

**DECISION  
AND  
FINDING OF NO SIGNIFICANT IMPACT  
  
MAMMAL DAMAGE MANAGEMENT  
IN THE  
TENNESSEE WILDLIFE SERVICES PROGRAM**

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 mammal damage management (MDM) in Tennessee and assessed potential impacts of various alternatives for responding to damage problems. The EA analyzes the potential environmental and social effects for resolving mammal damage related to the protection of resources, and health and safety on private and public lands in Tennessee. WS' proposed action is to implement an Integrated Wildlife Damage Management (IWDM) program on public and private lands throughout the state. 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). The imminent threat of damage or loss of resources is often deemed sufficient for wildlife damage management actions to be initiated (U.S. District Court of Utah 1993). Resource management agencies, organizations, associations, groups, and individuals have requested WS to conduct mammal damage management to protect resources and human health and safety in Tennessee. 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 1: 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 Tennessee WS program will annually review its impacts on target mammal species and other species addressed in the EA each year to ensure that WS program activities do 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 32-day comment period by a legal notice in the *Commercial Appeal*, *News Sentinel*, *Tennessean*, and *Times Free Press* on February 1 and 2, 2005. 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 3 comment documents were received from the public after review of the pre-decisional EA. 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. Based upon these comments, several minor editorial changes have been incorporated into the EA. These minor changes enhanced the understanding of the proposed program, but did not change the analysis provided in the EA. All letters are maintained in the administrative file located at the Tennessee Wildlife Services State Office, 537 Myatt Drive, Madison, TN 37115.

### **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 Wildlife including Target and Nontarget Species, and T&E Species
- Effects on Human Health and Safety
- Effects on Socio-cultural Elements and Economics of the Human Environment
- Effects on Wetlands
- Humaneness of Methods Used by Wildlife Services

### **Affected Environment**

Areas of the proposed action could include, but are not limited to, state, county, municipal and federal natural resource areas, park lands, and historic sites; state and interstate highways and roads; railroads and their right-of-ways; property in or adjacent to subdivisions, businesses, and industrial parks; timberlands, croplands, and pastures; private and public property where

burrowing mammals cause damage to structures, dikes, ditches, ponds, and levees; public and private properties in rural/urban/suburban areas where mammals cause damage to landscaping and natural resources, property, and are a threat to human safety through vehicle collisions and the spread of disease. The area of the proposed action would also include airports and military airbases where mammals are a threat to human safety and to property; areas where mammals negatively impacts wildlife, including T&E species; and public property where mammals are negatively impacting historic structures, cultural landscapes and natural resources. The proposed action may be conducted on properties held in private, tribal, local, county, state or federal ownership.

### **Alternatives That Were Fully Evaluated**

The following four alternatives were developed to respond to the issues. Five additional alternatives were considered but not analyzed in detail. Appendix B of the EA provides a description of the methods that could be used or recommended by WS under each of the alternatives. 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: Continue the Current Federal MDM Program (No Action/Proposed Action)**

The proposed action is to continue the current portion of the WS program in Tennessee that responds to requests for MDM to protect agriculture, human health and safety, natural resources, and property in Tennessee. One component of MDM in the Tennessee WS program has the goal of minimizing human health and safety threats and property damage in urban and rural environments. Primary species of concern related to damage in these environments are raccoons, coyotes, groundhogs, skunks, and beavers. Damage by these or other mammal species also may be addressed by WS in MDM programs aimed at reducing losses or the risk of loss to agricultural crops, livestock, timber, and any other agriculture-related resource. In addition, damage caused by mammal species to natural resources, including threatened and endangered species, wildlife, natural flora, parklands, recreation areas, peculiar habitats, etc. may be addressed through programs conducted by WS. Elimination or alleviation of damage to property such as residential and non-residential buildings, water resources, dikes, dams, impoundments, drainages, landscape plantings, golf courses, grasses and turf, pets, zoo animals, trees, or any other properties would be an objective of WS MDM programs contemplated under this EA.

