maximum level for me to be satisfied	33.5	17.5	27.0	12.9	29.0	16.7
% Low enough for me to be satisfied	47.9	24.7	53.4	22.6	48.5	24.1
	$X^2 = 66.645$		$X^2 = 26.764$		$X^2 = 30.257$	
	p < 0.001		p < 0.001		p < 0.001	

Table 23. Continued.

	Stratum where primary WMU for hunting is located					
	Central-Western		Northern		Southeastern	
	How concerned		How concerned		How concerned	
Possible negative influence on hunting satisfaction	<“Very” %	”Very” %	<“Very” %	”Very” %	<“Very” %	”Very” %

**Number of sub-legal bucks shot by mistake**

We have no index to the number of sub-legal bucks that hunters saw taken by mistake so cannot determine if means differ for hunters who said they are “very concerned” about this aspect of hunting compared to those who place lesser concern on it.

% Too high to be satisfied	<b>16.9</b>	<b>36.9</b>	<b>17.6</b>	<b>33.8</b>	<b>17.3</b>	<b>35.7</b>
% At maximum level for me to be satisfied	26.0	21.2	18.6	13.2	21.2	16.3
% Low enough for me to be satisfied	57.1	41.9	63.7	52.9	61.5	48.0
	$X^2 = 25.111$		$X^2 = 5.946$		$X^2 = 11.053$	
	p < 0.001		p = 0.051		p = 0.004	

**Fear of being shot by other hunters who shoot unsafely at deer**

We have no index to the number of shots heard or proximity of shots fired, so cannot determine if means differ for hunters who said they are “very concerned” about this aspect of hunting compared to those who place lesser concern on it.

% Too high to be satisfied	<b>5.6</b>	<b>33.0</b>	<b>1.7</b>	<b>29.5</b>	<b>5.7</b>	<b>25.0</b>
% At maximum level for me to be satisfied	16.8	21.0	22.5	16.7	19.3	29.3
% Low enough for me to be satisfied	77.7	46.0	75.8	53.8	75.0	45.7
	$X^2 = 89.570$		$X^2 = 33.176$		$X^2 = 32.014$	
	p < 0.001		p < 0.001		p < 0.001	

Table 23. Continued.

	Stratum where primary WMU for hunting is located					
	Central-Western		Northern		Southeastern	
	How concerned		How concerned		How concerned	
Possible negative influence on hunting satisfaction	<“Very” %	”Very” %	<“Very” %	”Very” %	<“Very” %	”Very” %
<b>Difficulty figuring-out if bucks were legal to shoot</b>						
Mean # of young bucks	<b>4.3</b>	vs. <b>3.1</b>	<b>3.3</b>	vs. <b>4.3</b>	<b>2.8</b>	vs. <b>3.0</b>
with small antlers seen	t = 2.478		t = -0.715		t = -0.185	
as index to difficulty	p = 0.015		p = 0.480		p = 0.835	
Too high to be satisfied	<b>9.4</b>	<b>26.6</b>	<b>8.4</b>	<b>15.6</b>	<b>9.8</b>	<b>32.7</b>
At maximum level for me to be satisfied	16.4	26.6	21.1	40.6	22.2	20.0
Low enough for me to be satisfied	74.2	46.9	70.5	43.8	67.9	47.3
	$X^2 = 24.107$		$X^2 = 8.569$		$X^2 = 19.534$	
	p < 0.001		p = 0.014		p < 0.001	

H<sub>3</sub> was partially supported for “feeling a sense of urgency to shoot the first buck I see when I’d rather wait for a different one.” In Northern NY, respondents reported shooting at 26-28% of vulnerable (i.e., in-range, clear shot, had a valid permit) young bucks with smaller antlers, regardless of how much concern they expressed about their urgency to shoot rather than wait. In Central-Western NY, hunters expressing more concern shot at a higher proportion of vulnerable bucks (41% vs. 25%). In Southeastern NY, we found a similar, but non-significant, pattern as that in Central-Western NY between their behavior (shooting at a higher percentage of vulnerable bucks; 36% vs. 19%) and their perceptions (level of concern about urgency to shoot).

H<sub>4</sub> also generally was supported. For all five possible negative aspects, a higher proportion of respondents who said they were “very concerned” vs. less concerned also said their negative experiences/perceptions were “too high” for them to be satisfied. With respect to the aspect of “feeling crowded,” the percentage of time spent on public land (our index to numbers of hunters encountered) was similar for respondents indicating that they were “very concerned” about crowding and for respondents indicating less concern about crowding. However, 4-6 times as many of those who were “very concerned” said that their feeling of being crowded was too high for them to be satisfied. We found similar patterns for the other four possible negative aspects we examined, in that a higher percentage of respondents who indicated they were “very concerned” about a particular aspect also said that negative aspect was too high for them to be satisfied.

## Attitudes and Beliefs about Current Buck-hunting Opportunities

### Satisfaction or Dissatisfaction with Opportunities:

Respondents hunting deer in Northern and Central-Western NY were split with respect to whether they were satisfied or dissatisfied with their buck-hunting opportunities during 2006, whereas most respondents (56%) hunting deer in Southeastern NY were dissatisfied (Table 24). Further, although not significant, level of dissatisfaction among all generally dissatisfied hunters was most extreme in Southeastern NY, with 47% of dissatisfied hunters in that stratum indicating that they were “greatly dissatisfied” compared to 36-39% hunting in the other geographic regions. Among generally satisfied hunters, a plurality (45-56%) indicated they were “moderately satisfied” regardless of region hunted.

**Table 24. General satisfaction or dissatisfaction with buck-hunting opportunities during the 2006 deer-hunting season in New York according to respondents hunting in different geographic regions of the state, based on a mail survey conducted in 2007.**

<u>How satisfied?</u>	<u>Geographic stratum hunted</u>			<u>X<sup>2</sup></u>	<u>p</u>
	<u>Cent-West</u> <u>% of hunters</u>	<u>Northern</u> <u>% of hunters</u>	<u>Southeastern</u> <u>% of hunters</u>		
Generally dissatisfied	<b>44.2</b>	<b>40.3</b>	<b>56.4</b>	31.757	<0.001
<u>Levels of dissatisfaction</u>				9.332	0.053
Greatly dissatisfied	38.8	36.0	46.7		
Moderately dissatisfied	25.9	36.7	27.5		
Slightly dissatisfied	35.3	27.3	25.8		
Neither satisfied nor dissatisfied	<b>19.9</b>	<b>10.4</b>	<b>12.8</b>		
Generally satisfied	<b>39.8</b>	<b>45.4</b>	<b>30.8</b>		
<u>Levels of satisfaction</u>				4.484	0.344
Greatly satisfied	18.4	27.7	19.2		
Moderately satisfied	55.4	44.6	55.6		
Slightly satisfied	26.2	27.7	25.3		

DEC biologists were interested in knowing whether type of property hunted or age of the hunter was related to satisfaction with buck-hunting opportunities. Some anecdotal evidence suggested that public land hunters may be more dissatisfied than those hunting private land, especially when public land hunters complain about “all the bucks being shot off.” Also, given the aging population of deer hunters, DEC wanted to examine whether dissatisfaction with buck-hunting satisfaction.

Type of property used for hunting deer had no influence on satisfaction with buck-hunting opportunities ( $X^2 = 4.771$ ,  $df = 6$ ,  $p = 0.574$ ). Overall, 49% of respondents were dissatisfied and 38% were satisfied. Although not statistically different, it is interesting to note that deer hunters who used public land most of the time ( $n = 175$ ) had the lowest percentage who were dissatisfied (43%) and the highest percentage who were satisfied (41%), whereas hunters who used private land for which they had to pay a fee ( $n = 92$ ; including hunt clubs) had the highest percentage who were dissatisfied (56%) and the lowest percentage who were satisfied (31%).

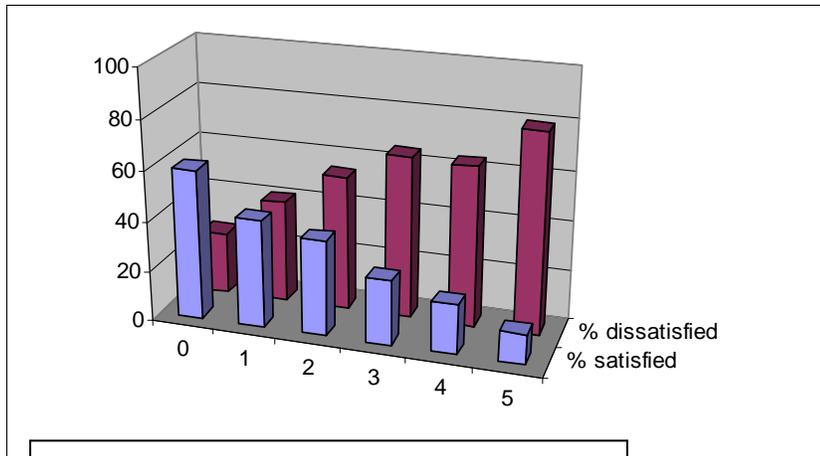
Age of the deer hunter also had no influence on satisfaction with buck-hunting opportunities ( $X^2 = 8.730$ ,  $df = 4$ ,  $p = 0.068$ ), probably because of relatively small numbers of youth  $\leq 18$  years of age ( $n = 52$ ) and young adults 19-25 years of age ( $n = 59$ ) among respondents. Nonetheless, it is worth noting that youth had the highest percentage who were satisfied with their buck-hunting opportunities (56%) and lowest percentage who were dissatisfied (36%). Older hunters  $\geq 26$  years of age had the highest percentage who were dissatisfied (49%) and lowest percentage who were satisfied (38%).

We also wanted to examine the influence of hunting-related impacts on satisfaction with buck-hunting opportunities, given recent papers on the concept of adaptive impact management, or AIM. In particular, we wanted to compare experienced levels of impacts with desirable or tolerable levels. We would expect more dissatisfied hunters to report that positive impacts were “too low,” and that negative impacts were “too high.”

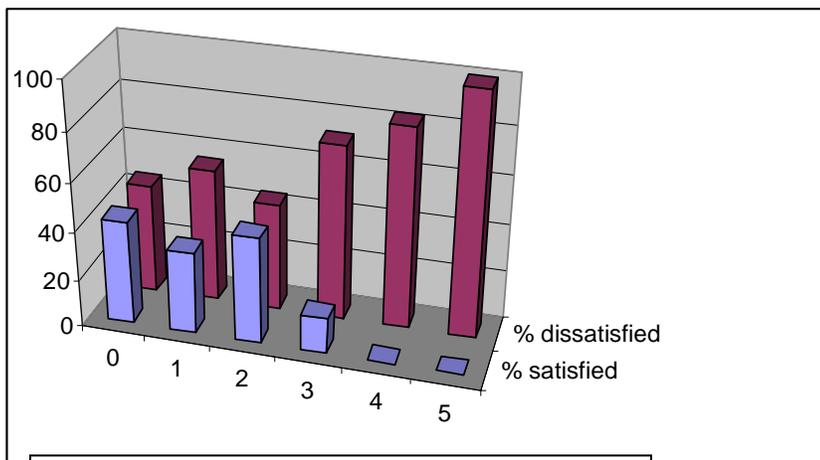
Our expectation was verified. Satisfaction with buck-hunting opportunities was related to the number of positive buck-related impacts the respondents’ believed were “too low for me to be satisfied” (i.e., below desirable levels; Figure 2a) and the number of negative buck-related impacts were “too high for me to be satisfied” (i.e., above tolerable levels; Figure 2b). Among respondents who believed that all 5 positive impacts about which we asked were above minimum desired levels (i.e., 0 of 5 were “too low”), more than twice as many said they were satisfied with their buck-hunting opportunities (60%) as said they were dissatisfied (25%). That one-quarter said they were dissatisfied indicates either that (a) other positive impacts are not experienced at desirable levels, or (b) some negative impacts are experienced at levels that are “too high.”

