

ENVIRONMENTAL ASSESSMENT

Reducing Mammal Damage
through an
Integrated Wildlife Damage Management Program
in the
State of New Hampshire

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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) proposes to continue the current damage management program that responds to mammal damage in the State of New Hampshire. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce mammal damage to property, agricultural resources, natural resources, and human/public health and safety. Damage management would be conducted on public and private property in New Hampshire when the resource owner (property owner) or manager requests assistance. 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 and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using: shooting, trapping, snaring, and FDA or EPA approved chemical products. 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 could include instances where application of lethal methods alone would be the most appropriate strategy.

Mammal damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing the take of mammals in New Hampshire.

ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHDA	New Hampshire Department of Agriculture
NHDES	New Hampshire Department of Environmental Services
NHFG	New Hampshire Fish and Game
NHDHHS	New Hampshire Department of Health and Human Services
NHDPC	New Hampshire Division of Pesticide Control
UNHCE	University of New Hampshire Cooperative Extension
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The phrases Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way {United States Department of Agriculture (USDA) 1997}:

"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."

Wildlife damage management is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1990). The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program (formerly known as Animal Damage Control) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105¹), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that local populations be reduced through lethal means.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed mammal damage management (MDM) program. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997). The final environmental impact statement (USDA 1997) may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, 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). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural, industrial and natural resources; property; livestock; and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, 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). The imminent threat of damage or loss of resources is often sufficient for

¹ WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

Normally, according to the 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. 6,000 -6,003, (1995)}. WS has decided in this case to prepare this EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. All wildlife damage management that would take place in New Hampshire would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be published in newspapers, consistent with the agency's NEPA procedures.

WS is a cooperatively funded, service-oriented program that receives requests for assistance from private and public entities, including other governmental agencies. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. WS's mission, developed through its strategic planning process, is

1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and*

2) *to safeguard public health and safety."*

WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

1.1 AUTHORITY AND COMPLIANCE

1.1.1 Wildlife Services Legislative Authority

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, 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), which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services

authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001.”

Since 1931, with changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing “bringing (damage) under control”, rather than “eradication” and “suppression” of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

“That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities.”

1.1.2 New Hampshire Department of Agriculture (NHDA)

The NHDA currently has a MOU with WS, which establishes a cooperative relationship between WS and the NHDA, and outlines roles and responsibilities for resolving wildlife damage management situations in New Hampshire. The mission of the NHDA is to develop, promote, conserve, and support the agriculture and agribusiness industry of the state and those natural and renewable resources that are associated with agriculture and other open lands for the benefit of all its citizens. NHDA provides agricultural information and statistics to WS, forwards citizen’s requests for wildlife damage management assistance to WS, and communicates wildlife damage management information to NH’s agricultural community.

1.1.3 New Hampshire Fish and Game Department (NHFG)

The NHFG currently has an MOU and Cooperative Service Agreement (CSA) with WS, which establishes a cooperative relationship between WS and the NHFG, and outlines roles and responsibilities for resolving wildlife damage management situations in New Hampshire. The mission of the NHFG is to protect and manage the State’s fish and wildlife to maximize their long-term biological, recreational, and economic values for all Granite State residents and visitors. The CSA between NHFG and WS includes a work and financial plan, combining state and federal expertise which handles wildlife damage management problems and programs involving resident game and furbearer species, as well as resident game birds. The NHFG typically forwards citizens’ request for mammal damage management to WS. WS and the NHFG cooperatively assist agricultural producers, homeowners and public entities with wildlife damage and hazard issues related to mammals, such as bear and white-tailed deer. The NHFG Nongame and Endangered Species Program (ENSP) administers programs related to enhancing nongame species populations and coordinates management of mammals such as woodchucks which may negatively impact identified species recovery efforts.

1.1.4 New Hampshire Department of Agriculture, Division of Pesticide Control (NHDPCC)

The NHDA Division of Pesticide Control enforces state laws pertaining to the use and application of pesticides, including those related to the registration of pesticide products, licensing of private and commercial pesticide applicators, and licensing of pesticide businesses. The NHDA Markets and Foods, Division of Pesticide Control obtains authority under NH Statue Title XL RSA 430 subchapters 33, 35, 36, and 50. Pesticide products for mammal and bird damage control are registered through the NHDA Division of Pesticide Control by USDA APHIS WS and other entities (eg. pesticide manufacturers).

1.1.5 New Hampshire Department of Health and Human Services (NHDHHS)

The NHDHHS currently has an MOU with WS, which establishes a cooperative relationship between WS and the NHDHHS, and outlines roles and responsibilities for resolving wildlife damage management situations in New Hampshire. The NHDHHS provides technical guidance to WS on public health related issues and potential health problems associated with wildlife, and refers callers with wildlife damage related questions to WS.

1.1.6 University of New Hampshire Cooperative Extension (UNHCE)

The University New Hampshire Cooperative Extension provides educational, outreach, and extension assistance to the citizens of New Hampshire. UNHCE currently has an MOU with WS, which establishes a cooperative relationship between WS and the UNHCE, in the development of educational publications and materials and will provide educational sessions and courses on wildlife management.

1.1.7 U.S. Fish and Wildlife Service (USFWS)

The USFWS is responsible for managing and regulating take of bird species that are listed as migratory under the Migratory Bird Treaty Act (MBTA) and those that are listed as threatened or endangered under the ESA. USFWS manages the Great Bay National Wildlife Refuge, John Hay National Wildlife Refuge, Lake Umbagog National Wildlife Refuge, and the Wapack National Wildlife Refuge located in New Hampshire. The USFWS authority for action is based on the MBTA of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

"From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

The authority of the Secretary of Agriculture, with respect to the Migratory Bird Treaty, was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

CFR 50 Subchapter C - The National Wildlife Refuge System - Part 30 - Feral Animals - Subpart B-30.11 - Control of feral animals states: (a) Feral animals, including horses, burros, cattle, swine, sheep, goats, reindeer, dogs, and cats, without ownership that have reverted to the wild from a domestic state may be taken by authorized federal or state personnel or by private persons operating under permit in accordance with applicable provisions of federal or state law or regulation.

1.1.8 Natural Resource Conservation Service (NRCS)

NRCS is responsible for certifying wetlands under the Wetland Conservation provisions of the Food Security Act (16 U.S.C. 3821 and 3822). Topographic maps are available through their offices that identify the presence of wetlands.

1.1.9 U.S. Army Corps of Engineers (COE)

The COE regulates and permits activities regarding waters of the United States including protection and utilization under Section 404 of the Clean Water Act.

1.1.10 U.S. Environmental Protection Agency (EPA)

EPA is responsible for implementing and enforcing the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) which regulates the registration and use of pesticides. The EPA is also responsible for administering and enforcing the Section 404 program of the Clean Water Act with the COE; this established a permit program for the review and approval of water quality standards that directly impact wetlands.

1.1.11 Compliance with Federal and State Statutes

Several federal laws, state laws, and state regulations regulate WS wildlife damage management. WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. Environmental documents pursuant to NEPA must be completed before operational activities consistent with the NEPA decision can be implemented. This EA meets the NEPA requirement for the proposed action in New Hampshire. When WS direct management assistance is requested by another federal agency, NEPA compliance is the responsibility of the other federal agency. However, WS could agree to complete NEPA documentation at the request of the other federal agency. WS also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

Endangered Species Act. It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the USFWS to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency... is not likely to jeopardize the continued existence of any endangered or threatened species . . . each agency shall use the best scientific and commercial data available" (Sec. 7(a)(2)). WS obtained a Biological Opinion (B.O.) from the USFWS describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). Additionally, WS conferred with the USFWS in preparation of this EA during 2005, regarding an analysis of potential impacts to Federally listed and candidate species in NH (Appendix D).

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The EPA is responsible for implementing and enforcing FIFRA. All chemical methods integrated into the WS program in New Hampshire are registered with and regulated by the EPA and NHDA Division of Pesticide Control and used by WS in compliance with labeling procedures and other requirements.

The Clean Water Act (33 U.S.C. 1344). The Clean Water Act provides regulatory authority and guidelines for the EPA and the U.S. Army Corps of Engineers related to wetlands. Several Sections of the Clean Water Act pertain to regulating effects on wetlands. Section 101 specifies the objectives of this Act, which are implemented largely through Subchapter III (Standards and Enforcement), Section 301 (Prohibitions). The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Subchapter IV (Permits and Licenses) of this Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the State level. WS consults with appropriate regulatory authorities when wetlands exist in proximity to proposed activities or when such activities might impact wetland areas. Such consultations are designed to determine if any wetlands will be affected by proposed actions.

Food Security Act. The Wetland Conservation provision (Swampbuster) of the 1985 (16 U.S.C. 3801-3862), 1990 (as amended by PL 101-624), and 1996 (as amended by PL 104-127) Food Security Act require all agricultural producers to protect wetlands on the farms they own. Wetlands converted to farmland prior to December 23, 1985 are not subject to wetland compliance provisions even if wetland conditions return as a result of lack of maintenance or management. If prior converted cropland is not

planted to an agricultural commodity (crops, native and improved pastures, rangeland, tree farms, and livestock production) for more than 5 consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulations under Swampbuster and Section 404 of the Clean Water Act. NRCS is responsible for certifying wetland determinations according to this Act.

Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360). This law places administration of pharmaceutical drugs, including those used in wildlife capture and handling, under the Food and Drug Administration.

Controlled Substances Act of 1970 (21 U.S.C. 821 et seq.). This law requires an individual or agency to have a special registration number from the federal Drug Enforcement Administration (DEA) to possess controlled substances, including those that are used in wildlife capture and handling.

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA). The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife. Those requirements are: (1) a valid "veterinarian-client-patient" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under the proposed action. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period of time after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human within the withdrawal period must be identified; the Western Wildlife Health Committee of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC *undated*). APHIS-WS establishes procedures in each state for administering drugs used in wildlife capture and handling that must be approved by state veterinary authorities in order to comply with this law.

Occupational Safety and Health Act of 1970. The Occupational Safety and Health Act of 1970 and its implementing regulations (29CFR1910) on sanitation standards states that, "Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected." This standard includes mammals that may cause safety and health concerns at workplaces.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that has the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the MDM methods described in Appendix B that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of

ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing wildlife. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental Justice is a priority within APHIS and WS. Executive Order 12898 requires federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898.

WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. All chemicals used by WS are regulated by the EPA through FIFRA, NHDA, FDA, by MOUs with land managing agencies, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations. In contrast, the proposed action may benefit minority or low-income populations by reducing mammal damage such as threats to public health and safety and property damage.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045). Children may suffer disproportionately from environmental health and safety risks for many reasons, including their development physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed mammal damage management program would only occur by using legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

New Hampshire Wildlife Laws, Regulations and Policies Regarding Wildlife Damage Management

New Hampshire Statutes Annotated (RSA) Title 18 contains fish, game, and wildlife law for the State of New Hampshire.

1. RSA 207:22(a) The executive director shall adopt rules pursuant to RSA 541-A (Administrators Procedure Act), regulating the issuance of depredation permits to kill animals causing damage to commercial crops or which pose a threat to human health and safety. Such rules shall address the method and manner of taking animals, the disposition of animals taken under such permits, as well as the qualifications necessary to participate in the program. Such qualifications shall include, but not be limited to, the provision of information concerning the history of damage, the record of preventative methods used in the path, and the public hunting access history.
2. RSA 207:3(a) It is unlawful for a person to discharge a firearm or to shoot with a bow and arrow within 300 feet of a permanently occupied dwelling without permission of the owner or occupant of the dwelling or from the owner of the land on which the person discharging the firearm or shooting the bow and arrow is situated.
3. RSA 207:26 A person may pursue, wound or kill, on land owned or occupied by such person, any unprotected bird or animal which the person finds in the act of doing actual and substantial damage to poultry, crops, domestic animals, or the persons property, and may authorize a family member, employee, or any person requested to do so under the provision of depredation permit issued by the executive director pursuant to RSA 207:22-c, III.
4. RSA 207:14 No person shall import, possess, sell, exhibit, or release any live marine species or wildlife, or the eggs or progeny thereof, without first obtaining a permit from the executive director except as permitted under title XVIII.

Policies of the NHFG regarding wildlife damage management.

1. Policy on Relocation of Wildlife (FIS 805.02 Permits to Release Wildlife). The Policy identifies situations and requirements pertaining to the relocation of wildlife in NH. (a) No live wildlife designated as controlled, the eggs or progeny thereof, shall be released without a permit to release wildlife or except as otherwise permitted under RSA 207:1-a, 214:34-d, and 209-A: 3, IV or unless the release of wildlife is specifically permitted under another permit such as birds for regulated shooting areas or individual training and shooting permits or fish for kid's tournaments under this chapter. (b) No person shall release or allow to be released any wildlife that is diseased or suspected of being diseased. (c) No wildlife shall be released on the property of another without written landowner permission. (d) A permit to release shall be valid from date of issuance to the end of the calendar year in which the permit was issued or the expiration of the health certificate, whichever is sooner.

New Hampshire Firearm, Trapping and Mechanical Noisemaking Devices Laws

207:3-a Prohibition. – It is unlawful for a person to discharge a firearm or to shoot with a bow and arrow within 300 feet of a permanently occupied dwelling without permission of the owner or the occupant of the dwelling or from the owner of the land on which the person discharging the firearm or shooting the bow and arrow is situated. Whoever violates the provisions of this section shall be guilty of a violation if a natural person, or guilty of a misdemeanor if any other person.

207:4 Silencing Devices. – Limits the use of silencing devices on firearms. So as that no person shall possess a rifle, pistol, or other firearm fitted or contrived with any silencer or device for deadening the sound of explosion, for the purpose of taking wildlife. However, nothing in this section shall prohibit a person who has obtained a depredation permit issued by the executive director of fish and game from taking wildlife under such permit using a lawfully obtained silencing device.

Fis 303.16 Restrictions on Certain Traps. –It is unlawful for any person to set any conibear type body gripping trap the size of a 220 conibear or larger except: 1. Five feet or more above the ground or surface of the snow with the exception of a snowstorm during the pervious 24 hours; 2. In water for trapping beaver or otter; or 3. Set for bear under the provisions of RSA 208:22 and RSA 210:15.

644:13 Unauthorized Use of Firearms and Firecrackers. – Discusses the limitations upon discharging firearms and firecrackers. A person is guilty of a violation if, within the compact part of a town or city, such person fires or discharges any cannon, gun, pistol, or other firearm, except by written permission of the chief of police or governing body. For the purposes of this section, "compact part" means the territory within a town or city comprised of the following: (a) any nonresidential, commercial building, including, but not limited to, industrial, educational, or medical buildings, plus a perimeter 300 feet wide around all such buildings without permission of the owner. (b) Any park, playground, or other outdoor public gathering place designated by the legislative body of the city or town. (c) Any contiguous area containing 6 or more buildings which are used as either part-time or permanent dwellings and the spaces between them where each such building is within 300 feet of at least one of the others, plus a perimeter 300 feet wide around all the buildings in such area.

