

**HUNTERS' PERSPECTIVES ON SATISFYING AND DISSATISFYING
ASPECTS OF THE DEER-HUNTING EXPERIENCE
IN NEW YORK**

by

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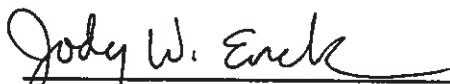
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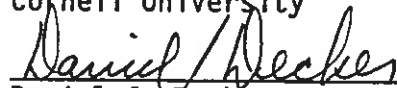
JOB NUMBER AND TITLE: IV-2 - Evaluation of the Deer Management Permit System as a Recreational Hunting and Deer Population Management Tool

- JOB OBJECTIVES:
- (1) To determine elements of deer hunting satisfaction and dissatisfaction from the perspective of deer hunters statewide, and relate these to the deer management program from the standpoint of enhancing satisfaction and diminishing dissatisfaction associated with deer hunting.
 - (2) To identify aspects of the deer management permit system that may be modified to produce greater hunter satisfaction.
 - (3) To provide information that DEC can use to assess the need for modification of deer management objectives relative to recreational hunting demands.

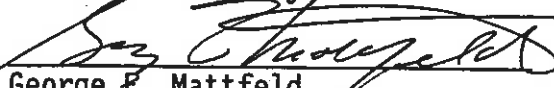
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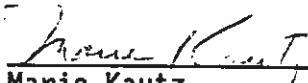
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EXECUTIVE SUMMARY

The goal of deer management in New York is "...perpetuation of the white-tailed deer resource, maintaining populations at levels that insure optimal recreational opportunities commensurate with range carrying capacity and tolerable conflicts with other land uses" (Dickinson, No date). This goal reflects the desire to balance habitat concerns, recreation, and other societal interests in deer. To achieve this goal, deer managers require information about deer habitat, deer population biology, and human values relative to deer. One of the human values that the New York State Department of Environmental Conservation (DEC) considers is hunters' satisfaction with recreational deer hunting.

In the summer of 1989, DEC asked the Human Dimensions Research Unit (HDRU) in the Department of Natural Resources at Cornell University to develop a study to determine deer hunters' perspectives on the satisfying and dissatisfying aspects of recreational deer hunting in the State. The objectives of the study we designed were to :

- (1) Identify the important aspects of overall deer hunting satisfactions and dissatisfactions for hunters in New York;
- (2) Determine how hunters develop preseason expectations about important satisfactions;
- (3) Determine whether hunters experience what they expect during the deer season; and
- (4) Identify possible program actions to increase deer hunter satisfactions and decrease dissatisfactions.

Keywords: Deer management, human dimensions, whitetailed deer, hunting satisfactions, hunting motivations, expectations, deer management permits

CONCEPTUAL FRAMEWORK

Deer hunter satisfaction is a complex concept to measure. Since the 1970's, researchers have recognized that participants derive many different types of satisfactions from deer hunting (Hendee 1974, Decker et al. 1980). Management to enhance these satisfying aspects of deer hunting depends on knowing which experiences or aspects of deer hunting are important to deer hunters.

Previous research (e.g., Decker et al. 1984) has suggested that the importance hunters place on specific aspects of deer hunting is related to 1 of 3 types of motivations for hunting deer: (1) achievement (hunting primarily to meet a self-determined standard of performance such as bagging a deer or a certain size or sex); (2) affiliation (hunting primarily for the camaraderie and to strengthen personal relationships); and (3) appreciation (hunting primarily to relax and escape from everyday concerns). In addition, Clawson (1963) and Langenau and Peyton (1982) described a model in which satisfaction relates to experiences occurring during 3 stages of the hunting experience: (1) planning and preparation during which the hunter "gets ready" for a hunting trip, (2) field experience which includes the time hunting, and (3) recollection which reinforces and adds to satisfactions gained during the other stages. We believe the referent for this model can be an entire hunting season, not just 1 hunting trip. Combining the Decker et al. (1984) motivational theory with our application of the theory on hunting experiences (Clawson 1963, Langenau and Peyton 1982) provides a conceptual framework for examining deer-hunting satisfactions which account for all combinations of the motivational and temporal aspects described above.

Another influence on overall satisfaction is the degree of correspondence between an individual's experiences and his/her expectations (Snowden 1976). Meeting 1 expectation likely does not guarantee satisfaction when considered in light of the multiple-satisfactions theory described earlier. Some aspects of the hunting experience are "absolutely necessary" for a hunter to be satisfied, but they are not sufficient by themselves. Conversely, some aspects of a hunting experience may be "absolutely dissatisfying," resulting in a dissatisfying hunting season regardless of whatever else is experienced during the season. Information is needed on the importance of the various aspects of deer hunting satisfaction, and how hunters' expectations for the aspects is related to satisfaction. Understanding the relationships between expectations and satisfactions also depends on understanding how expectations are developed. This development process has not been studied relative to deer-hunting satisfactions.

This conceptual framework led us to examine the following questions:

1. What levels of importance do hunters place on various aspects of their deer-hunting experiences (both satisfying and dissatisfying aspects)?
2. Do the most important aspects of deer hunting encompass each of 3 time periods relative to the deer season (i.e., preseason, during the season, and postseason), and encompass each of 3 motivational orientations (i.e., achievement, affiliation, and appreciation)?
3. How do hunters form expectations about what they will experience during the upcoming deer season.
4. Are hunters always satisfied if their expectations are met for all aspects they identify as "absolutely necessary" (i.e., critical)?
5. Are hunters always dissatisfied if their expectations are not met for all aspects they identify as "absolutely necessary"?

METHODS

A sample of 5,965 big game license holders was selected from the approximately 770,000 big game licenses sold in New York in 1989. The sample was selected to provide information about hunters on a statewide basis as well as in 7 specific groups (i.e., sampling strata): (1) Adirondack residents, (2) Catskill residents, (3) Central/Western New York residents, (4) New York City/Long Island Metropolitan residents, (5) Nonresidents, (6) Muzzleloader hunters, and (7) Bowhunters.

A mail questionnaire was developed based on a review of the literature on hunting satisfactions and group interviews with deer hunters and deer managers throughout the State. The survey was implemented on 7-8 May 1990; up to 3 reminder letters were sent to nonrespondents at 10- to 14-day intervals after the initial mailing. An assessment of nonresponse bias was made via telephone interviews with 50-60 nonrespondents from each group for which we experienced a response rate <65%. Because nonrespondents did not provide new information about increasing hunters' satisfaction with deer hunting, we did not adjust the overall response to reflect the attitudes and behaviors of this group, except in special cases where noted.

The margin of error associated with the responses reported herein varies according to the size of the sample for the group of interest and the percentage of respondents giving a particular answer to each question. The maximum expected margin of error at the 95% confidence level for this study is $\pm 5.7\%$.

RESULTS AND DISCUSSION

The initial sample of 5,965 big game license holders resulted in 137 undeliverable questionnaires and 3,539 codable returns (61% of the deliverables). Response rates for the various strata were: 55% Metro; 61% Catskills; 55% Adirondacks; 63% Central/Western; 74% Nonresidents; and 70% Muzzleloader hunter. Bowhunters were identified from other groups and were not sampled separately.

Characteristics of Deer Hunters and Their Hunting Experiences

In New York during 1989, deer hunters across the State had the following characteristics:

- Most hunters were male (93.5%). The Adirondack group had the highest percentage of female hunters (10%) of any group.
- Respondents averaged 41 years of age with relatively few young hunters 16-25 years old in the hunting population.
- Respondents averaged 20 years of deer-hunting experience in New York or elsewhere.
- Respondents had bagged an average of 9.7 deer in their lifetime in New York or elsewhere.
- All parts of the rural-urban continuum were represented with 45% of the respondents living in rural areas, 35% living in villages and small cities, and 20% living in cities with >25,000 inhabitants. The obvious exceptions were that a greater percentage of Adirondack residents lived in rural areas, and a greater percentage of Metro residents lived in urban areas.
- Respondents hunted primarily in the geographic region in which they lived, with the exception of the Metro residents, a larger percentage of whom hunted in the Catskills.
- Most resident deer hunters who responded hunted "every year" (59%) since they first started deer hunting, or they hunted "most years" (30%). Adirondack residents had the lowest percentage (54%) who hunted "every year" whereas almost three-quarters of Nonresidents (71%), Bowhunters (74%), and Muzzleloader hunters (75%) hunted "every year."

- Respondents hunted approximately 6 hours out of 10 hours of legal shooting time per day.
- Overall, respondents averaged about 9 days hunting during the regular firearms season. However, a wide distribution of hunting effort existed. About one-half of the respondents hunted less than a week, one-third hunted a week to 2 weeks, and 1 of 6 hunted more than 2 weeks.
- On average, fewer days were spent afield during the early archery season (about 5 days), the late archery season (about 1 day), and the muzzleloader season (about 1 day) than during the regular firearms season.
- Adirondack residents hunted relatively few days during the early archery season (about 3 days). They also hunted relatively many days during the regular gun season (about 14 days). This probably reflects the greater opportunity provided by the longer Northern Zone season, which is about twice as long as the Southern Zone season.
- Respondents saw about 4 deer per day during the regular firearms season. About 8% of the respondents saw no deer, most respondents (73%) saw 1-5 deer per day, 14% saw 6-10 deer per day, and 5% saw ≥ 11 deer per day.
- Respondents saw about 4 deer per day during the early archery season, 2 deer per day during the late archery season, and 3 deer per day during the muzzleloader season.
- Respondents averaged about 1 shot during the regular firearms season although only 43% took shots then. Bowhunters and Muzzleloader hunters averaged less than 1 shot during their respective seasons. Metro residents took the fewest shots, averaging about 1 shot for every 2 hunters.
- About 16% of the respondents bagged a buck during the regular firearms season, 29% bagged a deer on a deer management permit (DMP) during the regular firearms season, about 14% bagged a deer during the early archery season, less than 1% bagged a deer in the late archery season, and about 7% bagged a deer during the muzzleloader season.
- Regional differences were found in the buck harvest rate. For example, Adirondack hunters reported one of the highest buck harvest rates of any group (about 25%). Nonresidents also reported a high buck harvest rate (about 30%). Metro residents reported the lowest buck harvest rate of any group (about 10%).

Overall Satisfaction With Deer-Hunting Experiences

- Overall, about two-thirds (68%) of the resident hunters were satisfied with their deer-hunting experiences during 1989. Only 18% indicated some level of dissatisfaction. About 14% said they were neither measurably satisfied nor dissatisfied.
- Some regional differences in satisfaction were found. More Nonresidents (77%) and Bowhunters (75%) than any other groups said they were satisfied. Approximately 70% of the respondents from the Adirondack, Central/Western, Metro, and Muzzleloader hunter groups were satisfied. A somewhat lower percentage of respondents from the Catskill group were satisfied (62%), and a concomitantly higher percentage (25%) were dissatisfied.
- Respondents placed different levels of importance on 35 satisfactions and 35 dissatisfactions examined. Sixteen of the satisfactions were of primary importance (i.e., "very important" or "absolutely necessary"), and 11 of the dissatisfactions were identified as being primary (i.e., "tends to make me dissatisfied" or "absolutely makes me dissatisfied").

Primary Satisfactions and Dissatisfactions

- The concept of multiple satisfactions was reinforced in that 16 of the satisfactions and 11 of the dissatisfactions examined were of primary importance for respondents.
- Primary satisfactions and dissatisfactions grouped into 5 main categories: (1) "preparation" for the season, (2) "visual evidence" of deer in an area, allowing hunters to perceive they have a chance to bag a deer; (3) "relaxation and escape" from everyday worries, (4) "interaction" with other hunters, and (5) "access to private land" for deer hunting.
- "Preparation" likely increased the respondents' perceived chances of seeing and bagging deer, and may have provided respondents with a better opportunity to "make a clean kill," which was also identified as being important.
- "Visual evidence" of deer gave respondents first-hand knowledge that deer were in an area, and thus gave respondents a perceived chance to bag a deer.
- Deer hunting gave respondents an opportunity to relax and escape from everyday worries, but dissatisfactions like unwanted interactions with other hunters prevented many respondents from achieving this satisfaction.
- Respondents desired limited contact with other hunters outside of their group, and when those contacts occurred, respondents wanted to encounter safe, ethical hunters.

- Dissatisfying interactions with other hunters were major reasons why most respondents (75%) preferred to hunt on "private land for free" where access to other hunters was controlled. Fourteen percent of resident respondents preferred to hunt on "public land" because they "did not have to ask permission" or because they believed the "deer habitat was better." About 8% preferred to hunt on "leased land," and 3% had no preference.

- Although most respondents preferred to hunt on "private land for free," we estimate from the study that about 100,000 hunters statewide did not or could not hunt on that type of land for reasons mostly relating to problems in gaining access.

Temporal-Motivational Aspects of Satisfaction

- Our hypothesis that all temporal-motivational dimensions of the hunting experience would be represented by the primary satisfactions and dissatisfactions was not supported; only a few dimensions were represented by primary satisfactions and dissatisfactions.

- Primary satisfactions pertained mostly to the time period during the deer season, and to a lesser extent, the preseason. Achievement-oriented and appreciative-oriented motivations were represented whereas affiliative-oriented motivations were not.

- Primary dissatisfactions generally occurred during the deer season, and pertained to inhibiting the respondents' appreciation of hunting and nature.

"Single Greatest" Satisfactions and Dissatisfactions

- The "single greatest" satisfactions listed by the largest percentages of respondents pertained to "relaxation," "visual evidence" of deer, "bagging deer," and the "affiliative" aspects of hunting.

- The "single greatest" dissatisfactions listed by the largest percentages of respondents pertained to "poor hunter behavior," not seeing "visual evidence" of deer, "not bagging deer," "bad weather," and "encountering posted land."

- Respondents suggested 3 kinds of solutions for overcoming their "single greatest" dissatisfactions: (1) changes in management actions (e.g., reduce deer management permits, more Conservation officers, stiffer penalties for violators, start the hunting season earlier); (2) enhancement of the Sportsmen's Education Courses (SEC's) (e.g., more ethics in SEC, teach hunting skills in SEC, more safety in SEC's, mandatory safety school for violators); and (3) actions that can be taken by sportsmen (e.g., peer pressure, hunt somewhere else, hunt more hours/days, scout/plan more).

Development of Preseason Expectations

- Most respondents relied on multiple types and sources of information to develop their preseason expectations about the number of deer they would see during the hunting season. The most important sources of information were personal reconnaissance or the personal experience of friends. "Secondary sources" of information such as reading magazines or newspapers, or obtaining information from DEC were used by relatively few respondents overall.
- Metro and Nonresident respondents were more likely than respondents from other groups to use "secondary sources" of information to develop preseason expectations about the number of deer they would see during the hunting season. This may have been due to the fact that many Metro and Nonresident respondents live long distances from their hunting areas, and have less opportunity to scout personally.

Expectations vs. Actual Experiences

- Generally, when respondents saw only 1 or 2 deer per day, their expectations were not met. When they saw 5 or more deer per day, their expectations were met, thus contributing to their satisfaction.
- Catskill hunters reported seeing about the same number of deer per day as respondents from other groups (about 4), yet they had the lowest percentage of satisfied hunters (62%). Clearly, their expectations for seeing deer were higher than for any other group. This is especially interesting because Catskill and Metro respondents hunted in the same geographic area, and Metro respondents had a lower expectation for the number of deer they would see during the hunting season.
- A set of conditional relationships exist between satisfying and dissatisfying aspects of deer hunting. These relationships describe many, but not all, respondents. The foundation for the relationships is whether a hunter's preseason expectations are met during the hunting season:
 - If a hunter's expectations are met for all aspects that are identified as "absolutely necessary" for the hunter to be satisfied, and no aspects exist to make the hunter "absolutely dissatisfied," then the hunter will be satisfied.
 - If a hunter's expectations are not met for all aspects that are identified as "absolutely necessary" for the hunter to be satisfied, then the hunter will be dissatisfied even if no aspects exist to make the hunter "absolutely dissatisfied."
 - If a hunter's expectations are met for all aspects that are identified as "absolutely necessary" for the hunter to be

satisfied, but at least 1 aspect exists to make the hunter "absolutely dissatisfied," then the hunter will be dissatisfied. (For these hunters, dissatisfactions override satisfactions.)