The percentage of respondents who were dissatisfied increased as the number of positive impacts that were “too low” increased. For respondents who said that just 1 out of 5 positive impacts was “too low,” the percentages of those who were satisfied (43%) vs. dissatisfied (41%) were nearly equal. If  $\geq 2$  positive impacts were “too low” for hunters to be satisfied, the percentage who were dissatisfied overall with their buck-hunting opportunities was higher than the percentage who were satisfied.

Figure 2b shows that even when zero negative impacts (out of the 5 about which we asked) were “too high,” just as many respondents were dissatisfied with their buck-hunting opportunities (45%) as were satisfied (43%). This suggests either that (a) some other negative impacts about which we did not ask were “too high,” or (b) some positive impacts were “too low.” The percentage who said they were satisfied dropped off substantially if they believed  $\geq 3$  negative impacts were “too high.”



a. Number of **positive** buck-related impacts that are “**too low**” for me to be satisfied



b. Number of **negative** buck-related impacts that are “**too high**” for me to be satisfied

**Figure 2. Relationship between the number of buck-related impacts below desirable levels or above tolerable levels, and satisfaction or dissatisfaction with overall buck-hunting opportunities for deer hunters participating in the 2006 hunting season in New York State, from a mail survey conducted in 2007.**

## Attitudes and Beliefs about Some “Hot Button” Issues

### Experimental Regulation to Reduce Buck Bag Limit to One Antlered Deer:

Reducing the buck bag limit to one for all hunters would decrease satisfaction for a plurality or majority of hunters in every stratum (Table 25). The proportion of hunters indicating that reducing the buck bag limit would change their overall satisfaction was not different among strata. Whether hunters supported or opposed reducing the bag limit at one buck mirrored the change in satisfaction, with more hunters in each stratum opposing it than supporting it (Table 26). Further, the vast majority of hunters who believed such a regulation would increase their satisfaction (>79%) indicated they supported the regulation whereas the vast majority of those who said their satisfaction would decrease (>92%) opposed it (Table 27).

It is worth noting that 12-21% of hunters, depending on the area, who believed that their satisfaction would increase if the buck bag limit was reduced to one buck for all hunters did not support such an experimental change in regulations. Of these hunters, 60% said they already were satisfied with their buck-hunting opportunities. Apparently they believed that some consequence(s) of reducing the buck bag limit “would not be good” and might otherwise reduce their satisfaction.

**Table 25. Direction and magnitude of change in satisfaction with buck-hunting opportunities anticipated by respondents who hunted deer in different geographic strata in New York State during the 2006 hunting season, if an experimental regulation is enacted to reduce the buck bag limit to one for all hunters, based on a mail survey conducted in 2007.**

	Geographic stratum hunted		
	Cent-West	Northern	Southeastern
<u>Change in satisfaction</u>	<u>%</u>	<u>%</u>	<u>%</u>
Greatly increase	17.6%	19.9%	16.1%
Moderately increase	9.3%	8.2%	8.9%
Slightly increase	4.5%	4.4%	5.6%
Neither increase nor decrease	21.2%	26.1%	18.4%
Slightly decrease	7.4%	6.0%	6.4%
Moderately decrease	9.3%	9.6%	7.2%
Greatly decrease	30.6%	25.7%	37.3%
	$X^2 = 12.814,$	$df = 12,$	$p = 0.383$

**Table 26. Magnitude of support or opposition reported by respondents who hunted deer in different geographic strata in New York State during the 2006 hunting season, for an experimental regulation to reduce the buck bag limit to one buck for all hunters, based on a mail survey conducted in 2007.**

	Geographic stratum hunted		
	Cent-West	Northern	Southeastern
<u>Support or oppose</u>	<u>%</u>	<u>%</u>	<u>%</u>
Greatly support	25.7%	21.6%	20.2%
Slightly support	9.1%	13.5%	10.9%
Neither increase nor decrease	14.8%	15.6%	13.6%
Slightly oppose	14.1%	12.9%	11.5%
Greatly oppose	36.3%	36.4%	43.9%
	$X^2 = 10.998$	df = 8,	p = 0.202

**Table 27. Relationship between anticipated change in hunting satisfaction and support or opposition for an experimental regulation to reduce the buck bag limit to one for all hunters, by geographic stratum of New York State, from a mail survey conducted in 2007.**

<u>Support or opposition</u>	Stratum where primary WMU for hunting is located								
	Central-Western			Northern			Southeastern		
	<u>Satisfaction will...</u>			<u>Satisfaction will...</u>			<u>Satisfaction will...</u>		
	Increase	Neither	Decrease	Increase	Neither	Decrease	Support	Neither	Oppose
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Support	87.8	27.7	2.9	79.4	32.7	2.3	83.2	20.7	3.8
Neither	4.9	52.6	4.9	5.9	49.1	2.3	7.4	51.7	3.8
Oppose	7.3	19.7	92.2	14.7	18.2	95.4	9.5	27.6	92.5
	$X^2 = 631.447$	p < 0.001	$X^2 = 182.826$	p < 0.001	$X^2 = 282.076$	p < 0.001			

Primary type of property hunted affected whether respondents thought reducing the buck bag limit would increase or decrease their satisfaction ( $X^2 = 16.281$ ,  $df = 6$ ,  $p = 0.012$ ). Respondents who hunted most of their time either on private land for free or on public land had the highest percentage who thought their satisfaction would increase (34% and 32%, respectively), and those who paid a fee to hunt on private land or generalist hunters had lower percentages who thought their satisfaction would increase (21% and 27%, respectively). Despite these differences in anticipated change in satisfaction, level of support or opposition for experimentally reducing the buck bag limit did not differ by type of property hunted ( $X^2 = 9.063$ ,  $df = 6$ ,  $p = 0.170$ ). Overall, 50% opposed such an experimental reduction, 34% supported it, and 16% said they neither supported nor opposed it.

Age of hunter affected both anticipated change in hunting satisfaction ( $X^2 = 24.701$ ,  $df = 4$ ,  $p < 0.001$ ) and support or opposition ( $X^2 = 19.594$ ,  $df = 4$ ,  $p = 0.001$ ) for experimentally reducing the buck bag limit. Fewer young adults aged 19-25 years old (19%) thought such an experimental change would increase their satisfaction compared to youth (34%) or older hunters (33%). More young adults (68%) and youth (55%) compared to older hunters (41%) thought reducing the buck bag limit would decrease their satisfaction. Reflecting these differences, more young adults (71%) compared to either youth (52%) or older hunters (46%) opposed such an experimental reduction. Also, fewer young adults (25%) compared to youth (39%) or older hunters (35%) supported it.

### **Experimental Regulation to Protect Most Yearling Bucks from Harvest:**

Hunters evaluated this possible experimental regulation change more positively than the possible change in buck bag limit. In all three upstate strata, pluralities or a majority of hunters indicated that enacting an experimental regulation to protect most yearling bucks from harvest (i.e., increase the buck harvest standard) would increase their hunting satisfaction (Table 28). We found no differences among strata in the proportion of hunters indicating that protecting most yearling bucks from harvest would change their overall satisfaction ( $X^2 = 14.351$ ,  $df = 12$ ,  $p = 0.279$ )— although it may be important from a management perspective that the percentage indicating an increase in satisfaction was seemingly highest in the Southeastern area.

Whether hunters supported or opposed protecting yearling bucks mirrored their change in satisfaction, with more than one-half of hunters in each stratum supporting such a experimental regulation and about one-quarter to one-third opposing it (Table 29). The vast majority of hunters who believed protecting yearling bucks would increase their satisfaction (>94%) said they also supported such an experiment. In addition, the vast majority of those who said their satisfaction would decrease (>79%) opposed protecting yearling bucks (Table 30).

Any difference based on primary type of property hunted? Regardless of the type of property hunted most of the time, more respondents thought such an experimental regulation would increase than decrease their satisfaction. However, higher percentages of respondents who paid a fee to hunt on private land (64%) or generalist hunters (55%) said it would increase their satisfaction compared to those who hunted primarily on private land for free (51%) or on public land (46%) ( $X^2 = 13.375$ ,  $df = 6$ ,  $p = 0.037$ ). Despite these differences, level of support or

**Table 28. Direction and magnitude of change in satisfaction with buck-hunting opportunities anticipated by respondents who hunted deer in different geographic strata in New York State during the 2006 hunting season, if an experimental regulation is enacted to protect most yearling bucks from harvest, based on a mail survey conducted in 2007.**

	Geographic stratum hunted		
	Cent-West	Northern	Southeastern
<u>Change in satisfaction</u>	<u>%</u>	<u>%</u>	<u>%</u>
Greatly increase	28.0%	30.8%	33.9%
Moderately increase	12.2%	10.7%	13.2%
Slightly increase	8.7%	7.0%	11.9%
Neither increase nor decrease	18.1%	18.2%	14.1%
Slightly decrease	7.6%	8.4%	7.8%
Moderately decrease	7.9%	6.5%	6.9%
Greatly decrease	17.6%	18.2%	12.2%
	$X^2 = 14.351,$	$df = 12,$	$p = 0.279$

**Table 29. Magnitude of support or opposition reported by respondents who hunted deer in different geographic strata in New York State during the 2006 hunting season, for an experimental regulation to protect most yearling bucks from harvest, based on a mail survey conducted in 2007.**

	Geographic stratum hunted		
	Cent-West	Northern	Southeastern
<u>Support or oppose</u>	<u>%</u>	<u>%</u>	<u>%</u>
Greatly support	38.8%	36.8%	41.7%
Slightly support	17.8%	15.1%	21.5%
Neither increase nor decrease	13.5%	13.7%	11.2%
Slightly oppose	11.7%	14.2%	10.3%
Greatly oppose	18.2%	20.3%	15.3%
	$X^2 = 8.534$	$df = 8,$	$p = 0.383$

**Table 30. Relationship between anticipated change in hunting satisfaction and support or opposition for an experimental regulation to protect most yearling bucks from harvest, by geographic stratum of New York State, from a mail survey conducted in 2007.**

Support or opposition	Stratum where primary WMU for hunting is located								
	Central-Western			Northern			Southeastern		
	Satisfaction will...			Satisfaction will...			Satisfaction will...		
	Increase %	Neither %	Decrease %	Increase %	Neither %	Decrease %	Support %	Neither %	Oppose %
Support	96.8	38.1	7.8	95.1	18.4	7.0	94.1	28.9	12.8
Neither	2.8	50.8	9.1	2.9	60.5	4.2	3.2	51.1	8.1
Oppose	0.6	11.0	83.1	1.9	21.1	88.7	2.7	20.0	79.1
	$X^2 = 656.423$ $p < 0.001$			$X^2 = 241.549$ $p < 0.001$			$X^2 = 281.269$ $p < 0.001$		

opposition for protection of yearling bucks did not differ by type of property hunted ( $X^2 = 9.072$ ,  $df = 6$ ,  $p = 0.170$ ). Overall, 57% supported such an experimental regulation, 28% opposed it, and 15% said they neither supported nor opposed it.

Any difference based on age of hunters? We found no differences among age categories with respect to anticipated change in hunting satisfaction ( $X^2 = 2.615$ ,  $df = 4$ ,  $p = 0.624$ ) or support vs. opposition ( $X^2 = 0.525$ ,  $df = 4$ ,  $p = 0.971$ ) for experimentally protecting yearling bucks from harvest. More hunters thought it would increase their satisfaction (52% overall; 47% for youth; 54% for young adults) than thought it would decrease their satisfaction (28% overall; 34% for youth; 32% for young adults). Regardless of age, most hunters supported protecting yearling bucks from harvest (57% overall; 54% for youth; 57% for young adults). A smaller percentage opposed it (27% overall; 30% for youth; 29% for young adults).

Any difference based on importance of, or interest in, deer hunting? The more importance hunters placed on the activity of deer hunting, the clearer opinion they had about experimentally protecting most yearling bucks (i.e., lower percentage say they neither supported nor opposed it). However, that clearer opinion also resulted in more of a split in attitudes ( $X^2 = 71.817$ ,  $df = 6$ ,  $p < 0.001$ ). That is, as importance increases, the percentage of respondents indicating they support protecting yearling bucks increases, but so does the percentage that say they oppose the idea (Table 31).