New Hampshire Pesticide Laws

New Hampshire's pesticide regulations, found in NH Agriculture, Horticulture and Animal Husbandry Title 40, Chapter 430, Subchapters 33-49 are implemented and enforced by the NHDPC. These regulations include processes and requirements for pesticide product registration (RSA 430:36), pesticide applicator registration certificates and permits (430:33), pesticide dealers (430:35), certification, registration and licensing requirements (PES 300), sale and use of pesticides, (PES 700), certification of pesticide dealers (PES 300), disposal of pesticides (PES 800), restrictions on use (PES (1000) and agricultural worker protection (PES 1100). In order for WS to apply a restricted use pesticide as part of wildlife damage management in NH, the product must be registered with the DPC and the applicator must be licensed. Additionally, label instructions, and all other pesticide and wildlife laws and regulations must be adhered to (eg. possession of a depredation permit from the USFWS and/or the NHFG to take the protected bird species). Pesticide products are registered annually, and applicator licenses are obtained and maintained through completion of training courses and examinations conducted through the DPC.

1.2 SCOPE AND PURPOSE OF THIS EA

The scope and purpose of this EA is to address and evaluate the potential impact to the human environment from the implementation of a WS MDM program to protect agricultural resources; natural resources property; and public health and safety in New Hampshire. Damage problems can occur throughout the State, resulting in requests for WS assistance. Under the Proposed Action, MDM could be conducted on private, federal, state, tribal, county, and municipal lands in New Hampshire upon request.

Several mammal species have potential to be the subject of WS MDM control activities in New Hampshire. Mammals species addressed in this EA include woodchucks (*Marmota monax*), muskrats (*Ondatra zibethicus*), white-tailed deer (*Odocoileus virginianus*), bear (*Ursus americanus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*) and beaver (*Castor canadensis*).

1.3 NEED FOR ACTION

Conflicts between humans and wildlife are common in New Hampshire. The need for action is based on the necessity for a program to protect agriculture resources, property, natural resources, and human health and safety from mammal damage. Mammals can have a negative economic impact in New Hampshire. Comprehensive surveys of mammal damage in New Hampshire have not been conducted. Table 1-3 provides the number of Technical Assistance requests in the New Hampshire WS program for Fiscal Years 2000-2004. These data represent only a portion of the total damage caused by mammals because not all people who experience damage request assistance from WS.

1.3.1 Need for Mammal Damage Management to Protect Human Health and Safety

A considerable threat to human health is sometimes presented by disease organisms or parasites carried by some mammals which are transmissible or infectious to humans (Davidson and Nettles 1997). These include viral, bacterial, mycotic (fungal), protozoal and rickettsial diseases. Several of these diseases are transmittable to humans. Individuals or property owners that request assistance with mammals frequently are concerned about potential disease risks but are unaware of the types of diseases that can be associated with them. In most such situations, MDM is requested because of a perceived risk to human health or safety associated with wild animals living in close association with humans, or from animals acting out of character by roving in human-inhabited areas during daylight, or showing no fear when humans are present. Under the proposed action, WS could agree to assist in resolving these types of problems. In the majority of cases in which human health concerns are a reason for requesting MDM, there may have been no actual cases of transmission of disease to humans by mammals to prompt the request. Thus, it is the risk of disease transmission that is the primary reason for requesting and conducting MDM. As is such the case for species such as raccoon, red and gray fox, woodchuck, skunk and coyote.

Burrowing mammals, such as woodchucks and muskrats, may sometimes threaten earthen dams as they form networks of burrows which can weaken such structures, causing erosion and failure. Such incidents can threaten the safety and lives of humans living downstream from the dam. For that reason, managers of such sites are concerned with preventing excessive burrowing by these animals at dam sites. Much of the damage caused by muskrats is primarily through their burrowing activity (Miller 1994, Linzey 1998, Perry 1982) in dikes, dams, ditches, ponds, and shorelines. Muskrats dig burrows into banks, levees, and where higher ground is available, for dens (Linzey 1998, Perry 1982). Muskrats dig burrows with underwater entrances along shorelines and burrowing may not be readily evident until serious damage has occurred. When water levels drop, the muskrat holes are expanded to keep pace with the retreating water level. Additionally, when water levels rise muskrats expand the burrows upward. These burrows can collapse when walked upon by people or animals and crossed over with heavy equipment (i.e., mowers, tractors).

Beavers have the potential for causing flooding and girdling damage to property. Many times beavers will dam road culverts flooding roads and causing hazardous conditions. Other areas requesting assistance with beaver damage are tree farms where trees are either being removed, girdled or killed by the associated flooding. Human health concerns related to beaver tend to be drinking water reservoirs with beaver activity, the main concern being Giardia.

Bear, deer, and coyote may be a threat to human safety where populations and interactions are elevated. Human safety is considered a threat in New Hampshire when nuisance bear activity (primarily feeding at birdfeeders, dumpsters or trash) occurs in close proximity to people. Deer collisions with vehicles are a concern in portions of the state. Threats to human safety associated mammal interactions with people continue to rise in New Hampshire as human populations increase and available wildlife habitat is developed.

1.3.2 Need for Mammal Damage Management at Airports

Wildlife creates a variety of problems at airports that can compromise safe aircraft operations. The most significant are the thousands of collisions that occur annually between wildlife and aircraft (Cleary and Dolbeer 1999). Wildlife strikes result in millions of dollars in direct and indirect damages. The cost of wildlife strikes to the civil aviation industry in the U.S. is estimated to be in excess of 534,361 hours/year of aircraft down time and \$469.8 million in monetary losses (Cleary et al. 2002).

Mammals create a serious threat to safe aircraft operations. WS is often contacted and asked to solve problems involving mammal damage issues in relation to human safety and property damage. At many airports there is the continuing risk of a mammal/aircraft strike which could result in human injury or death (Cleary and Dolbeer 1999). Mammals such as woodchucks venture onto airfields and become a direct threat to planes both landing and taking off. Since 1985 the USAF has recorded more than 190 strikes that involved aircraft and mammals (Cleary and Dolbeer 1999). These strikes resulted in more than \$496,000 in damage. Woodchucks pose an indirect risk to aircraft as they burrow under the runway potentially

chewing sensor and flight control wires. These actions could potentially cause serious damage to aircrafts, health and human safety and high monetary losses in repairing such damage to runways.

In New Hampshire, there are a total of twenty-five carrier airports and private airports. During the past fourteen year period there were thirteen reported wildlife strikes involving mammals including: bats, white-tailed deer, coyote and skunk. Extensive woodchuck burrowing activity poses threats to navigational equipment at one New Hampshire airport. Beaver activity resulting in an attractant for waterfowl has created an indirect risk to aircraft at other New Hampshire airports.

WS receives requests for assistance regarding mammal damage management at civil airports and military airfields in New Hampshire. These requests are considered serious because of the potential for loss of human life and because damage to aircraft can be extremely expensive. With the implementation of an Integrated MDM program in New Hampshire, WS could provide direct management and technical assistance at the request of aviation facilities in the State.

1.3.3 Need for Mammal Damage Management to Protect Agriculture

A number of mammal species cause damage to a variety of agricultural resources in New Hampshire. Losses related to field crops, orchards, nurseries, truck gardens, commercial timber, and livestock are reported yearly to WS (USDA-WS MIS Database 2002). Bear damage to apiaries, livestock and corn is documented annually in New Hampshire. Deer negatively impact numerous agricultural commodities in New Hampshire including: apple orchards, truck gardens, nurseries, blueberries and other commercially produced vegetables. Woodchuck feeding and burrowing activity primarily impacts seasonal vegetable producers throughout the state.

Muskrats eat a variety of natural emergent vegetation (Linzey 1998) and cultivated crops (Perry 1982). Some of the cultivated crops eaten by muskrats include corn, alfalfa, carrots, rice, and soybeans. In areas where farm ponds are located, vegetation or crops located near the shore may also be used in building muskrat houses.

1.3.4 Need for Mammal Damage Management to Protect Natural Resources Including Threatened and Endangered Species

Natural resources may be described as those assets belonging to the public and often managed and held in trust by government agencies as representatives of the people. Such resources may be plants or animals, including threatened and endangered species, historic properties, or habitats in general. Examples of natural resources in New Hampshire are historic structures and places; parks and recreation areas; natural areas, including unique habitats or topographic features; threatened and endangered plants or animals; and any plant or animal populations which have been identified by the public as a natural resource.

Sometimes the activities of mammals cause damage to natural resources. This most frequently occurs in relation to plants or other animals, including but not limited to, trees, natural vegetation of other types, other mammals, and birds. Mammals causing damage are usually locally overabundant at the damage site, and threaten the welfare of a species population identified as a natural resource. An example of this might be an overabundant population of woodchucks that devastate a plant species that are either endangered or are an important food source for another endangered species. Additional examples include: park vegetation which is being damaged by excessive browsing by overabundant white-tailed deer populations, or ground-nesting game bird populations which are being decimated by the presence of mammalian carnivores, such as raccoons, coyotes, or foxes.

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 are preyed upon or otherwise adversely affected by certain mammal species. In FY 2001, the WS nationwide program actively protected 144 Federal and State listed threatened and endangered species. More than 95 percent of these projects resulted in the increase or maintenance of local threatened and endangered species

populations. Threatened and endangered species could be jeopardized by mammals in New Hampshire. In New Hampshire, woodchuck foraging negatively impacts wild lupine which is essential for life cycle completion of the federally endangered Karner blue butterfly (*Lycaeides melissa samuelis*).

Muskrats are largely vegetarians; however, they also eat other animals as part of their diet (Perry 1982). Schwartz and Schwartz (1959), Neves and Odom (1989) and Miller (1994) reported muskrats also ate animal matter including mussels, clams, snails, crustaceans (i.e., crawfish), and young birds. Some mussels consumed by muskrats may be listed as federal T&E species under the ESA. In New Hampshire muskrats have the potential to jeopardize endangered dwarf wedgemussel (*Alasmidonta heterodon*) populations, during periods of low water table or during dam draw downs. Muskrats can negatively impact native vegetation. When muskrats become over-populated an "eat-out" may occur. An "eat-out" occurs when vegetation, including soil binding roots, is consumed. These "eat-out" events may result in the feeding area being ruined for a number of years (O'Neil 1949). The loss of vegetation removes food and cover for muskrats and other wildlife. Marsh damage from muskrats is inevitable when areas heavily populated by muskrats are under-trapped (Lynch et al. 1947). While eat-outs are beneficial to some bird species, they also result in stagnant water which predisposes the same birds to diseases (Lynch et al. 1947).

WS has received requests in the past for assistance in resolving damage caused to natural resources by mammals, and could be requested to provide services for management of damage to natural resources caused by any mammal at any location in New Hampshire.

1.3.5 Need for Mammal Damage Management to Protect Property

Mammals cause damage to a variety of property types in New Hampshire each year. During FY 2000-2004 complainants who contacted WS reported \$104,427 in damage by all mammal species to all types of property in New Hampshire. Considerable among these was \$85,301 in damages to agricultural crops, which includes beehives, livestock, apple orchards, vegetable crops, commercial nurseries, and truck gardens. Damage was caused by a variety of mammals, including weasels, muskrats, woodchucks, raccoons, white-tailed deer, black bear, and others.

Economic loss due to muskrat damage can be very high, particularly in aquaculture production areas. In some states damage may be as much as \$1 million per year (Miller 1994). Elsewhere, economic losses caused by muskrats may be limited and confined primarily to burrowing in farm pond dams or feeding on desirable plants. Muskrats cause damage by digging burrows into banks, levees, or higher ground for denning (Perry 1982, Linzey 1998).

1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS, previously called Animal Damage Control (ADC), has issued a Final EIS on the national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

1.5 WS RECORD KEEPING REGARDING REQUESTS FOR MAMMAL DAMAGE MANAGEMENT ASSISTANCE

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information that is collected from people who have requested services or information from Wildlife Services. It does not include requests received or responded to by local, State or other Federal agencies, and it is not a complete database for all wildlife damage occurrences. The number of requests for assistance does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exist.

The database includes, but is not limited to, the following information: species of wildlife involved, the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate

the conflict; and the resource that is in need of protection. Table 1-3 provides a summary of Technical Assistance projects completed by the New Hampshire WS program for Fiscal Years 2000-2004. A description of the WS Direct Control and Technical Assistance programs is contained in Chapter 3 of this EA.

Table 1-1*. The annual number of requests for technical assistance involving mammals for New Hampshire Wildlife Services during 2000-2004.

Fiscal Year	Agriculture	Human Health and Safety	Property	Natural Resources	Total
2000	398	396	954	5	1753
2001	273	582	676	4	1535
2002	236	556	536	1	1329
2003	282	637	598	26	1543
2004	330	693	718	56	1797
Total	1519	2864	3482	92	7957

Data presented in this table were taken from NH WS Annual Program Reports and represent the number of technical assistance projects conducted by the NH WS program and do not include data from operational projects conducted during the time period covered.

1.6 PROPOSED ACTION

The USDA, APHIS, Wildlife Services proposes to continue the current damage management program that responds to mammal damage in the State of New Hampshire. An IWDM approach would be implemented to reduce mammal damage to property, agricultural resources, natural resources, and human/public health and safety. Damage management would be conducted on public and private property in New Hampshire when the resource owner (property owner) or manager requests assistance. 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 and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using: shooting, trapping, snaring, and FDA or EPA approved chemical products. 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 could include instances where application of lethal methods alone would be the most appropriate strategy.

Mammal damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing the take of mammals in New Hampshire.

1.7 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS implement an integrated mammal damage management strategy, including technical assistance and direct control, to meet the need for mammal damage management in New Hampshire?

- If not, should WS attempt to implement one of the alternatives to an integrated mammal damage management strategy as described in the EA?
- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an EIS?

1.8 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.8.1 Actions Analyzed

This EA evaluates mammal damage management by WS to protect: 1) property; 2) agricultural resources; 3) natural resources; and 4) public health and safety in New Hampshire. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

1.8.2 American Indian Lands and Tribes

Currently, New Hampshire WS does not have any MOUs with any American Indian tribes. If WS enters into an agreement with a tribe for MDM, this EA would be reviewed and supplemented, if appropriate, to insure compliance with NEPA. MOUs, agreements and NEPA documentation would be prepared as appropriate before conducting MDM on tribal lands.

1.8.3 Period for which this EA is Valid

This EA would remain valid until the WS program in New Hampshire and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA is sufficient.

1.8.4 Site Specificity

This EA analyzes the potential impacts of MDM and addresses activities on all lands in New Hampshire under MOUs, Cooperative Agreements and in cooperation with the appropriate public land management agencies. It also addresses the impacts of MDM on areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional MDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of mammal damage must be viewed as being conceptually similar to federal or other agency actions 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. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where mammal damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever mammal damage and resulting management occurs, and are treated as such. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in New Hampshire (see Chapter 3 for a description of the Decision Model and its application).

The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within the State of New Hampshire. In this way, APHIS-WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission.

1.8.5 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS. Issues were defined and preliminary alternatives were identified. As part of this process, and as required by the Council on Environmental Quality (CEQ 1981) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and six (6) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation, and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers and those consulted during this EA process. Appendix A is a list of the literature cited during the preparation of the EA and Appendix B is a detailed description of the methods used for MDM in New Hampshire. Appendices C-E are comprehensive lists of Federal and NH T&E species and correspondence with the FWS regarding T&E species.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop mitigation measures and SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter and in the discussion of issues used to develop mitigation measures. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the proposed program in Chapter 3.