- Not all hunters can be described using the conditions above. Some hunters are satisfied even when their expectations were not all met. This likely happens as the context of their hunting experiences change. Something occurs that is so satisfying (e.g., a child bagging a first deer) that other expectations are no longer important. For these hunters, satisfactions override dissatisfactions.

Deer Management Permits (DMP's)

- Among all resident respondents, 45% were "generally satisfied" with the deer management system DEC uses in the Southern Zone, 16% were "generally dissatisfied," 27% had "mixed feelings," and 12% had "no opinion."
- Reasons for being "generally satisfied" included confidence in DEC staff (28%) and seeing plenty of deer (8%). Many satisfied respondents (43%) gave no reason. Reasons for being "generally dissatisfied" included a perception that too many deer management permits were issued (33%), disagreement about the accuracy of DEC deer population estimates (11%), and not seeing enough deer (10%).
- A higher percentage of Catskill respondents than respondents from other groups were dissatisfied with the deer management system used in the Southern Zone. This regional difference is important considering most Central/Western, Metro, and Nonresident respondents also hunted in the Southern Zone, and Metro respondents hunted in the same part of the Southern Zone as Catskill respondents. Reasons for dissatisfaction given by Catskill respondents were the same as reasons given by the relatively few dissatisfied respondents from other regions. The higher percentage of Catskill respondents who were dissatisfied likely relates to their higher expectations for seeing deer.
- Overall, 81% of the resident respondents wanted to apply for a DMP although only 59% actually did so.
- About 86% of the respondents who applied for a DMP received one.
- The most important reasons for applying for a DMP included "to increase chances of bagging a deer" (55%), "to hunt legally after filling buck tag" (13%), and "to help manage deer herd" (12%).
- The most important reasons for not applying for a DMP included "too many does are shot in my area" (22%) and "did not get around to it" (20%).

- Regional differences occurred with respect to the use of DMP's:
 - Relatively few Adirondack respondents (41%) applied for a DMP, and only 67% said they wanted to apply, probably because DMP's cannot be used in the Northern Zone.
 - Only 50% of Catskill respondents applied for a DMP although 74% said they wanted to apply. Catskill respondents were split with respect to their feelings about DMP's. Compared with other groups, a high percentage of Catskill respondents wanted to apply for a DMP so they could take an extra deer whereas others believed the DMP program was responsible for an undesirable decrease in the deer population.
 - The Central/Western group had the highest percentage of respondents (87%) who wanted to apply for a DMP, and a relatively high 66% did so.
 - Most Metro respondents (83%) wanted to apply for a DMP, and 64% did apply.
 - Nonresidents were less likely than other groups to apply for a DMP (only 48% did) although 73% said they wanted to apply. An important reason why Nonresidents did not apply was that they "didn't think their chances of getting a DMP were very good." This reason does not reflect the undersubscription of DMP's in many management units in the last few years; Nonresidents actually have a high likelihood of receiving a DMP in many units.
 - Most Muzzleloader hunters (78%) wanted to apply for a DMP, and many did so (63%).
 - A very high percentage of Bowhunters wanted to apply for a DMP, and a higher percentage of Bowhunters than any other group did apply (72%). A relatively high percentage of Bowhunters (18%) compared with other groups said the most important reason they applied was "to hunt legally after bagging a buck," presumably as extra insurance that they could hunt during the regular season.

MANAGEMENT IMPLICATIONS

The results of this study support the multiple satisfactions concept of deer hunting (e.g., Hendee 1974, Decker et al. 1980). Whether deer hunters in New York are satisfied with their hunting experiences depends on more than a single aspect such as seeing deer or bagging a buck. Satisfaction depends on a range of hunting experiences being either realized or not realized. The

range of satisfactions and dissatisfactions that are important, and the degree to which each aspect is important, differs among hunters.

Most deer hunters were satisfied with their deer-hunting experiences and expressed support for DEC's deer management program. Continued support depends in part on helping hunters (1) establish realistic expectations for what they will experience during the hunting season and why they will have those experiences (i.e., understanding management), (2) meet their expectations for the most important satisfactions associated with deer hunting, and (3) avoid or overcome the most important dissatisfactions.

Management efforts will be most beneficial if they concentrate on helping hunters establish realistic expectations. However, establishing realistic expectations can only be accomplished by understanding that hunters place more value in personal reconnaissance or information from other hunters than in secondary sources of information such as newspapers, magazines, or even DEC. Perhaps local networks of sportsmen could be developed who would collect information and provide forecasts for the upcoming deer season. Such individuals would have to be trained to take into account the observability of deer at different times of the year and under different conditions (Sage et al. 1983) so they could provide the most accurate forecasts.

In helping hunters develop realistic expectations, managers also can help hunters understand why those expectations should be realistic. For example, if hunters "don't see enough deer," they need to understand that managers consider a broad range of societal needs when making decisions about the level the deer population should be in a given management unit, and that that level might be lower than the hunters would like it to be. Helping hunters understand why certain expectations should be realistic may not be an

easy task for managers because many hunters do not "perceive or value their role in management," but focus more on the achievement of personal satisfactions (Decker and Connelly 1990:450). Accomplishing this task will require strong communication and education efforts on the part of managers.

Changes in the use of DMP's also may help hunters' actual experiences match more closely with their expectations. Many hunters whose expectations for seeing deer were not met, especially in the Catskill residence group, believed "too many DMP's were issued." "Too many DMP's" may not have been issued, but their use early in the deer season decreased opportunities to observe deer later in the season (e.g., about 40% of the DMP's are filled during the first 3 days of the season in the Catskill region and only about 25% are filled during the last 4 days [NYSDEC, unpublished data]). One way for deer to be observable longer into the season would be to delay or spread out the use of DMP's.

Such a change in the use of DMP's would require simultaneous actions to overcome other dissatisfactions such as hunters' concerns about deer being pushed onto posted land during the hunting season. Whether deer actually move onto private land or not, many hunters perceive this behavior occurs and that it limits their opportunities to see and bag deer. If this deer behavior does occur, delaying or spreading out the use of DMP's could reduce the effectiveness of DMP's as a management tool. This indicates the importance of addressing access issues.

Many respondents could not, or did not, gain access to private lands to hunt deer and instead hunted on public land where "access was easier." Previous studies have indicated that landowners post their land because of concern about poor hunter behavior (Brown and Thompson 1976). This study

found that hunters shared this recognition that poor hunter behavior is a problem.

Poor hunter behavior was identified as a primary dissatisfaction by most hunters, and many hunters witnessed such behavior. DEC can help hunters overcome this dissatisfaction by building on the hunters' own recognition that poor behavior must be improved. Respondents suggested changes in the Sportsmen's Education Courses (SEC's) as a way to accomplish this. Suggested changes included additional training for new hunters, and mandatory renewal of SEC training by all hunters. Additional support for such actions may be gained if training can be used to obtain access to private lands for hunting. For example, hunters could be issued re-certification cards as proof to landowners that they have participated recently in a refresher course on hunting safety and ethics.

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Information obtained from hunters was an important part of the foundation for the mail questionnaire developed for the study. Numerous deer hunters around the state provided us with insights into the many satisfactions and dissatisfactions of deer hunting through a series of group interviews held in the fall of 1989. The Big Game Committee of the New York State Conservation Council was particularly helpful in providing insights. We also would like to express our appreciation to the more than 3,500 deer hunters who responded to the survey and provided the information described in this report.

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HUNTERS' PERSPECTIVES ON SATISFYING AND DISSATISFYING ASPECTS OF THE DEER HUNTING EXPERIENCE IN NEW YORK STATE

The goal of deer management in New York State is "... perpetuation of the white-tailed deer resource, maintaining populations at levels that insure optimal recreational opportunities commensurate with range carrying capacity and tolerable conflicts with other land uses" (Dickinson No date). This goal reflects the desire to balance habitat concerns, recreation, and other societal interests in deer. To achieve this goal deer managers require information about deer habitat, deer population biology, and human values relative to deer. One of the human values that the New York State Department of Environmental Conservation (DEC) considers is hunters' satisfaction with recreational deer hunting.

Deer management has come under increasing scrutiny by hunters in recent years, particularly as DEC has attempted to reduce deer densities that have reached all-time highs in some areas, and as deer populations in other areas have declined (N. Tripp, New York State Dep. Environ. Conserv., pers. comm.). Over the last decade the number of deer hunters in New York has declined (Brown et al. 1987) and political activity by sportsmen to influence DEC management objectives and mechanisms to achieve those objectives has increased. These changes add to the increasing complexity of deer management in New York. Of immediate concern to DEC is gaining a better understanding of the causes of satisfaction and dissatisfaction among deer hunters.

In the summer of 1989, DEC asked the Human Dimensions Research Unit (HDRU) in the Department of Natural Resources at Cornell University to develop a study to determine deer hunters' perspectives on the satisfying and

dissatisfying aspects of recreational deer hunting in the State. The objectives of the study we designed were to:

- (1) Identify the important components of overall deer hunting satisfactions and dissatisfactions for hunters in New York;
- (2) Determine how hunters develop preseason expectations about important satisfactions;
- (3) Determine whether hunters experience what they expect during the deer season; and
- (4) Identify possible program actions to increase deer hunter satisfactions and decrease dissatisfactions.

CONCEPTUAL FRAMEWORK

Deer hunter satisfaction is a complex concept to measure. Since the 1970's, researchers have recognized that participants derive many different types of satisfactions from deer hunting (Hendee 1974, Decker et al. 1980). As a result, managers have increasingly used a multiple-satisfactions approach to deer management in the belief that providing opportunities for a wide range of these satisfactions (many of which are under managers' control, though some are not) will add to the overall benefits hunters receive from deer management. Management to enhance these multiple satisfactions depends on knowing which experiences or aspects of deer hunting are important to hunters.

Research suggests that the importance hunters place on specific aspects of deer hunting is related to their motivations for hunting deer. Decker et al. (1984) suggested that an individual participates in an activity to meet 1 or more personal goals. Goals relative to deer hunting can be classified based on 3 general types of motivations: (1) achievement-motivated individuals who hunt primarily to meet a self-determined standard of performance such as bagging a deer of a certain size or sex; (2) affiliative-

motivated individuals who hunt primarily for the camaraderie and to strengthen personal relationships; and (3) appreciative-motivated individuals who hunt primarily to relax and escape from everyday concerns.

An individual may exhibit a combination of motivations for hunting deer, but research has shown that typically an individual has a "primary motivational orientation" focussing on 1 of the 3 motivations described above (Purdy and Decker 1986, Purdy et al. 1989). Hunters' primary motivational orientations may be reflected in the level of importance they place on the various aspects of deer hunting. Previous research (e.g., Hautaluoma and Brown 1979, Langenau et al. 1981, Vaske et al. 1986, Decker and Connelly 1988, Heberlein 1988, Hammitt et al. 1990) has shown that hunters place different levels of importance on various aspects of hunting, but the relationship between the importance an individual places on various aspects and the individual's primary motivation for hunting has not been examined.

As hunters meet personal goals relative to their primary motivational orientation, we expect that they become more satisfied with their deer-hunting experiences. For example, an individual with an affiliative-oriented motivation for hunting deer who can spend time hunting with friends and family members will be more satisfied than if he/she must hunt alone. Conversely, hunting alone may be a requisite of satisfaction for an individual with an appreciative-oriented motivation for hunting. However, satisfaction likely depends on more than meeting one's goals relative to his/her primary motivational orientation on any single occasion.

Instead, we believe that to be satisfied requires meeting one's goals during all stages of the hunting experience. An underlying theory of recreational behavior advocated by Clawson (1963) is that multiple stages

exist for any recreational experience. Langenau and Peyton (1982) proposed a modification of Clawson's approach that included 3 main stages: (1) planning and preparation, (2) field experience, and (3) recollection. During the initial stage, a person performs activities that help prepare for the hunt. This stage has been recognized as being especially important because many hunters spend more time preparing for the hunt than they spend in the field (More 1979). The field experience stage comprises a variety of hunting-related experiences. Finally, the recollection stage reinforces and adds to satisfactions gained during the preceding stages. All 3 stages contribute to the total recreational experience (Langenau and Peyton 1982).

We believe that a natural extension of the Langenau and Peyton (1982) model is to consider the 3 stages relative to the experiences of an entire deer season, not just 1 specific day afield or hunting trip. Given this extension, preseason experiences such as scouting for deer, practicing with firearms, and discussing hunting strategies with other hunters correspond to the planning and preparation stage. Experiences that occur during the deer-hunting season such as seeing and bagging deer, enjoying wildlife other than deer, and hunting with desired companions correspond to the field experience stage. Finally, postseason experiences like eating venison, reminiscing about the hunt with friends, and hiking or skiing to one's favorite deer-hunting area in the off-season to relive past hunts correspond to the recollection stage.

Combining the Decker et al. (1984) motivational theory with the extension of the Langenau and Peyton (1982) behavioral model provides a conceptual framework for examining deer-hunting satisfactions. This framework consists of a 9-cell matrix that accounts for all combinations (i.e.,

dimensions) of the motivational and temporal components described above (Figure 1). Theoretically, all cells in the matrix contribute to an individual's level of deer-hunting satisfaction. Some cells likely are more important than others because each individual has a primary motivational orientation. However, because previous research indicates that the total hunting experience is important, it is expected that all cells in the matrix in fact have some influence on overall satisfaction.

Another influence on overall satisfaction is the degree of correspondence between individuals' experiences and their expectations (Snowden 1976). On the most simplistic level, satisfaction likely will be higher if his/her preseason expectations for particular aspects are met or exceeded by conditions experienced during the hunting season than if those preseason expectations are not met. For example, a hunter who expects to see 10 deer per day and sees 15 is more likely to be satisfied than a hunter who expects to see 25 and only sees 15. However, meeting 1 expectation likely does not guarantee satisfaction when considered in light of the multiple-satisfactions theory discussed earlier. Some aspects of the hunting experience are "absolutely necessary" for a hunter to be satisfied, but they are not sufficient by themselves. The concept of satisfaction is more complex and requires the examination of several questions: Is the level of satisfaction gained from meeting or exceeding an expectation affected by how much importance the hunter places on that part of the experience? How many "absolutely necessary" aspects of the experience exist for most hunters? To what degree does it matter whether expectations are met for all aspects versus the few "absolutely necessary" ones?

		Temporal Dimension		
Motivational Dimension		Preseason	During Season	Postseason
	Achievement	<ul style="list-style-type: none"> • Buying hunting equipment • Sighting-in a deer rifle • Planning a new hunting strategy 	<ul style="list-style-type: none"> • Seeing deer • Shooting at deer • Bagging a deer 	<ul style="list-style-type: none"> • Butchering deer • Eating venison • Tanning deer hide
	Affiliative	<ul style="list-style-type: none"> • Sharing stories before the hunt • Talking over deer-hunting strategies with family and friends 	<ul style="list-style-type: none"> • Hunting with family members • Hunting with friends • Helping others in the woods 	<ul style="list-style-type: none"> • Sharing venison with others • Reminiscing about the hunt with friends
	Appreciative	<ul style="list-style-type: none"> • Seeing other wildlife while scouting for deer • Gaining a feeling of relaxation while scouting for deer 	<ul style="list-style-type: none"> • Taking advantage of early season opportunities that offer less crowded conditions • Seeing other wildlife while hunting deer • Gaining a sense of belonging to the environment 	<ul style="list-style-type: none"> • Skiing to favorite deer stand in the off-season • Personal reflection after the season

Figure 1. A conceptual framework for examining the temporal and motivational dimensions of deer-hunting satisfaction showing examples associated with each cell of the matrix.

An example may help place these questions into a context. Assume 2 hunters in different locations each expect to: (1) see about 5 deer per day, and (2) hunt in an area with few other hunters. Assume that seeing deer is more important to them than seeing few hunters. One hunter sees 1 deer, and no other hunters (first expectation not met, second met). The other hunter sees 10 deer, and 20 other hunters (first expectation met, second not met). Are both hunters dissatisfied because 1 of their 2 expectations was not met, or can the second hunter be satisfied because his/her expectation for his/her more important aspect was met?