WS' objective would be to attempt to respond to all requests for assistance with, at a minimum, technical assistance or self-help advice, or, where appropriate and when cooperative or congressional funding is available, direct damage management assistance in which professional WS Wildlife Biologists or Specialists conduct damage management actions. An Integrated Wildlife Damage Management approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requester needs for resolving conflicts with mammals. Lethal methods used by WS could include shooting, trapping, snaring, and FDA and EPA approved chemicals. Nonlethal methods used by WS could include fencing, netting, deterrents/repellents, exclusion, harassment, habitat alteration, or live-capture and translocation for some individuals of some species. However, non-lethal methods would not always be applied as a first response to each damage problem. The most appropriate response

would 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. In many situations, the implementation of nonlethal methods such as exclusion-type barriers would be the responsibility of the requester which means that, in those situations, WS's only function would be to implement lethal methods if determined to be necessary. MDM by WS would be allowed in the State, when requested on private property or public facilities where a need has been documented upon the completion of an *Agreement for Control*. All management actions would comply with appropriate Federal, State, and Local laws.

**Alternative 2: Nonlethal Required Before Lethal Control**

This alternative would not allow the use of lethal methods by WS as described under the proposed action until all nonlethal methods had been attempted to relieve damage caused by mammals, and these methods were found to be ineffective or inadequate. Although personnel experienced in MDM generally know when and where nonlethal control techniques would work, this alternative could result in the use of methods that are known to be ineffective in particular situations. This would be likely to increase the costs of MDM efforts and would allow unacceptable levels of damage to continue until requirements of this strategy could be met.

**Alternative 3: Technical Assistance Only**

This alternative would not allow for WS operational MDM in Tennessee. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct MDM using traps, shooting, vertebrate pesticides or any nonlethal or lethal method that is legal available to them. Property owners and land managers could implement their own mammal damage management program, use contractual services of private businesses, use volunteer services, or take no action. This alternative would place the immediate burden of operational damage management work on the property owners and other federal, state, or county agencies.

**Alternative 4: No Federal WS MDM**

This alternative would eliminate WS' Federal involvement in MDM in Tennessee. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own MDM without WS input. Information on MDM methods would still be available to producers and property owners through such sources as USDA Agricultural Extension Service offices, Tennessee Wildlife Resources Agency (TWRA), universities, or pest control organizations or companies. Property owners and land managers could implement their own mammal damage management program, use contractual services of private businesses, use volunteer services, or take no action. This alternative would place the immediate burden of operational damage management work on the property owners and other federal, state, or county agencies.

**Alternatives Considered but not Analyzed in Detail:**

**Lethal MDM Only by WS**

Under this alternative, WS would not conduct any nonlethal control of mammals for MDM purposes in the State, but would only conduct lethal MDM. This alternative was eliminated from further analysis because some mammal damage problems can be resolved effectively through nonlethal means. For example, a number of damage problems involving the encroachment of smaller mammals such as squirrels into buildings can be resolved by installing barriers or repairing of structural damage to the buildings, thus excluding the animal. Further, such damage situations as immediately shooting a coyote or white-tailed deer on a runway might not be possible, where as scaring them away through noise harassment might resolve the air passengers' threat at once. In addition, a lethal only program does not satisfy wildlife management objectives of WS, TWRA, and USFWS.

### **Compensation for Mammal Damage Losses**

The compensation alternative would require the establishment of a system to reimburse persons impacted by mammal damage. This alternative was eliminated from further analysis because no Federal or State laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct management or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely be significantly more costly than the current program. In Tennessee, damage reported to WS by all species of damaging mammals exceeded \$5.75 million during FY 1998 - 2002, yet the current WS program of abating such damage only costs about \$162,000 federally appropriated funds per year. In addition, damage reported as \$5.75 million for Tennessee was actually far less than occurred in reality, since only \$2,200 in costs related to human health and safety were derived, because of the difficulty of determining such damage values.
- Compensation would most likely be below full market value.
- It would be difficult, if not impossible, to assess and confirm losses in a timely manner for all requests, and, therefore, many losses could not be verified and would remain uncompensated.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by State law.
- Compensation would not be practical for reducing threats to human health and safety.

### **Short Term Eradication and Long Term Population Suppression**

An eradication alternative would direct all WS program efforts toward total long term elimination of mammal populations on private, State, Local and Federal government lands wherever a cooperative program was initiated in the State.