Consistent with the relationship between importance of deer hunting and having an opinion about experimentally protecting yearling bucks, more days of hunting effort were associated with a higher percentage having an clear opinion. However, different from the relationship shown in Table 31, more effort was associated with higher support, but no higher opposition ( $X^2 = 19.385$ ,  $df = 4$ ,  $p = 0.001$ ). About 61% of hunters who spent  $\geq 15$  days hunting supported the experimental regulation whereas 54% of those who spent 8-14 days afield and

**Table 31. Magnitude of support or opposition reported by deer hunters in New York State who place different importance on the activity of deer hunting hunted, for an experimental regulation to protect most yearling bucks from harvest, based on a mail survey conducted in 2007.**

Importance of deer hunting	Support		Neither		Oppose	
	n	%	n	%	n	%
Most important activity	278	60.8	42	9.2	137	30.0
One of most important activities	517	58.0	124	13.9	250	28.1
No more important than others	126	49.8	70	27.0	57	22.5
One of least important activities	30	50.8	23	39.0	6	10.2

( $X^2 = 71.817$ ,  $df = 6$ ,  $p < 0.001$ ).

55% of those who spent  $\leq 7$  days hunting supported it. Experimentally protecting yearling bucks was opposed by 28% of respondents hunting  $\geq 15$  days afield, 32% of those hunting 8-14 days, and 25% of those hunting a week or less.

We found no difference in level of support or opposition based on change in hunting interest over the last five years ( $X^2 = 6.213$ ,  $df = 4$ ,  $p = 0.184$ ). Regardless of whether their interest increased, decreased, or remained the same, 56-58% supported it, and 25-29% opposed it. The remainder (13-19%) expressed neither opinion.

Any difference based on the type of area in which the hunters live? We found no difference in level of support or opposition based on the type of place where hunters lived ( $X^2 = 7.649$ ,  $df = 4$ ,  $p = 0.105$ ). Regardless of whether hunters lived in urban areas with  $>50,000$  residents, villages or smaller cities, or farms and other rural areas, the majority supported the idea of protecting most yearling bucks from harvest. Only 25-28% opposed the idea.

Any difference based on the positive and negative deer-related impacts identified by hunters? We found two important patterns of support vs. opposition when we examined whether “seeing bucks of any age/size,” “seeing older bucks with larger antlers,” and “having a more natural mix of older and younger bucks” were impacts vs. not impacts (i.e., “very important” to hunters vs. less important). First, much higher percentages of hunters who identified any of these kinds of experiences as impacts supported protecting yearling bucks, compared to hunters for whom any of these are not impacts. Second, clear majorities of hunters who both identified any of these experiences as impacts, and who believed that the current level of these impacts was either “too low for me to be satisfied,” or “just about at the minimum level for me to be satisfied” also supported protecting yearling bucks. However, hunters who identified any of these experiences as impacts and who also believed the current levels of those impacts were “more than enough for me to be satisfied,” were more evenly split about whether they supported or opposed protecting most yearling bucks.

We found somewhat similar patterns when we examined whether “having a sense of urgency to shoot the first buck I see rather than waiting for one I’d rather shoot” or “fearing being shot by people who shoot unsafely at deer” were negative impacts to be managed (i.e., hunters were “very concerned” about them). First, a higher percentage of hunters who identified these experiences as impacts supported experimentally protecting yearling bucks compared to those for whom these negative experiences were not impacts. Second, majorities of hunters who identified these experiences as impacts supported protecting yearling bucks, regardless of whether those negative experiences were “too high for me to be satisfied,” “just about at the maximum level I can tolerate,” or “low enough for me to still be satisfied.”

### **Attitudes and Behaviors Relating to Bear Hunting**

Relatively few respondents hunting deer in any stratum considered themselves to be a bear hunter (23% hunting in the Southeastern area, 23% hunting in Northern NY, and 14% hunting in Central-Western NY). Even smaller percentages hunting deer in each stratum said they actively hunted for bear during the 2006 season. Among respondents who hunted deer in the Southeastern area, 10% said they hunted for bear, with most hunting in the Catskill bear range (n = 22) and most of the rest (n = 8) hunting in the Adirondack bear range (1 respondent whose primary location to hunt deer was in Southeastern NY reported hunting bears in the Allegany bear range). All respondents whose primary place to hunt deer was in Northern NY and who also hunted bears (8%) said they hunted for bears in the Adirondack bear range. The 3% of Central-Western deer hunters who actively hunted for bears were split with respect to whether they hunted in the Adirondack bear range (n = 12) or the Allegany bear range (n = 7).

Despite so few active bear hunters and less than one-quarter of deer hunters saying they consider themselves to be bear hunters, a majority of respondents hunting deer in any stratum said they would harvest a bear if they had the opportunity to do so (64% in Central-Western; 70% in Northern; 72% in Southeastern). Yet, both actual behavior (having actively hunted bears) and intended behavior (would take a bear if had the opportunity) are linked to whether respondents considered themselves to be bear hunters. Only one respondent from each geographic stratum who did not consider him/herself to be a bear hunter actively went bear hunting (i.e., >99% who “were not bear hunters” did not go bear hunting).

About one-third of those who considered themselves to be bear hunters did go bear hunting among respondents from the Southeastern stratum(38%) and the Northern stratum (31%); the percentage was lower (16%) among deer hunters from the Central-Western area. The vast majority from each stratum who said they did consider themselves to be bear hunters also said they would take a bear if they had the opportunity (89% in the Northern area; 95% in the Central-Western area; 99% in the Southeastern area). Smaller, but still substantial, percentages of respondents in all three strata who “were not bear hunters” said they would harvest a bear if they had the opportunity (65% in the Northern area; 59% in the Central-Western area; 62% in the Southeastern area).



## Characteristics of Deer Hunters in 2007

The average age of all persons in the statewide sample was 48, ranging from 46 in the Central-Western stratum to 49 in the Southeastern and NYC-LI strata. The vast majority of respondents were male (95%) although the Northern strata had a greater proportion of female hunters than the other strata (8%) and the NYC-LI strata had a relatively low proportion of female hunters (2%) ( $X^2 = 14.835$ ,  $df = 3$ ,  $p = 0.002$ ).

We confirmed expected differences between geographic strata with respect to place of residence ( $X^2 = 570.059$ ,  $df = 12$ ,  $p < 0.001$ ). The highest proportion of hunters living on farms was in the Central-Western stratum and the lowest proportion was in the NYC-LI stratum (Table 32). Nearly two-thirds of hunters living in the three up-state strata lived in strata they characterized as either a farm or rural but not on a farm. The majority of hunters living in the NYC-LI stratum characterized their place of residence as either a city of >50,000 or a city with between 25,000 and 49,999.

Finally, we found differences among geographic strata with respect to the highest level of education attained ( $X^2 = 36.676$ ,  $df = 15$ ,  $p = 0.001$ ). A plurality of hunters (>40%) from the three up-state strata reported having attained a High School diploma or GED whereas a plurality (33%) of hunters from the NYC-LI stratum reported having attended some college (Table 33). The proportion of hunters in each of the other educational categories was fairly similar among the geographic strata.

**Table 32. Place of residence as reported by deer hunters living in different geographic strata of New York State, from a mail survey conducted in 2007.**

Type of place where they live	Geographic strata							
	Central- western		Northern		Southeastern		NYC-LI	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Farm	75	18.9	43	12.4	68	12.1	9	1.9
Rural, not farm	183	46.1	193	55.5	275	49.0	61	12.8
Village or city of <25,000	75	18.9	88	25.3	137	24.4	106	22.2
City of 25,000 to 49,999	28	7.1	21	6.0	46	8.2	90	18.8
City of >50,000	36	9.1	3	0.9	35	6.2	212	44.4

**Table 33. Highest level of education attained as reported by deer hunters living in different geographic strata of New York State, from a mail survey conducted in 2007.**

Highest level of education attained	Geographic strata							
	Central-western		Northern		Southeastern		NYC-LI	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Primary school	17	4.3	12	3.4	20	3.6	27	5.6
High school / GED	170	42.5	163	46.7	230	41.2	154	31.8
Some college	116	29.0	90	25.8	169	30.3	164	33.8
College graduate	67	16.8	67	19.2	100	17.9	102	21.0
Post grad (MS / Phd)	27	6.8	16	4.6	25	4.5	25	5.2
Professional degree	3	0.8	1	0.3	14	2.5	13	2.7

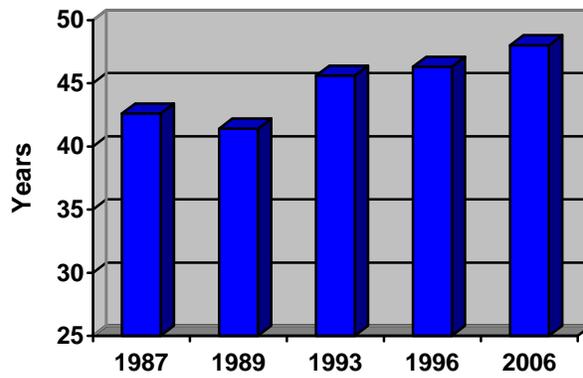
### Trends in the Characteristics of Deer Hunters in New York State

Gender. The percentage of males among deer hunters remained relatively stable at 92-95% from 1987 through 2006. Among the various strata, the percentage of women has been consistently highest (~8-10%) in Northern NY.

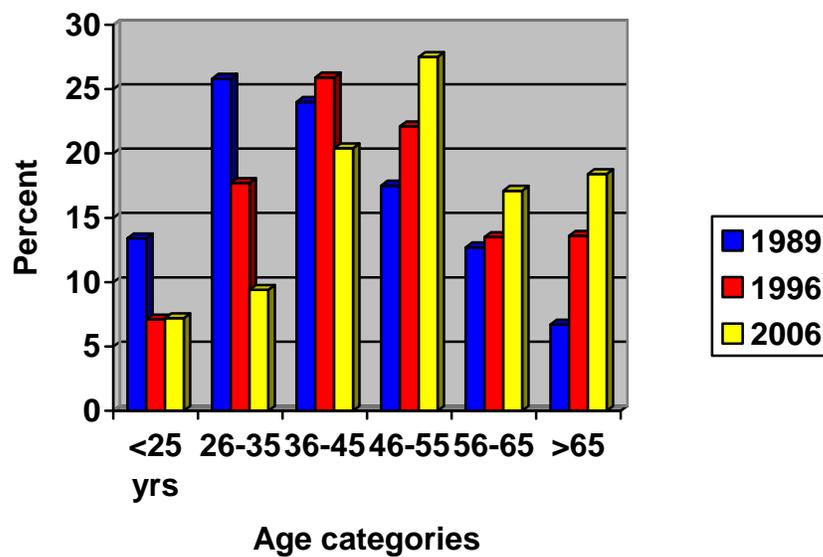
Age. The average age of deer hunters in New York State has increased from about 42 years in 1988 to about 48 years in 2007 (Figure 3). In addition, the age distribution has shifted, with a smaller proportion of deer hunters <45 years in 2006 compared to earlier surveys (Figure 4). Indeed, 62% of deer hunters in 2006 were over 45 years of age.

Index to hunter recruitment. Examining the percentage (Figure 4) and number (Figure 5) of hunters <25 years-old provides insight about recruitment of deer hunters. Clearly, recruitment of young hunters decreased substantially between 1989 and 1997. However, the percentage of hunters in this category was similar in 1997 and 2006, suggesting that recruitment into this age category has been relatively stable over the last decade. Still, because the total number of deer hunters declined from about 650,000 in 1997 to 545,440 in 2006, the number of deer hunters ≤25 years of age in 2006 was about 7,000 less than in 1997 (46,150 vs. 39,270; Figure 5).