Understanding the relationship between expectations and satisfactions also depends on understanding how expectations are formed. One aspect of human behavioral theory suggests that individuals encounter environmental stimuli or cues that result in certain expected outcomes (Fantino and Logan 1979). The development of these expectations depends on whether certain outcomes consistently follow from specific cues. If the relationship between 1 or more cues and an outcome is confirmed repeatedly, the strength of the expectation increases. Two questions follow from this theoretical relationship between expectations and satisfactions that are relevant for managers: How are deer hunters' preseason expectations formed? What environmental cues are important in developing expectations about components such as the number of deer a hunter will see during the season?

This conceptual framework led us to examine the following questions in this study:

What levels of importance do hunters place on various aspects of their deer-hunting experiences (both satisfying and dissatisfying aspects)?

Do the most important aspects of deer hunting encompass each of 3 time periods relative to the deer season (i.e., preseason, during the season,

postseason), and encompass each of the 3 motivational orientations (i.e., achievement, affiliation, appreciation)?

How do hunters form expectations about what they will experience during the upcoming deer season?

Are hunters satisfied if their expectations are met for all aspects they identify as "absolutely necessary" (i.e., critical)?

Are hunters always dissatisfied if their expectations are not met for all aspects they identify as "absolutely necessary"?

METHODS

A sample of 5,965 big game license holders was selected from the approximately 770,000 big game license holders in New York in 1989 (see Appendix A). The sample was selected to provide information about hunters on a statewide basis as well as in 7 specific groups (i.e., sampling strata): (1) Adirondack residents, (2) Catskill residents, (3) Central/Western New York residents, (4) New York City Metropolitan area residents, (5) Nonresidents, (6) Muzzleloader hunters, and (7) Bowhunters. The 4 geographic areas corresponding to the in-state residence groups are shown in Figure 2.

All studies of human behavioral characteristics and attitudes that involve taking samples from a large population have a margin of error associated with them. This margin of error varies according to sample size and the percentage of respondents giving a particular answer to each question. The sample for this study was selected in a way that provides statistically reliable information for each of the 7 groups of interest. The maximum expected margin of error at the 95% confidence level for this study is $\pm 5.7\%$ (Table 1). That is, if 100 different samples of 500 license holders were taken from 1 of the groups examined in this study, 95 times out of 100 the results obtained would vary no more than ± 5.7 percentage points from the

Figure 2. In-state geographic divisions for the study of deer-hunting satisfactions and dissatisfactions in New York, 1990.

Table 1. Margin of error at the 95% level for responses to any question in the study of deer-hunting satisfactions and dissatisfactions in New York, 1990.

<u>Response percentage^a</u>	<u>Margin of error</u>
10% or 90%	$\pm 3.4\%$
20% or 80%	$\pm 4.6\%$
30% or 70%	$\pm 5.2\%$
40% or 60%	$\pm 5.5\%$
50%	$\pm 5.7\%$

^aExample: If the survey indicated that 93.2% of all license holders hunted deer in 1989, the margin of error would be 3.4%. Thus, the percentage of license holders who hunted deer would fall between 89.8% and 96.6% 95 times out of every 100 that a sample of 500 was drawn from the population of big game license holders.

results that would be obtained if the entire population of license holders in that group was surveyed.

A mail questionnaire was developed for the study based on a review of the literature on recreational satisfactions (see discussion in Conceptual Framework on pages 2-8) and group interviews with deer hunters and deer managers throughout the State (see Appendix A). Group interviews using the Nominal Group Technique (More 1978) were held with hunters and managers to determine the breadth of deer-hunting aspects that should be addressed in the questionnaire. The final questionnaire sought information on deer-hunting participation, overall deer-hunting satisfaction, the aspects of deer hunting that lead to satisfaction or dissatisfaction, how hunters' preseason expectations are formed, and selected demographic data.

The mail survey was implemented on 7-8 May 1990; up to 3 reminder letters were sent to nonrespondents at 10- to 14-day intervals after the

initial mailing. Responses were coded by the Cornell Institute for Social and Economic Research and HDRU staff using SPSS-DE for the micro-computer (SPSS, Inc. 1988a). Statistical analyses were conducted by HDRU staff using the Statistical Package for the Social Sciences computer package (SPSS Inc. 1988b).

Results were analyzed for the entire set of respondents who were New York State residents and for each of the 7 groups of interest. The aggregate analysis was conducted by weighting the results from the 4 in-state residence groups to account for differences in the number of licenses sold in each region (see Table A2 in Appendix A).

An assessment of nonresponse bias was made via telephone interviews with 50-60 nonrespondents from each group for which we experienced a response rate <65% (i.e., Adirondack, Catskill, Central/Western, and New York City Metropolitan residence groups). Nonrespondents generally placed significantly less importance on many of the aspects of hunting satisfaction and dissatisfaction examined, indicated higher satisfaction with deer management, and were somewhat less involved in deer hunting than respondents. Because nonrespondents did not provide new information about increasing hunters' satisfaction with deer hunting, we did not adjust the overall response to reflect the attitudes and behaviors of this group, except in special cases where noted for comparison with data from other sources. See Appendix B for a detailed description of how potential nonresponse bias was assessed, and Appendix C for a description and characterization of nonrespondents.

RESULTS AND DISCUSSION

The initial sample of 5,965 big game license holders resulted in 137 undeliverable questionnaires and 3,539 codable returns (61% of the deliverables). Response rates for the various strata were: 55% Metro; 61% Catskills; 55% Adirondacks; 63% Central/Western; 74% Nonresidents; and 70% Muzzleloader. Bowhunters were identified from respondents in each of the other groups and were not surveyed as a specific group, per se.

Characteristics of Deer Hunters and Their Hunting Experiences

Deer hunters in New York State in 1989 were predominantly male (93.5%), and averaged 41 years of age. They averaged about 20 years of deer-hunting experience, and had bagged an average of 9.7 deer in New York or elsewhere in their lifetime.

The age distribution of hunters (Figure 3) shows relatively few hunters in the 16-25 year category compared with the 26-35 year, 36-45 year, and 46-55 year categories. This dominance by older hunters also was reported by Decker and Connelly (1988) for recipients of deer management permits in 1987. New York's relatively old population of deer hunters may help to explain why Empire State hunters seem to have somewhat more deer-hunting experience than hunters studied in other states such as Michigan (17 years) (Langenau and Aldrich 1981) and Wisconsin (16 years) (Jackson 1988), or those who hunted at a National Recreation Area in Tennessee (11 years) (McDonald and Hammitt 1985).

The relatively low percentage of young deer hunters found in the study reported herein may indicate a decline in the recruitment of young men and women into deer hunting. The percentage of 16-25 year-olds in the general

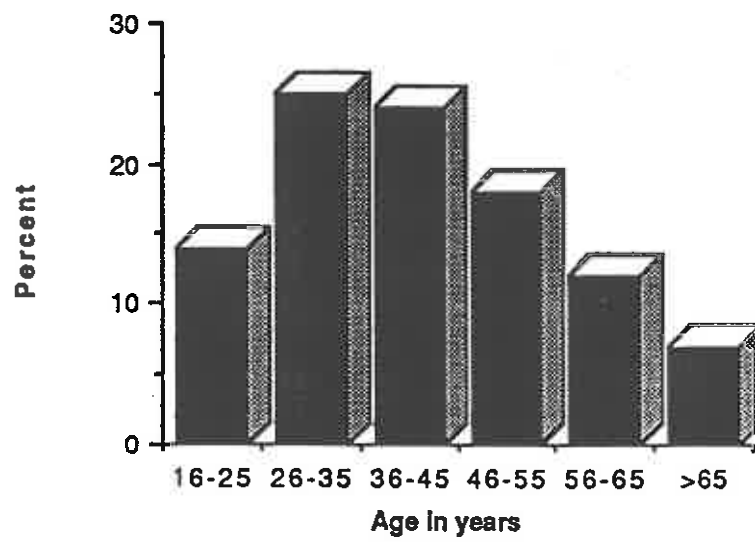


Figure 3. Age distribution of resident deer hunters in New York in 1989.

population was projected by the Census Bureau to decline by only 1% (13% to 12%) between 1980 and 1985 (U.S. Dep. Commerce 1982). However, the percentage of 16-25 year-olds recruited into the population of deer hunters declined 9% (65% to 56%) from 1978 to 1983 (HDRU, unpubl. data). Since about 1981, recruitment of new deer hunters has not kept pace with the number of persons ceasing to purchase a big game license (Brown et al. 1987). This phenomenon requires further research to determine whether low recruitment is occurring only among 16-25 year-olds or among all age classes.

Respondents represented all parts of the rural-urban continuum, but rural residents were more prevalent among deer hunters than the general New York State population (U.S. Dep. Commerce 1982). In our study, 45% of the deer hunters lived in rural areas, 35% lived in villages and small cities, and 20% lived in cities with >25,000 inhabitants. The prevalence of rural residents was similar to the results reported in the study of 1987 DMP recipients (Decker and Connelly 1988), and similar to the residence characteristics of hunters reported in the 1985 National Survey of Hunting and Fishing (U.S. Dep. Interior 1989).

Respondents hunted primarily in the geographic region in which they lived, with the obvious exception of hunters in the NYC Metro area and Nonresidents (Table 2). Because region of residence was virtually the same as region where respondents hunted, and because the data were more easily aggregated by region of residence (some respondents hunted in more than 1 region and thus would be counted multiple times in the analysis if region where respondents hunted was used), the data reported herein are based on area of residence rather than area where respondents hunted.

Table 2. Comparison of the geographic regions in which deer hunters lived in 1989 (and the special hunting implements used) with the geographic regions in which respondents hunted for deer in New York during 1989.

<u>Geographic region where lived</u>	<u>Geographic region where hunted</u>			
	<u>Adirondack %</u>	<u>Catskill %</u>	<u>Central/Western %</u>	<u>Metro %^a</u>
Adirondacks	93	15	18	<1
Catskills	13	96	4	1
Central/Western	7	3	98	<1
Metro	6	87	9	11
Nonresidents	17	41	46	<1
<u>Type of special hunting implement used</u>				
Muzzleloader	55	45	22	0
Bowhunter	20	50	42	8

^aThe Metro region offered limited hunting opportunities because it included New York City and the surrounding counties.

Most respondents hunted either "every year" (59%) or "most years" (30%) since they started. Although a high percentage (93%) said they hunted in 1989, few hunted full days when they were afield. Out of about 10 hours of legal hunting time per day, respondents averaged about 6 hours afield.

Similarly, deer hunters did not or could not take advantage of the full length of the various deer seasons in New York in 1989. They averaged 9.1 days hunting during the regular gun season. Although this average is higher than expected from field observations by DEC staff (J. O'Pezio, DEC Biometrics Unit, pers. comm.), it is almost identical to the 9.3 days reported by Decker

and Connelly (1988) for 1987 DMP recipients. Also, it is important to note that a wide distribution of hunting effort was found among the hunters. About one-half of the respondents hunted a week or less, about one-third hunted between 1 and 2 weeks, and 1 of 6 hunted more than 2 weeks (Figure 4).

In our study, Bowhunters hunted about 5 days during the early archery season. Hunters taking advantage of primitive hunts in wilderness areas, the late archery season, and the muzzleloader season averaged only about 1 day afield during each of those seasons.

Hunters reported seeing about 4 deer per day during the regular firearms season. Not all hunters saw this "average" number of deer; at the extremes, 8% reported seeing no deer whereas 8% reported seeing 10 or more deer per day (Figure 5). Bowhunters saw slightly under 4 deer per day during early archery season and about 2 deer per day during late archery season. Hunters reported seeing 1 deer per day during the early primitive firearms season. During the late muzzleloader season, they reported seeing fewer than 3 deer per day on average.

The number of deer that hunters see during the course of the season may be a more important aspect of satisfaction than the number of deer seen on any particular day. During the course of the regular firearms season, respondents saw an average of about 30 deer. However, 10% saw no deer at all, and 20% saw 41 or more deer (Figure 6).

Deer hunters did not take many shots, especially considering they saw an "average" of 30 deer over the course of the season. During the regular firearms season, respondents averaged only 1 shot, and 43% did not take any shots. Bowhunters averaged 0.84 shots during the early archery season.

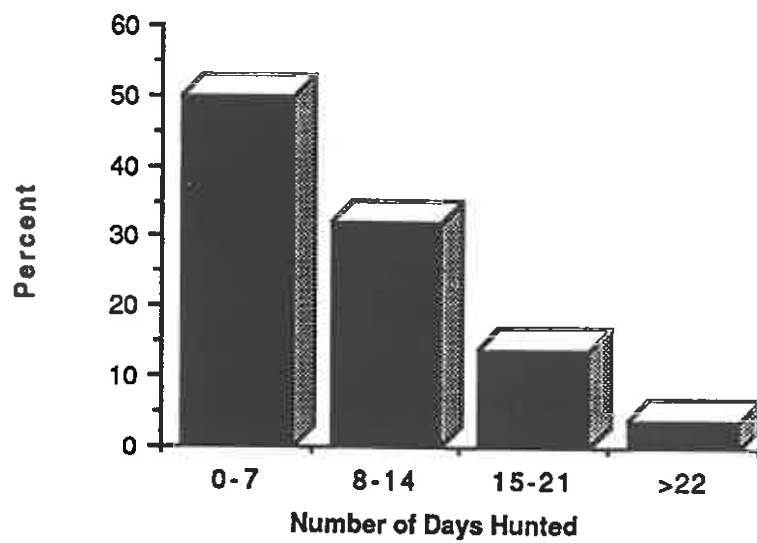


Figure 4. Distribution of the number of days resident deer hunters hunted for deer during the 1989 regular firearms season in New York.

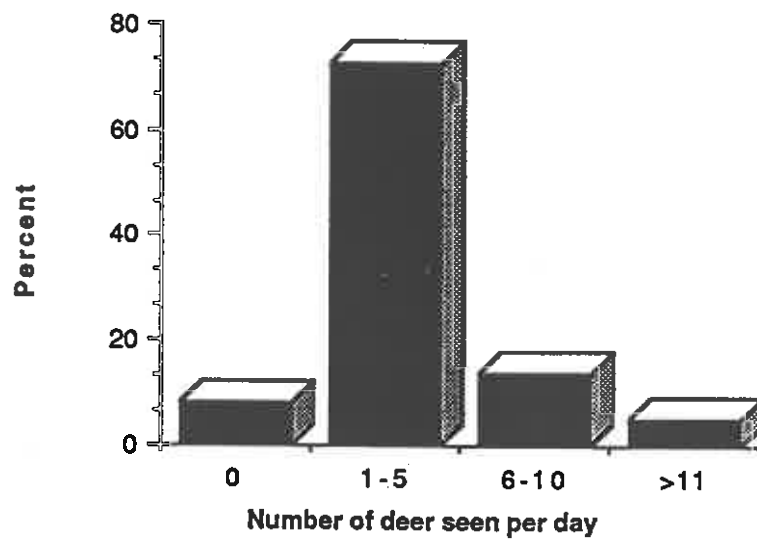


Figure 5. Distribution of the number of deer seen per day by resident deer hunters during the 1989 regular firearms season in New York.

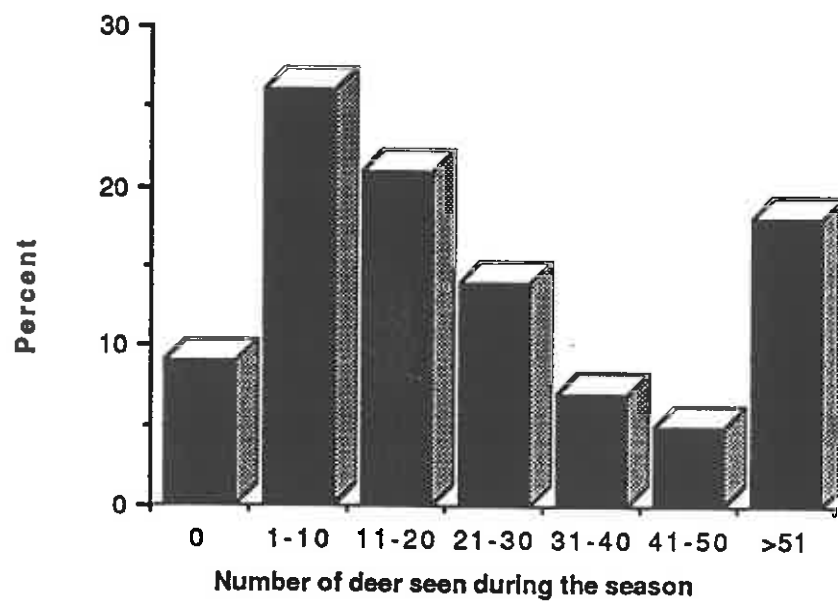


Figure 6. Distribution of the number of deer seen by resident deer hunters over the course of the 1989 regular firearms season in New York.

