

**DECISION
AND
FINDING OF NO SIGNIFICANT IMPACT**

**An Integrated Wildlife Damage Management Approach
For the Management of White-tailed Deer Damage
In the State of North Carolina**

United States Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS), Wildlife Services (WS) program responds to requests for assistance from individuals, organizations and agencies experiencing damage caused by wildlife. Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). To evaluate and determine if any potentially significant impacts to the human environment from WS' planned and proposed program would occur, an environmental assessment (EA) was prepared. The EA documents the need for white-tailed deer (*Odocoileus virginianus*) damage management in North Carolina and assessed potential impacts of various alternatives for responding to damage problems. The EA analyzes the potential environmental and social effects for resolving deer damage related to the protection of resources, and health and safety on private and public lands in North Carolina. WS' proposed action is to implement an Integrated Wildlife Damage Management (IWDM) program on public and private lands in North Carolina. Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing this decision.

WS is the Federal program authorized by law to reduce damage caused by wildlife (Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767). Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992). WS uses an IWDM approach, commonly known as Integrated Pest Management (WS Directive 2.105) in which a combination of methods may be used or recommended to reduce damage. WS wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (Slate et al. 1992, USDA 1997, WS Directive 2.201). Resource management agencies, organizations, associations, groups, and individuals have requested WS to conduct deer damage management to protect resources and human health and safety in North Carolina. All WS wildlife damage management activities are in compliance with relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act of 1973.

Consistency

The analyses in the EA demonstrate that Alternative 5: 1) best addresses the issues identified in the EA, 2) provides safeguards for public health and safety, 3) provides WS the best opportunity to reduce damage while providing low impacts on non-target species, 4) balances the economic effects to agricultural and natural resources, and property, and 5) allows WS to meet its obligations to government agencies or other entities.

Monitoring

The North Carolina WS program will annually provide to the North Carolina Wildlife Resources Commission WS lethal take of target and non-target animals to help ensure the total statewide take (WS and other take) does not impact the viability of target and non target wildlife species. In addition, the EA will be reviewed each year to ensure that it and the analysis are sufficient.

Public Involvement

The pre-decisional EA was prepared and released to the public for a 30-day comment period by a legal notice in *The News and Observer, Roanoke-Chowan County, News Herald and Gates County Index, Winston-Salem Journal, The Charlotte Observer, The Greensboro News & Record, Beaufort Hyde News, New Bern Sun Journal, Fayetteville Observer, Asheville Citizen Times, and Daily Advance* newspapers. A letter of availability for the pre-decisional EA was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. A total of two comment documents were received from the public during the comment period. All comments were analyzed to identify substantial new issues, alternatives, or to re-direct the program. Responses to specific comments are included in Appendix A. All letters are maintained in the administrative file located at the Wildlife Services State Office in Raleigh, North Carolina.

Major Issues

The EA describes the alternatives considered and evaluated using the identified issues. The following issues were identified as important to the scope of the analysis (40 CFR 1508.25).

- Effects on White-tailed Deer Populations
- Effects on Plants and Other Wildlife Species, including T&E Species
- Effects on Human Health and Safety
- Humaneness of Methods to be Used
- Effects on Aesthetic Values
- Effects on Regulated White-tailed Deer Hunting

Affected Environment

The areas of the proposed action include, but are not limited to, property on or adjacent to airports, recreational areas, parks, corporate complexes, subdivisions, businesses, industrial parks, schools, agricultural areas, and cemeteries. The proposed action may be conducted on properties held in private, local, state or federal ownership.

Alternatives That Were Fully Evaluated

The following five alternatives were developed to respond to the issues. Two additional alternatives were considered but not analyzed in detail. A detailed discussion of the effects of the Alternatives on the issues is described in the EA; below is a summary of the Alternatives.

Alternative 1: No Deer Damage Management by WS

This alternative would eliminate WS involvement in all deer damage management activities in North Carolina. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own deer damage management without WS input.

Alternative 2: Technical Assistance Only

This alternative would only allow North Carolina WS to provide technical assistance to individuals or agencies requesting deer damage management. Individuals might choose to implement WS lethal and non-lethal recommendations, implement methods not recommended by WS, use contractual services of private businesses, or take no action.

Alternative 3: Lethal Deer Damage Management only by WS

Under this alternative, WS would provide only lethal direct control services and technical assistance. Requests for information regarding non-lethal management approaches would be referred to the North Carolina Wildlife Resources Commission, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS lethal recommendations, implement non-lethal methods or other methods not recommended by WS, contract for WS lethal direct control services, use contractual services of private businesses, or take no action.