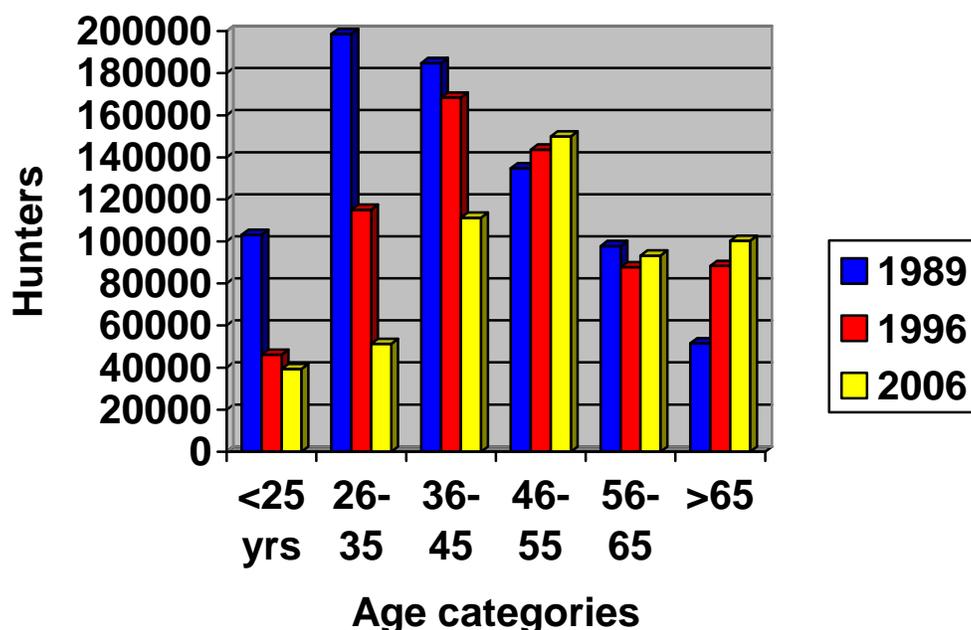
A second index to recruitment emerges from the comparison of the numbers of hunters in succeeding age categories from one survey period to the next. In 1989, about twice as many hunters were in the 26-35 age category as in the ≤25 category (see Figure 5), indicating substantial recruitment by hunters 26-35 years-old. A similar pattern exists for 1997. However, in 2006, only about 33% more hunters were in the 26-35 age category as in the ≤25 category, indicating that recruitment into the second-oldest category dropped off substantially.



**Figure 3. Average age of deer hunters from five statewide surveys of hunters conducted in New York State from 1987 to 2006.**



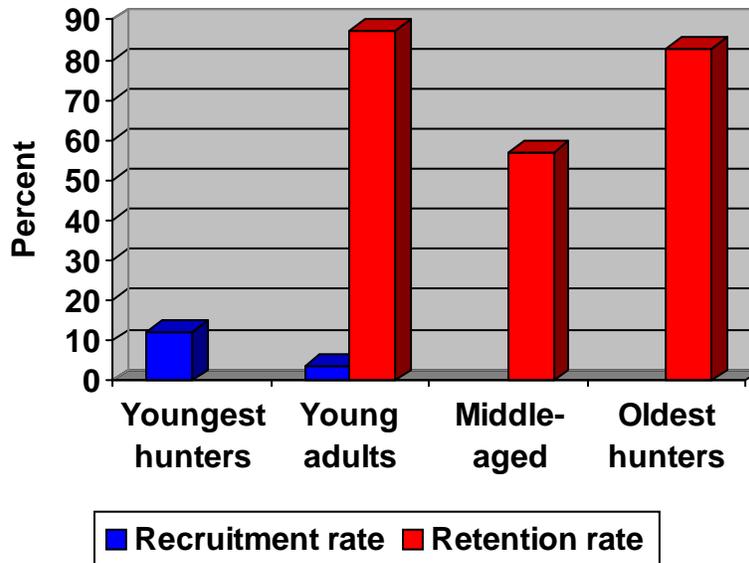
**Figure 4. Percentages of deer hunters in New York State in different age categories in 1989, 1997, and 2006, from statewide mail surveys conducted in those years.**



**Figure 5. Total number of deer hunters in New York State in 1989, 1996, and 2006 by age categories, from statewide mail surveys conducted in those years.**

A third index to recruitment emerges from a comparison of the number of hunters in the various age categories in 1989 and in 2006, based on percentages recorded in the statewide studies from those years. Deer hunters who were  $\leq 35$  years-old in 2006 would have been too young to hunt deer in 1989, and thus reflect an index to recruitment of youth into deer hunting between 1989 and 2006. Comparing the number of these hunters in 2006 ( $n = 81,810$ ) to the number of hunters in this age category in 1989 ( $n = 265,379$ ), yields a 2006 recruitment index only 30.8% as high as the 1989 level (Figure 6). Thus, youth recruitment declined 69.2% between 1989 and 2006. Overall, the 81,810 youth hunters recruited from 1989 to 2006 reflects a youth recruitment rate of 12.1% of the 677,000 hunters existing in 1989 (noted in Figure 6).

Deer hunters who were 16-25 years-old in 1989 ( $n = 90,713$ ) would have been in the 36-45 years-old category by 2006 ( $n = 116,716$ ). Comparing these numbers provides an index to recruitment of adults into deer hunting between 1989 and 2006. Assuming retention of hunters who were 16-25 years old in 1989 was 100%, the maximum number of recruited young adults between 1989 and 2006 was 25,998. We have no data with which to compare recruitment index for young adults between 1989 and 2006. However, the 25,998 young adult hunters apparently recruited from 1989 to 2006 reflects a young adult recruitment rate of 3.8% of the 677,000 hunters existing in 1989 (Figure 6).



**Figure 6. Recruitment and retention rates for different age categories of New York State deer hunters between 1989 and 2006, based on a total population of 677,000 deer hunters in 1989.**

Index to retention. By examining the number of hunters in successive 10-year age categories from one study to the next (because they were conducted at about 10-year intervals), we can gain insights about retention. For example, retention of hunters  $\leq 25$  years-old in 1989 seems reasonably good if one assumes minimal recruitment of adult hunters between 1989 and 2006. In 1989, there were about 103,000 hunters in this age category (Figure 5). About a decade later (1997), there were 115,000 hunters 26-35 years old, and 111,000 hunters 36-45 years old a decade after that (2006).

Deer hunters who were 26-35 years-old in 1989 ( $n = 174,666$ ) would have been in the 46-55 years category by 2006 ( $n = 152,712$ ). Comparing these numbers provides a maximum index to retention of young adults between 1989 and 2006. Assuming 0% recruitment into this age category during the intervening years, a minimum of 21,954 young adults (13%) dropped out of deer hunting between 1989 and 2006. Thus, the maximum retention of young adult deer hunters from 1989 to 2006 was 87% (see Figure 6)

Most deer hunters who were 36-45 years-old in 1989 ( $n = 162,480$ ) would have been in the 56-64 years category ( $n = 95,990$ ) by 2006. Comparing these numbers provides a maximum index to retention of middle-aged adults between 1989 and 2006. Assuming 0% recruitment into this age category during the intervening years, a minimum of 66,490 middle-aged adults (41%) dropped out of deer hunting between 1989 and 2006. Thus, the maximum retention of middle-aged adult deer hunters from 1989 to 2006 was 59% (see Figure 6).

Deer hunters who were 46-55 years-old in 1989 ( $n = 118,475$ ) would have been in the >65 years category by 2006 ( $n = 98,172$ ). We conservatively assume that the 85,979 deer hunters who were 56-65 years-old and the 45,359 deer hunters >65 years-old in 1989 would have ceased hunting by 2006 due to death, illness, or other reasons. Thus, comparing the 118,475 older deer hunters in 1989 with the 98,172 remaining in 2006, and assuming 0% recruitment into these age categories in the intervening years, determines that 20,303 older deer hunters stopped hunting between 1989 and 2006. This yields a maximum retention of older hunters between 1989 and 2006 of 83% (see Figure 6).

Changes in interest in deer hunting. Although technically not a trend in terms of data collected in different years, we did ask in the 2007 survey whether interest in deer hunting had increased, decreased, or not changed “compared to five years ago.” We reported in an earlier section of this report the percentage of hunters in the various geographic strata who said their interest had changed, and we provided a comparison of change in interest with level of importance that respondents placed on the activity of deer hunting. Here we examined the relationship between change in interest in deer hunting and age of deer hunters.

DEC staff was interested in whether hunters’ interest in deer hunting wanes at some point after they start, either in relation to (1) age, or (2) years of participation or experience. By looking at age, we could assess whether general life stage influenced interest in deer hunting. By looking at years of deer-hunting experience, we could assess whether the “novelty of deer hunting wore off” after some period of time regardless of the age of the hunter. We also could assess whether deer-hunting interest was affected for respondents who started hunting as young adults rather than youth, and who may have started a family later than most.

Age influenced interest in deer hunting to a slight degree (Figure 7). Overall, the percentage of respondents indicating that their interest in deer hunting had declined over the last five years steadily increased with increasing age. Conversely, the percentage indicating that their interest had grown over the last five years decreased with increasing age. The exception to this pattern was for the 19-25 year-old age category, where a smaller percentage than expected indicated that their interest had increased (concomitantly, a higher proportion than expected indicated that their interest had not changed). We attribute this to many respondents in this age category attending college or otherwise being apart from their usual social support group or typical place to hunt.

We also found some evidence of either a novelty effect or some other influence for respondents who had hunted deer for about 11-15 years (Figure 8), and this seemed unrelated to age of the hunter. A higher than expected proportion of respondents who had 11-15 years of deer-hunting experience said their interest had decreased, and a lower than expected proportion said their interest had increased. Yet, the average age of respondents with 11-15 years of experience was literally the same ( $p = 0.336$ ) as hunters with 5-10, 16-20, and 21-25 years of experience.

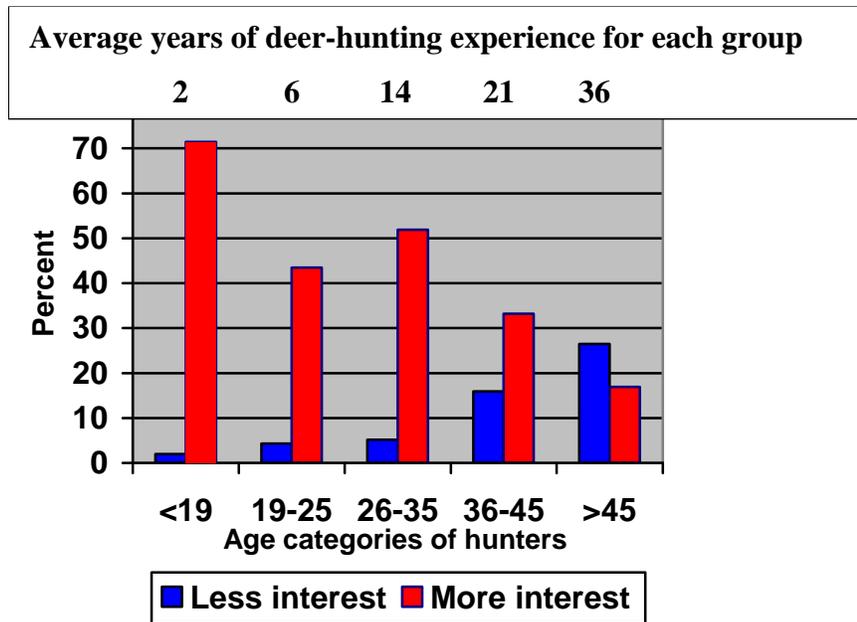


Figure 7. Relationship between changing interest in deer hunting over the last five years and age of deer hunters in New York State, showing average years of deer –hunting experience for hunters in each age class, from a mail survey conducted in 2007.