In Tennessee, eradication of native mammal species is not a desired population management goal of State agencies or WS. Although generally difficult to achieve, eradication of a local population of nutria (*Myocastor coypus*) may be the goal of individual MDM projects in fulfillment of Executive Order 13112 on Invasive Species (see Subsection 1.8.2.6). This is because the nutria is not native to North America and is only present because of human introduction. However, eradication as a general strategy for managing mammal damage will not be considered in detail because:

- All State and Federal agencies with interest in, or jurisdiction over, wildlife oppose eradication of any native wildlife species.
- Eradication is not acceptable to most people.

Suppression would direct WS program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to localized populations of mammals, WS can decide to implement local population suppression as a result of using the WS Decision Model. Problems with the concept of suppression are similar to those described above for eradication.

It is not realistic or practical to consider large-scale population suppression as the basis of the WS program. Typically, WS activities in the State would be conducted on a very small portion of the sites or areas inhabited or frequented by problem species.

### **Bounties**

Payment of funds (bounties) for killing some mammals suspected of causing economic losses have not been supported by Tennessee State agencies such as TWRA and Tennessee Department of Agriculture (TDA) as well as most wildlife professionals for many years (Latham 1960, Hoagland 1993). WS concurs with these agencies and wildlife professionals because of several inherent drawbacks and inadequacies in the payment of bounties, including:

- Bounties are generally ineffective at controlling damage, especially over a wide area such as Tennessee,
- Circumstances surrounding the take of animals are typically arbitrary and completely unregulated,
- It is difficult or impossible to assure animals claimed for bounty were not taken from outside the damage management area, and
- WS does not have the authority to establish a bounty program.

### **Reproduction 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. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

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:

- Surgical sterilization (vasectomy, castration, and tubal ligation),
- Chemosterilization
- Gene therapy.

Contraception could be accomplished through:

- Hormone implantation (synthetic steroids such as progestins)
- Immunocontraception (contraceptive vaccines)
- 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, 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 nontarget 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 and Katz 1997, Becker et al. 1999). Immunocontraceptive vaccines prevent conception by stimulating the production of antibodies that bionutralize proteins or hormones essential for reproduction (Miller et al. 2000). 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 1996), but to date, there is no published documentation that immunocontraceptive vaccines have

successfully reduced any free-ranging deer herd or population. Additionally, Underwood and Verret (1998) reported that despite 5 years of PZP treatment, the Fire Island, NY white-tailed deer population continued to grow, albeit at a slower rate. Other components of the reproductive system have been studied for immunocontraception as well, such as GnRH (Becker and Katz 1997, Becker et al. 1999).

Recently, Canadian researchers at Dalhousie University (Halifax, Nova Scotia) have investigated the use of a single-dose immunocontraceptive vaccine based on liposome delivery of PZP antigens (Spay Vac<sup>TM</sup>), and reported a 90% reduction in pup production by gray seals (*Halichoerus grypus*) (Brown et al. 1997). Fraker et al. (in press) reported that fertility of an island population of fallow deer (*Dama dama*) was greatly reduced by a single administration of Spay Vac<sup>TM</sup> during the first year of treatment; a longer-term assessment is underway. Refinement of the delivery system and field application/experimentation on the ability of Spay Vac<sup>TM</sup> to reduce free-ranging cervid populations will occur in subsequent years.

Turner et al. (1993) note that although contraception in white-tailed deer may be used to limit population growth, it will not reduce the number of animals 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.

Development of a single-shot sterilization technique as an alternative to immunocontraception was investigated by Rutgers University scientists in 2000. One possible approach is gene therapy which could accomplish reproductive control via sterilization through producing death of the anterior pituitary cells that synthesize luteinizing hormone (LH), which triggers ovulation in females and spermatogenesis in males. Efficacy testing and development of a delivery system will be investigated over the next few years.

The use of reproductive control is subject to Federal and State regulation. Additionally:

- No chemical or biological agent to accomplish reproductive control for free-ranging mammals has been approved by Federal and Tennessee authorities,
- For cervids, reproductive control has not been shown to reduce free-ranging populations or damage,
- If an effective tool was legally available, and if the project area was fenced., it would take many years for some mammal populations to stabilize at a lower level, and ongoing damage would continue to occur at unacceptably high levels, and
- There are considerable logistic, economic and socio-cultural limitations to trapping, capturing and chemical treatment of the hundreds or thousands of mammals that would be necessary to affect an eventual decline in the population.