Alternative 4: Nonlethal Deer Damage Management only by WS

This alternative would require WS to use and recommend non-lethal methods only to resolve all deer damage problems. Requests for information regarding lethal management approaches would be referred to the North Carolina Wildlife Resources Commission, local animal control agencies, or private businesses or organizations. Persons incurring deer damage could still resort to lethal methods or other methods not recommended by WS, use contractual services of private businesses that were available to them, or take no action.

Alternative 5: Integrated Deer Damage Management Program: No Action (Preferred Alternative/No Action)

Under this alternative, Wildlife Services would continue the current damage management program that responds to requests for white-tailed deer damage assistance in the State of North Carolina. An IWDM approach would be implemented in consultation and coordination with the North Carolina Wildlife Resources Commission to alleviate white-tailed deer damage to agriculture, property, natural resources, and human health and safety on all private and public lands of North Carolina where a need exists, a request is received, and funding is available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, white-tailed deer, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellants, and physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by sharpshooting and live capture followed by euthanasia under permits issued by the North Carolina Wildlife Resources Commission. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods.

However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Deer damage management would be conducted in the state, when requested, on private or public property after an *Agreement for Control* or other comparable document has been completed. All deer damage management would be consistent with other uses of the area and would comply with appropriate federal, state and local laws.

Alternative Considered but not Analyzed in Detail:

Live Trapping and Relocation

Under this alternative WS would capture deer alive using cage-type live traps or capture drugs administered by dart gun and then relocate the captured deer to another area. Numerous studies have shown that live-capture and relocation of deer is relatively expensive, time-consuming and inefficient (Ishmael and Rongstad 1984, O'Bryan and McCullough 1985, Diehl 1988, Jones and Witham 1990, Ishmael et al. 1995). Population reduction achieved through capture and relocation is labor intensive and would be costly (\$273-\$2,876/deer) (O'Bryan and McCullough 1985, Bryant and Ishmael 1991). Additionally, relocation frequently results in high mortality rates for deer (Cromwell et. al. 1999, O'Bryan and McCullough 1985, Jones and Witham 1990, Ishmael et. al. 1995). Deer frequently experience physiological trauma during capture and transportation, (capture myopathy) and deer mortality after relocation, from a wide range of causes within the first year, has ranged from 25-89% (Jones and Witham 1990, Mayer et al. 1993). O'Bryan and McCullough (1985) found that only 15% of radio-collared black-tailed deer that were live-captured and relocated from Angel Island, California, survived for one year after relocation. Although relocated deer usually do not return to their location of capture, some do settle in familiar suburban habitats and create nuisance problems for those communities (Bryant and Ishmael 1991). High mortality rates of relocated deer, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane alternative to lethal removal methods (Bryant and Ishmael 1991). Chemical Capture methods require specialized training and skill. A primary limitation of darting, the limited range at which deer can be effectively hit, is generally less than 40 yards. With modern scoped rifles, however, a skilled sharpshooter can hit the head or neck of a deer for a quick kill out to 200 yards and beyond (although a shot over 200 yards is not very likely). Thus, chemical capture is far less efficient, more labor intensive, and much more costly than lethal removal with rifles.

Translocation of wildlife is discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, potential for disease transfer and difficulties in adapting to new locations or habitats. Also many states no longer permit the interstate transfer of deer due to recent concerns of chronic wasting disease outbreaks. If CWD is already present in North Carolina, relocating deer within the state could serve to vector the disease.

Population stabilization through birth control

Reproductive control is often considered for use where wildlife populations are overabundant and where traditional hunting or lethal control programs are not publicly acceptable (Muller et. al. 1997). Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (longevity, age at onset of reproduction, population

size and biological/cultural carrying capacity, etc.), habitat and environmental factors (isolation of target population, cover types, and access to target individuals, etc.), socioeconomic and other factors. Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species.

Reproductive control for wildlife could be accomplished either through sterilization (permanent) or contraception (reversible, initial treatment usually followed by a booster and annual follow-up treatments). Sterilization could be accomplished through: 1. Surgical sterilization (vasectomy, castration, and tubal ligation), 2. Chemosterilization, and 3. Gene therapy. Contraception could be accomplished through: 1. Hormone implantation (synthetic steroids such as progestins), 2. Immunocontraception (contraceptive vaccines), and 3. Oral contraception (progestin administered daily). Research into the use of these techniques would consist of laboratory/pen experimentation to determine and develop the sterilization or contraceptive material or procedure, field trials to develop the delivery system, and field experimentation to determine the effectiveness of the technique in achieving population reduction.