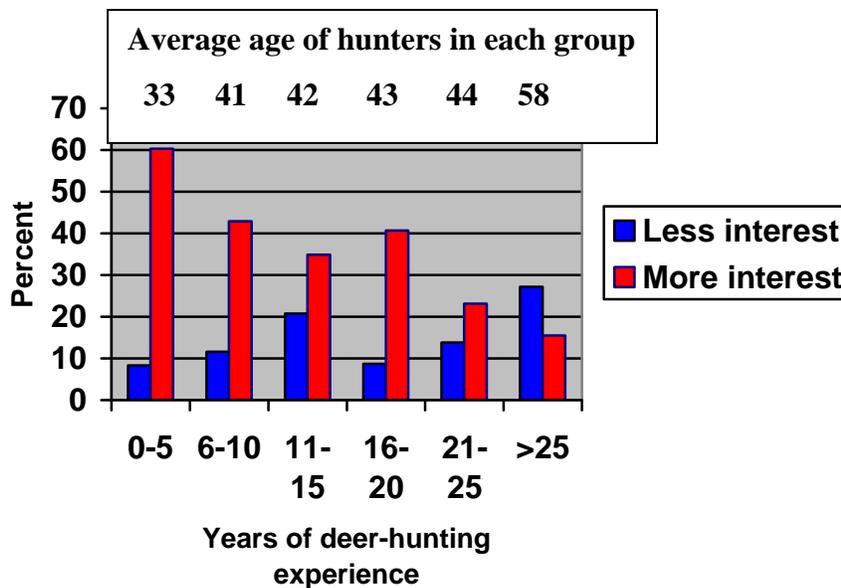
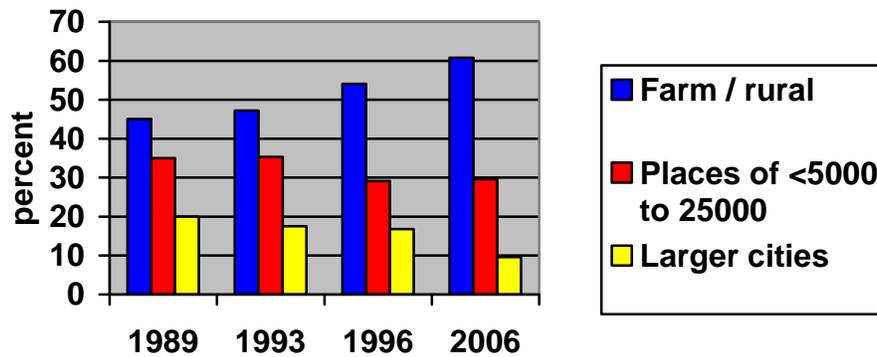


Figure 8. Relationship between changing interest in deer hunting over the last five years and years of deer-hunting experience for hunters in New York State, from a mail survey conducted in 2007.

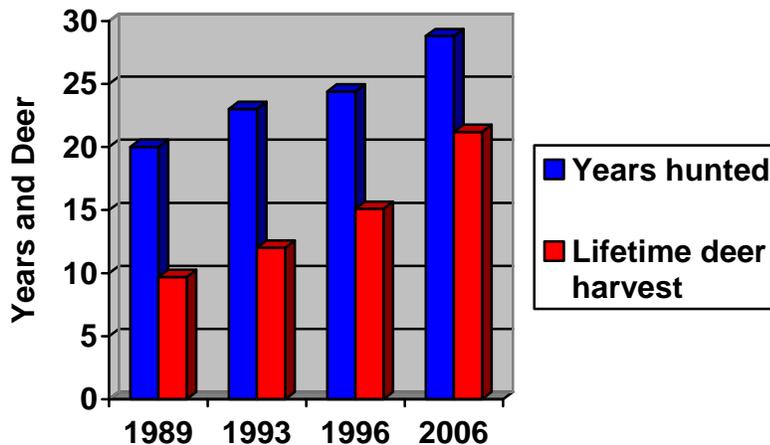
Shifting residence characteristics. The proportion of deer hunters in New York State living on farms and in other rural strata increased from 1989-2006 (no data were available from 1987 study), while the proportion living in more urban strata with >25,000 people decreased (Figure 8). The proportion of hunters living in small to medium towns and villages was stable between 1989 and 1994, decreased slightly by 1997, and has remained at that level since.



**Figure 9. Proportion of deer hunters in New York State living in each of three residence categories in 1989, 1993, 1996, and 2006, from mail surveys conducted in those years.**

Years of deer-hunting experience in lifetime. The average number of years of life-time, deer-hunting experience increased 38% between 1987 and 2006, reflecting the increase in average age of hunters. The average was 21 years in 1987, 20 years in 1989, 23 years in 1994, 24 years in 1998, and 29 years in 2007.

Deer bagged in lifetime. The average number of deer bagged in hunters' lifetimes increased 219% between 1989 and 2006, reflecting both increasing years of hunting experience (i.e., average age) and increases in bag limits and success rates. Hunters' lifetime harvest totals were 9.7 deer in 1989, 12.0 deer in 1994, 15.1 deer in 1997, and 21.2 deer in 2006. Comparing years of experience with lifetime deer harvest reveals that hunters averaged about 1/2 a deer per year of experience in 1989, increasing to about 2/3 of a deer per year of experience in 2006 (Figure 10).



**Figure 10. Relationship between average number of years of deer-hunting experience and lifetime harvest of deer reported by New York State deer hunters in 1989, 1993, 1996, and 2006, from mail surveys conducted in those years.**

Hunting vs. License buying. The vast majority of deer hunters who purchase a big game hunting license in a given year do go hunting, and the proportion of active hunters has remained relatively stable over the years. In 1987, 98% of DMP recipients (not all deer hunters – so may be more likely to hunt). The proportion of active hunters as a percentage of license buyers was 93.2% in 1989, 94.5% in 1994, 92.6% in 1997, and 92.5% in 2006.

Participation in various deer-hunting seasons. Since 1989, there has been a substantial increase in the percentage of deer hunters participating in early archery season and late special seasons (i.e., late archery and late muzzleloader) while the percentage participating during regular firearms seasons in either or both the Northern Zone and Southern Zone has varied between 85% and 92% (Figure 11). The percentage of deer hunters taking part in the early archery season has increased steadily from about one-quarter in 1989, about one-third in 1993 and 1996, to about 40% as of 2006. The percentage of deer hunters participating in the late special seasons has increased even more dramatically, from about one in twenty-five in 1989, to one in seven in the mid 1990s, and about one in three as of 2006.

Days of hunting effort. Trend in days of participation do not mirror the apparent increase in popularity of archery and late special seasons. The average number of days hunted during the early archery season decreased 35-40% from 1989 to 2006 (Figure 12) while the percentage of hunters participating increased >150% (from Figure 11). Similarly, while the percentage of hunters participating in late special seasons increased 775%, the average days of participation by those hunters remained virtually unchanged. Overall, the average number of days of participation during the regular firearms season showed a very slight increase.

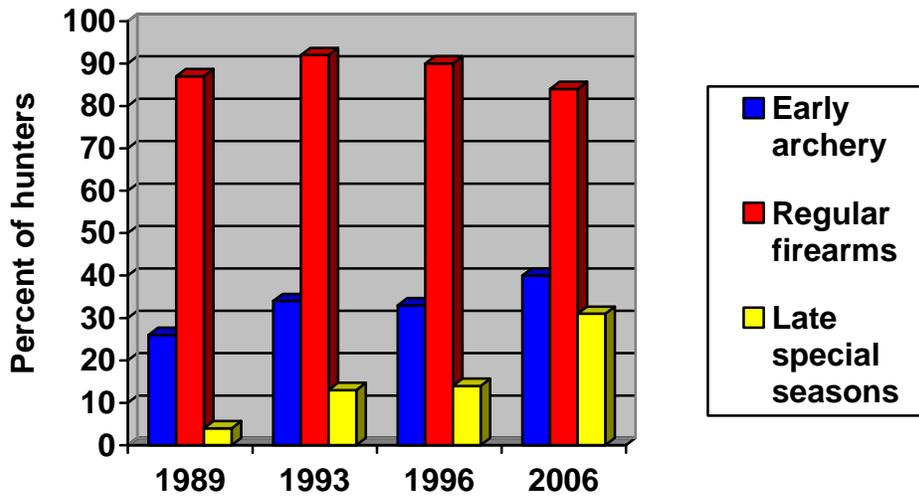
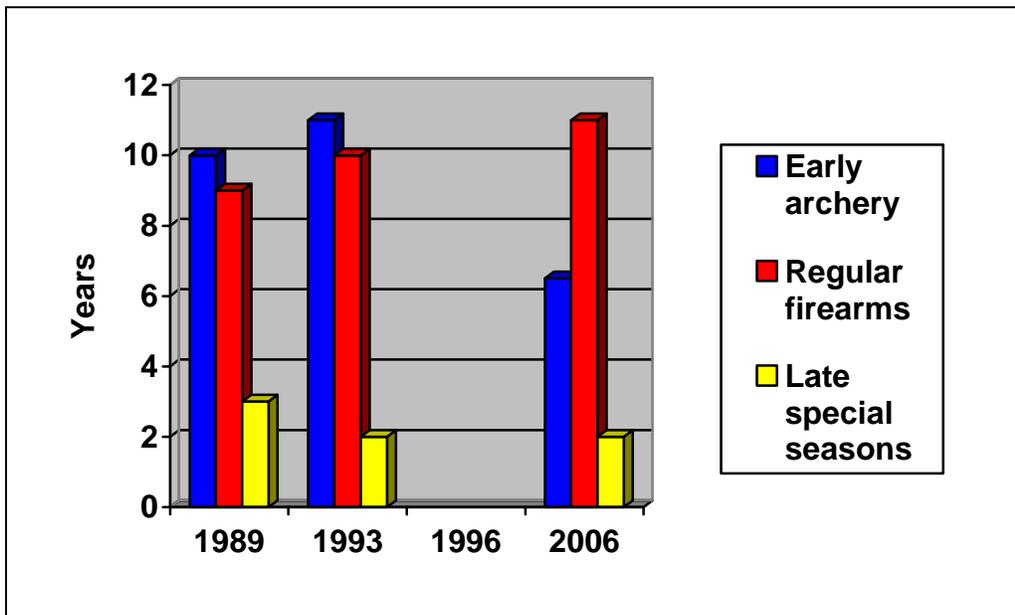


Figure 11. Percentage of resident deer hunters in New York State participating in various deer-hunting seasons during selected years between 1989 and 2006, from statewide mail surveys.




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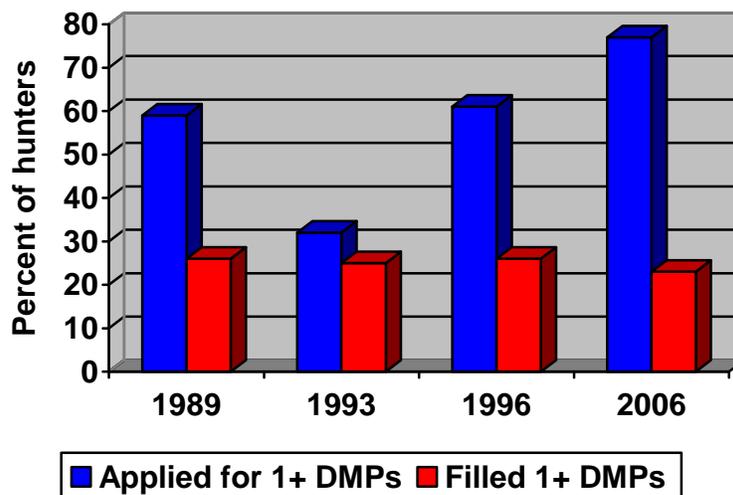
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**Figure 12. Mean number of days hunted by deer hunters in New York State during early archery season, regular firearms season, and late special seasons for selected years from 1989 and 2006, from statewide mail surveys.**

Hours of hunting effort. Effort on opening day has remained relatively stable, with hunters spending an average of 7.4 hours afield in 1989 and 7.3 hours afield in 2006. Similarly, effort on subsequent days of the season has remained relatively constant (5.9 hours per day in 1989 vs. 6.2 hours per day in 2006). However, effort on subsequent days consistently has been about 20% lower than on opening day.