Because there is no tool currently available for field application, and due to considerable logistic, economic, and socio-cultural limitations to the use of fertility control on free-ranging mammals, this approach is not considered for further analysis in this EA.

### **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. Mammal damage management as conducted by WS in Tennessee 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 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 Tennessee State listed threatened or endangered species. This determination is based upon concurrence from the USFWS and the TWRA that the project will not likely adversely affect any threatened or endangered species in Tennessee.
- 10. The proposed action would be in compliance with all federal, state, and local laws.

**Decision and Rationale**

I have carefully reviewed the Environmental Assessment 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 1 - Continue the Current Federal Mammal Damage Management (Proposed Action/No Action) and applying the associated mitigation measures discussed in Chapter 4 of the EA. Alternative 1 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 Tennessee Wildlife Services State Office, 537 Myatt Drive, Madison, TN 37115.



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11/1/05  
Date

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## Appendix A

### Response to Comments to the Environmental Assessment “Mammal Damage Management in the Tennessee Wildlife Services Program”

**Issue 1:** *The scope of the EA is too broad in terms of both the number and diversity of mammalian species and geographic region affected by the proposed action.*

**Program Response 1:** Some individuals question whether preparing an EA for an area as large as the State of Tennessee 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, WS only conducts mammal damage management in small areas of the State where damage is occurring or likely to occur. Planning for the management of mammal damage must be viewed as being conceptually similar to the actions of federal or other agencies whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Sections 1.3 and 5.1.1.1.1 of the EA provides adequate information pertaining to the life histories, biology and ecological association of the mammal species addressed in this EA, and also the types of damages and conflicts for which WS assistance may be requested. The information is presented in such a manner to allow the decision maker to make an informed decision on the need for and potential impacts of the proposed mammal damage management program in Tennessee.

**Issue 2:** *The EA fails to fully explain what procedures WS will use to evaluate damage and how WS will respond to requests for assistance. How does WS decide which management approach to us? What incentives or disincentives does WS consider when deciding on a management approach?*

**Program Response 2:** As described in section 4.2.3 of the EA, WS uses a Decision Model (Slate et al. 1992) to evaluate damage and to determine the appropriate course of action to reduce mammal damage and conflicts at the site specific level. In assessing the damage, immediate attention is given to confirming the type of damage and what animal species was responsible for the damage. Commonly this requires an inspection, depending on the type and complexity of the problem. The severity of the problem is then considered in deciding which management options are potentially applicable. 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, all available methods are evaluated for their practicality. Methods deemed to be practical for the situation are then 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 3:** *The EA fails to evaluate a non-lethal only alternative.*

**Program Response 3:** Non-lethal methods are an important component of any program using an IWDM approach. A non-lethal only management approach would have similar impacts as the “Non-lethal Required Before Lethal Control” alternative that is analyzed in detail in the EA. The analysis shows that the use of non-lethal methods alone could result in a substantial increase in losses as well as an increase in expenditures.

**Issue 4:** *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 4:** This alternative is similar to the proposed action alternative (Alternative 1). 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, target mammal species, 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, physical exclusion, and live-capture and translocation could be recommended and utilized to reduce mammal damage. In other situations, animals would be removed as humanely as possible by shooting, live capture and euthanasia, and FDA and EPA approved chemical methods. 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 5:** *The EA overstates the potential risks of disease transmission from mammals to humans and livestock.*

**Program Response 5:** As summarized in section 1.3.2 of the EA, various mammal species have the potential to spread and transmit diseases directly and indirectly to humans and livestock. Even though some of these diseases currently do not occur in Tennessee, the potential risks are real. Since WS may be requested to assist in reducing the spread of diseases, WS believes that a discussion of the potential risks associated with 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 6:** *The EA should discuss and provide a cost-benefit analysis of its services.*

**Program Response 6:** As stated in section 2.4.6 of the EA, the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.23) does not require a formal, monetized cost-benefit analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered.