Hunters took the fewest shots on average during the early primitive season (0.09), late archery season (0.16), and muzzleloader season (0.31).

Consistent with the few deer seen per day and few shots taken during seasons other than the regular firearms season, very few primitive firearms hunters (0.3%), late-season Bowhunters (0.8%), and Muzzleloader hunters (6.7%) harvested deer. During the early archery season, 13.8% of the Bowhunters harvested a deer.

The high number of deer seen, shots taken, and the effectiveness of the firearms used suggested that the highest success rates would have been experienced by firearms hunters during the regular season. An estimate of the rate of success in harvesting bucks, adjusted for nonresponse bias and based on those residents who hunted deer in New York in 1989, is 19.9% statewide. Among all resident big game license holders (not just those who said they hunted deer in 1989), the estimated statewide success rate is 16.7% ($\pm 1.4\%$). This estimate differs slightly from the 12.9% success rate estimated by DEC deer managers (N. Dickinson, NYSDEC, pers. comm.).

The harvest rate for those residents who tagged a deer with a DMP, adjusted for nonresponse bias and based on those who received a DMP in New York in 1989, is 29.0% ($\pm 2.1\%$) statewide. This is near the 34.0% reported by DEC for all DMP recipients in 1989 (J. O'Pezio, DEC Biometrics Unit, pers. comm.).

Overall Satisfaction With Deer-Hunting Experiences

Hunters were asked the degree to which they were satisfied with their deer-hunting experiences in New York during the last year in which they hunted. Two-thirds of the resident hunters (68%) indicated that they were

satisfied, and most indicated more than slight satisfaction. Almost one-quarter of the respondents (23%) marked a +3 (on a scale of -4 [greatly dissatisfied] to +4 [greatly satisfied]), and about one-quarter more (26%) marked a +2. Only 18% indicated some level of dissatisfaction. About 14% said they were neither measurably satisfied nor dissatisfied.

To determine what influences satisfaction or dissatisfaction, several aspects of the deer-hunting experience were examined using a scale with 35 satisfaction aspects and 35 dissatisfaction aspects. Based on previous research (see Conceptual Framework) and our group interviews with deer hunters across the State, we hypothesized that hunters would place different levels of importance on the satisfactions and dissatisfactions examined. We found this to be true. Sixteen of the 35 satisfactions were found to be of primary importance to hunters (i.e., mean score ≥ 2 on a scale of 0 to 3) whereas the remaining 19 were of secondary importance (Table 3). Eleven of the 35 dissatisfaction aspects were identified as primary (Table 4).

Primary Satisfactions and Dissatisfactions

The concept of multiple satisfactions was reinforced in that 16 of the satisfactions and 11 of the dissatisfactions examined were identified as being of primary importance for deer hunters. For most hunters, no single aspect of deer hunting was reported to "make or break" a season. Overall satisfaction was influenced by several different aspects, both positive and negative, of the hunting experience.

The satisfactions and dissatisfactions identified by respondents as being primary grouped logically into 5 main categories. One of categories pertained to "getting ready" for the hunting season (e.g., getting firearm or

Table 3. Importance scores of various satisfaction aspects of deer hunting given by deer hunters in New York during 1989.

<u>Primary satisfaction aspects</u>	<u>Score^a</u>
Making a clean kill	2.74
Getting my firearm or bow ready before the season	2.55
Encountering other hunters who are safe	2.53
Seeing deer while hunting	2.45
Seeing deer sign while hunting	2.36
Seeing a buck while hunting	2.32
Relaxing and getting away from everyday worries through hunting	2.20
Feeling like I had a challenging hunt	2.17
Seeing deer year-round	2.17
Having a feeling of solitude while deer hunting	2.16
Planning a deer hunt	2.14
Seeing other kinds of wildlife	2.14
Seeing only a few hunters in my hunting area other than those in my group	2.11
Having access to private lands for hunting	2.10
Practicing at the shooting range with my deer-hunting gun or bow	2.06
Scouting for deer before the season	2.00
<u>Secondary satisfaction aspects</u>	
Eating venison	1.88
Knowing that I am participating in a traditional American activity	1.87
Teaching others about deer hunting	1.81
Passing the tradition of deer hunting on to others throughout the year	1.81
Getting together with my deer-hunting friends/family before the season to talk about deer hunting	1.77
Having access to public lands for deer hunting	1.77
Sharing venison with friends from a deer I shot	1.77
Hunting with family members	1.76
Bagging a buck	1.75
Having a relatively long deer-hunting season	1.74
Hunting with friends	1.72

Table 3. (cont.)

Bagging a deer	1.58
Getting together with friends/family after the season to talk about deer hunting	1.50
Buying hunting equipment	1.47
Hunting in suitable weather	1.42
Butchering a deer myself rather than taking it to a butcher	1.28
Showing a deer I bagged to family and friends	1.17
Reading books or magazines on deer hunting	1.09
Being at deer camp	0.96

^aMean score based on a scale where 3 = absolutely necessary, 2 = very important, 1 = somewhat important, and 0 = not at all important.

Table 4. Importance scores of various dissatisfaction aspects of deer hunting given by deer hunters in New York during 1989.

<u>Primary dissatisfaction aspects</u>	<u>Score^a</u>
Seeing unsafe hunters in the woods	2.91
Seeing unethical hunters in the woods	2.79
Not being able to find a deer that I wounded	2.78
Finding evidence of poaching	2.75
Seeing hunters breaking conservation laws	2.71
Seeing wounded or dead deer that others have lost	2.69
Knowing that deer habitat is being lost to commercial and housing developments	2.32
Seeing a lot of hunters in my hunting area	2.25
Hearing negative comments about hunters from the public	2.24
Not seeing any deer while hunting	2.09
Seeing inexperienced hunters in the woods	2.05
<u>Secondary dissatisfaction aspects</u>	
Not seeing deer sign while hunting	1.95
Not seeing bucks while hunting	1.89
Not seeing other wildlife while deer hunting	1.87
Seeing deer killed by cars along the highway	1.84
Knowing there are other hunters in the woods the day before the season opens	1.79
Having trouble finding a place to hunt because of posting	1.70
Feeling that the state does not do enough to open private land for deer hunting	1.63
Feeling that sportsmen do not do enough to open private land for deer hunting	1.63
Not being able to hunt with the people with whom I want to hunt	1.47
Not bagging a buck	1.28
Feeling that there are not enough conservation officers in the field during deer season	1.28
Not bagging a deer	1.22
Not personally believing the need for the number of deer management permits issued	1.19

Table 4. (cont.)

Feeling like I don't have a good understanding of deer population dynamics	1.18
Hunting in unsuitable weather	1.09
Waiting 2 months between the time when I apply for a deer management permit and the time when I find out if I was selected	1.04
Feeling like I don't have a good understanding of New York's deer management program	1.03
Not receiving a deer management permit	0.99
Knowing that other hunters shoot bucks on deer management permits	0.81
Having to pay extra for a deer management permit	0.75
Having to buy an archery stamp if I want to hunt deer during the archery season	0.62
Not being able to find parking places or trails on public land because they are not marked well	0.56
Having to buy a muzzle loader hunting stamp if I want to hunt deer during the muzzle loader season	0.54
Filling out an application for a deer management permit	0.34

^aMean score based on a scale where 3 = absolutely makes me dissatisfied, 2 = tends to make me dissatisfied, 1 = may make me dissatisfied, and 0 = has no influence on whether I am dissatisfied.

bow ready before the season, practicing with a firearm or bow, planning a hunt, and preseason scouting). The importance of "getting ready" was not surprising considering More's (1979) finding that many hunters spend more time preparing for the hunt than actually hunting. "Getting ready" also likely increased hunters' perceived chances of seeing and bagging deer, which related directly to a second category of satisfactions and dissatisfactions. "Getting ready" also probably helped hunters meet their primary satisfaction of "making a clean kill." The desire to make a clean kill may also be a reason why

hunters took relatively few shots compared with the number of deer they saw (see page 16).

A second category included those aspects of satisfaction and dissatisfaction related to hunters having first-hand knowledge that deer were in a particular area and thus feeling that a chance existed for bagging a deer (e.g., seeing deer [or not seeing deer] while hunting, seeing bucks while hunting, seeing deer sign while hunting, and seeing deer year-round). The importance of these kinds of "visual evidence" of deer has been reported previously (Decker et al. 1980, Jackson 1988, Hammitt et al. 1990). In this study, the number of deer seen per day differed ($t=-6.37$, $P\leq 0.05$, d.f.=1,208) between those who were satisfied with their overall deer-hunting experiences ($\bar{x} = 4.4$) and those who were dissatisfied ($\bar{x} = 3.0$), further reinforcing the importance of "visual evidence" of deer to overall deer-hunting satisfaction.

A third category reflected respondents' desire to use deer hunting as a source of relaxation and escape (e.g., relaxing and getting away from everyday worries through hunting, seeing other kinds of wildlife while hunting, and having a sense of solitude while hunting). This "appreciative" aspect of hunting has been identified previously as being important (Decker et al. 1984, Purdy et al. 1986). The opportunity to attain a sense of relaxation and nature appreciation is influenced by another category of primary satisfactions and dissatisfactions--interaction with other hunters.

Interactions with other hunters (e.g., encountering other hunters who are safe, seeing only a few hunters other than companions, seeing unsafe hunters, seeing unethical hunters, and seeing inexperienced hunters) encompassed 2 main subcategories. First, many deer hunters seemed to want

limited contact with other hunters, especially strangers. Second, when deer hunters encountered other hunters, they wanted them to be safe and ethical.

The presence of other hunters (i.e., crowding and out-of-group contact) has been identified previously as a dissatisfaction for deer hunters (Hautaluoma and Brown 1979, Decker et al. 1980, McDonald and Hammitt 1985). However, the influence of other hunters' behavior on deer hunters' satisfaction has not been studied in detail, and had not been reported to be a primary dissatisfaction. McDonald and Hammitt (1985) reported that a slight majority of deer hunters (55%) on a National Recreation Area in Tennessee said other hunters interfered with their hunting enjoyment to some extent, but that the level of interference was "very little." We are uncertain why poor hunter behavior was identified as a primary dissatisfaction by deer hunters in New York, but we did determine that this negative aspect of hunting had a bearing on where hunters preferred to hunt and why.

The desire for limited contact with other groups of hunters, and the desire for encountering safe and ethical hunters when out-of-group contacts occur, was reflected in the reasons why respondents said they would prefer to hunt in certain areas, especially "private land" (Table 5). This is of special interest because access to "private land" for deer hunting was a primary satisfaction. In general, the 2 most important reasons hunters gave for preferring to hunt on "private land for free" or on "leased private land" were that fewer hunters use these lands and that other hunters encountered on private lands are safer. A comment from 1 of the questionnaires sums up these reasons:

This was the first year me and my friends hunted on private land. It made everything more relaxed because you didn't have to worry about other hunters. We are very careful about guns, [but] other hunters may not be.

Table 5. Reasons given by New York State resident deer hunters for preferring to hunt deer on public land, private land for free, or leased land in 1989.

Reason for preference	Type of Land Preferred for Hunting					
	Public land		Private land for free		Private land for pay	
	% checking ^a	% most important	% checking ^a	% most important	% checking ^a	% most important
Don't have to ask permission	70.7	39.1	8.3	0.4	19.2	1.3
No cost	49.1	5.5	35.3	1.1	2.4	0.0
Better deer habitat	39.2	14.4	47.5	8.6	45.7	4.6
Better law enforcement	34.9	10.3	6.5	0.4	15.3	0.4
More deer	23.8	6.1	39.8	7.7	41.8	8.0
Fewer hunters	20.9	9.9	86.4	42.9	90.8	36.2
Other hunters are safer	13.5	1.7	49.3	18.2	69.9	32.0
Other hunters are more ethical	10.8	0.2	33.6	3.0	54.6	10.8
Have permission from landowner	5.5	0.7	64.6	10.1	17.9	1.6
Other reasons	17.0	<u>12.1</u> 100.0	14.2	<u>7.6</u> 100.0	12.6	<u>5.2</u> 100.0

^aAdds to more than 100% because respondents could check more than 1 reason.

Having access to "public land" for deer hunting was not a primary satisfaction. Apparently hunters did not perceive "public land" as having the qualities that reflect the primary satisfactions. The 2 most important reasons for preferring to hunt on "public land" were "don't have to ask permission" and "better deer habitat," neither of which appear to be related to the primary satisfactions.

Knowledge of the types of land on which hunters would prefer to hunt deer and the reasons why they had such preferences provide deer managers with insights about how to increase hunter satisfaction. This knowledge can also be useful in devising ways to modify the distribution of hunters (and thus deer harvest) in certain areas. In this study, 75% of all deer hunters said they would prefer to hunt on "private land for free," but only 80% of the hunters with this preference actually did so (Table 6). Given that about 770,000 big game licenses were sold in New York in 1989, this means that over 100,000 hunters did not or could not hunt on "private land for free" although they would prefer to do so. About 11% of those who would prefer to hunt on "private land for free" (more than 63,000 hunters) actually hunted on "public land." Another 7% (about 40,000 hunters) hunted on a variety of types of land (i.e., could not or did not hunt on 1 type of land consistently) even though they had a specific preference for "private land for free."

These findings indicate hunters may be encountering problems in gaining access to particular types of land for deer hunting. Recall that the most important reason given for hunting on "public land" was "don't have to ask permission" rather than because "public land" provides more satisfactions for deer hunting. Managers have recognized that some "public lands" are over-harvested whereas deer populations are increasing in other areas dominated by

Table 6. Comparison of the type of land hunted by deer hunters in New York in 1989 with the type of land they preferred to hunt.

Type of land hunted most of the time	Type of Land Preferred							
	Public		Private for free		Private for pay		Multiple types	
	n	%	n	%	n	%	n	%
Public	262	62	253	11	30	12	28	27
Private for free	99	24	1832	80	46	20	55	54
Private for pay	9	2	34	2	134	57	9	9
Multiple types	51	$\frac{12}{100}$	163	$\frac{7}{100}$	25	$\frac{11}{100}$	10	$\frac{10}{100}$
Totals preferring each type of land		14%		75%		8%		3%

"private land" (NYSDEC 1990). Some hunters agree. One respondent reflected the feelings of many other hunters:

... a very large percentage of the land is being posted generally by people who are buying wooded sections and are from the cities. The lands that are available are over-hunted. Many deer are pushed into posted areas where we the hunters can't get at them. After opening day, your chance of seeing a buck is nil for the season.

Our data indicate that hunters are willing to hunt, and indeed prefer to hunt, on "private land," but are not doing so for reasons most likely related to problems in gaining access. Previous statewide studies of access-related problems in New York showed an increase in posting of "private lands" from 25% in 1963 to about 50% in 1981 (Waldbauer 1966, Brown and Thompson 1976, Brown et al. 1982). One of the reasons cited most frequently by landowners for posting their land was a concern about poor hunter behavior (Brown et al. 1982). We found that deer hunters share the concern about poor hunter behavior, and that deer hunters would prefer to have access to land where they do not encounter other hunters who may exhibit poor behavior. That is, they

want access to private land where access of other hunters is limited. These access-related questions should be investigated further in light of this common concern of deer hunters and landowners.

Temporal-Motivational Aspects of Satisfaction

In interviews with deer hunters throughout the State, satisfactions and dissatisfactions were identified representing all dimensions of the temporal-motivational matrix described on pages 4 and 5. We wanted to determine which dimensions of the matrix were represented by the primary satisfaction and dissatisfaction aspects. By identifying the most important dimensions from the hunters' perspectives, deer managers can gain insights for actions to refine New York's deer management program such that satisfactory experiences result.