The use of hormones was investigated (Matschke 1976, 1977 a, b, c, and Roughton 1979), and eventually rejected as an effective and efficient reproductive control technique for deer. Additionally, concerns related to costs and logistics of widespread distribution of drugged baits, dosage control and ingestion of baits by children and non-target animals make oral contraception (by steroids) largely impractical (Lowery et al. 1993). More recently, immunocontraception has been studied in various situations and locations, but its potential use appears limited due to considerable constraints regarding treatment and follow-up treatment of a sufficiently large number of target animals, varying immunogenicity of vaccines, genetic backgrounds of individual animals, age, nutritional status, stress and other factors (Becker et al. 1997, Becker et al. 1999). The use of porcine zona pellucida (PZP) as a contraceptive agent in wildlife management has been investigated recently (Kirkpatrick et al. 1990, Turner and Kirkpatrick 1991, Turner et al. 1992, and Turner et al. 1996), but to date, there is no published documentation that immunocontraceptive vaccines have successfully reduced any free-ranging white-tailed deer herd or population.

USDA National Wildlife Research Center (NWRC) scientists have developed GonaCon™, a new single dose immunocontraceptive vaccine that shows great promise as a wildlife infertility agent. Recent studies have demonstrated the efficacy of this single-shot GnRH vaccine on California ground squirrels, Norway rats, feral cats and dogs, feral swine, wild horses and white-tailed deer. Infertility among treated female swine and white-tailed deer lasted up to 2 years without requiring a booster vaccination (Miller et al. 2000). This vaccine overcomes one of the major obstacles of previous two dose vaccines, the need to only capture animals once to vaccinate them. A single-injection vaccine is much more practical as a field delivery system for use on free-ranging animals.

Ongoing studies initiated by NWRC in 2004, are examining the practicality of administering GonaCon™ to free-ranging white-tailed deer as well as the efficacy, toxicity and safety of the vaccine. No fertility control agents have been approved by FDA for non-investigational use on

wildlife populations in the U.S. Several materials, however, including GnRH and PZP vaccines, have been classified as investigational drugs that may be used only in rigidly controlled research studies. NWRC studies that are underway at several locations are being conducted as pivotal studies that are required as part of FDA's approval process for a new animal drug.

The single-shot, multiyear vaccine will be a useful technique for the management of enclosed or urban/suburban deer populations. However, GonaCon™ still has limitations, especially the need to capture and inject each animal. Scientists are hopeful that the GnRH vaccine will soon be approved for wildlife fertility control. If and when this vaccine is proven effective and safe to use for free-ranging white-tailed deer in North Carolina, this EA and its analysis would be supplemented pursuant to NEPA at that time.

Turner et al. (1993) noted that although contraception in white-tailed deer may be used to limit population growth, it will not reduce the number of deer in excess of the desired level in many circumstances. They further contend that initial population reductions by various other means may be necessary to achieve management goals, and that reproduction control would be one facet of an integrated program. In sum, although immunocontraceptive technology has been variously effective in laboratories, pens, and in island field applications, it has not been effective in reducing populations of free-ranging white-tailed deer.

The use of this method would be subject to approval by Federal and State Agencies. This alternative was not considered in detail because:

- it would take a number of years of implementation before the deer population would decline and therefore, damage would continue at the present unacceptable levels for a number of years;
- surgical sterilization would have to be conducted by licensed veterinarians, and would therefore be extremely expensive;
- it is difficult, time-consuming, and expensive to effectively live trap, chemically capture, or remotely treat the number of deer necessary to effect an eventual decline in the population; and

State and Federal regulatory authorities have approved no chemical or biological agent for use as a deer contraceptive.

Finding of No Significant Impact

The analysis in the EA indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of this proposed action. I agree with this conclusion and therefore find that an EIS need not be prepared. This determination is based on the following factors:

1. White-tailed deer damage management as conducted by WS in North Carolina is not regional or national in scope.

2. The proposed action would pose minimal risk to public health and safety. Risks to the public from WS methods were determined to be low in a formal risk assessment (USDA 1997, Appendix P).
3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected. Built-in mitigation measures that are part of WS's standard operating procedures and adherence to laws and regulations will further ensure that WS activities do not harm the environment.
4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to wildlife damage management, this action is not highly controversial in terms of size, nature, or effect.
5. Based on the analysis documented in the EA and the accompanying administrative file, the effects of the proposed damage management program on the human environment would not be significant. The effects of the proposed activities are not highly uncertain and do not involve unique or unknown risks.
6. The proposed action would not establish a precedent for any future action with significant effects.
7. No significant cumulative effects were identified through this assessment. The number of deer killed by WS, when added to the total known other take, would fall within population management objectives established by the North Carolina Wildlife Resources Commission. The EA discussed cumulative effects of WS on target and non-target species populations and concluded that such impacts were not significant for this or other anticipated actions to be implemented or planned within the State.
8. The proposed activities would not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources.
9. WS has determined that the proposed project would not adversely affect any Federal or North Carolina State listed Threatened and Endangered species or species of Special Concern.
10. The proposed action would be in compliance with all federal, state, and local laws.