2.1 AFFECTED ENVIRONMENT

Upon request for assistance, mammal damage management could be conducted on private, federal, state, tribal, county, and municipal lands in New Hampshire to protect agricultural and natural resources, property, and public health and safety. 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 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.

2.1.1 The "Environmental Status Quo" for managing damage and conflicts associated with State managed or unprotected wildlife species

As defined by NEPA implementing regulations, the "*human environment* shall be interpreted comprehensively to include the natural and physical environment *and the relationship of people with that environment.*" (40 CFR 1508.14). Therefore, when a federal action agency analyzes its potential impacts on the "human environment," it is reasonable for that agency to compare not only the effects of the federal action, but also the potential impacts that occur or will occur in the absence of the federal action. This concept is applicable to situations involving federal assistance in managing damage associated with State-resident wildlife species or unprotected wildlife species.

Unprotected wildlife species, such as most non-native invasive species, are not protected under state or federal law. Most State-resident wildlife species are managed under State authority or law without any federal oversight or protection. In some states, with the possible exception of restrictions on methods (e.g., firearms restrictions, pesticide regulations), unprotected wildlife species and certain resident wildlife species are managed with little or no restrictions allowing them to be killed or taken by anyone at any time. For mammal damage management in New Hampshire, the NHFG has the authority to manage and authorize the taking of mammals for damage management purposes (see section 1.1).

When a non-federal entity (i.e. State wildlife agencies, State agriculture agencies, State health agencies, municipalities, counties, private companies, individuals, etc.) takes a management action on a State-resident wildlife species or unprotected wildlife species, the action is not subject to NEPA compliance due to the lack of federal involvement in the action. Under such circumstances, the environmental *baseline* or *status quo* must be viewed as an environment that includes those species *as they are managed or impacted by non-federal entities in the absence of the federal action being proposed.* Therefore, in those situations in which a non-federal entity has decided that a management action directed towards a state protected or

unprotected wildlife species will occur and even the particular methods that will be used, WS's involvement in the action will not affect the *environmental status quo*. WS's decision-making ability is restricted to one of two alternatives - either taking the action using the specific methods as decided upon by the non-federal entity, or taking no action at all at which point the non-federal entity will take the same action anyway.

The inability to change the *environmental status quo* in the types of situations described above presents a clear question of whether there is enough federal control over the action to be taken to make direct assistance by WS a federal action requiring compliance with the National Environmental Policy Act. This lack of federal control over the decision to be made is even clearer when the non-federal entity has committed to taking the same actions in the absence of any federal assistance from WS. Clearly, under these circumstances, by any analysis we can envision, WS would have virtually no ability to affect the *environmental status quo* by selecting any possible alternative, even the alternative of no federal action by WS.

Therefore, based on the discussion above, it is clear that in those situations where a non-federal cooperator has obtained the appropriate NHPG permit or authority, and has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS's involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target mammal species
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Impacts to stakeholders, including aesthetics
- Humaneness and animal welfare concerns of methods used

2.2.1 Effects on Target Mammal Species

Of interest to WS, program recipients, decision-makers, and members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are woodchucks, muskrats, deer, bear, coyote, raccoon, red fox, gray fox, skunk and beaver.

2.2.2 Effects on Other Wildlife Species, including T&E Species

WS and the rest of the wildlife management profession, as well as the public, are concerned about whether the proposed action or any of the alternatives might result in adverse impacts to populations of other wildlife, especially T&E species. WS' mitigation measures and SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing non-target species.

Threatened and Endangered species lists for the USFWS and State of New Hampshire were reviewed to identify potential effects on federal and state listed T&E species. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential effects of MDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997). WS also consulted with the FWS NH Field Office under Section 7 during this EA process, to ensure that potential effects on T&E species were adequately addressed (correspondence in Appendix D).

2.2.3 Effects on Human Health and Safety

Safety and efficacy of chemical control methods.

The public is sometimes concerned about chemicals used in mammal damage management programs because of potential adverse effects on people from being exposed either to the chemicals directly or to mammals that have died as a result of the chemical use. Under the alternatives proposed in this EA, chemical use is regulated by the EPA through FIFRA, by New Hampshire State Pesticide Control Laws, by DEA, by FDA and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P).

Other individuals may have concerns that there is a potential for drugs used in animal capture, handling, and euthanasia to cause adverse health effects in humans that hunt and eat the species involved. Among the species to be captured and handled under the proposed action, this issue is expected to only be of concern for wildlife which are hunted and sometimes consumed by people as food.

Impacts on human safety of non-chemical MDM methods

Some people may be concerned that WS's use of firearms, traps, snares and pyrotechnic scaring devices could cause injuries to people. WS personnel occasionally use traps, snares and firearms to remove or scare mammals that are causing damage. WS may use pyrotechnics in noise harassment programs to disperse or move mammals. There is some potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive public concern because of safety relating to the public and the threat of misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

The use of restraining traps such as foothold or body-grip traps; or snares is a sensitive issue because of the lack of understanding and experience by the public in using these devices. Some people believe they could be captured and restrained by these traps. Some believe these traps indiscriminately and automatically capture people who may unknowingly approach locations where these traps or snares are placed. When conducting activities that require using such devices, WS personnel provide information about the techniques used to the appropriate landowners or land management personnel. WS is assisting with the development of Best Management Practices (BMP's) for improving traps and trapping programs in the United States.

These BMP's evaluate the animal welfare and efficiency of various traps for species which can be legally harvested in North America.

Impacts on human health and safety from mammals

The concern stated here is that the absence of adequate MDM would result in adverse effects on human health and safety, because mammal damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

WS assists airport management who seek to resolve wildlife hazards to aviation. Airport managers and air safety officials are concerned that the absence of a WS MDM program could lead to a failure to adequately address complex wildlife hazard problems faced by the aviation community. Hence, potential effects of not conducting such work could lead to an increased incidence of human injuries or loss of life due to mammal strikes to aircraft.

2.2.4 Impacts to Stakeholders, including Aesthetics

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful.

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people, directly affected by problems and threats to public health or safety associated with mammals, insist upon their removal from the property or public location when they cause damage. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the problems caused by wildlife, strongly support removal. Individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific

locations or sites. Those totally opposed to mammal damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of mammals regardless of the amount and type of damage. Some members of the public who oppose removal of wildlife do so because of human-affectionate bonds with individual wildlife. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

The WS program in New Hampshire only conducts wildlife damage management at the request of the affected property owner or resource manager. If WS received requests from an individual or official for MDM, WS would address the issues/concerns and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if ". . . *the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

According to the AVMA (1987), suffering is described as a ". . . *highly unpleasant emotional response usually associated with pain and distress.*" However, suffering ". . . *can occur without pain . . .*," and ". . . *pain can occur without suffering . . .*". Because suffering carries with it the implication of a time frame, a case could be made for ". . . *little or no suffering where death comes immediately . . .*" (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would ". . . *probably be causes for pain in other animals . . .*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since ". . . *neither medical nor veterinary curricula explicitly address suffering or its relief*" (CDFG 1991). Research suggests that some methods, such as restraint in leg-hold traps or changes in the blood chemistry of trapped animals, indicate "*stress*" (USDA 1997). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

The AVMA states "... *euthanasia is the act of inducing humane death in an animal*" and "... *the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness.*" (Beaver et al. 2001). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild and feral animals. The AVMA states that "*For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress-free death may not be possible.*" (Beaver et al. 2001).

The decision-making process involves tradeoffs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where nonlethal damage management methods are not practical or effective.

New Hampshire WS personnel are experienced and professional in their use of wildlife damage management methods, so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 4.

2.2.5.1 Humaneness of Using Drowning Sets for Euthanizing and Muskrats

Some people are concerned about muskrats that drown while restrained by foothold traps and these people consider drowning inhumane. There is considerable debate and disagreement among animal interest groups, veterinarians, wildlife professionals, fur trappers, and nuisance wildlife control specialists on this issue. The debate centers on an uncertainty as to whether the drowning animals are rendered unconscious by high levels of CO₂ and are thus insensitive to distress and pain (Ludders et al. 1999). The AVMA identifies drowning as an unacceptable method of euthanasia (Beaver et al. 2001), but provides no literature citations to support this position. Ludders et al. (1999) concluded drowning is not euthanasia based on the animals not dying from CO₂ narcosis and reported CO₂ narcosis does not occur until 95 millimeters of mercury in arterial blood is exceeded. Ludders et al. (1999) showed death during drowning is from hypoxia and anoxia, and thus animals experience hypoxemia and concluded that animals that drown are distressed because of stress related hormones, epinephrine and norepinephrine, and therefore drowning is not euthanasia.

Carbon dioxide (CO₂) causes death in animals by hypoxemia and some animals (cats, rabbits, and swine) are distressed before death (Beaver et al. 2001). Even though these animals are distressed, the AVMA (Beaver et al. 2001) states this death is an acceptable form of euthanasia. Thus, the AVMA does not preclude distress or pain in euthanasia. In fact, the AVMA supports inducing hypoxemia related distress when necessary to reduce total distress, because reducing total distress is a more humane death.

Death by drowning in the classical sense is caused by the inhalation of fluid into the lungs and is referred to as "wet" drowning (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that all submerged beaver do not die from wet drowning, but die of CO₂ induced narcosis, and the AVMA has stated the use of CO₂ is acceptable (Gilbert and Gofton 1982, Noonan 1998). Gilbert and Gofton (1982) reported that after beaver were trapped and entered the water, they struggled for 2-5 minutes followed by a period of reflexive responses. Andrews et al. (1993) stated that with some techniques that induce hypoxia, some animals have reflex motor activity followed by unconsciousness that is not perceived by the animal. Gilbert and Gofton (1982) stated it is unknown how much conscious control actually existed at this stage and they stated anoxia may have removed much of the sensory perception by 5-7 minutes post submersion. However, Gilbert and Gofton (1982) have been criticized because levels of carbon dioxide in the blood were not reported (Ludders et al. 1999) and there was insufficient evidence that the beaver in their study were under a state of CO₂ narcosis when they died (V. Nettles, Southeastern Cooperative Wildlife Disease Study, letter to W. MacCallum, Massachusetts Division of Fisheries and Wildlife, June 15, 1998). Adding to the controversy, Clausen and Erslund (1970) did measure CO₂ in the blood for submersed restrained beaver, yet none of the beaver in their study died, so Clausen and Erslund (1970) could not determine if beavers die of CO₂ narcosis. Clausen and Erslund (1970) demonstrated that CO₂ increased in arterial blood while beaver were submersed and CO₂ was retained in the tissues. While Clausen and Erslund (1970) did measure the amounts of CO₂ in the blood of submersed beaver they did not attempt to measure the analgesic effect of CO₂ buildup to the beaver (letter from V. Nettles, D.V.M., Ph.D., Southeastern Cooperative Wildlife Disease Study to W. MacCallum, MA Division of Fisheries and Wildlife, June 15, 1998).

When muskrats are trapped using foothold traps with intent to “drown”, the muskrat is exhibiting a flight response. Gracely and Sternberg (1999) report that there is stress-induced analgesia resulting in reduced pain sensitivity during flight or flight responses. Environmental stressors that animals experience during flight or fight activate the same stress-induced analgesia (Gracely and Sternberg 1999).

The use of drowning trap sets has been a traditional wildlife management technique in trapping aquatic mammals such as muskrats. Trapper education manuals and other wildlife damage management manuals written by wildlife biologists recommend drowning sets for foothold traps set for aquatic rodents (Bromley et al. 1994, Dolbeer et al. 1994, Howard et al. 1980, Miller and Yarrow 1994, Randolph 1988). In some situations drowning trap sets are the most appropriate and efficient method available to capture muskrat. For example, a drowning set attachment should be used with foothold traps when capturing muskrat to prevent the animal from injuring themselves while restrained, or from escaping. Animals that drown die relatively quickly (e.g., within minutes) versus the possible stress of being restrained and harassed by people, dogs, and other wildlife before being euthanized. Drowning sets make the captured animal and trap less visible and prevents injury from the trapped animal (i.e., bites and scratches) to people who may otherwise approach a restrained animal. Furthermore, some people may be offended by the sight of dead animals. Drowning places the dead animal out of public view. Some sites may be unsuitable for body-gripping traps or snares because of unstable banks, deep water, or a marsh with a soft bottom (a.k.a., muck), but these sites would be suitable for foothold traps.

Given the short time period of a drowning event, the possible analgesic effect of CO₂ buildup, the minimum if any pain or distress on drowning animals, the AVMA’s acceptance of hypoxemia as euthanasia and the AVMA’s acceptance of a minimum of pain and distress during euthanasia, the acceptance of catching and drowning muskrats approved by International Humane Trapping Standards (Fur Institute of Canada 2000), we conclude that drowning, though rarely used by WS, is acceptable. We recognize some people will disagree and are unswayed by WS decision to continue the use of this method.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management should be Fee Based

Funding for WS comes from a variety of sources in addition to federal appropriations. In New Hampshire, funds to implement wildlife damage management activities and programs are derived from a number of sources, including, but not limited to Federal, state, county and municipal governments/agencies, private organizations, corporations and individuals, homeowner/property owner associations, and others, under Cooperative Service Agreements and/or other contract documents and processes. Federal, state, and local officials have decided that wildlife damage management should be conducted by appropriating funds. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Wildlife damage management is an appropriate sphere of activity for government programs, since aspects of wildlife damage management are a government responsibility and authorized and directed by law.

2.3.2 Mammal Damage Should be Managed by Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce mammal damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses and cities and towns may prefer to use WS because of security and safety issues and reduced administrative burden.

2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) for Such a Large Area

Some individuals might question whether preparing an EA for an area the size of the State of New Hampshire would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EAs covering smaller zones. In addition, the WS program in New Hampshire only conducts MDM on a relatively small area of the State where damage is occurring or likely to occur.

2.3.4 Wildlife Damage is a Cost of Doing Business — a “Threshold of Loss” Should Be Established Before Allowing Any Lethal MDM

WS is aware that some people feel Federal wildlife damage management should not be allowed until economic losses reach some arbitrary predetermined threshold level. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, resource owners and situations differ widely and a set wildlife damage threshold levels would be difficult to determine or justify. WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.3.5 Effectiveness of Mammal Damage Management Methods

A concern among members of the public is whether the methods of reducing mammal damage will be effective in reducing or alleviating damage and conflicts. 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 successful reducing damage to acceptable levels. WS technical assistance program provides information to assist persons in implementing their own MDM program, but at times the person receiving WS technical assistance may not have the skill or ability to implement the MDM methods recommended by WS. Therefore, it is more likely that a specific MDM 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 MDM activities.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992) as described in Chapter 2 (pages 20-35), Appendix J (Methods of Control), Appendix N (Examples of WS Decision Model), and Appendix P (Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program) of the ADC FEIS (USDA 1997).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ's) definition (CEQ 1981).