Our hypothesis that all dimensions of the matrix would be represented by primary aspects was not supported. Primary satisfactions represented only a few dimensions of the temporal-motivational matrix (Table 7). The importance of experiences occurring during the deer season, and to a lesser extent beforehand, were emphasized. From a motivational perspective, achievement-oriented and appreciative-oriented aspects seemed to be more important than affiliative-oriented aspects.

Primary dissatisfactions represented even fewer dimensions of the temporal-motivational matrix (Table 8). The time period during the deer-hunting season was the most important. Appreciative-oriented aspects were most important from a motivational perspective. That is, those aspects that were most likely to dissatisfy hunters generally occurred during the

Table 7. Dimensions of a temporal-motivational matrix represented by primary satisfactions described by deer hunters in New York.

<u>Primary satisfaction aspect</u>	<u>Matrix dimensions</u>	
	<u>Temporal^a</u>	<u>Motivational^b</u>
Making a clean kill	During	Achievement
Getting my firearm or bow ready before the season	Preseason	Achievement
Encountering other hunters who are safe	During	Appreciative
Seeing deer while hunting	During	Achievement
Seeing deer sign while hunting	During	Achievement
Seeing a buck while hunting	During	Achievement
Relaxing and getting away from everyday worries through hunting	During	Appreciative
Feeling like I had a challenging hunt	During	Achievement
Seeing deer year-round	Any	Unsure
Having a feeling of solitude while deer hunting	During	Appreciative
Planning a deer hunt	Preseason	Unsure
Seeing other kinds of wildlife	During	Appreciative
Seeing only a few hunters in my hunting area other than those in my group	During	Appreciative
Having access to private lands for deer hunting	During	Achievement
Practicing at the shooting range with my deer-hunting gun or bow	Any	Achievement
Scouting for deer before the season	Preseason	Achievement

^aThe temporal dimensions encompasses those aspects that occur preseason, during the season, postseason, or any time of year.

^bThe motivational dimension encompasses those aspects that are achievement-related, affiliative-related, appreciative-related, or for which the motivational orientation is unsure.

Table 8. Dimensions of a temporal-motivational matrix represented by primary dissatisfaction aspects described by deer hunters in New York.

<u>Primary dissatisfaction aspects</u>	<u>Matrix dimensions</u>	
	<u>Temporal^a</u>	<u>Motivational^b</u>
Seeing unsafe hunters in the woods	During	Appreciative
Seeing unethical hunters in the woods	During	Appreciative
Not being able to find a deer that I wounded	During	Appreciative
Finding evidence of poaching	Any	Achievement
Seeing hunters breaking conservation laws	During	Unsure
Seeing wounded or dead deer that others have lost	During	Appreciative
Knowing that deer habitat is being lost to commercial and housing developments	Any	Unsure
Seeing a lot of hunters in my hunting area	During	Appreciative
Hearing negative comments about hunters from the public	Any	Appreciative
Not seeing any deer while hunting	During	Achievement
Seeing inexperienced hunters in the woods	During	Unsure

^aThe temporal dimension encompasses those aspects that occur preseason, during the season, postseason, or any time of year.

^bThe motivational dimension encompasses those aspects that are achievement-related, affiliative-related, appreciative-related, or for which the motivational orientation is unsure.

deer-hunting season and pertained to inhibiting their enjoyment and appreciation of hunting and nature.

"Single Greatest" Satisfactions and Dissatisfactions

The previous section examined the importance of various satisfaction and dissatisfaction aspects whereas this section examines "what single thing" satisfied hunters most and "what single thing" dissatisfied hunters most in the last year they hunted deer. Only 5 of the top 10 aspects listed as the "single greatest" satisfaction (based on percentages of respondents listing each) (Table 9) were represented among the 16 primary satisfaction. Similarly, only 5 of the top 10 aspects listed as the "single greatest" dissatisfaction (Table 10) were represented among the 11 primary dissatisfaction.

One main reason exists for the specific differences between the primary aspects and the "single greatest things." Most respondents were satisfied with their deer-hunting experiences so at least some of the aspects they said were absolutely necessary for them to be satisfied (i.e., primary aspects) must have been experienced. However, that does not mean those primary aspects were the ones that satisfied the respondents most. For example, several hunters indicated that bagging a deer was not necessary for them to be satisfied, but bagging a deer gave them "... a very great feeling." Similarly, some hunters who said "not being able to hunt with the people with whom I want to hunt" was of relatively little importance in general nonetheless indicated that the single greatest thing that dissatisfied them was not being able to hunt with their son (or daughter, or father) because of unexpected circumstances.

Table 9. The "single greatest thing" that satisfied New York State hunters about their deer hunting experience in the last year they hunted showing which dimension of a temporal-motivational matrix each "thing" represented.

<u>"Single greatest thing"</u> <u>that satisfied hunters</u>	<u>n</u>	<u>%</u>	<u>Matrix dimensions</u>	
			<u>Temporal</u>	<u>Motivational</u>
Getting outdoors / relaxing ^a	578	22	During	Appreciative
Seeing deer ^a	331	13	During	Achievement
Hunting with family or friends	262	10	During	Affiliative
Bagging a buck	156	6	During	Achievement
Friends/family bagged a deer	120	5	During	Unsure
Seeing bucks ^a	104	4	During	Achievement
Bagging a deer	93	4	During	Achievement
Having an opportunity to hunt	85	3	During	Achievement
Seeing other wildlife while deer hunting ^a	80	3	During	Appreciative
Having a feeling of solitude while hunting ^a	74	3	During	Appreciative
121 others	764	29	-----	-----

^aThese responses were primary satisfaction aspects for hunters. See Table 7.

Table 10. The "single greatest thing" that dissatisfied New York State hunters about their deer hunting experience in the last year they hunted showing which dimension of a temporal-motivational matrix each "thing" represented.

<u>"Single greatest thing"</u> <u>that dissatisfied hunters</u>	<u>n</u>	<u>%</u>	<u>Matrix dimensions</u>	
			<u>Temporal</u>	<u>Motivational</u>
Not seeing enough deer while hunting ^a	333	12	During	Achievement
Evidence of poaching ^a	172	6	Anytime	Achievement
Encountering posted land	153	6	During	Achievement
Seeing unethical hunters ^a	143	5	During	Appreciative
Finding wounded/dead deer others have lost ^a	135	5	During	Appreciative
Unsuitable weather	127	5	During	Appreciative
Not seeing bucks while hunting	123	5	During	Achievement
Encountering trespassers	112	4	During	Achievement
Not bagging a deer	111	4	During	Achievement
Encountering unsafe hunters ^a	102	4	During	Appreciative
205 Others	1191	44	-----	-----

^aThese responses were dissatisfaction aspects for hunters. See Table 8.

half of the hunters (48%). "The number of deer I saw in that area in previous seasons" was listed by more than one-quarter of the hunters (29%), indicating again that personal experience, even if "dated," is very important. Other types of information were much less important: "talking with friends who are hunters" (12%), "talking with family members" (6%), "reading magazines or newspapers" (1%), and "information from the New York State Department of Environmental Conservation" (1%).

We hypothesized that hunters' expectations would be based on the type and strength of the information available to them. Personal reconnaissance is an important and very strong stimuli compared with other sources of information such as magazines, newspapers, or information from DEC. In addition, these other sources of information often are available only in the time period immediately preceding the deer season. On the other hand, a hunter can scout, recall past deer seasons, or talk with family and friends throughout the year.

Expectations vs. Actual Experiences

Understanding how hunters form preseason expectations provides insight into mechanisms for improving satisfactions. However, information about the relationship between expectations and actual hunting experiences also is needed to understand fully the concept of satisfaction.

Recall from page 15 that satisfied hunters saw an average of 4.4 deer per day whereas dissatisfied hunters saw only 3.0. Why did seeing fewer deer dissatisfy hunters? The reason relates to the hunters' expectation for the number of deer they would see during the deer season (Table 12). When hunters saw only a few deer per day, their expectations clearly were not met. When

Table 12. Comparison of the number of deer that hunters saw during the 1989 regular firearms deer season in New York with the number of deer that hunters expected to see.

<u>Average number of deer seen per day</u>	<u>Was expectation met by majority of hunters?</u>
0	No ^a
<1	No
1	No
2	Mixed ^b
3	Mixed
4	Mixed
5	Yes ^c
6	Yes
7	Yes
≥8	Yes

^aNo = <45% answered affirmatively.

^bMixed = 45% to 55% answered affirmatively.

^cYes = >55% answered affirmatively.

they saw 5 or more deer per day, their expectations were met, thus contributing to their satisfaction. Hunters who saw 2-4 deer per day were mixed with respect to whether their expectations were met.

This provided an example of the relationship between expectations, actual experiences, and satisfaction for only 1 primary satisfaction aspect of deer hunting. What is the relationship when all primary satisfaction aspects are examined simultaneously? We hypothesized that if certain aspects were deemed to be "absolutely necessary" for a hunter to be satisfied, and if that hunter's preseason expectations for all those aspects were met during the

Table 11 (cont.)

Hunter-generated solutions	Single greatest dissatisfaction									
	Unsuitable weather		Not seeing bucks while hunting		Encountering trespassers		Not bagging a deer		Encountering unsafe hunters	
	n	%	n	%	n	%	n	%	n	%
No solution given	80	64	33	27	13	12	30	27	19	19
Reduce/eliminate DMP's	0	0	24	20	0	0	6	5	0	0
More ECO's	2	1	5	4	23	20	3	3	9	8
Stiffer penalties for violators	0	0	0	0	20	18	1	1	3	3
Hunters report violators	0	0	0	0	9	8	0	0	2	2
Incentives to open private land for hunting	1	<1	1	<1	1	<1	0	0	0	0
Increased communication with landowners about hunting	0	0	0	0	1	<1	0	0	0	0
More ethics in SEC's	1	<1	0	0	4	3	0	0	8	8
Peer pressure	0	0	0	0	8	7	0	0	3	3
Teach hunting skills in SEC's	0	0	0	0	0	0	0	0	0	0
Start season earlier	18	14	2	2	0	0	0	0	0	0
Pray	6	5	0	0	0	0	0	0	0	0
Hunt somewhere else	1	<1	7	6	0	0	5	4	2	2
Hunt more hours or days	0	0	5	4	0	0	21	19	0	0
Scout/plan more	0	0	5	4	0	0	13	12	1	<1
More safety in SEC's	0	0	0	0	0	0	0	0	33	32
Mandatory safety school for violators	0	0	0	0	0	0	0	0	4	4
135 Others	16	13	40	33	31	28	32	29	18	18

hunters place importance on experiences occurring during the deer season which are related to having an opportunity to bag a deer and to enjoy the appreciative aspects of deer hunting. Does this mean that managers should concentrate their efforts on programs that affect just those aspects of deer hunting? Answering this question requires an understanding not only of what aspects of deer hunting are important, but also information about what hunters expect to happen relative to those aspects. A step toward this understanding is examining how hunters develop their expectations for what they will experience during the deer season.

Development of Preseason Expectations

We believe the likelihood of a hunter being satisfied depends in part on whether his/her expectations about particular aspects of hunting are met. Hunters develop expectations about all aspects of their deer-hunting experiences, but it is not possible to examine all those expectations in 1 study. Instead, we started to look into this topic by examining how hunters developed expectations about 1 of the most important aspects of deer hunting identified in the group interviews with hunters--the number of deer they were likely to see while hunting.

Hunters' perceptions of the number of deer they would see during a season were influenced by several kinds and sources of information. The largest percentage of hunters listed "the number of deer I saw in that area in previous seasons" (80%) followed by "preseason scouting" (66%), and "talking with friends who are hunters" (63%). These 3 types of information rely on personal reconnaissance or the personal experience of friends. Of somewhat lesser influence was "talking with family members" (40%). The types of information listed by the smallest percentages of hunters were indirect indicators of the number of deer in an area. That is, "reading magazines or newspapers" (19%) and "information from the New York State Department of Environmental Conservation" (17%) did not involve the personal experience of the hunter or his/her close friends.

When asked what was the most important type of information used to develop preseason expectations about the number of deer they likely will see while hunting, information based on personal experience was listed most frequently, especially experience gained just prior to the season. "Preseason scouting" was listed as the most important type of information by nearly one-

Although the individual responses differed, the cells they represented in the temporal-motivational matrix were similar between the primary satisfactions and dissatisfactions and the "single greatest" satisfactions or dissatisfactions (cf. Table 7 with Table 9 and Table 8 with Table 10). Both sets of tables underscore the importance of experiences occurring during the deer season. They also emphasize the importance of both achievement-oriented and appreciative-oriented motivations and the lesser importance of affiliative-oriented motivations.

We provided hunters with the opportunity to recommend solutions to their single greatest dissatisfactions listed in Table 10 to learn their ideas about handling these concerns. Three types of solutions were offered by hunters (Table 11): (1) changes in management actions (e.g., reduce/eliminate deer management permits, more Conservation Officers, stiffer penalties for violators, start hunting season earlier); (2) enhancement of the sportsmen's education course (SEC) (e.g., more ethics in SEC, teach hunting skills in SEC, more safety in SEC, mandatory safety school for violators); and (3) actions that can be taken by sportsmen (e.g., peer pressure, hunt somewhere else, hunt more hours or days, scout/plan more). These responses indicate that hunters may want DEC to take the lead in overcoming dissatisfying aspects of deer hunting, but hunters also are willing to take some responsibility. The responses also indicate a desire by deer hunters for an even greater emphasis on ethics and safety than exists currently in SEC's.

The temporal-motivational dimensions of the solutions provided by hunters reflect closely the temporal-motivational dimensions of the "single greatest" satisfactions and dissatisfactions, as well as the primary satisfactions and dissatisfactions discussed in the last section. That is,

Table 11. Solutions suggested by deer hunters for overcoming aspects identified as the "single greatest thing" that dissatisfied deer hunters in New York in 1989.

Hunter-generated solutions	Single greatest dissatisfaction									
	Not seeing enough deer while hunting		Finding evidence of poaching		Encountering posted land		Seeing unethical hunters		Finding dead/wounded deer others have lost	
	n	%	n	%	n	%	n	%	n	%
No solution given	60	18	24	14	36	24	29	20	37	28
Reduce/eliminate DMP's	123	37	1	<1	0	0	0	0	4	3
More ECO's	9	3	79	46	1	<1	22	15	11	8
Stiffer penalties for violators	1	<1	25	14	3	2	18	13	9	7
Hunters report violators	1	<1	14	8	0	0	5	4	1	<1
Incentives to open private land for hunting	12	4	0	0	38	25	0	0	0	0
Increased communication with landowners about hunting	0	0	0	0	26	18	1	<1	0	0
More ethics in SEC	0	0	2	2	2	1	22	16	3	2
Peer pressure	0	0	8	5	0	0	12	8	1	1
Teach hunting skills in SEC's	0	0	0	0	0	0	0	0	39	29
Start season earlier	0	0	0	0	0	0	0	0	0	0
Pray	1	<1	0	0	0	0	0	0	0	0
Hunt somewhere else	9	3	1	<1	0	0	1	<1	0	0
Hunt more hours or days	10	3	0	0	0	0	0	0	0	0
Scout/plan more	6	2	0	0	0	0	0	0	0	0
More safety in SEC's	0	0	1	<1	0	0	2	1	2	1
Mandatory safety school for violators	0	0	1	<1	0	0	1	<1	0	0
135 others	95	29	16	9	43	29	29	20	26	20

season, then the hunter would be satisfied with his/her overall deer-hunting experiences.

The data only partially supported this hypothesis (Table 13). Of those hunters whose expectations were met for up to 17 specific satisfactions of deer hunting, 72% said they were satisfied with their overall deer-hunting experiences, but 16% said they were dissatisfied (the remainder were neutral). Further examination of the 16% who theoretically should have been satisfied revealed that specific aspects existed that would "absolutely make [the hunter] dissatisfied." These aspects generally included aspects relating to poor hunter behavior (e.g., unsafe hunters, unethical hunters, seeing hunters breaking Conservation laws, and evidence of poaching), and lack of "visual evidence" of deer (e.g., not seeing deer). We do not know whether any of these dissatisfying aspects were experienced by those individuals because we did not ask them questions about all of their experiences, but it seems highly likely. These absolutely dissatisfying aspects apparently negated the fact that a hunter's expectations were met for all aspects they said were "absolutely necessary" for them to be satisfied.