Decision and Rationale

I have carefully reviewed the EA prepared for this proposal and the input from the public involvement process. I believe that the issues identified in the EA are best addressed by selecting Alternative 5 (Integrated Deer Damage Management Program (Preferred Alternative/No Action) and applying the associated Standard Operating Procedures discussed in Chapter 3 of the EA. Alternative 5 is selected because (1) it offers the greatest chance at maximizing effectiveness and benefits to resource owners and managers while minimizing cumulative impacts on the quality of the human environment that might result from the program's effect on target and non-target

species populations; (2) it presents the greatest chance of maximizing net benefits while minimizing adverse impacts to public health and safety; and, (3) it offers a balanced approach to the issues of humaneness and aesthetics when all facets of these issues are considered. The comments identified from public involvement were minor and did not change the analysis. Therefore, it is my decision to implement the preferred alternative as described in the EA.

Copies of the EA are available upon request from the North Carolina Wildlife Services Office, 6213-E Angus Drive, Raleigh, North Carolina 27617.



Charles S. Brown, Regional Director
APHIS-WS Eastern Region



Date

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Appendix A
Response to Comments to the Environmental Assessment
“An Integrated Wildlife Damage Management Approach
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In the State of North Carolina”

Issue 1: *Lethal control measures are ineffective at reducing deer damage and are only a short-term solution.*

Program Response 1: As described in the proposed action, lethal control is only part of an integrated wildlife damage management approach that WS will use to manage white-tailed deer damage and conflicts in North Carolina. When practical and effective, WS will consider the use of non-lethal methods as part of an overall management scheme. WS recognizes that a reduction of a local deer population or deer herd is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed. While lethal control may only have a temporary short-term effect in many circumstances, this may be the only effective management approach available at a site specific location. At times lethal control may be the only option available to effectively and efficiently reduce damage to acceptable levels. The decision on when and how a lethal management approach may be implemented will be based upon the Decision Model described in section 3.3.5 of the EA. As shown in section 3.4.3 of the EA, lethal control measures have been effective at reducing deer damage and conflicts in North Carolina. Therefore, as appropriate, lethal control measures will continue to be used and recommended by WS to reduce white-tailed deer damage in North Carolina.

Issue 2: *There is no evidence that the proposed deer damage management program is effective at reducing deer damage and conflicts.*

Program Response 2: As described in section 3.4.3 of the EA, WS deer damage management activities have been effective in reducing deer damage and conflicts in North Carolina.

Issue 3: *Killing deer does not reduce the risk of Lyme Disease because not enough ticks are removed from the environment.*

Program Response 3: Currently, the most common disease involving deer is Lyme disease, caused by the spirochete *Borrelia burgdorferi* and transmitted to humans by the deer tick (*Ixodes dammini* in the eastern U.S.) (Conover 1997). As many as 500 adult ticks may parasitize a single deer (Piesman et al. 1979, Anderson and Magnarelli 1980, Main et al. 1981, Schulze et al. 1984). Wilson et al. (1985, 1988) and Anderson et al. (1987) found that islands with deer contained active populations of *I. dammini* and *B. burgdorferi*-infected ticks, whereas islands without deer did not.

The spatial correlation between the abundance of deer ticks and that of deer was tested in an experiment that involved the virtual elimination of an isolated deer herd in Massachusetts, resulting in decreased abundance of *I. dammini* (Wilson et al. 1988). Incidence of human infection by the agent of Lyme disease in that site thereafter was reduced (unpublished data, Sam Telford III, personal communication in Deblinger et al. 1993). Although, according to Deblinger et al.

(1993), a gradual reduction of deer density failed to produce a rapid, precipitous decline in immature tick abundance. Five to seven years after the initial intervention, immature *I dammini* densities had declined to levels roughly one-half of that observed before intervention. Therefore, they conclude that ecological component of risk of Lyme disease has been reduced to about half that of levels before intervention.

Issue 4: *Contraceptives should be used to control deer populations. Birth control alternative is inappropriately dismissed.*

Program Response 4: The use of reproductive control to manage deer damage is discussed in section 3.5.2 of the EA.