Alternatives analyzed in detail are:

- Alternative 1: Technical Assistance Only
- Alternative 2: Integrated Mammal Damage Management Program. (Proposed Action/No Action)
- Alternative 3: Non-lethal Mammal Damage Management Only By WS
- Alternative 4: No federal WS Mammal Damage Management

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1: Technical Assistance Only

This alternative would not allow for WS operational MDM in New Hampshire. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, corporations, or others could conduct MDM using any legal lethal or non-lethal method 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.

3.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

The USDA, APHIS, Wildlife Services proposes to continue the current damage management program that responds to mammal damage in the State of New Hampshire. An IWDM approach would be implemented to reduce mammal damage to property, agricultural resources, natural resources, and human/public health and safety. Damage management would be conducted on public and private property in New Hampshire when the resource owner (property owner) or manager requests assistance. 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 and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, mammals would be removed as humanely as possible using: shooting, trapping, snaring, and FDA or EPA approved chemical products. 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 could include instances where application of lethal methods alone would be the most appropriate strategy.

Mammal damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing the take of mammals in New Hampshire.

3.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

This alternative would require WS to use non-lethal methods only to resolve mammal damage problems. Information on lethal MDM methods would still be available to producers and property owners through other sources such as USDA Agricultural Extension Service offices, NHFG, universities, or pest control organizations. Requests for information regarding lethal management approaches would be referred to NHFG, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS non-lethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS direct control services, use contractual services of private businesses, or take no action. Persons receiving WS's non-lethal technical and direct control assistance could still resort to lethal methods that were available to them.

3.1.4 Alternative 4: No Federal WS Mammal Damage Management

This alternative would eliminate WS involvement in MDM in New Hampshire. WS would not provide direct operational or technical assistance and requesters of WS's assistance would have to conduct their own MDM without WS input. Information on MDM methods would still be available to producers and property owners through other sources such as USDA Agricultural Extension Service offices, NHFG, universities, or pest control organizations. Requests for information would be referred to NHFG, local animal control agencies, or private businesses or organizations. 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.

3.2 MDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN NEW HAMPSHIRE

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both WS technical assistance and operational MDM by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective² manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem. WS considers the biology and behavior of the damaging species and other factors using the WS Decision Model (Slate et al 1992). The recommended strategy(ies) may include any combination of preventive and corrective actions that could be implemented by the requester, WS, or other agency personnel, as appropriate. Two strategies available are:

² The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

1. Preventive Damage Management is applying wildlife damage management strategies before damage occurs, based on historical problems and data. All non-lethal methodologies, whether applied by WS or resource owners, are employed to prevent damage from occurring and therefore fall under this heading. When requested, WS personnel provide information and conduct demonstrations, or take action to prevent additional losses from recurring. An example would be a cooperater installing and maintaining rip rap on a pond levee to reduce potential burrowing damage caused by muskrats.

2. Corrective Damage Management Corrective damage management is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations, or take action to prevent additional losses from recurring. An example would be in areas where woodchuck are damaging crops or vegetation, WS may provide information about fencing, or conduct operational damage management to stop the losses.

3.2.2 The IWDM Strategies Employed by WS

Technical Assistance Recommendations

“Technical assistance” as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods and approaches. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for use by non-WS entities. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application. In some instances, wildlife-related information provided to the requestor by WS results in tolerance/acceptance of the situation. In other instances, management options are discussed and recommended.

Under APHIS NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving mammal damage problems.

Direct Damage Management Assistance (Direct Control)

Direct damage management assistance includes damage management activities that are directly conducted or supervised by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone and when *Agreements for Control* or other comparable instruments are provided for direct damage management by WS. The initial investigation defines the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem. The professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use pesticides are necessary or if the problems are complex.

Educational Efforts

Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

Research and Development

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.

3.2.2.1 Examples of WS Direct Operational and Technical Assistance in MDM in New Hampshire

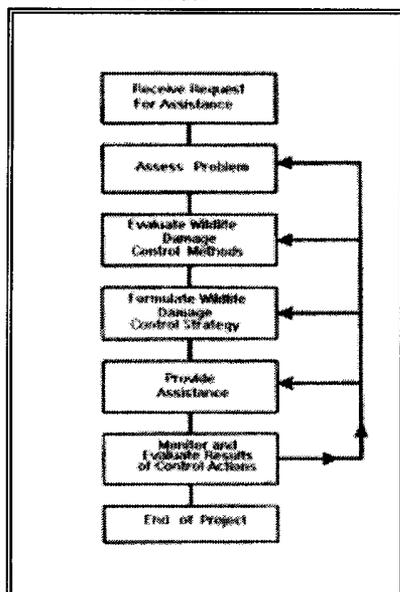
- The City of Newington, New Hampshire contracted with WS for the management of woodchucks in an apartment complex causing property damage, posing potential human health and safety problems, and a disease threat to both domestic pets and humans. WS implemented an IWDM approach consisting of habitat manipulation (structural prevention techniques), population reduction (trapping, euthanasia, gas cartridges), and public education regarding wildlife feeding and pet vaccination.
- Pease Air force Base and NH WS entered into a cooperative agreement to control the number of woodchucks found in the airfield. Concerns were raised about woodchucks burrowing under aircraft runways, damaging their structural integrity and potentially damaging the underground wiring used in navigation and runway illumination. The potential damages include aircraft destruction and damages, health and human safety, and higher monetary losses in runway repairs.
- NH WS works in cooperation with the USFWS and NHFG in the protection of the federally endangered Karner Blue butterfly. Woodchuck foraging negatively impacts wild lupine which is essential for completion of the butterflies' life cycle. WS control activities employing gas cartridges and habitat modification have enhanced butterfly population recovery efforts. Reproduction was documented at recovery sites in 2004, the first such event since initiation of recovery efforts.
- Star Island Corporation located on the Isle of Shoals contracts with WS to perform muskrat control before the tourism season begins. A large muskrat population on the small island, which is used for conferences and camps for adults and children, became a health and human safety concern. WS conducted population control methods and utilized 110 conibear traps in muskrat runs found on land and around the cisterns.
- NH WS works in cooperation with NHFG to mitigate deer and bear damage to agricultural and horticultural commodities, reduce property damage and minimize human health and safety threats throughout the state. Employing an IWDM approach emphasizing exclusion, harassment, repellents and changing cultural practices animals are rarely if ever removed. However, under rare instances, e.g. the need to immediately address a human health and safety threat removal activities may potentially be conducted.
- To prevent the northward spread of rabies WS distributes oral rabies vaccination baits in the Upper Connecticut River Valley. Raccoon live-trapping is conducted to assess bait uptake, program efficacy and population structure. In the event of encounter with suspect rabies positive animals or a potential exposure some animals may be need to be removed for testing.
- Hazards to an earthen dam in Littleton, New Hampshire from woodchuck burrowing activity include: structural damage, erosion due to loss of vegetative cover, employee safety and damage to specially designed steep slope mowing equipment. To maintain the integrity of the earthen dam and reduce unacceptable hazards WS conducts woodchuck control activities primarily employing gas cartridges.

- To enhance recovery of the federally endangered Piping plover on the Isles of Shoals, New Hampshire WS conducted muskrat control activities to reduce egg and nest predation.

3.2.3 WS Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints which is depicted by the WS Decision Model and described by Slate et al. in 1992 (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for effectively reducing damage. WS personnel assess the problem then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions.

Figure 3-1
WS Decision Model



3.2.4 Mammal Damage Management Methods Available for Use

3.2.4.1 Nonchemical Methods

Agricultural producer and property owner practices consist primarily of nonlethal preventive methods such as **cultural methods¹** and **habitat modification**.

¹Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

Animal behavior modification refers to tactics that alter the behavior of mammals to reduce damages. Some but not all of these tactics include the following:

- Propane exploders
- Pyrotechnics
- Visual repellents and scaring tactics

Habitat modification is used whenever practical to attract or repel certain wildlife species.

Live capture and relocation can be conducted to reduce damage caused by certain mammals. Various capture devices such as box or cage traps, and nets can be used to live capture mammals for relocation. In some instances permits are required by the State wildlife agency to capture and remove certain mammals.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

Sport hunting/trapping can be part of a MDM strategy to enhance the effectiveness of harassment techniques or used to reduce local populations of mammals. For example, WS sometimes directs trappers to contact NHPW about areas where muskrats are causing damage, or informs individuals requesting assistance about the option of utilizing sport trapping as a management tool.

Shooting is selective for the target species and may involve the use of spotlights and rifles or shotguns. WS personnel using firearms receive firearms safety training as specified by appropriate WS directives.

Foothold Traps can be effectively used to capture a variety of mammals. Placement of traps is contingent upon habits of the respective target species, habitat conditions, and presence of nontarget animals.

Snares are capture devices comprised of a cable formed in a loop with a locking device. Snares are usually placed in travel ways. Snares may be used as either a lethal or nonlethal method. Snares are generally easier to keep operational than foothold traps during inclement weather.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes and are made of galvanized wire mesh, and consist of a treadle in the middle of the cage that triggers the door to close behind the animal being trapped.

Body grip (Conibear type) traps are designed to cause the quick death of the animal that activates the trap. Body grip traps usually range in size from #110 to #330. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing traps.

3.2.4.2 Chemical Methods

Repellants. Several products are available that are designed to act as repellants for certain mammals. Most of these are taste repellants used on trees, shrubs, garbage, fences and other objects. As with most repellants, frequent reapplication is often necessary to obtain continued results.

Carbon dioxide (CO₂) gas is an American Veterinary Medical Association (AVMA) approved euthanasia method which is sometimes used to euthanize mammals which are live captured and when relocation is not a feasible option (Beaver et al. 2001). Live animals are placed in a container or chamber into which CO₂ gas is released. The animal quickly expires after inhaling the gas.

Gas cartridges are incendiary devices designed to give off carbon monoxide and other poisonous gases and smoke when ignited. They are used to fumigate mammal burrows.

Toxicants are chemicals that kill instead of repel animals. The use of toxicants by WS personnel in New Hampshire is directed at reducing damage caused by rodents. All toxicants used by WS personnel are registered under FIFRA and administered by the EPA. WS personnel who use toxicants are certified to use such products by the New Hampshire Department of Agriculture according to established rules and regulations set forth by that agency. One toxicant utilized by WS in New Hampshire is Zinc Phosphide (ZP). ZP is a heavy, finely ground black powder that is practically insoluble in water. When ZP comes in contact with moisture, it slowly decomposes and releases phosphine gas (PH₃).

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calm fear, and allay anxiety.

Telazol (tiletamine) is another anesthetic used in wildlife capture. It is 2.5 to 5 times more potent than ketamine; therefore, it generally works faster and lasts longer.

Xylazine is a sedative that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia.

Sodium Pentobarbital is a barbiturate that rapidly depresses the central nervous system to the point of respiratory arrest. There are DEA restrictions on who can possess and administer this drug. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered, but not analyzed in detail. These were:

3.3.1 Lethal Mammal Damage Management 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 woodchucks under 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 an animal on a runway might not be possible, where as scaring them away through noise harassment might resolve the air passengers' threat at once.

3.3.2 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 control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the ADC Final EIS 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 to determine and administer appropriate compensation.
- Compensation would most likely be less than full market value.
- Responding in a timely fashion to all requests to assess and confirm damage would be difficult and certain types of damage could not be conclusively verified. For example,

proving conclusively in individual situations that mammals were responsible for disease outbreaks would be impossible, even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.

- 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.

3.3.3 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 land wherever a cooperative program was initiated in the State. In New Hampshire, eradication of native mammal species is not a desired population management goal of State agencies or WS. 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.

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.

3.3.4 Nonlethal Methods Implemented Before Lethal Methods

This alternative is similar to Alternative 2 except that WS personnel would be required to always recommend or use nonlethal methods prior to recommending or using lethal methods to reduce mammal damage. Both technical assistance and direct damage management would be provided in the context of a modified IWDM approach. Alternative 2, the Proposed Action, recognizes nonlethal methods as an important dimension of IWDM, gives them first consideration in the formulation of each management strategy, and recommends or uses them when practical before recommending or using lethal methods. However, the important distinction between the Nonlethal Methods First Alternative and the Proposed Alternative is that the former alternative would require that all nonlethal methods be used before any lethal methods are recommended or used.

While the humaneness of the nonlethal management methods under this alternative would be comparable to the Proposed Program Alternative, the extra harassment caused by the required use of methods that may be ineffective could be considered less humane. As local mammal populations increase, the number of areas negatively affected by mammals would likely increase and greater numbers of mammals would be expected to congregate at sites where nonlethal management efforts were not effective. This may ultimately result in a greater numbers of mammals being killed to reduce damage than if lethal management were immediately implemented at problem locations. Once lethal measures were implemented, mammal

damage would be expected to drop relative to the reduction in localized populations of animals causing damage.

Since in many situations this alternative would result in greater numbers of animals being killed to reduce damage, at a greater cost to the requester, and result in a delay of reducing damage in comparison to the Proposed Alternative, the Nonlethal Methods Implemented Before Lethal Methods Alternative is removed from further discussion in this document.

3.3.5 Bounties

Payment of funds (bounties) for killing some mammals suspected of causing economic losses have not been supported by many State agencies 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 New Hampshire,
- 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.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR MAMMAL DAMAGE MANAGEMENT TECHNIQUES

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for effects that otherwise might result from that action. As appropriate, mitigation measures are incorporated in WS Standard Operating Procedures. The current WS program, nationwide and in New Hampshire, uses such mitigation measures and these are discussed in detail in Chapter 5 of the ADC Final EIS (USDA 1997).

3.4.1 Standard Operating Procedures (SOPs)

Some key SOPs pertinent to the proposed action and alternatives include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.
- Drugs are used according to the Drug Enforcement Agency, FDA, and WS program policies and directives and procedures are followed that minimizes pain.
- All controlled substances are registered with DEA or FDA.
- WS employees would follow approved procedures outlined WS Field Manual for the Operational Use of Immobilizing and Euthanizing Drugs (Johnson, et al. 2001).
- WS employees that use controlled substances are trained to use each material and are certified to use controlled substances under Agency certification program.
- WS employees who use pesticides and controlled substances participate in State approved continuing education to keep abreast of developments and maintain their certifications.
- Pesticide and controlled substance use, storage, and disposal conform to label instruction and other applicable laws and regulations, and Executive Order 12898.

- Material Safety Data Sheets for pesticides and controlled substances are provided to all WS personnel involved with specific WDM activities.
- All WS Specialists in the State who use restricted chemicals are trained and certified by, or else operate under the direct supervision of, program personnel or others who are experts in the safe and effective use of chemical MDM materials.
- Research is being conducted to improve MDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental effects.
- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the State, would not be conducted.
- WS uses MDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

3.4.2 Additional Standard Operating Procedures Specific to the Issues

The following is a summary of additional SOPs that are specific to the issues listed in Chapter 2 of this document.

Effects on Target Species Populations

- MDM activities are directed to resolving mammal damage problems by taking action against individual problem mammals, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
- WS take is monitored by comparing numbers of mammals killed by species or species group (e.g., carnivore) with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse effects to the viability of native species populations.