A corollary to our previous hypothesis was that if a hunter's expectations were not met for 1 or more aspects that were "absolutely necessary" for them to be satisfied, then the hunter would be dissatisfied. This hypothesis was not supported (Table 13). Only 24% of those whose expectations were not met were dissatisfied and 58% said they were satisfied.

This leads us to believe that a set of conditional relationships exist between satisfying and dissatisfying aspects of deer hunting. The relationships we propose below are plausible, but are not the only possible

Table 13. Relationship between deer-hunting satisfaction and whether hunters' expectations were met for 17 specific aspects of deer hunting as described by deer hunters in New York, 1990.

	<u>Expectations were met</u>	<u>Expectations were not met</u>
Satisfied	72%	58%
Dissatisfied	16%	24%
Neutral	<u>12%</u>	<u>18%</u>
	100%	100%

relationships. We propose them here as hypotheses for testing in future studies:

1. If a hunter's expectations are met for all aspects that are identified as "absolutely necessary" for the hunter to be satisfied, and no aspects exist to make the hunter "absolutely dissatisfied," then the hunter will be satisfied.

[The 72% in Table 13 who said their expectations were all met, and who were satisfied are accounted for by this relationship.]

2. If a hunter's expectations are not met for all aspects that are identified as "absolutely necessary" for the hunter to be satisfied, then the hunter will be dissatisfied even if no aspects exist to make the hunter "absolutely dissatisfied."

[The 24% in Table 13 who said their expectations were not all met, and who were dissatisfied are accounted for by this relationship.]

3. If a hunter's expectations are met for all aspects that are identified as "absolutely necessary" for the hunter to be satisfied, but at least 1 aspect exists to make the hunter "absolutely dissatisfied," then the hunter will be dissatisfied. (That is, dissatisfying aspects take precedence over satisfying aspects.)

[The 16% in Table 13 who said their expectations were all met, but who were dissatisfied are accounted for by this relationship.]

The 58% who said their expectations were not all met, but who were satisfied anyway (Table 13) are not accounted for by any of the 3 relationships described above. Although it seems contradictory that a hunter

could be satisfied even though all of his/her expectations were not met for "absolutely necessary" aspects, this is not too surprising considering the inexactness of human behavior. It may be easy for a hunter to know which of the many aspects of the hunting experience are "not at all important" compared with those that are "absolutely necessary," but it may be difficult to know which aspects are "absolutely necessary" vs. which are "very important." Thus, the respondents may not have been entirely literal when responding that specific aspects were "absolutely necessary."

Given the difficulty in literally interpreting the phrase "absolutely necessary" we hypothesized that a hunter would be more likely to be satisfied if most of his/her expectations were met. This hypothesis was supported (Table 14). The higher percentage of expectations met, the higher percentage of hunters who were satisfied.

Table 14. The relationship between the percent of expectations that were met for "absolutely necessary" aspects of deer hunting and overall satisfaction for those deer hunters in New York who said that one or more of their expectations were not met.

Overall Satisfaction	Percent of Expectations Met							
	0-25% of expectations met		26-50% of expectations met		51-75% of expectations met		76-99% of expectations met	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Satisfied	96	47	148	58	79	72	26	83
Neutral	38	18	56	22	17	15	3	11
Dissatisfied	72	<u>35</u>	52	<u>20</u>	15	<u>13</u>	2	<u>6</u>
	100		100		100		100	

Deer Management Permits

A keystone of DEC's deer management efforts in the Southern Zone is the issuance of either-sex deer management permits (DMP's) as a mechanism to control the deer population. Among all resident respondents (those who applied for a DMP as well as those who did not), 45% were "generally satisfied" with the deer management system DEC uses, 16% were "generally dissatisfied," 27% had "mixed feelings," and 12% had "no opinion." Respondents were provided the opportunity to state a reason for their response (Table 15). Many of those who were "generally satisfied" (43%) gave no reason for their satisfaction whereas many others (28%) indicated DEC staff were doing "a good job" or "were doing their best." Reasons for dissatisfaction with the deer management system used in the Southern Zone mostly pertained to the number of DMP's issued ("too many DMP's issued" [33%]), the result of using DMP's ("don't see enough deer" [10%]), or how the system was operated ("don't agree with DEC's population estimates" [11%]).

Although less than one-half of the respondents said they were "generally satisfied" with the deer management system used in the Southern Zone, a large majority of all hunters wanted to take advantage of the opportunities DMP's provided. Overall, 81% of the residents said they wanted to apply for a DMP although only 59% actually did so (i.e., 73% of those who wanted to apply for a DMP actually did so).

This finding differs from the assumption we used in selecting the sample for the study (Appendix A). We assumed that about 60% of the license holders in the Catskill and Central/Western regions would have wanted to apply for a DMP, and that only about 40% of the license holders in the Adirondack and Metro regions would have wanted to apply for a DMP. When drawing the sample

Table 15. Respondents' feelings about the deer management system used by the New York State Department of Environmental Conservation in the Southern Zone of New York, and reasons for those feelings.

A. Generally Satisfied with the Deer Management System (45%)

<u>Reason</u>	<u>n</u>	<u>%</u>
No reason given	538	43
DEC is doing a good job	353	28
I see plenty of (healthy) deer	104	8
I received a deer management permit	47	4
79 other reasons	<u>222</u>	<u>17</u>
	1264	100

B. Generally Dissatisfied with the Deer Management System (16%)

<u>Reason</u>	<u>n</u>	<u>%</u>
No reason given	16	3
Too many deer management permits issued	152	33
I don't agree with DEC's population estimates	50	11
I don't see enough deer	46	10
Deer management permits are just a way for DEC to make more money	21	4
I want to have a doe season separate from the buck season	20	4
77 other reasons	<u>152</u>	<u>35</u>
	457	100

C. Mixed feelings about the Deer Management System (27%)

<u>Reason</u>	<u>n</u>	<u>%</u>
No reason given	119	19
Too many deer management permits issued	88	14
I don't agree with DEC's population estimates	80	13
I don't see enough deer	50	8

Table 15. (cont.)

Too many hunters shoot fawns/bucks with a deer management permit	21	3
I want to have a doe season separate from the buck season	16	3
101 other reasons	<u>264</u> 638	<u>40</u> 100

D. No opinion about the Deer Management System (12%)

for the study, we purposefully over-sampled to ensure obtaining enough hunters from the Catskill and Central/Western regions who did not want to apply for a DMP and enough hunters from the Adirondack and Metro regions who did want to apply so we could adequately describe the 2 groups of hunters. Because of that precaution, and even with such a small percentage of hunters indicating that they did not want to apply for a DMP, our sample was sufficiently large to provide statistically valid results for all 7 geographic and hunting implement groups.

Of those respondents who applied for a DMP, 86% said they received one. This percentage is slightly lower than the 91% reported for all DMP applicants in 1989 (J. O'Pezio, DEC Biometrics Unit, pers. comm.). However, the difference is within the margin of error associated with responses to this question.

Many hunters who applied for a DMP expressed a variety of reasons for doing so including "to increase chances of bagging a deer" (79%), "to hunt legally with family and friends after filling a buck tag" (51%), "to have a chance to take a second deer" (45%), "to help manage the deer herd" (44%), and

"to take a second buck" (33%). Among these, "to increase chances of bagging a deer" was the most important reason for the greatest percentage of applicants (55%). As reported by Decker and Connelly (1988), a high percentage of 1987 DMP recipients also indicated that they applied for a DMP to increase their chances of bagging a deer and to hunt with family and friends after filling their buck tag.

A plurality of respondents who wanted to apply for a DMP, but did not, said they simply "did not get around to it" (31%); 13% said "the application period was too short," 12% "did not think they would have enough time to hunt," and 10% believed their "chances of getting a DMP were not good." Among the minority who did not want to apply for a DMP, 27% responded "too many does are shot in my area," and 25% said "I did not need an extra deer."

One of the 2 most important reasons why deer hunters did not apply for a DMP pertained to a dislike of the system whereas the other top reason pertained to a lack of initiative on the part of the hunters. "Too many does are shot in my area" was the most important reason for nonapplication for 22% of the respondents. About the same percentage (20%) said they simply "did not get around to it."

IMPORTANT DIFFERENCES AMONG THE 7 GROUPS OF INTEREST

In the following sections, we discuss important regional and hunting implement differences. We have organized these results by subject topics rather than by regions or hunting implements used because we believe it is easier to make comparisons among the groups this way. The subheadings for this section do not include all those found in the results and discussion for

the aggregate responses because regional differences did not occur for all topics.

Characteristics of Deer Hunters and Their Hunting Experiences

Adirondack residents differed from the other groups in several important ways. A higher percentage of female hunters (10%) were found in the Adirondack group than in any other group. Also, consistent with the nature of this region, more than one-half of the hunters from this group (54%) lived in rural areas and only 7% lived in medium or large cities. Surprisingly, only 54% of the Adirondack residents (the lowest percentage of any group) hunted deer "every year," although about the same percentage of Adirondack residents (88%) as those from other groups hunted deer at least "most years." They also tended to hunt fewer days during early archery season (3.3 days), and more days during regular gun season (14.2 days) than other respondents. That they hunted the most days during the regular firearms season was not surprising because the regular firearms season is about twice as long in the Northern Zone as in the Southern Zone.

Adirondack hunters reported the highest buck harvest rate of any group (25.5% of those who hunted deer in 1989; adjusted for nonresponse bias). Additionally, only 24.7% of Adirondack residents who received a DMP shot a deer with one (this was among the lowest of any group). These results were not surprising considering that most of the Adirondack region is "bucks only" during the regular firearms season and that DMP holders from this region may have to travel relatively long distances to use their tag. Perhaps not all DMP holders make the trip to the Southern Zone to use their tag, especially if

they have tagged a buck in the Northern Zone before the Southern Zone season opens.

Respondents from the Metro group obviously had residence characteristics different from other respondents, with 52% residing in medium to large cities, 37% in small cities, and only 11% in rural areas. These hunters also tended to be less active participants than other respondents. They hunted fewer days during the regular season (5.6), saw fewer deer per day (2.8), took fewer shots (0.54), harvested fewer bucks (9.8% of those who hunted deer in 1989; adjusted for nonresponse bias), and filled fewer DMP's (23.5% of DMP recipients; adjusted for nonresponse bias). They also bagged fewer deer on average in their lifetime (6.5) than other hunters although they were about the same age as other hunters (\bar{x} = 43 years) and had hunted deer for about the same number of years as other hunters (\bar{x} = 18 years).

Metro residents likely were less active hunters because most lived far from their hunting area. With few exceptions (e.g., residents of parts of Westchester, Rockland, and Suffolk Counties), they do not have the opportunity to see deer regularly. In addition, they likely are less familiar with changes that may occur in their deer-hunting areas that would influence their ability to see and get shots at deer.

Nonresidents seemed to be highly-committed deer hunters. A total of 92% said they hunt deer somewhere at least "most years," and 71% hunt deer "every year." In addition, they bagged an average of 16.3 deer in their lifetime, almost double the average for the other groups. These respondents hunted the most hours on opening day (7.3 hrs) and on subsequent days (7.0 hrs) of any group surveyed, but they hunted relatively few days during the regular season (5.4 days). Apparently Nonresidents made the most of their few days afield

(and higher license cost) by hunting long hours. Their persistence seemed to have resulted in seeing more deer per day (5.1) than other hunters, and in the highest buck harvest rate (30.1%).

Not surprisingly, Muzzleloader hunters and Bowhunters also tended to be highly-committed to their sport. Three-quarters of the Muzzleloader hunters (75%) and Bowhunters (74%) hunted deer every year. These hunters also hunted an average of 7 hours or more on opening day¹. Bowhunters were the youngest (\bar{x} = 37 years) of any group.

Overall Satisfaction With Deer-Hunting Experiences

Approximately 70% of the respondents from the Adirondack, Central/Western, Metro, and Muzzleloader groups were satisfied with their overall hunting experiences. A somewhat lower percentage of respondents from the Catskill group were satisfied (62%), and a concomitantly higher percentage were dissatisfied (25%). More Nonresidents (77%) and Bowhunters (75%) than any other group said they were satisfied.

Primary Satisfactions and Dissatisfactions

Only the Adirondack and Metro residents differed from the other groups with respect to which satisfaction and dissatisfaction were identified as being primary, and they also differed from each other. "Having access to private lands for deer hunting" and "scouting for deer before the season" were not primary satisfaction for Adirondack residents. Access to private lands

¹It was not clear whether Muzzleloader hunters and Bowhunters indicated the number of hours they hunted on opening day of their special seasons or opening day of the regular firearms season. However, because of the placement of the question in the questionnaire, we believe they were responding to the opening day of the regular firearms season.

likely is not a primary satisfaction because of the abundance of public land available for deer hunting in that area. Adirondack hunters were more likely than any other group to hunt on public land (26%) and to prefer to hunt there (21%). We are not sure why scouting for deer is not a primary satisfaction for Adirondack hunters.

"Scouting for deer before the season" also was not a primary satisfaction for Metro residents. We do not know how much opportunity Metro hunters had to scout for deer because they generally lived some distance from their hunting areas. "Seeing deer year-round" was not a primary satisfaction for these hunters, likely because there are few opportunities to view deer in most of the Metro area.

Muzzleloader hunters differed from the other groups with respect to 3 satisfactions and 2 dissatisfactions. These hunters indicated that "eating venison," "passing the tradition of deer hunting on to others throughout the year," and "knowing that I am participating in a traditional American activity" were all primary satisfactions. It was not surprising that hunters who use a traditional firearm would place great importance on participating in a traditional activity.

"Not seeing deer" was not a primary dissatisfaction for Muzzleloader hunters whereas "not seeing other wildlife while deer hunting" was a primary dissatisfaction. Perhaps Muzzleloader hunters, even more than other hunters, place more importance on the total outdoor experience than they do on seeing or bagging deer.

Bowhunters were similar to Muzzleloader hunters with respect to their primary satisfactions, but not their primary dissatisfactions. "Eating venison," "passing the tradition of deer hunting on to others throughout the

year," and "knowing that I am participating in a traditional American activity" were primary satisfactions for Bowhunters. However, Bowhunters indicated that "not seeing deer sign" and "seeing inexperienced hunters" were primary dissatisfactions.

Expectations vs. Actual Experiences

Although a majority of hunters in each group were satisfied with their overall deer-hunting experiences, some regional differences existed (see page 13). Our data suggest that these differences were related to regional differences in expectations, especially the number of deer that hunters expected to see during the regular firearms season. Hunters in all regions indicated their expectations were not met when only a few deer were seen per day, but hunters in the Catskill region were noticeably different. Catskill hunters reported seeing about the same average number of deer per day as hunters in other regions ($\bar{x} = 4$), but their expectations for seeing deer were higher than for other regions (Table 16). The majority of the Catskill hunters did not meet their expectations for seeing deer even if they saw 4 deer per day. Thus, they had the lowest percentage of satisfied hunters (62%) of any group.

Although most Metro residents hunted in the Catskills, they had much lower expectations for seeing deer. This may be related to the type of information Metro hunters used to develop their expectations. Metro hunters were more likely than Catskill hunters to use secondary sources of information when developing expectations about the number of deer they were likely to see during the hunting season. Catskill hunters relied more on personal reconnaissance as their most important source of information, especially

Table 16. Comparison of the number of deer that various groups of hunters saw during the 1989 firearms deer season in New York with the number of deer the hunters expected to see.

Average number of deer seen per day.	Was expectation met by majority of hunters in each of the following groups?						
	Adirondacks	Catskills	Central/Western	Metro	Nonresident	Muzzleloader	Bowhunter
0	No ^a	No	No	No	No	No	No
<1	No	No	No	No	No	No	No
1	No	No	No	No	No	No	No
2	Mixed ^b	No	No	Mixed	Mixed	No	No
3	Mixed	No	Mixed	Mixed	Mixed	No	Mixed
4	Yes ^c	No	Mixed	Mixed	Mixed	Mixed	Mixed
5	Yes	Yes	Mixed	Yes	Mixed	Yes	Yes
6	Yes	Mixed	Yes	Yes	Mixed	Yes	Yes
7	Yes	Yes	Yes	Yes	Yes	Yes	Yes
≥8	Yes	Yes	Yes	Yes	Yes	Yes	Yes

^aNo = <45% answered affirmatively.