**Issue 7: *Non-lethal control measures should be used to reduce mammal damage and conflicts.***

**Program Response 7:** As described in the proposed action, WS will consider the use of non-lethal methods as part of an overall management scheme when determined practical and effective for a given situation. Non-lethal methods may be used or recommend as the only method or may be used in combination with lethal control measures to obtain the desired results for a specific project. At times, non-lethal methods may be ineffective at reducing damage and conflicts to acceptable levels. The decision on what types of methods to use or recommend will be based upon the Decision Model (Slate et al. 1992) described in section 4.2.3 of the EA. As appropriate, non-lethal control measures will continue to be used and recommend by WS to reduce mammal damage in Tennessee.

**Issue 8: *EA fails to provide information showing that predation is not the primary cause of all livestock losses.***

**Program Response 8:** This comment implies that because losses to predation are only one of a number of causes of mortality in livestock and that because losses to predation are not as great as losses to other causes, livestock producers should not attempt to reduce losses whenever possible. Livestock producers seek to minimize all causes of mortality (e.g., by using vaccinations, veterinary care, proper nutrition) and the predator damage management is simply one additional measure to minimize loss. The proportion of each type of loss is not important because livestock producers are seeking to minimize all causes of mortality to the extent possible. In fact, as summarized in section 1.3.4 of the EA, predation loss can be a substantial cause of mortality for livestock producers. It is WS policy to provide wildlife damage management assistance when requested.

**Issue 9: *The EA does not indicate how successful lethal or non-lethal methods have proven to be in Tennessee in reducing mammal damage and conflicts.***

**Program Response 9:** A concern among some individuals is whether the methods of reducing mammal damage will be or has been effective in reducing or alleviating damage and conflicts. All mammal damage management program activities in Tennessee have reductions in damage and conflicts as the primary goal. The effectiveness of each method or methods can be defined in terms of decreased potential for health risks, decreased human safety hazards, reduced property damage, reduced agricultural damage, and reduced natural resource damage. In terms of the effectiveness of a specific method or group of methods, this would not only be based on the specific method used, but more importantly upon the skills and abilities of the person implementing the control methods and the ability of that person to determine the appropriate course of action to take. It would be expected that the more experience a person has in addressing mammal damage conflicts and implementing control methods the more likely they would be in successfully reducing damage to acceptable levels. The WS technical assistance program provides information to assist persons in implementing their own damage management program, but at times the person receiving WS technical assistance may not have the skill or ability to effectively implement the methods recommended by WS. Therefore, it is more likely that a specific method

or group of methods would be effective in reducing damage to acceptable levels when WS professional wildlife damage assistance is provided than that would occur when the inexperienced person attempts to conduct mammal damage management activities. To assist in monitoring program activities, Chapter 3 of the EA examines objectives that will be used to measure the effectiveness of the mammal damage management program in Tennessee.

**Issue 10:** *WS mammal damage activities should target only those animals or groups of animals responsible for the damage.*

**Program Response 10:** WS personnel in Tennessee are experienced, trained and professional in their skills and abilities to identify mammal damage and the responsible animal or animals. As described in section 4.2.3 of the EA, WS uses a Decision Model (Slate et al. 1992) to evaluate damage and to determine the appropriate course of action to reduce mammal damage and conflicts at the site specific level. In assessing the damage, immediate attention is given to confirming the type of damage and what animal species was responsible for the damage.

**Issue 11:** *Killing coyotes causes more reproduction.*

**Program Response 11:** Mortality in coyote populations can range from 19%-100%, with 40%-60% mortality most common (USDI 1979). Several studies of coyote survival rates, which include calculations based on the age distribution of coyote populations, show typical annual survival rates of only 45% to 65% for adult coyotes. High mortality rates have also been shown in four telemetry studies involving 437 coyotes that were older than 5 months of age; 47% of the marked animals were known to have died. Mortality rates of "unexploited" coyote populations were reported to be between 38%-56% (USDI 1979). Thus, most natural coyote populations are not stable (USDI 1979). In studies where reported coyote mortality was investigated, only 14 of 326 recorded mortalities were due to WS' activities (USDI 1979).

Dispersal of "surplus" young coyotes is the main factor that keeps coyote populations distributed throughout their habitat. Such dispersal of subdominant animals removes surplus animals from higher density areas and repopulates areas where artificial reductions have occurred. Three studies (Connolly et al. 1976, Gese and Grothe 1995, Gese 1999) investigated the predatory behavior of coyotes and determined that the more dominant (alpha) animals (adult breeding pairs) were the ones that initiated and killed most of the prey items. Thus, it appears the above concern is unfounded because the removal of local territorial (dominant, breeding adult) coyotes actually removes the individuals that are most likely to kill livestock and generally results in the immigration of subdominant coyotes that are less likely to prey on livestock.