Harvest during the various seasons. Data were collected only after the 1989 and 1996 seasons, in part because DEC estimates these harvest numbers independently from HDRU surveys, and because changing bag limits between years make comparisons difficult. In 1989, 14% of bowhunters reported taking a deer during the early archery season. This increased to 22% for the 1996 season. Also in 1989, 36% of hunters reported taking a deer during the regular firearms seasons. By 1996, this percentage increased to 47% and remained at 46% in 2006.

One aspect of bag limit that has changed over the years pertains to use of deer management permits (DMPs). Both the number of DMPs that an individual hunter can apply for and fill has changed, as well as the seasons in which a hunter can attempt to fill his/her DMPs. To standardize application and use of DMPs for comparison, we present trends for the percentages of hunters who applied for and filled at least one DMP. Whereas the percentage of hunters who have applied for at least one DMP has varied substantially over the years, the percentage which has filled at least one DMP has remained remarkably stable (Figure 13).

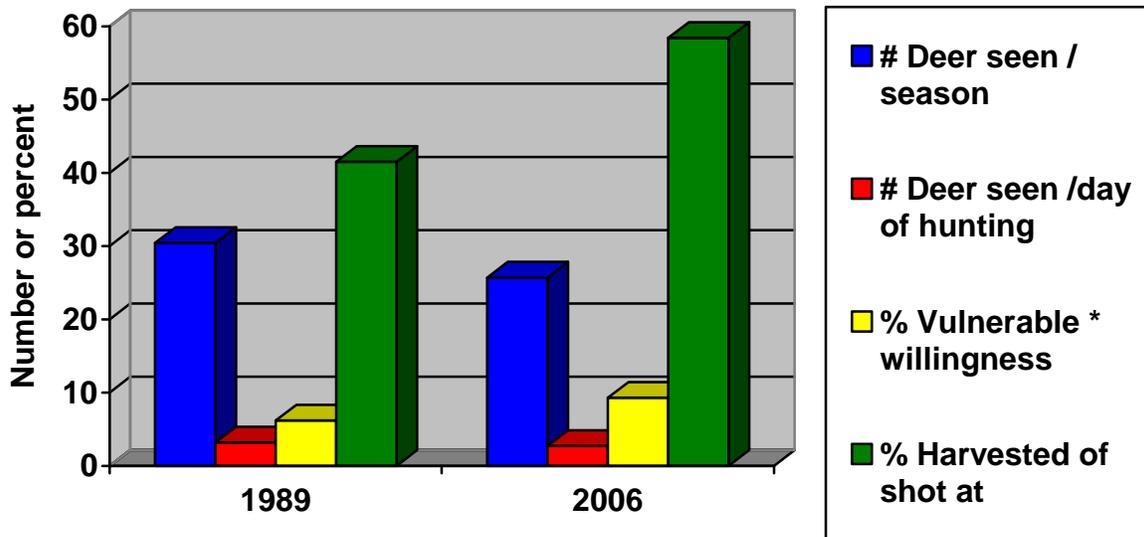


**Figure 13. Percentage of deer hunters in New York State who applied for at least one deer management permit (DMP) and filled at least one DMP in selected years from 1989 to 2006, based on statewide mail surveys.**

Buck bag limits also have changed somewhat over the years. The percentage of deer hunters who reported taking at least one antlered buck was 23% in 1989, and decreased to 17% in 1993. Then it increased to 32% in 1996, and remained at 31% in 2006.

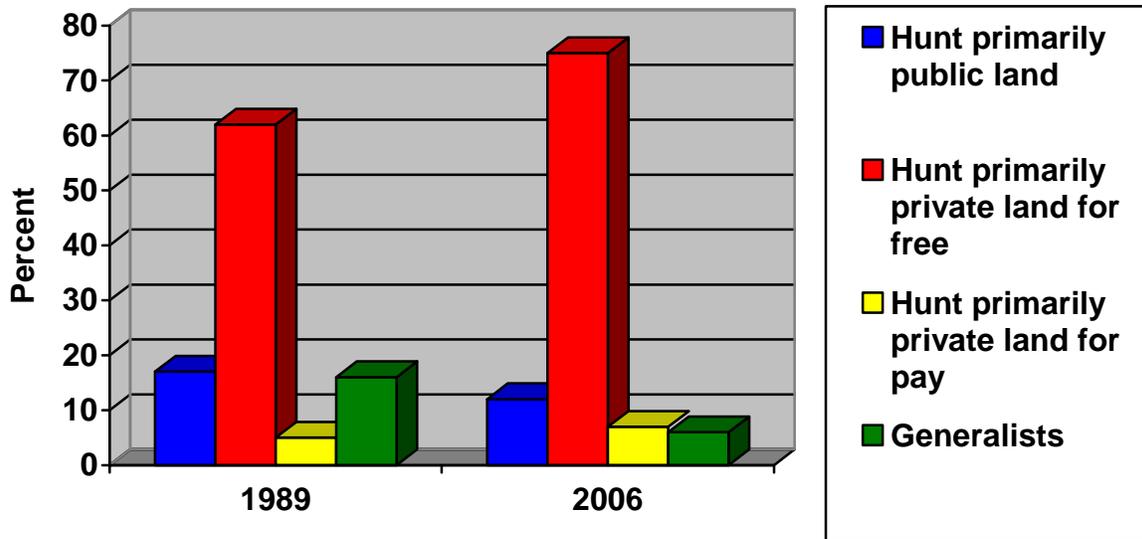
Other factors affecting harvest in addition to changes in bag limits include changes in the deer population, observations of those deer by hunters, the vulnerability of deer to being shot (in range, clear shot available), the willingness of hunters to take deer that are vulnerable, and shooting effectiveness of the hunters. We have data for most of these variables from only 1989 and 2006.

Generally, the total number of deer observed by hunters during the regular firearms season (Northern and Southern Zones, combined) decreased about 16% from >30 during the 1989 season to about 25 in the 2006 season, and the number of all deer observed per day of hunting decreased by a similar magnitude from an average of 3.2 to 2.7 (Figure 14). In 1989, hunters shot at 6.2% of all the deer they observed during the season, which reflects combined vulnerability and willingness to shoot at vulnerable deer. In 2006, 42.8% of all deer observed by hunters were vulnerable to being shot, but hunters were willing to shoot at only 21.8% of those vulnerable deer. Thus, hunters shot at 9.3% of deer they observed in 2006 (i.e., combined vulnerability and willingness). Also, shooting effectiveness was slightly higher in 2006 (i.e., hunters harvested 58.4% of the deer they shot at) compared to 1989 (41.5%).



**Figure 14. Total number of deer seen during the regular firearms season and per day of hunting, percent of observed deer at which hunters shot (vulnerable \* willingness), and % of deer shot at that were harvested (shooting effectiveness) by deer hunters in New York State in 1989 and in 2006, from statewide mail surveys.**

Hunting on public vs. private land. Compared to 1989, a smaller percentage of hunters in 2006 hunted on public land and more hunted on private land for free (Figure 15). The percentage of generalist hunters decreased. However, the percentage hunting on private land where they must pay a fee (including leases and hunt clubs) remained relatively stable.



**Figure 15. Percentages of deer hunters in New York State who hunted primarily on various kinds of properties in 1989 and 2006, based on statewide surveys.**

## DISCUSSION

Respondents to our survey were relatively experienced, long-term deer hunters who expressed high levels of avidity and interest in hunting deer. The many years of experience and relatively high avidity and interest are consistent with an aging hunter population, apparently resulting from low recruitment and moderate retention of hunters since the late 1980s and early 1990s. These trends in recruitment and retention of deer hunters are a major concern for the future of deer management in New York State, given the self-imposed restraint hunters consistently have shown for harvesting antlerless deer (e.g., this study and Brown et al. 2000).

Geographically, the challenge of using hunters to manage deer may be greatest in the Southeastern part of the state. About one-fifth of hunters from the Southeastern stratum indicated that deer hunting was not an important recreational activity for them, and two-thirds of those said their interest in deer hunting had decreased in the last five years. No other area of the state had this combination of low avidity and low interest, and it may portend less retention in that area in the coming years.

Neither of the possible experimental regulations we asked about is likely to increase satisfaction enough to improve hunter participation in the Southeastern stratum, or elsewhere. Experimentally reducing the buck bag limit to one antlered buck for all hunters regardless of the number of hunting implements used (to improve equitable distribution of opportunity and harvest of bucks) was soundly opposed and generally would decrease hunter satisfaction. Experimentally protecting most yearling bucks from harvest (i.e., increasing the buck harvest standard) was more positively received by hunters. Yet, although a majority of hunters who said their interest in deer hunting had decreased in the last five years supported protecting yearlings (to improve the age structure of bucks, probably e.g., through antler restrictions), those hunters were no more likely to support or oppose the idea than hunters whose interest either had increased or remained the same. Thus, implementing antler restrictions would be unlikely to be a “carrot” that would improve retention of these less avid, less interested hunters.

Especially given the poor recruitment of younger deer hunters, DEC was particularly interested in evaluating whether satisfaction and support for either standardizing the buck bag limit or increasing the buck harvest standard differed by hunter age categories or by whether they primarily hunted on public land or private land. Neither age nor type of land hunted seemed to influence satisfaction from, or support for, either of the possible regulation changes. Instead, support or opposition was tied strongly to the level of importance or concern that hunters placed on some possible deer-hunting outcomes (i.e., impacts) they anticipated if the regulations were changed. These findings support the concept of adaptive impact management or AIM (e.g., Riley et al. 2002, Riley et al. 2003, Enck et al. 2006)

In general, a higher percentage of hunters supported protecting most yearling bucks from harvest if they believed it would increase positive impacts that were “too low” for hunters to be satisfied, or decrease negative impacts that were “too high” for hunters to tolerate” For example, hunters who indicated that (1) “seeing antlered bucks of any age,” (2) “seeing older bucks with large antlers,” or (3) “having a more natural mix of older and younger bucks” were important enough to be impacts to be managed, apparently believed that those outcomes were likely (although we did not ask them). These hunters also were much more likely than hunters who did not identify these outcomes as important enough to be impacts to have a measurable attitude about protecting yearling bucks (i.e., either “support” or “oppose”, rather than “neither”). Majorities of these hunters also supported experimentally protecting most yearling bucks. Similarly, hunters indicating that “feeling a sense of urgency to shoot the first antlered buck I see when I’d rather wait for a different buck,” or “fearing being shot by unsafe hunters” were negative impacts to be managed, were more likely than those who did not identify these experiences as impacts to have a measurable attitude and to support experimentally protecting yearling bucks.

Further, whether *experienced levels* of positive impacts were at *desirable levels* influenced support for experimentally protecting most yearling bucks from harvest. If hunters believed that experienced levels of positive impacts either were too low or just about at the minimum level for them to be satisfied, they supported experimentally protecting yearlings. However, hunters who believed that experienced levels were more than high enough to be satisfied were split about whether they supported or opposed the idea. For hunters who already were experiencing enough of those impacts, changing deer-hunting regulations might influence other, positive impacts in uncertain ways. Perhaps those hunters believed that protecting yearling bucks would decrease levels of other unidentified positive impacts. What those impacts might be remains unknown at this time.

*Experienced levels* of negative impacts, compared to *tolerable levels*, did not influence support or opposition. Regardless of whether the levels of negative impacts were too high or low enough for them to still be satisfied, strong majorities supported protecting yearling bucks. Hunters who believed that their sense of urgency to shoot the first buck they see, or whose fear of being shot by unsafe shooters was too high, apparently believe that their urgency or fear would be reduced to more tolerable levels by experimentally regulating the taking of yearling. Hunters who believed those negative impacts already were at tolerable levels apparently believe that regulating the taking of yearling bucks apparently would keep them at tolerable levels.