Effects on Nontarget Species Populations Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets. For example, WS personnel utilize pan tension devices or alter trap triggers in order to exclude or reduce the capture of non-target species.
- WS has consulted with the USFWS regarding potential effects of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). Further consultation on species not covered by or included in that formal consultation process will be initiated with the USFWS and WS will abide by any RPAs, RPMs, and terms and conditions that result from that process to avoid jeopardizing any listed species.
- WS uses chemical methods for MDM that have undergone rigorous research to prove their safety and lack of serious effects on nontarget animals and the environment.

Effects on Human Health and Safety

- WS personnel are trained and supervised in the use of MDM methods, including firearms, watercraft, traps, immobilization drugs, and vertebrate pesticides to ensure that they are used properly and according to policy. Furthermore, WS personnel using restricted-use vertebrate

pesticides will be certified according to EPA and New Hampshire State laws. WS specialists using firearms will routinely receive firearms safety training according to WS policy.

Effects on Aesthetics

- Whenever practicable, WS personnel perform components of mammal removal activities, such as shooting and euthanizing, away from public view.
- In addition, animals which are transported after being killed are concealed from public view when they must be transported in areas of human habitation, in an effort to reduce adverse effects on the aesthetic quality of the environment.

Humaneness of Methods Used by Wildlife Services

- When lethal methods are determined necessary, WS personnel kill target animals as quickly and humanely as possible. In most field situations, a shot to the brain with a small caliber firearm is performed which causes rapid unconsciousness followed by cessation of heart function and respiration. This is in concert with the American Veterinary Medical Association's definition of euthanasia (AVMA 2000).
- Research continues with the goal of improving the selectivity and humaneness of management devices.
- WS personnel recommend the use of various nonlethal methods such as exclusion, habitat and animal behavior modification, and changing cultural practices where these are applicable.
- WS personnel use trap lures and set traps in locations that are conducive to capturing the target animal, but minimize potential effect on nontarget species. Further, all damage management methods would be used in a manner that minimizes pain and suffering of individual animals, to the extent that the method is effective and its use is practical.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS MDM actions are not undertakings that could adversely affect historic resources (See Section 1.1.8).

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

As described in section 2.1.1, in those situations where a non-federal cooperator has obtained the appropriate NHFG permit or authority, and has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, however, certain aspects of the human environment may actually benefit more from WS's involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.1 Effects on Target Mammal Species Populations

4.1.1.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would have no impact on target mammal populations in the State because the program would not provide any operational MDM activities. The program would be limited to providing advice only. Some resource owners experiencing damage may trap or shoot mammals, or hire private trappers. Some mammal populations would continue to increase where trapping and shooting pressure was low and may decline or stabilize where trapping and shooting pressure was adequate.

Since affected resource owners would likely lethally remove the damaging mammal that would no longer be removed by WS, private efforts to reduce or prevent mammal damage and perceived disease transmission risks could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown below in the

population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003).

4.1.1.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

In those situations where a non-federal cooperator has obtained the appropriate NHFG permit or authority, and has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*.

Analysis of this issue is limited to those species killed during WS MDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. Table 4-1 identifies the number of mammals killed by WS during FY2000-FY2004.

Table 4-1. Mammals lethally removed by WS for Mammal Damage Management during FY 2000 through FY 2004 in New Hampshire.

Species	Gas Cartridges Used*	Shooting	Conibear Trap	Total
Muskrat	0	0	121	121
Woodchuck	741	0	1	742
Total	741	0	122	863

* Gas cartridge use is not indicative of number of woodchucks killed. The number used includes multiple treatments of individual borrows.

Muskrat Population Information and Effects Analysis

Musk rats (*Ondatra zibethicus*) are fairly large rodents with dense, glossy fur, dark brown above, lighter on the sides, paler below to nearly white on the throat. They have long scaly tails which are nearly naked and laterally flattened, tapering to a point but not paddle shaped as the beaver. They build houses, or lodges of aquatic plants, especially cattails, up to 2.4 m (8ft) in diameter and 1.5m (5 feet) high. These structures are usually built atop of piles of roots, mud, or similar support in marshy areas, streams, lakes, or along water banks. They also burrow in stream or pond banks with entrances often above water line. Other sign of the presence of muskrats includes feeding platforms built of cut vegetation in water or on ice, marked by discarded or uneaten grasses or reed cuttings, and floating blades of cattails, sedges, and similar vegetation near banks. This species is most active at dusk, dawn, and at night, but may be seen at any time of the day in all seasons, especially spring. Musk rats are excellent swimmers and spent much of their time in the water. They inhabit fresh, salt, and brackish waters of marshes, ponds, lakes, rivers, and canals in most of Canada and the U.S., except for Arctic regions, much of California, the southwestern U.S., Texas, and Florida (National Audubon Society 2000). They can be found in marshes, ponds, sloughs, lakes, ditches, streams, and rivers (Boutin and Birkenholz 1987).

Mammal species with high mortality rates, such as rodents and lagomorphs, typically possess high reproductive rates and produce large and frequent litters of young (Smith 1996). Muskrats are highly prolific and produce 3-4 litters per year that average 5-8 young per litter (Wade and Ramsey 1986) which makes them relatively immune to over harvest (Boutin and Birkenholz 1987). Harvest rates of from 3 to 8 per acre have been reported to be sustainable in muskrat populations (Boutin and Birkenholz 1987). Muskrat home ranges have been shown to vary from 529 sq. ft to 11,970 sq. ft. (0.1 to 0.25 acres) with the size of home ranges occupied by muskrats depends on habitat quality and population density (Boutin and Birkenholz 1987).

No population estimates were available for muskrat in New Hampshire. Therefore the best available information was used to estimate statewide populations. There are over 200,000 acres of wetlands in New Hampshire (Dahl 1990) including an estimated minimum of 10,000 miles of streams (USEPA 1998). Using the assumption that 50% of the wetlands support a muskrat population, an average home range of 0.25 acres per muskrat, only 1 muskrat occupies a home range, and no home ranges overlap; a conservative statewide muskrat population could be estimated at over 400,000 muskrats.

Muskrats are classified as protected furbearers in New Hampshire, and seasons and limits for take are set by NHFG. There are no population estimates for muskrats in New Hampshire however, it is believed that muskrat populations could be in decline. The NHFG Wildlife Harvest estimates that approximately 1,453 muskrats were harvested during 2003 in New Hampshire. (E. Orff, pers. comm., February 2005, Wildlife Harvest Report 2003).

Wildlife Services provided technical assistance for 17 muskrat damage complaints during FY 1999-2005. There were no total monetary losses reported during FY1999-2004. Muskrat conflicts are typically localized in New Hampshire, with WS removing only 121 for MDM purposes in FY 1999-2004 (annual average = 24.2). They sometimes threaten the integrity of earthen dams and therefore pose a threat to human safety and property at these sites. Other areas of concern are sites where elevated muskrat populations have close contact with humans, such as New Hampshire tourist islands and lake shores. Muskrats may also cause damage to hobby and vegetable gardens and are implicated in erosion to yards where they burrow in drainage ditches in urban environments. In future programs, WS may be requested to address damage being caused by muskrats anywhere in New Hampshire to protect any resource being damaged or threatened.

Based upon an anticipated increase for requests for WS assistance, it is highly unlikely that the program would kill more than 250 muskrats in the entire state in any year under the proposed action. Muskrat damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property.

Based upon the above information, WS limited lethal take of muskrat would have minimal effects on local or statewide muskrat populations. The NHFG has determined that there is no evidence to suggest that human mediated mortality resulting from regulated fur harvest and damage management, including removal by WS, will be detrimental to the survival of the muskrat populations in the state of New Hampshire (Eric Orff, NHFG furbearer biologist, pers. comm. 2005).

Woodchuck Population Information and Effects Analysis

The woodchuck/groundhog (*Marmota monax*) is a large rodent, often seen in pastures, meadows, and fields in New Hampshire. They dig large burrows, generally 8-12 inches at the opening, sometimes 5 feet deep and 30 feet long with more than 1 entrance to a spacious grass filled chamber. Green vegetation such as grasses, clover, and alfalfa forms its diet; at times it will feed

heavily on corn and can cause extensive damage in a garden to other crops (National Audubon Society 2000).

Mammal species with high mortality rates, such as rodents and lagomorphs, typically possess high reproductive rates and produce large and frequent litters of young (Smith 1996). The breeding season for woodchucks is usually from March through April (Bollengier, 1994). Female woodchucks usually produce from 4 to 6 young (Chapman and Feldhamer, 1982) with the offspring breeding at age 1 and typically living 4-5 years. If a pair of woodchucks and their offspring all survived to breed as soon as possible, with an average litter size of 4 with a 1:1 sex ratio; they could produce over 645 woodchucks through their life time.

Woodchucks are considered game animals in many states. There is usually no bag limit or closed season (Bollengier 1994). In New Hampshire, woodchucks are unprotected with a year round season and no limit on the number that can be taken. No population data or density information was available for woodchucks in New Hampshire. Field observations related to the presence of woodchucks in urban environments in New Hampshire suggest that they are locally abundant in many such areas of the state (Eric Orff, NHFG furbearer biologist, pers. comm. 2005).

During FY 1999-2004 WS responded to 421 Technical Assistance requests for woodchuck damage in New Hampshire. Individuals requesting assistance reported \$6,220, or an average of \$14.77 per complaint, in damages to a variety of resources including gardens, landscaping, lawns, and general property (USDA-WS MIS Database 2005). Wildlife Services in New Hampshire used a total of 741 gas cartridges on woodchuck burrows (the numbers include multiple treatments done to individual burrows) during FY 2000-2004. In future programs, it is possible that WS could be requested to provide MDM to address woodchuck damage at any location in the state.

Based upon current and an anticipated increase in woodchuck damage management activities in the future, it is possible that WS could kill 600 woodchucks per year in all MDM programs in New Hampshire. Woodchuck damage management activities would target single animals or local populations of the species at sites where their presence was causing unacceptable damage to agriculture, human health or safety, natural resources, or property.

Based upon the above information, WS limited lethal take of woodchucks would have minimal effects on local or statewide woodchuck populations. The NHFG has determined that there is no evidence to suggest that human mediated mortality resulting from regulated hunting and damage management, including removal by WS, will be detrimental to the survival of the woodchuck population in the state of New Hampshire (Eric Orff, NHFG furbearer biologist, pers. comm. 2005).

Other Target Species

Target species, in addition to muskrats and woodchucks analyzed above, may need to be removed in small numbers by WS in the future, including deer, bear, coyote, raccoon, red fox, gray fox, skunk and beaver. These other target species could be killed during MDM.

None of these mammal species are expected to be taken by WS MDM at any level that would adversely affect overall mammal populations. Most of these mammals are regulated by the NHFG and the take is limited by permit. Therefore, these mammals are taken in accordance with applicable state laws and regulations authorizing including the NHFG permitting process. The NHFG, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on these mammal populations would have no significant adverse impact on the quality of the human environment.

Based upon an anticipated increase in future requests for WS assistance, WS predicts that no more than 20 individuals of each of the above mentioned "other target mammal species" would be lethally removed annually under the proposed action. Based on the above information, NHFG oversight, and WS limited lethal take of these "other mammal species" in New Hampshire, WS should have minimal effects on local or statewide populations.

4.1.1.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would not kill any target mammal species because no lethal methods would be used. Although WS lethal take of mammals would not occur, it is likely that without WS conducting some level of lethal MDM activities for these species, private MDM efforts would increase, leading to potentially similar or even greater effects on target species populations than those of the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.2, however, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Effects and hypothetical risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 1, but less than Alternative 4.

4.1.1.4 Alternative 4: No Federal WS Mammal Damage Management

WS would conduct no mammal damage management activities under this alternative. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, WS would have no impact on target mammal populations in the State. Private efforts to reduce or prevent depredations could increase which could result in effects on target species populations to an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. Some resource owners experiencing damage may trap or shoot mammals, or hire private trappers. Some mammal populations would continue to increase where trapping and shooting pressure was low and may decline or stabilize where trapping and shooting pressure was adequate.

Since affected resource owners would likely lethally remove the mammal that would no longer be removed by WS, private efforts to reduce or prevent mammal damage and perceived disease transmission risks could increase, which could result in similar or even greater effects on those populations than the Proposed Action. However, for the same reasons shown below in the population effects analysis in section 4.1.1.2, it is unlikely that target mammal populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target mammal populations (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003).

4.1.2 Effects on Other Wildlife Species, including T&E Species

4.1.2.1 Alternative 1: Technical Assistance Only

Adverse Effects on Nontarget Species. Alternative 1 would not allow any WS direct operational MDM in New Hampshire. Non-target or T&E species would not be impacted by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support might lead to more selective use

of control methods by private parties than that which might occur under Alternative 4, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 3 and 4, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Beneficial Effects on Nontarget Species. The ability to reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 4 since WS would be available to provide information and advice.

4.1.2.2 Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Adverse Effects on Non-target (non-T&E) Species. Direct impacts on nontarget species occur when WS program personnel inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. To date, lethal take of non-target species by WS while conducting MDM activities in New Hampshire is extremely rare. WS take of non-target species during MDM activities is expected to be extremely low to non-existent. While every precaution is taken to safeguard against taking non-target wildlife, changes in local animal movements and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program. The NHFG concurs that New Hampshire WS mammal damage management activities would have no adverse effects on native wildlife populations in New Hampshire, including non-target species that may be taken under the proposed program (M. Ellingwood, NHFG, pers. comm., 2005)

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding nontarget species. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. WS personnel use animal lures and set traps and snares in locations that are conducive to capturing target animals while minimizing potential impacts to nontarget species. Any non-target species captured unharmed in a live trap would be subsequently released on site. No adverse impacts from the use of registered pesticides and repellents are anticipated. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Mitigation measures designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

Beneficial Effects on Non-target Species. This alternative has the greatest possibility of successfully reducing mammal damage and conflicts to wildlife species since all MDM methods could possibly be implemented or recommended by WS.

T&E Species Effects. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. The USFWS's and NHFG's list of Federal and State T&E species for New Hampshire were reviewed by WS to determine whether any T&E species might be affected by the

proposed action. Mitigation measures to avoid adverse impacts on T&E species are described in Chapter 3.

Federally listed species

WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of MDM methods on T&E species and has obtained a Biological Opinion. For the full context of the Biological Opinion, see Appendix F of the ADC Final EIS (USDA 1997, Appendix F). For the preparation of this EA, WS obtained and reviewed the list of federally listed T&E species for the state of New Hampshire (Appendix C) and determined that the proposed WS MDM program would not likely adversely affect any T&E species or critical habitat. WS has consulted with the USFWS New England Field Office under section 7 to ensure that potential effects on T&E species were adequately addressed. The USFWS concurred with WS not likely to adversely affect determination (correspondence in Appendix D).

Effects on Bald Eagle

As stated in the 1992 BO, the USFWS has determined that the only MDM methods that might adversely affect the bald eagle were the use of leghold traps and snares used near animal carcasses or large pieces of meat; and the above ground use of strychnine treated bait. It is WS program policy to set leghold traps and snares no closer than 30 feet from exposed bait to prevent the capture of non-target animals. Strychnine is no longer registered for above ground use and would not be used by WS for MDM in the State. Therefore, WS use of MDM in New Hampshire is not likely to adversely affect bald eagles.