Coyotes in areas of lower population densities may reproduce at an earlier age and have more offspring per litter, however, these same populations generally sustain higher mortality rates. Therefore, the overall population of the area does not change. The number of breeding coyotes does not substantially increase without exploitation and individual coyote territories produce one litter per year independent of the population being exploited or unexploited. Connolly and Longhurst (1975) demonstrated that coyote populations in exploited and unexploited populations

do not increase at significantly different rates and that an area will only support a population to its carrying capacity.

**Issue 12: *Livestock producers and others should be encouraged to use non-lethal methods.***

**Program Response 12:** Most livestock producers continuously implement non-lethal methods before, during, and after WS involvement. Therefore, the proposed action, an integrated wildlife damage management program, generally involves non-lethal methods which are an ongoing preventative or corrective measures implemented primarily by the livestock producer. The integrated wildlife damage management strategy encompasses the use of practical and effective methods for preventing or reducing damage. As appropriate, WS will consider the use of non-lethal methods as part of an overall management scheme when determined practical and effective for a given situation. Appendix B of the EA identifies the types of non-lethal methods WS may recommend or use under the proposed program.

**Issue 13: *Lethal control measures are ineffective at reducing damage and are only a short-term solution.***

**Program Response 13:** As described in the proposed action, lethal control is only part of an integrated wildlife damage management approach that WS will use to manage mammal damage and conflicts in Tennessee. 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 target mammal population 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 (Slate et al. 1992) described in section 4.2.3 of the EA. As described in section 4.2.2.5 of the EA, WS uses an IWDM approach, including the use of lethal control measures, to reduce mammal damage and conflicts in Tennessee. As appropriate, lethal control measures will continue to be used and recommend by WS to reduce mammal damage in Tennessee.

**Issue 14: *EA fails to provide information showing that predation is a primary limiting factor in prey populations.***

**Program Response 14:** WS recognizes that many factors other than predation contribute to declines in a prey population, including but not limited to weather, habitat loss, disease, and human induced mortality. However, as described in section 1.3.5 of the EA and the following paragraphs, at times predation can play an important role in suppressing or reducing a local prey population. Predation rates are one of the limiting factors wildlife managers have the ability to actively reduce through the implementation of an effective mammal damage management program.

Bird populations may be regulated by density dependent and independent factors including food supply, territorial space, nesting sites, predation, and parasites (Cote and Sutherland 1997). Cote and Sutherland (1997) showed predator removal benefited nesting bird populations by increasing the number of breeding individuals. Predator removal can be an important management activity necessary to maintain some bird populations because nest predation accounts for the largest share of nest failure in most species of songbirds (Martin 1992) and rates of nest predation can be so great that some local populations cannot be self-sustaining and have been labeled population sinks (Pulliam 1988, Brawn and Robinson 1996). Predator removal can reduce early avian mortality on eggs and chicks (Cote and Sutherland 1997). Similarly, post-breeding population sizes are also significantly larger following the removal of predators. However, predator removal does not necessarily affect bird breeding population sizes to the same extent. Predator removal studies that examine the benefit of breeding bird populations are not consistent in their results, with some studies showing increased breeding populations whereas other studies show no effect or decreases (Cote and Sutherland 1997). These results are not unexpected given how bird populations are regulated (hunted versus non-hunted species)(Cote and Sutherland 1997).

Predator removal studies may fail to enhance breeding bird populations for hunted species because the fall breeding population was reduced by hunting (Cote and Sutherland 1997). While the breeding bird population was not increased for some hunted species by predator removal, the number of chicks fledged was increased and, therefore, more game animals were made available for harvest during hunting seasons (Cote and Sutherland 1997).

Predation is one of many mortality factors that influence wildlife populations. Predators often play critical roles in the composition and function of wildlife populations in ecosystems (Witmer et al. 1996). The effects of predation on birds can be detrimental to local populations or islands, especially when predator densities are high or when predators gain access to areas not historically occupied (Bailey 1993, Stoult 1982). In general, ground nesting birds suffer the highest predation rates, followed by cliff/burrow nesters, and tree nesters benefit from the lowest rates of predation (DeVos and Smith 1995).