We caution that although the impacts concept provides a useful foundation for explaining likely changes in hunters' satisfaction with, and support/opposition toward, protecting most yearling bucks from harvest, the current study did not identify all deer-related impacts (positive or negative) that hunters apparently associate with this possible change in the buck harvest standard. For those hunters who believe that several buck-related impacts are "high enough" under the current situation, we do not know the impacts that led high percentages of those hunters to oppose protecting yearling bucks. Despite this caution, the impacts concept as applied in this study builds on, and improves our understanding of, the multiple satisfactions associated with deer hunting (e.g., Decker et al. 1980).

In particular, we now know that the experience of seeing antlered bucks while hunting that was identified by Enck and Decker (1991) as a primary satisfaction component, conveys other "very important" meanings to hunters, including the naturalness of the mix of bucks and does and the naturalness of the mix of older and younger bucks. Further, we now have determined that seeing older bucks with larger antlers is as important to most hunters as is seeing bucks of any size – not just because they want to harvest bigger bucks – but because seeing those larger bucks helps the hunters interpret the "health" and "naturalness" of the deer herd in their local area. In addition, we know now that encountering other hunters afield (a major dissatisfaction identified by Enck and Decker) has both a crowding aspect and a safety aspect. Survey results indicate that hunters believe intolerable levels of concern about both safety and crowding might be improved by experimentally protecting most yearling bucks from harvest.

While these insights may help DEC staff improve decision-making in the context of deer management, we also obtained information that will help in the context of bear management. As black bears continue to expand their ranges outside of the traditional three areas (i.e., Adirondacks, Catskills, and Allegany region), DEC will be able to count on deer hunters to help

harvest more bears. Although only 3-8% of deer hunters actively hunted bears during the 2006 season, about one-quarter of deer hunters have a self-perception that they are a bear hunter. In addition, more than two-thirds of all deer hunters said they would try to harvest a bear if they had the legal opportunity to do so.

Finally, this study provided an important opportunity to continue monitoring long-term trends in deer hunter characteristics. The most-recent, previous opportunity had been about a decade ago. Since then, the deer hunter population in New York State has continued to become more rural and older, on average, with apparently very low recruitment and moderate retention rates. Nonetheless, remaining hunters mostly are relatively avid and interested in continuing deer hunting. Further, recent changes in how licenses are issued has increased application rates for DMPs although fill rates have not changed substantially. Certainly, the deer hunter population in New York will continue to change over time, and because of DEC's continuing commitment to monitoring those trends, it will be in a good position to assess what those changes mean for deer management in the state.

## **CONCLUSIONS AND IMPLICATIONS**

Across New York State, deer hunters reported remarkably similar experiences in general, and have relatively similar attitudes about those experiences. Hunters have as many or more opportunities now than they ever had, and large numbers of hunters are taking advantage of those opportunities. Large minorities of deer hunters use several hunting implements, with a very large increase in the popularity of muzzleloaders. More hunters than ever before also are applying for DMPs to use during the special implement seasons as well as during the regular firearms season.

However, these opportunities are not translating into highly satisfied participants. Overall, most hunters are not very satisfied with their buck-hunting experiences and some changes may be warranted in the regulations affecting those opportunities. One possible change that likely would be widely support is some kind of regulation to protect most yearling bucks from harvest. Not only do most hunters in all geographic areas of the state believe such a change would increase their hunting satisfaction and would support the idea of protecting yearling bucks, but their reasons for supporting the idea seem to be based on reasonable expectations. Deer hunters who highly-valued several positive or negative deer-related impacts supported the idea of protecting most yearling bucks, especially if they believed levels of those impacts would improve through such a regulation. On the other hand, the idea of standardizing the buck bag limit at one antlered buck per hunter generally was not supported and would decrease satisfaction for most hunters.

Neither of the possible changes we investigated (standardizing the buck bag limit and improving the buck harvest standard) would improve the poor recruitment and retention rates experienced in New York over the last two decades. If DEC decides to target those concepts for management interventions or research, the greatest benefit would be to do so outside of the realm of deer management. Such an effort likely would be a long-term process requiring substantial collaborative efforts with many partners.

Of more immediate benefit would be continued monitoring of trends in characteristics of hunters and continued research into trade-offs among impacts of importance to hunters. This study has provided greater understanding about impacts than was available previously. It also assessed experienced levels of some impacts that were not expected to be particularly salient to hunters under current regulations (e.g., difficulty deciding if an encountered buck was legal to shoot), but which could be quite salient under a regulation to protect yearling bucks from harvest. Substantial decision-making benefit could be reaped by continuing to measure both experienced levels and desirable/tolerable levels of impacts.

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## APPENDIX A:

### **Buck Harvest Standards (BHS) - Is it time for a Change?**

#### NY's Deer Management Program

New York's overall deer management program strives to provide both the means to control deer numbers and recreational benefits. The program has evolved over several decades in response to changing deer numbers and human interests.

The current buck harvest standard (BHS), an antler 3" long, was established in 1912. At that time NY was in the restoration phase of deer management, trying to allow deer populations to expand after they were decimated in the 1800s. The intent of the 3" inch BHS was to simply differentiate bucks from does. Protecting does from harvest worked and NY's deer populations grew. By the 1950's deer numbers had grown to the point that population control was needed in some strata of the state. To control deer numbers a program to provide for doe harvest was needed and the Deer Management Permit (DMP) system now in place began to take shape.

While the DMP system, or something similar, will continue to be essential for population control, because buck harvest plays a lesser role in population management the BHS could be changed in response to other interests.

#### Why consider changing the BHS?

While buck harvest plays a minimal direct role in deer population control, it is a major element of the recreational aspects of the program and has considerable influence on hunter satisfaction. Looking long term, maintaining hunter numbers and effort will be important to successful deer management. Are there changes that could be made to buck hunting opportunities that would help maintain, or even boost, hunter interest and participation?

#### Effect of BHS on a deer herd.

The BHS sets the age that a buck is likely to be eligible for harvest. The age at which an animal can be taken and the intensity of harvest affects the composition of a population. In the case of bucks in NY, because most can be taken as yearlings, very few bucks live into older age classes - less than 2% live to age 4. Alternatively with does, where harvest intensity is controlled, and generally lower, over 10% live to age 4. The differential harvest rates on the sexes effects adult sex ratios, which may affect breeding and other social behavior.

#### Can real change be achieved?

Yes, where hunting occurs it is commonly the highest form of mortality deer face. Hunters can and do dictate herd composition. After many decades of experiencing the abbreviated buck age structure that results from the current BHS some hunters mistakenly believe that is all that can be expected. Deer are capable of surviving into their teens and survival rates of young adults are very high, excluding hunting mortality. Change hunter selectivity and you can change herd composition.

#### What could a higher BHS accomplish?

While programs utilizing higher BHS are purported to, and may, have several positive effects on a deer herd, people should have realistic expectations on what they may see accomplished. Some changes will be obvious and others, if they occur, will be subtle and hard to note in the field. Following are some interests/concerns commonly raised....

**Larger bucks** - This is the most straight forward and obvious result of increasing the BHS. Younger bucks protected by a higher BHS have very good prospects of surviving to the following fall. Research including recent work in PA show that over 75% of bucks that survive a hunting season will survive to the following fall. NY's deer belong to the subspecies, *O.v. borealius*, which occurs over much of the northeastern portions of the deer's range - east of the Mississippi from Illinois to New Jersey northward into Canada and given an opportunity to live a few years could produce deer to rivals those found most anywhere.

**More Bucks** - Protecting all or portions of one or more year classes results in adding most of these bucks to the buck population the following fall. The extent of change is dependent on the BHS used, but nearly a doubling of preseason buck numbers is possible.

### **Balancing Adult Sex Ratios**

While adult sex ratios in strata of NY with a history of does harvest (most of the southern tier) are not terribly skewed in most cases, increasing the BHS would tend to bring it more in balance - this is assuming appropriate doe harvests are achieved.

**Harvest Rates** - Setting a higher BHS will result in a period of reduced buck harvest opportunity. The length of this period is roughly equal to the number of year classes a new BHS is intended to protect. A BHS intended to protect yearling bucks would result in one season of very limited opportunity to harvest a buck followed by a return to conditions where buck harvests should approach the level previously achieved. Long term buck harvest rates are likely to settle in slightly below previous levels, as would doe harvest needs.

**Breeding behavior/success** - More older bucks and a more balanced adult sex ratio may increase the intensity of the rut. NY's deer have been thriving and the timing of the rut is largely tied to seasonal changes (day length) so people should not expect dramatic changes in breeding timing or success. A more intense rut may produce conditions that benefit hunters, with bucks possibly being more vulnerable and responsive to hunting techniques such as rattling.

**Hunter Satisfaction** - If the prospects of seeing more bucks afield, of having a better chance of taking a larger buck, or of successfully using hunting techniques such as "grunting" or "rattling" interests you, than a higher BHS offers the prospect of boosting your hunting satisfaction.

### Are There Risks or Costs with a higher BHS?

The biggest cost of a higher BHS is the "investment period" with very limited buck harvest. Prospects of unintentionally (or intentionally) effecting genetics are remote. Long term harvest opportunity following setting a new BHS will be dependent on the standard set, but a program set to protect yearlings, would result in harvest opportunities approaching those previously available.

### How do you set a BHS?

Parties must agree on the minimum age (or size) they would like most bucks to obtain. Then an ideal BHS would provide an easy field technique for distinguishing bucks above and below that point. Unfortunately, no such criteria exist. Lacking that, a review of habitat quality and antler data should be used to determine what makes sense for a particular area. Because of the range in habitat quality and the age (or size) standards that might be chosen there is no one size fits all answer for setting BHS. However, it can be said that on good quality habitat, point criteria provide a much weaker basis for separating age classes than antler width.

### Field Application and Enforcement

A commonly voiced concern is that any new BHS would be difficult to adhere to in the field and to enforce. Even the 3" rule requires some judgement by a hunter, while counting points or gauging width may take more care and patience, for some people it would be a small price to pay for the potential benefits. A point count or width standard could both offer clear enforcement standards.

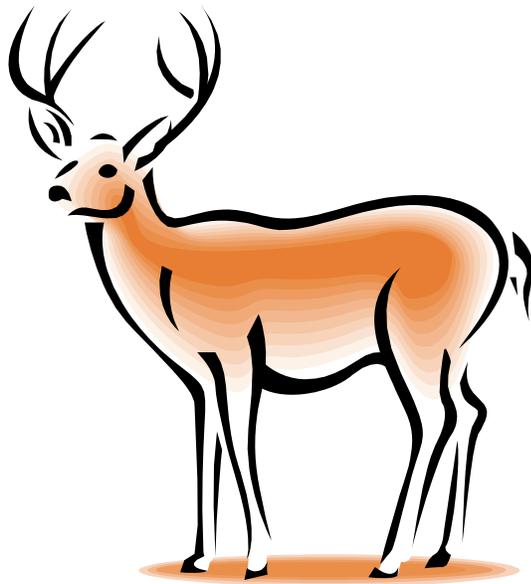
### Herd Numbers versus Herd Composition?

NY's deer program has long been focused on controlling overall deer numbers, with little emphasis on the composition of the resulting deer herd. For many people, i.e. farmers and motorist, this serves their interests and maintaining overall deer numbers at desired levels will continue to be a program priority and changing the BHS would not change the population goal for an area. For some other people, i.e. hunters and deer observers, management which directed attention on herd composition could heighten their enjoyment of the resulting deer herd. Changing the BHS is one means to do so, is it time to consider a change?