Effects on Canada Lynx

The USFWS published the final rule to list the Canada lynx on March 24, 2000 (Federal Register, 50 CFR Part 17). The Final Rule identifies the listed population as the "U.S. District Population Segment" which occurs or historically occurred in forested portions of the States of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, and Wisconsin. WS wildlife biologists consulted on the Canada lynx with USFWS in Regions 3 and 5 in March 2001. The USFWS (letter from L. Lewis, USFWS, Acting Assistant Regional Director to G. Larson, WS Eastern Regional Director, May 9, 2001) determined that, Canada lynx are unlikely to be affected by WS MDM actions. This letter states that a "not likely to adversely affect" determination is appropriate for APHIS-WS operational programs, including those in New Hampshire.

State listed species

WS has obtained and reviewed the list of New Hampshire State listed T&E species (Appendix E) and has determined that the proposed WS MDM program is not likely to adversely impact any state listed endangered or threatened species. The NHFG has concurred with WS that it is not likely to adversely affect any listed species (M. Ellingwood pers. comm. 2005).

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS management activities may have less of an impact non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.2.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Adverse Effects on Nontarget Species. Under this alternative, WS take of non-target animals would hypothetically be less than that of the proposed action because no lethal control actions would be taken by WS. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. However, if mammal damage problems were not effectively resolved by non-lethal control methods, members of the public may resort to lethal means of control such as the use of firearms, traps, snares, registered pesticides, or even the illegal use of chemical toxicants. These efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 1 and 4, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Beneficial Effects on Nontarget Species. This alternative would reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, if non-lethal methods were effective in reducing such damage to acceptable levels. If non-lethal methods were ineffective at reducing damage to acceptable levels, WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that mammal damage to wildlife species and their habitats would likely remain the same or possibly increase dependent upon actions taken by the affected resource or landowner.

4.1.2.4 Alternative 4: No Federal WS Mammal Damage Management

There would be no impact on other wildlife species, including T&E species by WS from this alternative. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Adverse Effects on Nontarget Species. Alternative 4 would not allow any WS MDM in the State. There would be no impact on non-target or T&E species by WS MDM activities from this alternative. Private efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997, White et al. 1989, USFWS 2001, USFDA 2003). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Beneficial Effects on Nontarget Species. The ability to reduce negative impacts caused by mammals to wildlife species and their habitats, including T&E species, would be variable based upon the skills and abilities of the person implementing control actions.

4.1.3 Effects on Human Health and Safety

When used improperly or by untrained individuals, various methods used in mammal damage management projects could pose risks to humans. Methods analyzed that could pose risks to human health and safety include the use of chemicals, firearms, snares, foothold traps, conibear traps, and harassment with pyrotechnics. No accidents resulting in harm to any persons have occurred under the current WS MDM program in New Hampshire. A formal risk assessment of

WS operational management methods found that risks to human safety were low (USDA 1997). Wildlife Services SOP's include measures intended to mitigate or reduce the effects on human health and safety and are presented in Chapter 3. Risk to members of the public from WS use of pyrotechnics, chemicals, firearms, snares, foothold traps or body-gripping traps to take mammals would remain low due to adherence to WS policies, required safety precautions, and training.

4.1.3.1 Safety and Efficacy of Chemical Control Methods

Alternative 1: Technical Assistance Only

Concerns about human health and safety risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. WS would provide technical advice to those persons requesting assistance. Resource owners could use information provided by WS or implement their own damage reduction program without WS' technical assistance. Negative impacts to human health and safety resulting from the improper use of chemical control methods should be less than Alternative 4 when WS' technical advice is followed.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Under the proposed alternative WS may use certain EPA registered pesticides, including zinc phosphide and gas cartridges.

Zinc phosphide is a metallic toxicant most often used for muskrat damage control. The odor of zinc phosphide is attractive to rodents by repulsive to most other animals. Tarter emetic is sometimes added to baits used to control rats. This safety feature will cause most other species to regurgitate any zinc phosphide baits they may consume. Its effectiveness for rat control is not compromised because rats are unable to regurgitate.

Gas Cartridges are placed in burrows/dens and are burned to create carbon monoxide gas to euthanize animals. Applicators must exercise caution to avoid burns to the skin or surrounding vegetation.

Chemical MDM methods are regulated by EPA under FIFRA, and New Hampshire Pesticide Control Laws. Their use by WS personnel is carefully defined in WS Directives. Based on a thorough Risk Assessment, APHIS concluded that, when WS Program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Therefore, no adverse effects to public safety are expected from the use of chemical MDM methods by WS.

Non-lethal MDM chemicals that might be used or recommended by WS include repellents. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before EPA or FDA would register them. Any operational uses of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations that are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health and safety.

Drugs used in capturing, handling, and euthanizing wildlife for wildlife hazard management purposes include ketamine hydrochloride, xylazine (Rompun), sodium pentobarbitol, Beuthanasia-D, and a mixture of tiletamine and zolazepam (Telazol). Meeting the requirements of the AMDUCA should prevent any significant adverse impacts on human health with regard to this issue. Mitigation measures that would be part of the standard operating procedures include:

- All drug use in capturing and handling wildlife would be under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and APHIS-WS. As determined on a state-level basis by these veterinary authorities (as allowed by AMDUCA), wildlife hazard management programs may choose to avoid capture and handling activities that utilize immobilizing drugs within a specified number of days prior to the hunting or trapping season for the target species to avoid release of animals that may be consumed by hunters prior to the end of established withdrawal periods for the particular drugs used. Ear tagging or other marking of animals drugged and released to alert hunters and trappers that they should contact state officials before consuming the animal.
- Most animals administered drugs would be released well before state controlled hunting/trapping seasons which would give the drug time to completely metabolize out of the animals' systems before they might be taken and consumed by humans. In some instances, animals collected for control purposes would be euthanized when they are captured within a certain specified time period prior to the legal hunting or trapping season to avoid the chance that they would be consumed as food while still potentially having immobilizing drugs in their systems.

By following these procedures in accordance with AMDUCA, wildlife management programs would avoid any significant impacts on human health with regard to this issue.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Alternative 3 would not allow for any lethal chemical method to be used by WS in the State. WS could implement non-lethal chemical methods such as repellants. Impacts from WS use of these chemicals would be similar to those described under the proposed action.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Resource owners inexperienced in the safe and proper use of chemical MDM methods may attempt to resolve mammal damage problems. The potential for illegal use of chemical toxicants under this alternative might pose threats to human health and safety if such chemicals were used indiscriminately in areas used by humans, or where such chemicals might be transported into the human food chain.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Concerns about human health and safety risks from WS's use of chemical MDM methods would be alleviated because no such use would occur. Resource owners could use any legal MDM chemical available to them, including EPA registered chemicals and rodenticides. Without professional assistance or proper training in the use of chemical MDM methods, there is the

potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of chemical MDM methods may attempt to resolve mammal damage problems.

The potential for illegal use of chemical toxicants under this alternative might pose threats to human health and safety if such chemicals were used indiscriminately in areas used by humans, or where such chemicals might be transported into the human food chain.

4.1.3.2 Impacts on Human Safety of Non-chemical MDM Methods

Alternative 1: Technical Assistance Only

Concerns about human health and safety risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. WS would provide technical advice to those persons requesting assistance. Resource owners could use information provided by WS or implement their own damage reduction program without WS' technical assistance. Negative impacts to human health and safety resulting from the improper use of non-chemical control methods should be less than Alternative 4 when WS' technical advice is followed.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Non-chemical BDM methods that might raise safety concerns include shooting with firearms; use of traps and snares; and harassment with pyrotechnics. No adverse affects on human safety from WS's use of these methods is expected. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Firearms, traps, snares and pyrotechnics are only used by WS personnel who are experienced in handling and using them. The New Hampshire WS program has had no accidents involving the use of firearms, traps, snares or pyrotechnics in which any person was harmed. Wildlife Services personnel are trained and given refresher courses to maintain awareness of firearm and pyrotechnic safety and handling as prescribed by WS policy. Snares and traps are strategically placed to minimize exposure to the public. Signs are used to post properties where traps are set to alert the public of their presence.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, non-chemical non-lethal MDM methods used by WS that might raise safety concerns include shooting with firearms when used as a harassment technique, live traps, and harassment with pyrotechnics. Impacts from WS use of these non-chemical methods would be similar to those described under the proposed action.

Excessive cost or ineffectiveness of non-lethal techniques could result in some entities rejecting WS's assistance and resorting to other means of MDM. Resource owners could use any legal MDM available to them, including traps, snares, and firearms. Without professional assistance or proper training in the use of these methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of non-chemical MDM methods may attempt to resolve mammal damage problems. These increased risks are associated with the improper or inexperienced use of damage management methods such as trapping and shooting.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Concerns about human health and safety risks from WS's use of non-chemical MDM methods would be alleviated because no such use would occur. Resource owners could use any legal MDM non-chemical available to them, including traps, snares, and firearms. Without professional assistance or proper training in the use of non-chemical MDM methods, there is the potential for increased risks to public safety. Resource owners inexperienced in the safe and proper use of non-chemical MDM methods may attempt to resolve mammal damage problems. These increased risks are associated with the improper or inexperienced use of damage management methods such as trapping and shooting.

4.1.3.3 Impacts on Human Health and Safety from Mammals

Alternative 1: Technical Assistance Only

Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. When WS technical advice is requested and followed mammal threats to human health and safety should be less than Alternative 4. However, resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

People are concerned with potential human health and safety threats associated with mammals. An IWDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing this risk. All MDM methods could possibly be implemented and recommended by WS.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. The success or failure of the use of non-lethal methods can be quite variable. If non-lethal methods were ineffective at reducing damage and threats to human health and safety, WS would not be able to provide any other type of assistance. In these situations, mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners could implement their own damage reduction program without WS assistance. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts to human health and safety could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.4 Impacts to Stakeholders, including Aesthetics

4.1.4.1 Effects on Human Affectionate Bonds with Individual Mammals and on Aesthetic Values of Wild Mammal Species

Alternative 1: Technical Assistance Only

Under this alternative, WS would not conduct any direct operational MDM, but would still provide technical assistance or self-help advice to persons requesting assistance with mammal damage. Those who oppose direct operational assistance in wildlife damage management by the government, but favor government technical assistance, would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative because the individual animals would not be killed by WS. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS resulting in impacts similar to the Proposed Action alternative.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Those who routinely view or feed individual mammals would likely be disturbed by removal of such animals under the proposed program. WS is aware of such concerns and takes these concerns into consideration to mitigate effects. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals.

Some members of the public have expressed opposition to the killing of any mammals during MDM activities. Under this Proposed Action alternative, some lethal control of mammals would occur and these persons would be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular animals that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Lethal removal of mammals from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The ability to view and interact with animals at these sites is usually either restricted to viewing from a location outside boundary fences or is forbidden.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would not conduct any lethal MDM, but may conduct harassment of mammals that are causing damage. Some people who oppose lethal control of wildlife by the government, but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by the death of individual animals under this alternative, but might oppose dispersal or translocation of certain animals. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals. In addition, the abundant populations of target mammal species would enable people to continue to view them and to establish affectionate bonds with individual wild mammals. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, WS would not conduct any MDM in New Hampshire. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild mammals would not be affected by WS's activities under this alternative. However, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.4.2 Effects on Aesthetic Values of Property Damaged by Mammals

Alternative 1: Technical Assistance Only

Wildlife Services would provide technical advice to those persons requesting assistance. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. When WS technical advice is requested and followed, impacts on those persons adversely affected by mammal damage should be less than Alternative 4. However, resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 2: Integrated Mammal Damage Management Program (Proposed Action/No Action)

Damage to property would be expected to decrease under this alternative since all available damage management methods and strategies would be available for WS use and consideration.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with mammal damage problems. The success or failure of the use of non-lethal methods can be quite variable. If non-lethal methods were ineffective at reducing damage, WS would not be able to provide any other type of assistance. In these situations, mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, mammal damage could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Mammal damage would likely continue to increase unless resource owners implemented an effective MDM program in the absence of WS. Resource owners could implement their own damage reduction program without WS assistance. Resource owners' efforts to reduce or prevent conflicts could result in less experienced persons implementing control methods. Therefore, adverse impacts could be greater under this alternative than the proposed action alternative dependent upon the skills and abilities of the person implementing MDM control methods.

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used

4.1.5.1 Alternative 1: Technical Assistance Only

Under this alternative, WS would provide self-help advice only. Lethal methods viewed as inhumane by some persons would not be used by WS. Resource owners could use the information provided by WS or implement their own damage reduction program without WS technical assistance. Many of the methods considered inhumane by some individuals and groups might still be used by resource owners. Overall impacts should be less than Alternative 4 when WS technical advice is requested and followed.

4.1.5.2 Alternative 2: Implement an Integrated Mammal Damage Management Program (Proposed Action/No Action)

MDM methods viewed by some persons as inhumane would be employed by WS under this alternative. Despite SOP's designed to maximize humaneness, the perceived stress and trauma associated with being held in foothold traps or snares until the WS employee arrives at the capture site to dispatch or release the animal, is unacceptable to some persons. In addition, these methods are used in "drown sets" where the animal drowns shortly after being caught which is also considered inhumane by some persons. Other MDM methods used to take target animals including shooting and body-gripping traps (i.e., Conibear) result in a relatively humane death

because the animals die instantly or within seconds to a few minutes. These methods however, are also considered inhumane by some individuals.

WS uses EPA registered and approved pesticides, such as zinc phosphide, and gas cartridges to manage damage caused by some mammals in New Hampshire. Some individuals consider the use of such chemicals to be inhumane.

WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this Alternative, mammals would be trapped as humanely as possible or shot by experienced WS personnel using the best and most appropriate method(s) available. Some animal rights activists may perceive this method as inhumane because they oppose all lethal methods of damage management.

Wildlife Services WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some MDM methods are used in situations where nonlethal damage management methods are not practical or effective.

In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance, WS participation in carrying out the action will not affect the *environmental status quo*. In some situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

4.1.5.3 Alternative 3: Non-lethal Mammal Damage Management Only by WS

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.5.4 Alternative 4: No Federal WS Mammal Damage Management

WS would have no impact on this issue. Management actions taken by non-federal entities would be considered the *environmental status quo*.

Under this alternative, lethal methods, viewed as inhumane by some persons, would not be used by WS. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct MDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Under Alternatives 1, 2 and 3, WS would address damage associated with mammals in a number of situations throughout the State. The WS MDM program would be the primary federal program with MDM

responsibilities; however, some state and local government agencies may conduct MDM activities in New Hampshire as well. Through ongoing coordination with these agencies, WS is aware of such MDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct MDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct MDM activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of WS MDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

Mammal Damage Management methods used or recommended by the WS program in New Hampshire will likely have no cumulative adverse effects on target and non-target wildlife populations. WS limited lethal take of target mammal species is anticipated to have minimal impacts on target mammal populations in New Hampshire. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

Cumulative Impacts on Human Health and Safety

Chemical Methods

Lethal chemical MDM methods may include the use of zinc phosphide and gas cartridges.