Predator removal has been conducted to increase survival of fledglings and to increase breeding populations of threatened or endangered wildlife, rare species, and species not traditionally hunted. Numerous studies have shown that nest predation accounts for the largest share of nest failures of neotropical migratory songbirds and contribute to low recruitment rates (Heske et al. 2001, Nelson 2001). Increased rates of nest predation are believed to be largely related to habitat fragmentation, habitat degradation, and other changes in related landscape features (Heske et al. 2001, Nelson 2001, Sovada et al. 2001). The impacts of predation vary geographically because of habitat composition and structure and species composition of predator communities (Nelson 2001, Sovada et al. 2001). Also, when implemented, the effectiveness of predator removal to protect these non-game species has varied due to compensatory mortality (predator species composition), predator removal strategies and methodologies used (i.e. human bias), and geographic location. Some of these predator removal programs have resulted in increased populations and fledglings of species of management interest. Other predator removal programs have had mixed effectiveness.

Butchko and Small (1992) conducted mammalian and avian predator removal in California to benefit the endangered California least tern. Coyotes, raccoons, skunks, ground squirrels, ravens, crows, kestrels, and loggerhead shrikes were preying on least tern nests and fledglings. Because other exclusion methods were unable to reduce predation to allow satisfactory productivity, predator removal was implemented. Prior to predator removal there were 0.27 chicks fledged per breeding pair of least terns in 1987. After predator removal was initiated the number of chicks fledged ranged from 1.48 to 1.66 per pair in 1988. The number of chicks fledged increased in the early 1990's to the highest recorded number of chicks fledged (Butchko and Small 1992). A metapopulation model for the California least tern was developed to predict the persistence of the least tern population and the effects of various management actions (Akçakaya et al. 2003). The model demonstrated the reduction of predation did increase substantially the viability of the population under the assumption of low vital rates (e.g., survival and fecundity).

Removal of medium sized predators (e.g., raccoons, opossums, red fox, and skunks) has resulted in increased survival of waterfowl nests, hens, and ducklings fledged in prairie habitat (Garrettson et al. 1996). The impacts of medium sized predator removal on grassland nesting birds in prairie habitat has been less clear (Garrettson et al. 1996, Dion et al. 1999). The impacts appear confounded because of compensatory mortality where the removal of some predator species (e.g., raccoons, skunks, and red fox) resulted in other species (e.g., ground squirrels) increasing predation on grassland nesting songbirds (Dion et al. 1999).

Since WS may be requested to assist in reducing predation and damages on natural resources, including prey populations in Tennessee, WS believes that a discussion of this type of resource is appropriate and well within the scope of this document. The protection of natural resources from mammal damage is within WS legislative authority and is presented to inform the decision maker of the types of projects for which WS assistance may be requested.

***Issue 15: The EA lacks the necessary information to objectively analyze potential impacts of the proposed program.***

**Program Response 15:** In making an informed decision of potential environmental impacts, WS uses the best available scientific information, data and expert advice. Appendix A of the EA provides a list of 265 documents that are used and referenced throughout the EA for analyzing potential impacts of the proposed program and Chapter 6 of the EA provides a list of the persons consulted in the development of the EA. Potential impacts are systematically analyzed in Chapter 5 of the EA. Each issue is fully explained and analyzed against each alternative to allow the reader an objective way to evaluate potential outcomes of each alternative. By conducting such a systematic and objective analysis, and using the best available scientific information, data and expert advice, WS is able to make an informed decision as required by NEPA.

***Issue 16: The public should be educated on how to co-exist with wildlife.***

**Program Response 16:** As described in section 4.2.2.3 of the EA, WS considers education an important component of the WS mammal damage management program in Tennessee. Under the

proposed program, WS will continue to provide outreach materials and educational opportunities to residents of Tennessee on how to co-exist with wildlife.

**Issue 17: *Management methods that include capture and/or restraining devices are inhumane and may cause undue pain, suffering and death.***

**Program Response 17:** As described in sections 2.3.3 and 2.3.5 of the EA, WS recognizes that people have wide and varying opinions and beliefs regarding WS use of control methods. 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 4 of the EA.