**APPENDIX B:**

**Study Questionnaire**

**2007 Survey of Deer Hunters  
in New York State**



## **ABOUT THIS QUESTIONNAIRE**

2007 Survey of Deer Hunters in New York State

Research conducted by the  
Human Dimensions Research Unit  
Department of Natural Resources  
Cornell University

Sponsored by the New York State  
Department of Environmental Conservation (DEC)

*This survey is part of a continuing effort by deer biologists with the New York State Department of Environmental Conservation (DEC) to monitor hunting participation as well as the interests and concerns of the state's deer hunters. Every few years, DEC surveys a random sample of hunters throughout the state to track trends in hunter effort, better understand the experiences that affect hunter satisfaction, and to determine opinions about important issues that might affect hunters' experiences.*

*Please take a few minutes now to complete this survey. The information you provide will remain strictly confidential and will never be associated with your name.*

**THANK YOU FOR YOUR ASSISTANCE!**

## YOUR GENERAL DEER-HUNTING EXPERIENCES

- 1. How many years have you hunted deer in New York or other places?** *(If none, write in 0.)*

\_\_\_ Years (If you hunted for the first time in 2006, check here \_\_\_)

- 2. How many antlered bucks and antlerless deer have you harvested in New York or other places?** *(If none, write in 0.)*

\_\_\_ Antlered Bucks and \_\_\_ Antlerless Deer (fawns and does)

- 3. How important is deer hunting to you?** *(Please check one.)*

\_\_\_ Its my most important recreational activity.  
\_\_\_ Its one of my most important recreational activities.  
\_\_\_ It no more important than my other recreational activities.  
\_\_\_ It one of my least important recreational activities.

- 4. How has your interest in deer hunting changed over the last 5 years?** *(Please check one.)*

\_\_\_ I am less interested now compared to 5 years ago.  
\_\_\_ My interest has not changed over the last 5 years.  
\_\_\_ I am more interested now compared to 5 years ago.

- 5. How many Deer Management Permits (DMPs) did you apply for, receive, and fill during the 2006-07 hunting seasons in NY?** *(Write in a number for each line. If none, write in 0.)*

\_\_\_ DMPs applied for  
\_\_\_ DMPs received  
\_\_\_ DMPs filled

6. **Before opening day of the 2006-07 deer season in NY, how many hours did you spend preparing to hunt in these specific ways?** (Write in a number for each line. If none, write in 0.)

HOURS

- \_\_\_ Preseason scouting outdoors  
\_\_\_ Practicing with my bow or firearm  
\_\_\_ Calling or visiting landowners to get permission  
\_\_\_ Planning my hunt by consulting maps, reading magazines or websites  
\_\_\_ Gathering, sorting, and cleaning my equipment

7. **Did you hunt deer in New York State during the 2006-07 hunting season?** (Check only one response.)

- \_\_\_ No (In what year did you last hunt deer in NY? \_\_\_\_\_)  
    **If you checked “No” go to Question x.**  
\_\_\_ Yes (Continue with question 8)

8. **Did you hunt on opening day of the regular firearms season in the Southern Zone in either of the last 2 years?** (Circle one answer for each year.)

Hunted opening day in 2005 when it was a Monday? No Yes

Hunted opening day in 2006 when it was a Saturday? No Yes

9. **How did the change from a Monday to a Saturday opening day of the regular firearms season in the Southern Zone affect your overall deer-hunting satisfaction?** (Check one answer.)

- \_\_\_ Increased my satisfaction  
\_\_\_ Did not change my satisfaction  
\_\_\_ Decreased my satisfaction

**10. Consider all the time you spent deer hunting during the 2006-07 season, what percent of time did you spend using each of the following hunting techniques? (If none, write in 0.)**

Stationary stand (e.g., tree stand or ground blind)     \_\_\_ %

Deer drives (i.e., “drivers” push deer to “standers”)     \_\_\_ %

Still-hunting, stalking, or tracking deer     \_\_\_ %

Total = 100%

**11. What percentage of your time did you spend hunting on each of the following types of property? (If none, write in 0.)**

Public land (federal, state, county, etc.)     \_\_\_ %

Private land for free     \_\_\_ %

Land where you had to pay (lease, hunt club, etc.)     \_\_\_ %

Total = 100%

**12. How many days did you hunt during each of these seasons in New York? (Write in a number for each line. If none, write in 0.)**  
**DAYS**

Northern Zone

\_\_\_ Early muzzleloader season (October 14-20, 2006).

\_\_\_ Archery season (September 27 - October 20, 2006).

\_\_\_ Regular rifle season (October 21 - December 3, 2006).

\_\_\_ Late muzzleloader season (December 4-10, 2006)

Southern Zone

\_\_\_ Early archery season (October 14 - November 17, 2006).

\_\_\_ Regular gun season (November 18 - December 10, 2006).

\_\_\_ Muzzleloader season (December 11-19, 2006).

\_\_\_ Late archery season (December 11-19, 2006).

\_\_\_ Suffolk Co. archery (October 1 - December 31, 2006).

\_\_\_ Suffolk Co. gun season (January 8-31, 2007).

\_\_\_ Westchester Co. archery (October 14-December 31, 2006).

\_\_\_ WMUs 3C, 3H, 3J, or 3K with special antler restrictions.

**13. How many hours did you hunt on opening day and (on average) on other days during the following 2006-07 seasons?**  
*(Write a number in each box. If none, write in 0.)*

	Early archery Northern Zone	Rifle in Northern Zone	Late Muzzle-loader in Northern Zone	Early archery Southern Zone	Regular firearms Southern Zone	Late Muzzle-loader in Southern Zone
Total hours hunted on opening day						
Average # of hours hunted other days						

**14. Which one WMU do you consider your primary place to hunt?**  
 WMU \_\_\_\_

**15. Consider your primary place to hunt. Out of every 10 antlered bucks alive before the 2006-07 season started, how many were older bucks with larger antlers, and how many were younger bucks with smaller antlers?** *(Write a number on each line.)*

\_\_\_\_ Mature bucks + \_\_\_\_ Young bucks = 10 total bucks

**16. Consider your primary place to hunt. Out of every 100 total deer alive before the 2006-07 season started, how many were antlered bucks, and how many were antlerless deer (does and fawns)?** *(Write a number on each line below.)*

\_\_\_\_ antlered bucks + \_\_\_\_ antlerless deer (does and fawns) = 100 deer

**17. How satisfied were you with your buck-hunting opportunities in your primary place to hunt in New York State?** *(Circle one.)*

Greatly dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither Satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	Greatly satisfied
1	2	3	4	5	6	7

**WHAT DID YOU SEE AND HARVEST?**

**18. How many deer of the following types did you see, shoot at, and take during the 2006-07 regular firearms deer season?**  
*(Write a number in each box. Write in 0 if you saw no deer of a particular type, took no shots, or harvested no deer).*

<b>Sightings, shots, and harvest</b>	<b>All antlerless deer (does and fawns)</b>	<b>Younger antlered bucks with smaller antlers</b>	<b>Older antlered bucks with larger antlers</b>
<b>Number you saw while hunting</b>			
<b>Number you <u>could</u> have shot at if you wanted (had an unfilled tag and a clear shot in range)</b>			
<b>Number you did shoot at</b>			
<b>Number you harvested</b>			
<b>Number of total shots you took at these deer</b>			

**19. How important to you personally are each of these possible positive aspects of deer hunting?** *(Circle one number for each.)*

<u>Possible positive aspect</u>	<u>Not at all important</u>	<u>Slightly important</u>	<u>Moderately important</u>	<u>Very important</u>
seeing antlered bucks of any age	1	2	3	4
seeing older, legal bucks	1	2	3	4
having a natural mix of older and younger bucks	1	2	3	4
having a natural deer sex ratio	1	2	3	4
seeing healthy, good-quality deer	1	2	3	4
being considered a “good” or expert buck hunter by others	1	2	3	4
having the discretion to shoot the buck of my choice	1	2	3	4
all hunters having a fair chance to take an older buck	1	2	3	4

**20. How concerned are you personally about each of these possible negative aspects of deer hunting? (Circle one number for each.)**

<u>Possible negative aspect</u>	<u>Not at all concerned</u>	<u>Slightly concerned</u>	<u>Moderately concerned</u>	<u>Very concerned</u>
feeling its not worthwhile to hunt because I see so few deer	1	2	3	4
feeling crowded by too many hunters	1	2	3	4
feeling unsafe because people shoot indiscriminately at bucks	1	2	3	4
having difficulty figuring out if a buck I see is legal to shoot	1	2	3	4
seeing that some sub-legal bucks have been shot	1	2	3	4
feeling a sense of urgency to shoot the first legal buck I see instead of waiting for one I'd rather shoot	1	2	3	4

**21. Based on your hunting in 2006-07, how did each of the following affect your overall hunting satisfaction?**

<u>Some possible aspects of my deer hunting experiences</u>	<u>Too low for me to be satisfied</u>	<u>Just about at the minimum level I need to be satisfied</u>	<u>More than enough for me to be satisfied</u>
total number of antlered bucks I saw	1	2	3
number of older bucks with large antlers I saw	1	2	3
number of older bucks compared to younger bucks	1	2	3
number of bucks compared to does	1	2	3
total deer density	1	2	3
degree to which all hunters had a fair chance to shoot an older buck	1	2	3
amount of discretion to shoot the buck of my choice	1	2	3

Some possible aspects of my deer hunting experiences	Too high for me to be satisfied	Just about at the maximum level I can tolerate	Low enough for me to still be satisfied
sense of urgency to shoot a buck when I'd rather wait for a different one	1	2	3
feeling crowded by other hunters	1	2	3
feeling unsafe because people shoot indiscriminately at deer	1	2	3
amount of difficulty figuring out if a buck I see is legal to shoot	1	2	3
number of sub-legal bucks shot by hunters	1	2	3

**YOUR OPINIONS ABOUT SOME POSSIBLE CHANGES IN BUCK-HUNTING REGULATIONS**

Currently, the bag limit for antlered bucks is 2 for hunters who hunt with multiple implements (like bow and shotgun), although the limit is 1 buck for people who hunt only during the regular gun season. An experimental change would be to have a 1-buck bag limit for all hunters regardless of how many implements they use.

**22. How would an experimental change to a 1-buck bag limit affect your overall satisfaction with buck-hunting opportunities in New York State? (Circle one.)**

Greatly increase	Moderately increase	Slightly increase	Neither increase nor decrease	Slightly decrease	Moderately decrease	Greatly decrease
1	2	3	4	5	6	7

**23. To what extent would you support or oppose an experimental change to a 1-buck bag limit in New York State? (Circle one.)**

Greatly support	Slightly support	Neither support nor oppose	Slightly oppose	Greatly oppose
1	2	3	4	5

Currently, a large percentage of the yearling bucks are harvested by hunters each fall in New York State. An experimental regulation change would protect most yearling bucks from harvest through some kind of antler restriction.

**24. How would an experimental regulation to protect most yearling bucks affect your overall satisfaction with buck-hunting opportunities in New York State? (Circle only one.)**

			Neither			
Greatly increase	Moderately increase	Slightly increase	increase nor decrease	Slightly decrease	Moderately decrease	Greatly decrease
1	2	3	4	5	6	7

**25. To what extent would you support or oppose an experimental regulation to protect most yearling bucks from harvest? (Circle only one.)**

		Neither		
Greatly support	Slightly support	support nor oppose	Slightly oppose	Greatly oppose
1	2	3	4	5

24. Are you...? (Circle only one.) Female Male

25. In what year were you born? (Fill in the blank.) 19 \_\_\_\_.

26. How would you describe the type of stratum where you live?

<input type="checkbox"/> on a farm	<input type="checkbox"/> city with between 25,000 and 49,999 people
<input type="checkbox"/> a rural area, but not a farm	
<input type="checkbox"/> village or city with fewer than 25,000 people	<input type="checkbox"/> city with more than 50,000 people

27. What is the highest level of education you have attained?  
(Check one line.)

<input type="checkbox"/> Primary school	<input type="checkbox"/> College graduate ( B.A., B.S.
<input type="checkbox"/> High school or GED	<input type="checkbox"/> Postgraduate degree (M.S., PhD)
<input type="checkbox"/> Some college	<input type="checkbox"/> Professional degree (MD JD)

**THANK YOU VERY MUCH FOR YOUR ASSISTANCE**

**To return this questionnaire, simply seal it with the white reusable seal (postage has been provided) and drop it in the nearest mailbox.**