Issue 5: *The scope of the EA is too broad in terms of geographic region affected by the proposed action.*

Program Response 5: Some individuals question whether preparing an EA for an area as large as the State of North Carolina would meet the NEPA requirements for site specificity. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones. In addition, North Carolina WS only conducts deer damage management in small areas of the State where damage is occurring or likely to occur.

Issue 6: *The EA fails to fully explain what procedures WS will use to evaluate damage.*

Program Response 6: As described in Section 3.3.5 of the EA, WS uses a Decision Model (Slate et al. 1992) to evaluate damage at the site specific level. In assessing the damage, immediate attention is given to confirming the type of damage and that damage was caused by white-tailed deer. Commonly this requires an inspection, depending on the type and complexity of the problem. Then severity of the problem is considered in deciding which management options are potentially applicable. Once the problem assessment is completed, all available methods are evaluated for their practicality.

Issue 7: *The EA fails to sufficiently describe how WS will respond to requests for assistance; How does WS decide which management approach to use. What incentives or disincentives do WS consider when deciding on a management approach?*

Program Response 7: As described in Section 3.3.5 of the EA, WS uses a Decision Model (Slate et al. 1992) to determine the appropriate course of action to reduce deer damage and conflicts at the site specific level. WS personnel assess the problem and evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy.

Issue 8: *The EA overstates the potential risks of disease transmission from deer to humans and livestock.*

Program Response 8: As summarized in section 1.4.8 of the EA, white-tailed deer have the potential to spread and transmit diseases to humans and livestock. Even though some of these diseases currently do not occur in North Carolina, the potential risks are real. Since WS may be requested to assist in managing deer populations to reduce the spread of diseases, WS believes that a discussion of the potential risks associated with wildlife diseases is appropriate and well within the scope of this document. WS discussion of potential disease risks is not overstated and is presented to inform the decision maker of the types of diseases for which WS assistance may be requested.

Issue 9: *There is no evidence that reducing deer numbers reduces deer-vehicle collisions.*

Program Response 9: As summarized in section 1.4.5 of the EA, deer-vehicle collisions are a serious concern in North Carolina. In North Carolina, the statewide number of reported deer-vehicle collisions for 2003 was 15,456 incidents (Tucker 2004). Often, deer-vehicle collisions in which a deer carcass was not recovered or little vehicle damage occurred go unreported. A Cornell University study estimates that the actual number of deer-vehicle collisions could be as high as six times the reported number (Decker et al. 1990). A reduction of a local deer population may very well reduce the number of deer-vehicle collisions if a sufficient number of animals are removed from an area (Schwabe et al. 2002; J.W. Butfiloski, Pers. Comm. in Hederson et al. 2000). Upon receiving a request for this type of assistance, WS will assess the project site to determine the appropriate course of action to take to reduce deer-vehicle collisions, including a reduction in the local deer population. Depending on the site specific circumstances, lethal removal of deer may be the appropriate course of action to effectively reduce deer-vehicle collisions at a site specific location. It is reasonable to conclude that if deer densities are reduced in an area that has a high rate of deer vehicle collisions, the number of collisions would also decline due to the lower likelihood of a driver coming in contact with a deer.

Issue 10: *Increases in recreational hunting has not been shown to be effective at significantly reducing deer numbers or shifting deer distributions sufficiently to alleviate damage or perceived risks.*

Program Response 10: Deer hunting is regulated by the North Carolina Wildlife Resources Commission and is a valuable management tool to assist the state in maintaining a healthy and productive deer herd. Depending upon the local circumstances, hunting may be used to reduce damage and conflicts at a local level. This type of management approach has been shown to be successful on a localized basis (Kilpatrick et al. 2002). The success or failure of hunting in reducing damage and conflicts can be quite variable dependent upon the location that it is used, the hunting methods available, the skills of the hunter, and other damage management strategies being used in the area. While sport hunting is not appropriate for all situations, it may be recommended as part of a management strategy when determined practical and effective for a given situation.

Issue 11: *The EA fails to evaluate an alternative that would require all feasible and practical non-lethal methods to be exhausted before turning to lethal control.*

Program Response 11: This alternative is similar to the proposed action alternative. Under the proposed alternative, an IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, white-tailed deer, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellants, and physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by sharpshooting and live capture followed by euthanasia under permits issued by the North Carolina Wildlife Resources Commission. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy.

Issue 12: *Management methods of capture and restraining deer are inhumane and may cause undue pain and suffering.*

Program Response 12: As described in sections 2.2.4 and 2.2.5 of the EA, WS recognizes that people have wide and varying opinions and beliefs regarding WS use of control methods. North Carolina WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology and funding. Standard Operating Procedures used to maximize humaneness are listed in Chapter 3 of the EA.