^bMixed = 45% to 55% answered affirmatively.

^cYes = >55% answered affirmatively.

preseason scouting. Nonresidents also were more likely to use secondary sources of information and had relatively low expectations.

"Single Greatest" Satisfactions and Dissatisfactions

Respondents from all groups were relatively similar with respect to aspects listed as the "single greatest" satisfaction and dissatisfaction (cf. Tables 9 and 10). However, the various groups of hunters offered different types of solutions to the same dissatisfaction. Central/Western hunters provided the broadest range of solutions to their "single greatest" dissatisfaction including DEC management actions, enhancement of SEC's, and increased hunter effort. Catskill hunters suggested mostly DEC management actions and enhancement of SEC's whereas Metro and Nonresident hunters suggested DEC management actions and increased hunter effort as solutions. Adirondack hunters provided the narrowest range of solutions suggesting mostly DEC management actions as solutions to their "single greatest" dissatisfaction.

Development of Preseason Expectations

Hunters in all groups relied on several types of information to develop preseason expectations. However, Metro and Nonresident hunters were less likely than other hunters to use personal experience and more likely to rely on secondary sources of information. It could be that hunters in these 2 groups do not have as much opportunity to travel to their deer-hunting areas prior to the season and likely are less knowledgeable than other hunters of changes that occur in their hunting area between seasons. Thus, they are more

likely to rely on secondary sources of information as the basis for their preseason expectations.

Deer Management Permits

Feelings about the deer management system used by DEC in the Southern Zone differed among the various groups (Table 17). Groups with the highest percentage of respondents indicating they were "generally satisfied" were Nonresidents, Central/Western respondents, and Metro respondents. A large percentage of respondents from each of these groups hunted in the Southern Zone. Catskill respondents also hunted predominantly in the Southern Zone, and more specifically, tended to hunt in the same part of the Southern Zone as most Metro respondents (i.e., the Catskill region) (See Table 2). However, a higher percentage of Catskill than Metro respondents indicated they were "generally dissatisfied" with the deer management system used in the Southern Zone. This difference in satisfaction with the deer management system likely related to the difference between the groups' expectations for seeing deer as discussed above (see pages 54-55).

A relatively high percentage of Muzzleloader hunters (22%) and Bowhunters (21%) also were "generally dissatisfied" with the deer management system used in the Southern Zone. Dissatisfied respondents from these 2 groups listed the same kinds of reasons for their dissatisfaction as dissatisfied respondents from other groups. That is, they believed "too many DMP's were issued," they "didn't see enough deer," and they "disagreed with DEC's deer population estimates." These types of responses do not indicate any reasons why more Muzzleloader hunters or Bowhunters would be dissatisfied than respondents from most other groups. The 2 groups that did not hunt much

Table 17. Regional and special hunting implement differences about feelings toward the deer management system used by the New York State Department of Environmental Conservation in the Southern Zone of New York.

Region or implement type	Percent			
	Generally satisfied	Mixed feelings	Generally dissatisfied	No opinion
Adirondack residents	38%	26%	15%	21%
Catskill residents	40%	30%	22%	9%
Central/Western residents	47%	27%	14%	12%
NYC/LI Metro residents	47%	25%	17%	11%
Nonresidents	50%	21%	12%	18%
Muzzleloader hunters	38%	30%	22%	10%
Bowhunters	42%	32%	21%	6%

in the Southern Zone (e.g., Adirondack respondents) or otherwise did not know much about deer management in the Southern Zone because they did not live there (e.g., Nonresidents) had a relatively high percentage of respondents who indicated "no opinion" about the deer management system used in that part of the State.

Compared with the other groups, relatively few Adirondack hunters (41%) applied for a DMP, and only two-thirds (67%) wanted to apply. We had expected even fewer Adirondack hunters would want to apply because DMP's cannot be used in most of the Adirondack region. Indeed, a higher percentage of Adirondack hunters (10%) than those from other groups indicated they did not apply for a DMP because "no DMP's are issued in my area." Compared to other hunters, relatively few Adirondack hunters who did not apply for a DMP said they simply "did not get around to it" (20%), or that the "application period is too short" (8%).

Catskill hunters differed from hunters in other groups in that only 50% applied for a DMP; 74% said they wanted to apply for a DMP. A smaller percentage (45%) of Catskill hunters than any other group indicated they applied for a DMP "to increase my chances of taking a deer," but a higher percentage of Catskill DMP applicants (14%) than those from other groups applied so they could "take an extra deer." This is surprising considering 40% of the nonapplicants said they did not want to apply because "too many does are shot in my area," and 30% said they "did not need an extra deer." The percentages of Catskill hunters giving these 2 reasons were higher than for any other group.

That a relatively high percentage of Catskill hunters wanted to take an extra deer while others believed the DMP program was responsible for an undesirable decrease in the deer population indicates a split in attitudes among Catskill deer hunters. Although differences of opinion existed within all groups, this dichotomy is most evident with Catskill hunters.

The Central/Western group had a high percentage of hunters who applied for a DMP (66%), and the highest percentage of hunters who indicated that they wanted to apply for a DMP (87%). Central/Western hunters tended to be similar to other hunters with respect to their reasons for applying for a DMP. However, the percentage of Central/Western hunters not applying for a DMP who indicated they "did not get around to it" (37%) was higher than for other hunters, and the percentage who indicated they did not apply because "too many does are shot in my area" (20%) was lower than for other hunters.

Nonresidents were relatively unlikely to apply for a DMP--only 48% applied although 73% wanted to apply. Few of those who did not apply (18%) said it was because they simply "did not get around to it." Instead, a much

higher percentage of Nonresidents did not apply because they believed their "chances of getting a DMP were not good" (21%). In some management units in some years, this reason may reflect reality because DMP's are allotted to residents before nonresidents. However, Nonresidents have a "good" chance of receiving a DMP for those management units in which DMP's are undersubscribed.

Muzzleloader hunters were similar to other hunters regarding their desire to apply for a DMP and actual number who applied (i.e., 78% wanted to apply and 63% did so). However, among those who did not want to apply, a higher percentage of Muzzleloader hunters (30%) than other hunters indicated that they did not apply because "too many does are shot in my area."

Bowhunters differed from Muzzleloader hunters in that a very high percentage of Bowhunters (87%) wanted to apply for a DMP, and a higher percentage of Bowhunters (72%) than any other group of hunters did apply. Although a relatively low 42% said the most important reason they applied was "to increase their chances of taking a deer," a higher percentage of archers (18%) than other hunters applied for a DMP so they could "hunt legally after filling their buck tag."

MANAGEMENT IMPLICATIONS

This is one of the most comprehensive studies of deer-hunting satisfaction conducted. It is the first study to combine an examination of how preseason expectations are formed, how those expectations compare with actual deer-hunting experiences, and relationships between expectations, actual experiences, and satisfaction with deer hunting. Because of the theoretical framework used in this study, it offers numerous insights about the satisfying and dissatisfying aspects of deer hunting that are most

important to hunters, and reveals ways to maintain or enhance satisfaction among deer hunters.

The results of this study support the multiple-satisfactions concept of deer hunting (e.g., Hendee 1974, Decker et al. 1980). Whether deer hunters in New York are satisfied with their experiences depends on more than a single aspect such as seeing deer or bagging a buck. Satisfaction depends on a range of aspects either being experienced or not experienced. The range of satisfactions and dissatisfactions that are important to a hunter and the degree to which each aspect is important differs among hunters.

Most deer hunters in New York are satisfied with their deer-hunting experiences and expressed support for DEC's deer management program. Continued support depends in part on helping hunters (1) establish realistic expectations for what they will experience during the hunting season and why they should expect those experiences (i.e., understanding management), (2) meet their expectations for the most important satisfactions associated with deer hunting, and (3) avoid or overcome the most important dissatisfactions. Limited resources for management may preclude addressing all 3 of these needs at once, so they must be prioritized.

Management efforts will be most beneficial if they concentrate on helping hunters establish realistic expectations. We found that expectations play a large role in whether hunters are satisfied or dissatisfied. By addressing expectations, managers can simultaneously address several satisfactions and dissatisfactions.

In helping hunters develop realistic expectations, managers also can help hunters understand why those expectations should be realistic. For example, if hunters unrealistically expect to see a high number of deer, but

do not, they need to understand why their expectations were unrealistic. They need to have a better understanding that managers consider a broad range of societal needs when making decisions about the level the deer population should be in a given management unit, and that that level might be lower than the hunters would like it to be. Helping hunters understand why certain expectations should be realistic (and why others are unrealistic) may not be an easy task because many hunters do not "perceive or value their role in management," but focus more on the achievement of personal satisfactions (Decker and Connelly 1990:450). Accomplishing this task will require strong communication and education efforts on the part of managers.

Establishing realistic expectations involves more than providing information to hunters and assuming they will develop a sense of "reality" from that information. Few hunters rely on information from DEC or other "secondary sources" to develop expectations about important satisfactions such as the number of deer they will see during the hunting season. Instead, hunters place much more stock in information collected from personal reconnaissance or other sportsmen. One way DEC could overcome hunters' unwillingness to use "secondary sources" of information is to develop networks of local, volunteer hunters who "collect" information for DEC and provide forecasts of the upcoming deer season for sportsmen. Thus, DEC could use the fact that hunters are more likely to believe and use information for developing expectations when it comes from their peers.

This suggestion has associated with it some very obvious and some less obvious concerns. One concern is that even information collected personally by hunters may not reflect "reality." As found in a study conducted in the Adirondacks, some hunters may perceive deer populations to be lower than

"reality" because highly visible, and thus highly vulnerable, deer tend to be harvested first (Sage et al. 1983). In the Adirondack study, observations of deer in the summer decreased 87% following a 54% harvest the preceding fall. This disproportionate decrease in observed deer was attributed to harvest of highly visible deer.

McCullough (1984) suggested a similar phenomenon occurs when deer are managed for maximum sustainable yield (the reader should note that DEC purposefully does not manage for maximum sustainable yield). Such management increases the deer harvest and hunter success ratios, but results in lower residual populations. "Therefore, if hunters use the perception of the size of the deer population as their major reference point for satisfaction, management for increased harvest invariably will result in lower satisfaction" (McCullough 1984:239).

Similar decreases in observed deer may occur during the deer season (G. Parsons, NYSDEC, pers. comm.). Deer tagged with a DMP on the first day of the hunting season cannot be observed by other hunters later in the season. Thus, an initial deer population of size "X" may be perceived by hunters to be much lower than "X" soon after the season begins because highly observable deer are harvested early in the season before many hunters have the opportunity to see them. This may explain why some hunters who relied on preseason scouting to develop expectations did not see as many deer as they expected.

Many of the hunters whose expectations were not met, especially in the Catskill group, believed DEC issued "too many DMP's" in their hunting area. Rather than "too many DMP's" having been issued, their successful use early in the hunting season may have decreased opportunities for many hunters to observe deer later in the season. About 20 years ago in the Catskill region,

hunters tagged a relatively small percentage of the deer taken on DMP's during the first 3 days of the season and a relatively large percentage of the deer taken on DMP's during the last 4 days of the season. By the late 1980's, more than twice as many DMP's were filled during the first 3 days of the season as during the last 4 days (N. Tripp, NYSDEC, pers. comm.).

Respondents from the Catskill group were different from other respondents for several of the important findings relating to expectations and satisfaction. These differences in expectations and satisfactions suggest that different management strategies may be necessary in different regions of the State. DEC already manages differently to some degree by setting different harvest objectives among the various Deer Management Units (DMU's). Regional differences in management objectives and strategies may be necessary to enhance satisfaction among hunters, especially in areas like the Catskills where hunters' expectations and desires apparently differ from those elsewhere.

One way to help hunters in the Catskills, or elsewhere, meet their expectations for seeing deer would be to delay or spread out the use of DMP's over the course of the season. Such a management approach may give rise to certain dissatisfactions (e.g., hunters may perceive they have fewer days to hunt legally), but likely would not contribute to any of the primary dissatisfactions identified in this study. To the contrary, delaying or spreading out the use of DMP's over the course of the season could help overcome other dissatisfactions such as "seeing a lot of hunters in my hunting area" and "not seeing any deer while hunting."

Helping hunters meet their expectations for seeing deer is important because it relates to the relationship between "visual evidence" and

satisfaction. Also related to this relationship is whether hunters have access to lands they believe hold deer. Many hunters believed that deer were pushed onto posted land during the deer season, and thus they perceived that their opportunities to see and bag deer were reduced. Most hunters would prefer to hunt on these posted, private lands that are currently "off-limits"; however, many hunt instead on public land because access to public land is easier to gain, rather than because public land offers primary satisfactions. Deer managers have recognized that this heavy distribution of hunters on public land in some DMU's may result in greater deer harvest on that land than on private land and may prevent management objectives from being met in the entire DMU.

Both hunters and managers would like to alter the distribution of hunters (and deer harvest) within some DMU's. Unfortunately, our knowledge of the reasons for limitations on access is about 2 decades old (Brown and Thompson 1976). In the early 1970's, landowners' said they posted because of real and perceived negative behavior of hunters. This study found that hunters share this recognition that poor hunter behavior is a problem.

One credo of the hunting community has been that "a few bad apples spoil hunting for everyone else." Poor hunter behavior was identified as a primary dissatisfaction by most hunters in this study, and many hunters said they witnessed such behavior. DEC can help hunters overcome this dissatisfaction by building on the hunters' own recognition that poor behavior must be improved. Respondents suggested that one mechanism for improving hunter behavior is enhancement of SEC's.

Some groups have expressed concern to DEC that increasing the length of the SEC would act as an impediment to hunting participation (J. Ford, NYSDEC,

pers. comm.). This concern has not been supported in any previous study on hunting participation in New York (Purdy and Decker 1985, Purdy et al. 1986), and it was not supported by this study. To the contrary, hunters supported the idea of including more training on safety and ethics in SEC's for new hunters. There was even some support for mandatory renewal of SEC training by all hunters. Additional support may be gained if such training can be used to obtain access to private lands for hunting. For example, hunters could be issued re-certification cards as proof to landowners that they have participated recently in a refresher course on hunting safety and ethics.

Enhancing SEC's to improve hunter behavior and to help gain access to private land for hunting reinforces the notion that addressing 1 dissatisfaction can help enhance multiple satisfactions. Similarly, management efforts aimed at helping hunters develop realistic expectations also can help enhance several satisfactions and concomitantly can help overcome multiple dissatisfactions.

Overcoming dissatisfactions and increasing the likelihood that important satisfactions will be experienced undoubtedly will help to retain deer hunters in the hunting population, but we do not know whether these actions will have a substantial impact on recruitment of new hunters. This is an important point because relatively few, younger men and women hunt deer compared with older age classes of hunters. If this phenomenon reflects low recruitment of younger hunters, important social, economic, and management-related consequences will result in the future.

Poor recruitment will reduce the pool of experienced hunters available in the future who can initiate others into hunting and accompany them afield. Previous research (Decker and Brown 1982, Purdy and Decker 1986) has shown

that "initiators" and "companions" play important roles in getting others involved in hunting. Although fewer hunters could contribute to increased satisfaction for those persons concerned about crowding, the economic consequences of reduced license sales could be severe given current funding strategies. Additionally, fewer hunters in the future would reduce the opportunity to control the deer population in certain areas of the State because "[t]he fundamental mechanisms of deer management in New York State is the ... DMP system" (Decker and Connelly 1989). Even with current numbers of deer hunters, DMP's are undersubscribed in many deer management units (J. O'Pezio, NYSDEC, pers. comm.).

Direct links between hunting satisfaction and recruitment may not exist, but a person's perceptions of the satisfactions that may be gained from hunting undoubtedly influence his/her likelihood of being recruited into the hunting population. Given the relatively small percentage of younger persons participating in deer hunting, the relationships between perceived hunting satisfactions and recruitment deserve additional attention.