Zinc Phosphide is a finely ground gray-black powder that is practically insoluble (solubility = 1 ppm) in water and alcohol, therefore it is unlikely to be mobile in soils. It breaks down to elemental zinc and phosphine gas when exposed to moisture or under acidic conditions. The decomposition rate of ZP in the soil depends on soil moisture and pH, with complete decomposition in 30 days in moderately moist soils. The residue of ZP is not expected to accumulate in the soils between applications, or in animal tissues. The phosphine gas produced during breakdown is a colorless gas with a high vapor pressure and so is generally prevented from accumulating in low areas. Ultimately the phosphine is transformed into inorganic phosphate (USDA 1997). These factors indicate that no significant cumulative effects to human health and safety are expected from the use of this chemical in WS MDM programs in New Hampshire.

ZP is available to certified pesticide applicators in New Hampshire and might be used by some. Any non-WS programs that might employ ZP for purposes specified on product labels would not collectively produce cumulative effects for the same reasons outlined for WS MDM programs. Therefore, no significant cumulative effects on human health and safety are expected from all combined activities involving ZP for the management of damage caused by species for which the product is registered for use.

Sodium nitrate is the principle active chemical in gas cartridges, is a naturally occurring substance. Although stable under dry conditions, it is readily soluble in water and likely to be highly mobile in soils. In addition, dissolved nitrate is very mobile, moving quickly through the vadose zone to the underlying water table (Bouwer 1989). Burning sodium nitrate however, as in the use of a gas cartridge as a fumigant in a rodent burrow is believed to produce mostly simple organic and inorganic gases, using all of the available sodium nitrate. In addition, the human health drinking water tolerance level for this chemical is 10 mg / L, a relatively large amount, according to EPA Quality Criteria for Water (1986c). The gas along with other components of the cartridge, are likely to form oxides of nitrogen, carbon, phosphorus, and sulfur. These products are environmentally non-persistent because they are likely to be metabolized by soil microorganisms or enter their respective elemental cycles. In rodent cartridges, sodium nitrate is combined with seven additional ingredients; sulfur, charcoal, red phosphorus, mineral oil, sawdust, and two inert ingredients. None of the additional ingredients in this formulation are likely to accumulate in soil, based on their degradation into simpler elements by burning the gas

cartridge. Sodium nitrate is not expected to accumulate in soils between applications, nor does it accumulate in the tissues of target animals (USEPA 1991g). No gas residues remain at the treatment site where either formulation is used, for any period of time (USDA 1997), and so, no significant cumulative effects from the presence of gases can be expected. Based on properties and fate of sodium nitrate and its components as used in gas cartridges as a fumigant in WS MDM programs in New Hampshire, no significant cumulative effects to human health and safety are expected from its use in such programs.

Gas cartridges are available to the public in New Hampshire and this method might be used by some. Any non-WS programs that might employ gas cartridges for purposes specified on product labels would not collectively produce cumulative effects for the same reasons outlined for WS MDM programs. Therefore, no significant cumulative effects on human health and safety are expected from all combined activities involving gas cartridge use for the management of damage caused by rodents.

Based on use patterns, the chemical and physical characteristics of zinc phosphide and gas cartridges, and factors related to the environmental fate of these pesticides, no cumulative impacts are expected from the lethal chemical components used or recommended by the WS MDM program in New Hampshire.

Non-lethal chemicals may also be used or recommended by the WS MDM program in New Hampshire. Characteristics of these chemicals and use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use in WS MDM programs in New Hampshire.

Non-Chemical Methods

All non-chemical MDM methods, such as trapping, snaring, shooting, harassment methods, etc. are used and expended within a limited time frame, are not residual, and do not possess properties capable of inducing significant cumulative impacts on human health and safety.

Cumulative Impacts to Stakeholders, including Aesthetics

Impacts on Human Affectionate-bonds

In the wild, few animals in the United States have life spans approaching that of humans. Most wild mammals viewed frequently by people, such as squirrels, raccoons, and white-tailed deer, live less than five years. Mortality is high among wildlife populations and specific individuals among a species may experience death early in life. This is a natural occurrence and humans who form affectionate bonds with animals experience loss of those animals over time, in most instances. A number of professionals in the field of psychology have studied human behavior in response to attachment to pet animals (Gerwolls, 1994, Marks and Koepke 1994, Zasloff 1996, Archer 1999, Ross and Baron-Sorensen 1998, Meyers, 2000) and observations made regarding this is probably applicable to close bonds which could exist between people and wild animals. As observed by researchers in human behavior, normal human responses to loss of loved ones proceed through phases of shock or emotional numbness, sense of loss, grief, acceptance of the loss or what cannot be changed., healing, and acceptance and rebuilding which leads to resumption of normal lives (Lefrancois 1999). Those who lose companion animals, or animals for which they may have developed a bond and affection, are observed to proceed through the same phases as with the loss of human companions (Gerwolls 1994, Boyce 1998, Meyers 2000). However, they usually establish a bond with other individual animals after such losses. Although they may lose the sense of enjoyment and meaning from the association with those animals which die or are no longer accessible, they usually find a similar meaningfulness by establishing an association with new individual animals or through other relational activities (Weisman 1991). Through this process of coping with the loss and establishing new affectionate bonds, people may avoid compounding emotional effects resulting from such losses (Parkes 1979, Lefrancois 1999).

Some mammals with which humans have established affectionate bonds may be removed from some project sites by WS MDM actions in New Hampshire. Other individuals of the same species continue to be

present in the area and people tend to establish new bonds with those remaining animals. In addition, human behavior processes usually result in individuals ultimately returning to normalcy after experiencing the loss of association with a wild animal which might be removed from a specific location by WS MDM actions. Therefore, no significant cumulative effects on human affectionate bonds are expected from WS MDM programs in New Hampshire. Other non-WS actions which may disrupt human affectionate bonds with wildlife, such as natural wildlife mortality, hunter take, and other occurrences, in combination with the removal or dispersal of animals by WS, is not expected to collectively cumulatively affect this element of the human environment.

Impacts on Aesthetic Enjoyment of Wildlife

Those who enjoy viewing wildlife may experience a temporary reduction in being able to view wildlife at some sites where WS MDM programs have removed animals. However, other animals may replace those removed, and other animals may be viewed and enjoyed at adjacent locations. Because effects on aesthetic enjoyment gained by viewing wildlife are temporary, no significant cumulative effects are expected as a result of WS MDM actions. Other non-WS actions which may temporarily and locally reduce the presence of wildlife for public viewing, such as natural wildlife mortality, hunter take, and other occurrences, combined with removal of animals by WS, is not expected to collectively alter the availability of wildlife on a local, region or statewide scale. Wildlife will remain available for aesthetic enjoyment, and so no overall significant cumulative effects are expected regarding this element of the human environment.

Some people experience a decrease in aesthetic enjoyment of wildlife that cause damage and threaten human health and safety. The reduction of such threats and damage through WS MDM actions could reduce this type of negative aesthetic damage and also the possibility of cumulative degradation of the public's attitude about a particular mammal species, or wildlife in general. WS activities are not expected to have any significant cumulative effects on this element of the human environment.

Cumulative Impacts on Humaneness and Animal Welfare Concerns of MDM Methods

WS continues to seek new methods and to improve current technology to improve humaneness of methods in managing damage caused by mammals. Cooperation with individuals and organizations involved in animal welfare continues to be an agency priority for the purpose of evaluating WS strategies and defining research aimed at developing methods for MDM programs. Because WS continues to develop and implement more humane methods as technology advances, no significant cumulative effects from WS MDM actions are expected. Combined MDM activities of other entities which have the potential to affect concerns about humaneness of MDM methods, coupled with all WS MDM activities, are not expected to have any significant cumulative effects on this element of the human environment.

SUMMARY

No significant cumulative environmental impacts are expected from any of the 4 alternatives. Under the Proposed Action, the lethal removal of mammals by WS would not have a significant impact on overall target mammal populations in New Hampshire, but some local reductions may occur. No risk to public safety is expected when WS's services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists/specialists would conduct and recommend MDM activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternatives 1, 2 and 3 and conduct their own MDM activities, and when no WS assistance is provided in Alternative 4. In all 4 Alternatives, however, it would not be to the point that the impacts would be significant.

Under Alternative 4, management actions taken by non-federal entities would be considered the *environmental status quo*. In those situations where a non-federal cooperator has already made the decision to remove or otherwise manage mammals to stop damage with or without WS assistance in Alternatives 1, 2 and 3, WS participation in carrying out the action will not affect the *environmental status quo*. In some

situations, dependent upon the skills and abilities of the non-federal entity, WS involvement may actually have a *beneficial* effect on the human environment when compared to the *environmental status quo* in the absence of such involvement.

Although some persons will likely be opposed to WS's participation in MDM activities on public and private lands within the state of New Hampshire, the analysis in this EA indicates that WS Integrated MDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-3 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-2. Summary of Potential Impacts.

Issue	<u>Alternative 1</u> Technical Assistance Only	<u>Alternative 2</u> Integrated Mammal Damage Management Program (Proposed Action/No Action)	<u>Alternative 3</u> Nonlethal MDM Only by WS	<u>Alternative 4</u> No Federal WS MDM Program
1. Effects on Target Mammal Species	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not significantly affect local and state populations.	Low effect - reductions in local target mammal numbers; would not significantly affect local and state populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not significantly affect local and state populations.	No effect by WS. Low effect - reductions in local target mammal numbers by non-WS personnel likely; would not significantly affect local and state populations
2. Effects on Other Wildlife Species, Including T&E Species	No effect by WS. Impacts by non-WS personnel would be variable.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	No effect by WS. Impacts by non-WS personnel would be variable.
3. Effects on Human Health and Safety	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing mammal damage than under the proposed action.	The proposed action has the greatest potential of successfully reducing this risk. Low risk from methods used by WS.	Impacts could be greater under this alternative than the proposed action. Low risk from methods used by WS.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing mammal damage than under the proposed action.
4a. Aesthetic Values of Wild Mammal Species	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall local and state target mammal populations.	Low to moderate effect at local levels; Some local populations may be reduced; WS mammal damage management activities do not adversely affect overall local or state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on overall local and state target mammal populations.	Low to moderate effect. Local mammal numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall local and state target mammal populations.
4b. Aesthetic Values of Property Damaged by Mammals	Moderate to High effect – mammal damage may not be reduced to acceptable levels.	Low effect - mammal damage problems most likely to be resolved.	Moderate to High effect - mammal damage may not be reduced to acceptable levels.	High effect - mammal problems less likely to be resolved without WS involvement.
5. Humaneness and Animal Welfare Concerns of Methods Used	No effect by WS. Impacts by non-WS personnel would be variable.	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 2 since only non-lethal methods would be used by WS	No effect by WS. Impacts by non-WS personnel would be variable.

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**APPENDIX A
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APPENDIX B

MAMMAL DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE NEW HAMPSHIRE WILDLIFE SERVICES PROGRAM

Resource owners and government agencies have used a variety of techniques to reduce mammal damage. However, all lethal and non-lethal methods developed to date have limitations based on costs, logistics, or effectiveness. Below is a discussion of mammal damage management methods currently available to the New Hampshire WS program. If other methods are proven effective and legal to use in New Hampshire, they could be incorporated into the program, based upon NEPA compliance.

Nonchemical Mammal Damage Management Methods

Nonchemical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate resource damage. Methods may be non-lethal (e.g., fencing, frightening devices, etc.) or lethal (e.g., firearms, Conibear traps, snares, etc.). If WS personnel apply these methods on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator authorizing the use of each damage management method. Nonchemical methods used or recommended by WS include:

Exclusion pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Fencing, especially if it is installed with an underground skirt, can prevent access to areas for many mammal species which dig, including woodchucks and muskrat. Areas such as airports, yards or hay meadows may be fenced. Hardware cloth or other metal barriers can sometimes be used to prevent the entry of mammals into buildings through existing holes or gaps. Riprap and construction of concrete spillways may reduce or prevent damage to dams or levees by burrowing rodent species. Electric fences of various constructions have been used effectively to reduce damage to various crops by deer, raccoons, and other species (Craven and Hygnstrom 1994, Boggess 1994b).

Cultural Methods and Habitat Management includes the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. Strategies may include minimizing cover where damaging mammals might hide, manipulating the surrounding environment through barriers or fences to deter animals from entering a protected area, eliminating wildlife attractants or planting lure crops on fringes of protected crops.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops

Animal behavior modification refers to tactics that deter or repel damaging mammals and thus, reduce damage to the protected resource. These techniques are usually aimed at causing target animals to respond by fleeing from the site or remaining at a distance. They usually employ extreme noise or visual stimuli. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Conover 1982). Devices used to modify behavior in mammals include:

- electronic guards (siren strobe-light devices)
- propane exploders
- pyrotechnics
- laser lights
- human effigies

Live Capture and Relocation can be accomplished through the use of cage traps, snares, and foothold traps to capture some species of mammals for the purpose of translocating them for release to wild sites. WS sometimes uses these methods to conduct MDM programs in New Hampshire when the target animal(s) can legally be

relocated or can be captured and handled with relative safety by WS personnel. Live capture and handling of wild mammals poses an additional level of human health and safety threat if target animals are aggressive, large, or extremely sensitive to the close proximity of humans. For that reason, WS may limit this method to specific situations and certain species. Excessive populations may make this a poor wildlife management strategy for some species. In addition, moving damage-causing individuals to other locations can typically result in damage at the new location, or the translocated individuals can move from the relocation site to areas where they are unwanted. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals (Center for Disease Control 1990). Although relocation is not necessarily precluded in all cases, it would in many cases be logistically impractical and biologically unwise in New Hampshire, and is evaluated by WS on a case-by-case basis.

Trapping can utilize a number of devices, including footholds, cage-type traps, and Conibear (body-gripping) traps, foot snares, and neck/body snares. For a description of these methods the reader is referred to the FEIS, Appendix J (USDA 1997). These techniques are usually implemented by WS personnel because of the technical training required to use such devices.

Foothold (Leghold) Traps can be effectively used to capture a variety of mammals. Foothold traps are either placed beside, or in some situations, in travel ways being actively used by the target species. Placement of traps is contingent upon the habits of the respective target species, habitat conditions, and presence of non-target animals. Effective trap placement and adjustment and the use and placement of appropriate baits and lures by trained WS personnel also contribute to the foothold trap's selectivity. An additional advantage is that foothold traps can allow for the on-site release of non-target animals. The use of foothold traps requires more skill than some methods, but they are indispensable in resolving many damage problems.

Snares are capture devices comprised of a cable formed in a loop with a locking device and placed in travel ways. Most snares are also equipped with a swivel to minimize cable twisting and breakage. Snares are also easier than foothold traps to keep operational during periods of inclement weather. Snares set to catch an animal around the body or legs are usually a live-capture method. Implementation of snares would be conducted in accordance with current and proposed NHFG legislation.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes and are made of galvanized wire mesh, and consist of a treadle in the middle of the cage that triggers the door to close behind the animal being trapped.

Colony traps are multi-catch traps used to either live-capture or drown muskrats. There are various types of colony traps. One common type of colony trap consists of a cylindrical tube of wire mesh with a one-way door on each end (Novak 1987). Colony traps are set at entrances to muskrat burrows or placed in muskrat travel lanes. Colony traps are effective and relatively inexpensive and easy to construct (Miller 1994). The stovepipe trap, a common type of colony trap, is usually made with sheet metal and may capture two to four muskrats on the first night (Miller 1994).