The WS program is concerned about animal welfare and continuously evaluates existing and new methods because of our concern for animals. WS is conducting trap research at the National Wildlife Research Center and has provided grants annually since 1997 to state wildlife agencies to develop Best Management Practices for trapping wild furbearers. While it is regrettable that wild animals die to alleviate some damage, we believe that if an animal death must occur, then it should occur with a minimum amount of distress and pain, in as short period of time as practical, and with compassion. The American Society of Mammalogist (Baker et al. 1987) also states that, "*Field methods used to sacrifice mammals should be quick, as painless as possible, and compatible with ... the size and behavior of the species of mammal under investigation.*"

The AVMA (Andrews et al. 1993) states, "*Kill traps are practical and effective for animal collection when used in a manner that minimizes the potential for attraction and collection of non-target species.*" It appears the AVMA (Andrews et al. 1993) is not objecting to the use of kill traps. In addition, the American Society of Mammalogists recommends using kill traps for medium-sized animals in field investigations (Baker et al. 1987). Also, Conibear (kill traps) have passed the International Humane Trapping Standards for beaver and muskrat (Fur Institute of Canada 2000).

The basic problem associated with animal traps is a lack of defining "*humaneness*" as it relates to animal cruelty (Proulx and Barrett 1991). The definition of humaneness varies among people and cultures. Proulx (1999) reported on state of the art trap technology on the basis of the most stringent animal welfare performance criteria used to date. This criteria established that animals be rendered irreversibly unconscious in < 3 minutes; this standard was initially set for 10-minutes before being reduced to 3 minutes (FPCHT 1981). However, this later standard did not consider human safety. Initially, conibear traps were classified as state of the art trapping devices and later were judged to have failed state-of-the art trapping device standards (Proulx 1999). Novak (1981) found when the striking bars of 330 conibear traps were bent inward, the time to death for beaver was 7 - 9 minutes. However, this modification leaves no space between the striking bars. Proulx et al. (1995) modified 330 conibear traps by welding clamping bars to the striking bars. This results in a trap of similar appearance as Novak (1981) with its bent jaws. A trap modified with clamping bars strikes with 20% more force than a standard 330 conibear trap. Since people using the conibear trap occasionally catch their hands, the full force of the trap would strike the hand,

and most likely cause injury. We consider this modification, while more beneficial for animal welfare considerations, a detriment to human safety. While WS is willing to use kill traps that more quickly kill animals, we are unwilling to put our employees or the public at risk for potentially serious injury.

In May 2000, the Canadian government determined standard and modified 330 Conibear traps met the Agreement on International Humane Trapping Standards (Fur Institute of Canada 2000) for beaver. They also determined that leg-hold traps with a submersion system, 110 Conibear traps in water and 120 Conibear traps on land meet the Agreement on International Humane Trapping Standards (Fur Institute of Canada 2000). In summary, the Canadian government has determined that standard and modified 330 Conibear traps, 110 and 120 Conibear traps, and leghold traps on submersion systems met international humane trapping standards, the American Society of Mammologists recommended kill traps for medium-sized animals, and the AVMA is not opposed to kill traps for wildlife.

**Issue 18:** *Wildlife Services should use and recommend the most up to date and effective methods available for preventing and resolving conflicts between humans and mammals.*

**Program Response 18:** WS uses and recommends the most up to date and effective methods available for preventing and resolving conflicts between humans and wildlife. WS personnel receive information and training on a periodic basis to keep them aware new methods and techniques that become available for use in the wildlife damage management arena. Furthermore, the National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management. As new effective methods become available, the Tennessee WS program will consider them for potential use in managing mammal damage and conflicts throughout the state.

**Issue 19:** *Wildlife Services should utilize methods and incorporate modifications to capture devices that minimize the potential of capturing non-target animals, including river otters.*

**Program Response 19:** As specified in section 4.4.2 of the EA, WS will implement mitigation measures to minimize potential capture of non-target species. WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding non-targets. For example, as appropriate, WS personnel utilize pan tension devices or alter trap triggers in order to exclude or reduce the capture of non-target species. This would include adjusting the triggering device on body-gripping traps to minimize the potential capture of non-target river otters.