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APPENDIX A

Development of the Survey Instrument

In November 1989, we held meetings during which the Nominal Group Technique (NGT) (Moore 1987) was used with panels of 4-13 deer hunters in 4 geographic regions of the State: New York City metropolitan area (Metro), southeastern New York (Catskills), northern New York (Adirondacks), and central/western New York (see Figure 1 in the main report). Two similar meetings were held with the Big Game Committee of the New York State Conservation Council and DEC deer managers. Participants invited to the regional meetings were hunters selected to represent diverse characteristics of deer hunters. Lists of candidates were submitted to HDRU staff by the Regional Wildlife managers in that part of the State where each meeting was to take place. The characteristics we wanted represented among hunters at the meetings were: both sexes; a broad range of ages; hunters affiliated with organized sportsmen's groups and unaffiliated hunters; experienced and inexperienced hunters; hunters known to be supportive of DEC's deer management program and those not supportive. HDRU staff chose the actual participants to be invited because they were not familiar with any of the individuals on the lists and therefore would not bias the selection process.

At the meetings, participants were led through a structured NGT that resulted in lists of satisfying and dissatisfying aspects of deer hunting. Participants responded to the question: "What aspects of the recreational deer hunting experience do you believe lead to satisfaction or dissatisfaction among deer hunters?" The referent "deer hunting experience" was defined as "any activities and events prior to and after, as well as during the hunting season." The 6 meetings resulted in hunters expressing a total of 140

satisfying aspects and 166 dissatisfying aspects. These aspects formed the basis for developing questions to be used in a mail questionnaire.

Sample Selection

DEC was interested in 7 groups of hunters: (1) Metro, (2) Catskills, (3) Adirondacks, (4) Central/Western, (5) Nonresidents, (6) statewide Muzzleloader hunters, and (7) statewide Bowhunters. In addition, DEC was interested in determining whether differences in satisfaction existed between those persons who wanted to apply for a deer management permit (DMP) and those who did not want to apply. To obtain sufficient samples from each group of interest and to stay within the budget for a final sample of 6,000 hunters, we used a multi-step sampling process based the assumptions listed in Table A1. A sample of about 500 license holders was needed for each group of interest to meet statistical confidence requirements at the 95% level.

The first step in the sampling procedure was to ensure we would obtain a statistically valid sample of those persons who wanted to apply for a DMP (i.e., about 500) as well as those who did not want to apply (i.e., about 500) in each geographic region. Using the total of 773,580 big game licenses sold in 1987-88 as a basis for estimation, we needed to select an initial sample of size "X" that would result in the minimum 500 for each group of interest. In this effort, "X" was unknown beforehand. "X" had to account for the unknown percentage of licenses sold to hunters who did/did not want to apply for a DMP in each of the 4 geographic regions plus the Nonresidents. To estimate "X," we needed to consider the geographic region in which the smallest number of big game licenses were sold (Metro). Fortunately, all licenses purchased in the Metro region were purchased by Metro residents (assumption 1). Thus,

Table A1. Assumptions on which the sample selection was based for the study of deer hunter satisfactions and dissatisfactions in New York, 1990.

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1. Persons who purchase a license in the New York City metropolitan (Metro) region live in that region (i.e., no one from outside that region goes there to buy a license).
 2. In 1987-88 (the last year for which we had information) about 774,000 big game licenses were sold, and about 400,000 deer management permits (DMPs) were issued (about 50% of the number of big game licenses). However, we did not assume that 50% of the license holders in each geographic region wanted to apply for a deer management permit.
 - a. In the Metro and Adirondack regions, we assumed that only 40% of the license holders wanted to apply for a DMP.
 - b. In the Catskill and Central/Western regions, we assumed that 60% of the license holders wanted to apply for a DMP.
 3. Approximately 85-90% of the persons who buy a license in a region also live in that region (except the Metro region where virtually 100% of the license buyers also live there).
 4. Most of the persons who live in a region also hunt in that region (except for the Metro region and Nonresidents).
 5. The distribution of all big game licenses sold in each County did not change from the 1987-88 license year which was the last year for which we had information on the number of licenses sold in each County.
 6. The distribution of each type of license sold (e.g., Bowhunter, Muzzleloader, etc.) did not change from the 1987-88 license year.
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there was no reason to over-sample to obtain enough license stubs of residents of this region.

"X" was determined by solving the equation:

$$N_{\text{met}} = \%_{\text{met}} \text{ times "X"}$$

where N_{met} is the number of persons who bought a license in the Metro region, and $\%_{\text{met}}$ is the percent of persons in the sample who bought a license in the Metro region. We wanted about 500 license holders from the Metro region who wanted to apply for a DMP and about 500 persons who did not want to apply.

Using assumption 2a that only 40% of the license holders of the Metro region wanted to apply for a DMP, we needed a sample of about 1,250 not 1,000 from the Metro region to assure that we would obtain about 500 license holders who wanted to apply for a DMP, expecting therefore to obtain more than 500 who did not want to apply. We also knew from previous studies that Metro residents tend to respond at a lower rate than other residents. Thus, we decided on $N_{\text{met}} = 1,300$ to be conservative.

From the 1987-88 license-sale data, we knew that $\%_{\text{met}} = 0.1514$.

Substituting N_{met} and $\%_{\text{met}}$ into the equation for "X" gave us

$$1,300 = 0.1514 \times "X"$$

Solving for "X", gave us 8,586 license holders in our initial sample for the 4 in-state, geographic regions. We decided to use 8,600 to be conservative.

However, we had to subsample the 8,600 to arrive at a final sample size of no more than 6,000 because of budget considerations. This 6,000 would provide a statistically adequate sample for all groups of interest. Of that 6,000, about 400 needed to be Muzzleloader licenses and 500 needed to be Nonresident licenses (see sampling description for these 2 groups below). Also 1,300 needed to be licenses sold in the Metro region. That left about 3,800 to be split between the remaining 3 geographic groups.

Based on assumptions 2a and 2b, only 40% of the Adirondack license holders wanted to apply for a DMP, and only 40% of the Catskill and Central/Western license holders did not want to apply. We calculated that about 1,250 license holders needed to be sampled in each of the Adirondack, Catskill, and Central/Western regions.

Thus, the final sample size for the study was:

1,300 Metro
1,250 Catskills
1,250 Adirondacks
<u>1,250 Central/Western</u>
5,050 subtotal
400 Muzzleloader
<u>500 Nonresident</u>
5,950 grand total

Within the subtotal of 5,050, we expected to have about 900 Bowhunters (see Bowhunter sampling description below) and about 100 Muzzleloader hunters (see muzzleloader sampling description below).

After identifying the size of the samples to be selected for the 4 geographic, in-state groups and the nonresidents, the next step was to ensure an adequate sample of Bowhunters. As stated above, we needed a minimum of about 500 Bowhunters to describe them on a statewide basis. Of the 773,580 big game licenses sold in 1987-88, 18% were Bowhunters. Out of the in-state samples of hunters from the Adirondack, Catskill, Central/Western, and Metro groups (i.e., about 5,050 as described above), we expected to obtain about 900 Bowhunters ($5,050 \times 0.18 = 909$). Thus, we did not need to sample specifically for Bowhunters; we obtained an adequate statewide sample through the samples for the geographic groups.

Next we sampled for Muzzleloader hunters. Muzzleloader licenses accounted for about 2% of the license sales in 1987-88. Based on this, we expected to obtain about 100 Muzzleloader license holders from the 4 geographic regions ($5,050 \times 0.02 = 101$). We needed to obtain about 400 additional Muzzleloader license holders to be able to describe these hunters on a statewide basis. These additional license stubs were the first stubs selected in the sampling process, and they were drawn systematically from the

total pool of big game license stubs available based on the number of big game licenses sold in each county.

The next step was to draw the sample of Nonresident big game license stubs. Calculating the number of Nonresident license stubs to be sampled was different from calculating the number of Muzzleloader license stubs to be sampled. Recall that some of the Muzzleloader license stubs were obtained from the sample of 5,050 licenses in the 4 geographic regions, and that the 5,050 actually was subsampled from an initial sample of 8,600. In the case of the Nonresidents, we used all Nonresident license stubs found in the initial sample of 8,600 not the subsample of 5,050. We did this because we only wanted to describe Nonresidents in general and not on their behavior relative to DMP's.

Based on the knowledge that 4% of the big game license sales in 1987-88 were Nonresident licenses, we expected to obtain about 344 Nonresident licenses in the initial sample ($8,600 \times 0.04 = 344$). We needed about 156 additional Nonresident license stubs to obtain the final sample of 500 Nonresidents, and these additional license stubs were drawn based on the number of licenses sold in each county as described for Muzzleloader hunters above.

After the Muzzleloader and Nonresident licenses were accounted for, the samples were selected for each of the 4 remaining geographic regions. These samples were selected based on the number of big game licenses sold in each county.

Data Analysis

Results were analyzed statewide and for each of the 7 groups of interest. The statewide analysis was conducted by weighting results from the 4 in-state residence groups to account for differences in the number of licenses sold in each region (Table A2).

Table A2. Weighting factors used to adjust responses from 4 geographic regions in New York so that differences in the number of big game licenses sold in the regions were reflected.

<u>Region</u>	<u>Weighting factor</u>
New York City Metropolitan area	0.628
Catskills	0.778
Adirondacks	0.692
Central/Western New York	1.889

APPENDIX B

Accounting for Nonresponse Bias

Nonrespondents differed from respondents in 3 general ways. First, nonrespondents placed significantly less importance on many of the individual satisfaction and dissatisfaction components. Second, nonrespondents' overall satisfaction with Southern Zone deer management tended to be significantly higher than respondents' satisfaction. Finally, nonrespondents' behavior indicated they were somewhat less involved in deer hunting than respondents (e.g., hunted fewer days for deer, less likely to hunt deer in 1989).

Usually, we would adjust the results to reflect nonresponse bias for those variables which were significantly different between respondents and nonrespondents. However, because of limitations in a nonrespondent assessment, we had information on only 40 variables for nonrespondents out of the 200+ variables asked of the respondents on the mail questionnaire. In addition, we found different variables to be significantly different between respondents and nonrespondents among the 4 geographic regions examined. Thus, we had multiple barriers to adjusting for nonresponse bias using the typical method. Instead, we decided to describe the nonrespondents as a group by themselves based on the information we gathered from the telephone interviews. That information is presented in Appendix C.

APPENDIX C

Identifying Nonrespondents to the Mail Survey

We conducted a nonresponse bias follow-up for the 4 groups from the mail survey which experienced response rates <65%. Subsamples drawn from the lists of nonrespondents from the 4 groups resulted in 59 completed interviews with nonrespondents from the Metro region (50% of the reachable subsample; 91% of those contacted), 50 interviews with Catskill nonrespondents (41% of the reachable subsample; 83% of those contacted), 50 interviews with Adirondack nonrespondents (39% of the reachable subsample; 76% of those contacted), and 54 interviews with Central/Western nonrespondents (45% of the reachable subsample; 71% of those contacted).

Nonrespondents among the 4 geographic regions were similar for most variables. For this reason and because the relatively small sample size within each geographic region limits the usefulness of geographic analyses for nonrespondents, we analyzed nonrespondents on a statewide basis only. Weighting factors to account for geographic differences in the number of big game licenses sold were calculated for nonrespondents to be: 0.559 for Metro, 0.840 for Catskills, 0.720 for Adirondacks, and 1.889 for Central/Western.

Characteristics of Nonrespondents

Overall, nonrespondents averaged 34.5 years of age. One-half (50%) lived in rural areas, 35% lived in small towns and villages, and 15% lived in urban areas. Most nonrespondents (86%) hunted deer in New York in 1989. Of those who did not, 42% had hunted in 1988, but 15% had not hunted since 1987. One-quarter (24%) of those who did not hunt in 1989 had never hunted deer although they held a big game hunting license.

Nonrespondents who hunted in 1989 tended to participate at moderate levels. During the 1989 deer season, they hunted for an average of 11.5 days most of which occurred during the regular gun season (Table C1).

Overall, only 26% of the nonrespondents bagged a deer. About 6% bagged a deer during early archery, 24% bagged a deer during regular gun season (including 9% who bagged a deer on a DMP). None of the nonrespondents bagged a deer during the late archery or Muzzleloader seasons, which is consistent with the low number of days they hunted during those late seasons.

More than one-half of the nonrespondents (52%) applied for a DMP. Of those who applied, 87% received a DMP. The most-frequently-given reasons for applying were "to increase my chances of taking at least 1 deer" (36%), "to help manage the deer herd" (18%), "to allow me to hunt legally with friends and family after filling my buck tag" (17%), "to allow me legally to take a second buck" (13%), and "to be able to take an additional deer of either sex after filling my buck tag" (12%).

The behavior of actually applying for a DMP is only an index to the desire to apply for a DMP. In the case of nonrespondents, 78% wanted to apply

Table C1. Mean number of days nonrespondents to a mail questionnaire hunted for deer and percent of nonrespondents bagging a deer during various deer seasons in New York during 1989.

<u>Deer hunting season</u>	Days hunted	Bagged a deer	
	<u>Mean</u>	<u>n</u>	<u>%</u>
Early archery	2.6	11	6.2
Regular gun	8.4	44	24.4
Late archery	0.3	0	0.0
Muzzleloader	0.2	0	0.0

(26% more than actually did) whereas 22% specifically did not want to apply. Reasons given for not applying by those who wanted to apply included: "I did not think I would have enough time to hunt" (45%), "I did not get around to it" (32%), and "the permit application period was too short" (16%). The percentage of nonrespondents who did not think they would have time to hunt was much higher than the percentage of respondents who gave the same response. Reasons given by those who did not want to apply included: "I was concerned about too many does being shot in my area" (32%), "I did not want or need an extra deer" (32%), "I personally do not shoot does" (11%), and "there are too many unsafe hunters in the Southern Zone" (8%).

Nonrespondents generally believed DEC was doing a good job with deer management in the Southern Zone. When asked to describe their feelings about the current system DEC uses to manage deer in the Southern Zone, 71% said they were "generally satisfied," 19% had "mixed feelings," only 8% were "generally dissatisfied," and 2% had no opinion. Whether individuals received a DMP had little influence on their satisfaction with Southern Zone management. Of those who received a DMP, 77% were satisfied with the way DEC manages deer in the Southern Zone, 18% had mixed feelings, and only 5% were dissatisfied. Similarly, 68% of those who did not receive a DMP were satisfied, and the other 32% had mixed feelings.

Alternatively, nonrespondents' desire to apply for a DMP was a reflection of their feelings about Southern Zone deer management. Of those nonrespondents who were generally satisfied with Southern Zone deer management, 85% wanted to apply for a DMP. Conversely, slightly less than one-half (48%) of those who were dissatisfied with Southern Zone management

wanted to apply for a DMP. An intermediate percentage (70%) of those who had mixed feelings about Southern Zone deer management wanted to apply.

Very few of the satisfaction and dissatisfaction elements examined were very important to the nonrespondents (Table C2). Only "making a clean kill" and "relaxing and getting away from everyday worries through hunting" were primary satisfaction elements for nonrespondents. Similarly, the only primary dissatisfaction elements for nonrespondents were "seeing wounded or dead deer that others have shot and lost" and "seeing unsafe hunters in the woods."

Table C2. Importance of deer hunting aspects to mail-questionnaire nonrespondents in New York during 1989.

<u>Aspects of deer hunting</u>	<u>Mean score^a</u>	<u>n</u>
Primary satisfactions		
Making a clean kill	2.3	209
Relaxing and getting away from everyday worries through hunting	2.0	208
Secondary satisfactions		
Having access to public lands for deer hunting	1.4	209
Having access to private lands for deer hunting	1.4	210
Hunting with family members	1.4	209
Seeing deer while hunting	1.3	210
Bagging a deer	0.9	207
Primary dissatisfactions		
Seeing unsafe hunters in the woods	2.9	207
Seeing wounded or dead deer that others have shot and lost	2.7	208
Secondary dissatisfactions		
Seeing a lot of hunters in your hunting area	1.8	207
Knowing that deer habitat is being lost to housing and commercial developments	1.7	206
Not seeing any deer while hunting	1.1	207
Having trouble finding a place to hunt because of posting	1.0	207
Not bagging a deer	0.8	206

^aBased on a scale where: 0 = "not at all important," 1 = "somewhat important," 2 = "very important," and 3 = "absolutely necessary" for satisfaction elements, and 0 = "has no influence on whether I am dissatisfied," 1 = "may make me dissatisfied," 2 = "tends to make me dissatisfied," and 3 = "absolutely makes me dissatisfied" for dissatisfaction elements.