Body-grip (e.g., Conibear-type) Traps are designed to cause the quick death of the animal that activates the trap. Small Conibear traps, such as those used for muskrats, can be set either in or out of the water. Placement is in travel ways or burrow entrances created or used by the target species. The animal captured as it travels through the trap and activates the triggering mechanism. Safety hazards and risks to humans are usually related to setting, placing, checking, or removing the traps. Body-grip traps present a minor risk to non-target animals because of the placement in aquatic habitats and below the water surface.

Shooting is selective for target species and may involve the use of spotlights and either a handgun, shotgun or rifle. Shooting is an effective method to remove a small number of mammals in damage situations, especially where trapping is not feasible. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting is sometimes utilized as one of the first lethal damage management

options because it offers the potential of resolving a problem more quickly and selectively than some other methods, but it is not always effective. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment. WS personnel receive firearms safety training to use firearms that are necessary for performing their duties.

Hunting/Trapping: WS sometimes recommends that resource owners consider legal hunting and trapping as an option for reducing mammal damage. Although legal hunting/trapping is impractical and/or prohibited in many urban-suburban areas, it can be used to reduce some populations of mammals.

Dogs: WS sometimes recommends that resource owners consider legal use of hounds as an option for reducing bear damage.

Chemical Mammal Damage Management Methods

Pesticides used by WS are registered under the FIFRA and administered by the EPA and NHDA. All WS personnel in New Hampshire who apply restricted - use pesticides are certified pesticide applicators by NHDA and have specific training by WS for wildlife damage management pesticide application. The EPA and NHDA require pesticide applicators to adhere to all certification requirements set forth in the FIFRA. No chemicals are used by WS on public or private lands without authorization from the land management agency or property owner or manager. The following chemical methods have been proven to be selective and effective in reducing damage by mammals.

Zinc phosphide (ZP) is a rodenticide which is registered as a Restricted Use Pesticide (RUP) because of its hazard to non-target organisms and its acute oral toxicity (ExToxNet, 2003a). RUPs may be purchased and used only by certified applicators. Some formulations of this rodenticide are classified as highly toxic and require the Signal Word DANGER - POISON on the label. Others are either moderately toxic or only slightly toxic, and thus require the Signal Words WARNING or CAUTION, respectively. Trade names for commercial products containing ZP include Arrex, Commando, Denkarin Grains, Gopha-Rid, Phosvin, Pollux, Ridall, Ratol, Rodenticide AG, Zinc-Tox and ZP.

ZP is an inorganic compound that is used to control rats, mice, voles, ground squirrels, prairie dogs, nutria, muskrats, feral rabbits, and gophers. It is also used as a tracking powder for the control of house mice. It is applied to crop areas and non-crop areas including lawns, golf courses, highway medians, and areas adjacent to wetlands. It may be formulated as a grain based bait, as scrap bait, or as a paste. Rodenticide baits usually contain 0.5 to 2.07% ZP, pastes approximately 5 to 10%.

ZP ingested orally reacts with water and acid in the stomach and produces phosphine gas, which may account in a large part for observed toxicity. In rats, the LD50 for the technical product (80 to 90% pure) is 40 mg/kg, while the LD50 values for lower concentration formulations are slightly higher, indicating lower acute toxicity [160]. In sheep the LD50 ranges from 60 to 70 mg/kg [160]. The compound is nonirritating to the skin and eyes [160]. Rats fed ZP over a wide range of doses experienced toxic effects. Increased liver, brain, and kidney weights, and lesions on these organs, were noted in rats exposed to around 14 mg/kg/day. Body hair loss, reduction in body weight, and reduction of food intake were all noted at 3.5 mg/kg/day. The study was conducted over 13 weeks. There have been no observed symptoms of chronic poisoning due to ZP exposure in humans. However, it has been suggested that chronic exposure to sub-lethal concentrations for extended periods of time may produce toxic symptoms.

Small amounts of the rodenticide fed to experimental animals may have produced an 80% absorption of zinc as well. Zinc in sufficient concentrations may have an emetic effect. Hypophosphite may be excreted in the urine as a metabolite of ZP. There is little tendency for the compound to concentrate in living tissue, as it is readily converted to phosphine.

ZP is highly toxic to wild birds. The most sensitive birds are geese (LD50 of 7.5 mg/kg for the white-fronted goose). Pheasants, mourning doves, quail, mallard ducks, and the horned lark are also very susceptible to this compound. Blackbirds are less sensitive.

ZP is highly toxic to freshwater fish. The fish species which have been evaluated include bluegill sunfish (LC50 of 0.8 mg/L) and rainbow trout (LC50 of 0.5 mg/L) [1]. Carp were also found to be susceptible to ZP, especially in weakly acidic water.

ZP is also toxic to non-target mammals when ingested directly. Nearly 60 studies have been conducted on the toxicity of this rodenticide to wild animals. Secondary toxicity to mammalian predators (animals eating other animals that had been exposed to the compound) from ZP is rather low, primarily because the compound does not significantly accumulate in the muscles of target species. Some of the toxic effects to predators have been due to the ingestion of ZP that was in the digestive tract of the target organism. Studies on secondary organisms have focused on coyotes, fox, mink, weasels, and birds of prey. Under field conditions, most of the toxic effects to non-target wildlife are due to direct exposures resulting from misuse or misapplication of this rodenticide.

ZP is used in WS MDM programs in New Hampshire in accordance with label restrictions in a manner defined by application guidelines on the label. Application procedures and baits used are determined by formulations allowed by labeling and the species targeted.

The **Gas Cartridge** is registered as a fumigant by the EPA (Reg. No. 56228-21). When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, poisonous gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals in the den. Carbon monoxide euthanasia is recognized by the AVMA as an approved and humane method to kill animals (Beaver et al. 2001).

Sodium nitrate is the principle active chemical in gas cartridges, is a naturally occurring substance. Although stable under dry conditions, it is readily soluble in water and likely to be highly mobile in soils. In addition, dissolved nitrate is very mobile, moving quickly through the vadose zone to the underlying water table (Bouwer 1989). Burning sodium nitrate however, as in the use of a gas cartridge as a fumigant in a rodent burrow, is believed to produce mostly simple organic and inorganic gases, using all of the available sodium nitrate. In addition, the human health drinking water tolerance level for this chemical is 10 mg / L, a relatively large amount, according to EPA Quality Criteria for Water (1986c). The gas along with other components of the cartridge, are likely to form oxides of nitrogen, carbon, phosphorus, and sulfur. These products are environmentally non-persistent because they are likely to be metabolized by soil microorganisms or enter their respective elemental cycles. In rodent cartridges, sodium nitrate is combined with seven additional ingredients; sulfur, charcoal, red phosphorus, mineral oil, sawdust, and two inert ingredients. None of the additional ingredients in this formulation are likely to accumulate in soil, based on their degradation into simpler elements by burning the gas cartridge. Sodium nitrate is not expected to accumulate in soils between applications, nor does it accumulate in the tissues of target animals (USEPA 1991g). No gas residues remain at the treatment site where either formulation is used, for any period of time (USDA 1997).

Ketamine (Ketamine HCl) is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calms fear, and allay anxiety. Ketamine is possibly the most versatile drug for chemical capture, and it has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Usually, ketamine is combined with other drugs such as xylazine. The combination of such drugs is used to control an animal, maximize the reduction of stress and pain, and increase human and animal safety.

Telazol (tiletamine) is another anesthetic used in wildlife capture. It is 2.5 to 5 times more potent than ketamine; therefore, it generally works faster and lasts longer. Currently, tiletamine can only be purchased as Telazol, which is a mixture of two drugs: tiletamine and zolazepam (a tranquilizer). Muscle tension varies with species. Telezol

produces extensive muscle tension in dogs, but produces a more relaxed anesthesia in coyotes, wolves, and bears. It is often the drug of choice for these wild species (Fowler and Miller 1999). This drug is sold in a powder form and must be reconstituted with sterile water before use. Once mixed with sterile water, the shelf life is four days at room temperature and 14 days if refrigerated.

Xylazine is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel should be even more attentive to minimizing sight, sound, and touch. When using ketamine/xylazine combinations, xylazine will usually overcome the tension produced by ketamine, resulting in a relaxed, anesthetized animal (Fowler and Miller 1999). This reduces heat production from muscle tension, but can lead to lower body temperatures when working in cold conditions.

Sodium Pentobarbital is a barbiturate that rapidly depresses the central nervous system to the point of respiratory arrest. There are DEA restrictions on who can possess and administer this drug. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA and state regulations.

CO₂ is sometimes used to euthanize mammals which are captured in live traps and when relocation is not a feasible option. Live mammals are placed in a chamber and sealed shut. CO₂ gas is released into the chamber and the animal quickly dies after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association (Beaver et al. 2001). CO₂ gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO₂ by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

Repellents are usually naturally occurring substances or chemicals formulated to be distasteful or to elicit pain or discomfort for target animals when they are smelled, tasted, or contacted. Only a few repellents are commercially available for mammals, and are registered for only a few species. Repellents are not available for many species which may present damage problems, such as some predators or furbearing species. Repellents are commercially available for mitigating deer damage and implemented as appropriate as part of the NH MDM program. Repellents are variably effective and depend to a great extent on resource to be protected, time and length of application, and sensitivity of the species causing damage. Again, acceptable levels of damage control are usually not realized unless repellents are used in conjunction with other techniques.

Appendix C. Federally Listed Threatened and Endangered Species in New Hampshire

Animals

Status

- E Karner blue butterfly, *Lycaeides melissa samuelis*
- T Bald eagle, (lower 48 States), *Haliaeetus leucocephalus*
- T Piping plover, (except Great Lakes watershed), *Charadrius melodus*
- E Eastern mountain lion, *Felis concolor cougar*, (considered extirpated)
- E Leatherback sea turtle, *Dermochelys coriacea*
- T Puritan tiger beetle, *Cicindela puritana*
- E Dwarf wedgemussel, *Alasmidonta heterodon*
- E Finback whale, *Balaenoptera physalus*
- E Gray wolf, *Canis lupus*
- E Roseate tern, *Sterna dougallii*
- E Shortnose sturgeon, *Acipenser brevirostrum*
- T Canada lynx, *Lynx canadensis*

Plants

Status

- E Jesup's milk-vetch, *Astragalus robbinsii* var. *jesupi*
- T Small whorled pogonia, *Isotria medeoloides*
- E Northeastern bulrush, *Scirpus ancistrochaetus*

Appendix D. Correspondence from USFWS Regarding Federal T&E Species



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087



August 2, 2005

John McConnell
U.S. Department of Agriculture
Wildlife Services
59 Chenell Drive, Suite 7
Concord, NH 03301

Dear Mr. McConnell:

This responds to your recent correspondence requesting our review and comments regarding the Pre-Decisional Environmental Assessment (EA) "Reducing Mammal Damage through an Integrated Wildlife Damage Management Program in the State of New Hampshire" that covers woodchuck and muskrat control. Additional mammalian species are mentioned, however, future removal is not anticipated and would occur only after further consultation.

Based on information currently available to us, we concur that the implementation of mammal damage management activities as described in the Pre-Decisional EA will not adversely affect federally-listed threatened or endangered species with the following exceptions. The use of non-lethal habitat modification method could pose a risk to listed resources. For example, the use of riprap to reduce muskrat burrowing activity along the Connecticut River and in the Ashuelot River watershed could result in adverse effects to the dwarf wedgemussel (*Alasmidonta heterodon*). Also, the use of non-lethal animal behavior modification methods (i.e., propane exploders, pyrotechnics, and visual repellents) could result in the disturbance of beach-nesting piping plovers (*Charadrius melodus*), the roseate tern (*Stern dougallii*) colony at the Isles of Shoals, and in the vicinity of nesting bald eagles (*Haliaeetus leucocephalus*) in areas throughout the state.

Except as noted above, this concludes our review of the EA for potential impacts to listed species and critical habitat in New Hampshire. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Appendix E. State Listed Threatened and Endangered Species in New Hampshire

Animals

Status

E	Pied-billed grebe, <i>Podilymbus podiceps</i>
E	Northern harrier, <i>Circus cyaneus</i>
E	Golden eagle, <i>Aquila chrysaetos</i>
E	Peregrine falcon, <i>Falco peregrinus</i>
E	Upland sandpiper, <i>Bartamia longicauda</i>
E	Common tern, <i>Sterna hirunda</i>
E	Least tern, <i>Sterna antillarum</i>
E	Purple martin, <i>Progne subis</i>
E	Sedge wren, <i>Cistothorus platensis</i>
T	Common loon, <i>Gavia immer</i>
T	Osprey, <i>Pandion haliaetus</i>
T	Cooper's hawk, <i>Accipiter cooperii</i>
T	Arctic tern, <i>Sterna paradisaea</i>
T	Common nighthawk, <i>Chordeiles minor</i>
T	Three-toed woodpecker, <i>Picoides tridactylus</i>
T	Grasshopper sparrow, <i>Ammodramus savannarum</i>
E	Eastern small-footed bat, <i>Myotis leibii</i>
T	Pine marten, <i>Martes americana</i>
E	Sunapee trout, <i>Salvelinus alpinus</i>
E	Timber rattlesnake, <i>Crotalus horridus</i>
T	Eastern hognose snake, <i>Heterodon platirhinos</i>
E	Marbled salamander, <i>Ambystoma opacum</i>
E	Brook floater, <i>Alasmodonta varicosa</i>
E	Frosted elfin butterfly, <i>Incisalia irus</i>
E	Persius dusky skipper, <i>Erynnis persius</i>
E	Ringed boghaunter dragonfly, <i>Williamsonia lintneri</i>
T	Pine pinion moth, <i>Lithophane lepida</i>
T	pine barrens Zanclognatha moth, <i>Zanclognatha martha</i>
T	Cobblestone tiger beetle, <i>Cicindela marginipennis</i>

Appendix E. State Listed Threatened and Endangered Species in New Hampshire - continued

Plants

Status

E	Bulbous bitter cress, <i>Cardamine bulbosa</i>
E	Early buttercup, <i>Ranunculus fascicularis</i>
E	Green dragon, <i>Arisaema dracontium</i>
T	Goldie's fern, <i>Dryopteris goldiana</i>
E	False foxglove, <i>Aureolaria pedicularia</i>
E	Wild garlic, <i>Allium canadensis</i>
T	Ginseng, <i>Panax quinquefolium</i>
T	Sweet Goldenrod, <i>Solidago odora</i>
T	Large yellow lady's slipper, <i>Cypripedium pubescens</i>
T	Sickle-Pod, <i>Arabis canadensis</i>
E	Auricled twayblade, <i>Listers auriculata</i>
T	Lily-leaved twayblade, <i>L. convallarioides</i>
T	Heart-leaved twayblade, <i>L. cordata</i>
E	Palmate violet, <i>Viola palmata</i>
T	Northern waterleaf, <i>Hydrophyllum virginianum</i>
E	Pink wintergreen, <i>Pyrola asarifolia</i>