SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT

REDUCING MAMMAL DAMAGE
IN THE
STATE OF INDIANA

Prepared By:

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

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ACRONYMS

ADDL	Animal Disease Diagnostics Laboratory
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
bTB	Bovine Tuberculosis
CFR	Code of Federal Regulations
CWD	Chronic Wasting Disease
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FY	Fiscal Year
IDNR	Indiana Department of Natural Resources
IWDM	Integrated Wildlife Damage Management
MDM	Mammal Damage Management
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NVSL	National Veterinary Services Laboratory
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WDB	Wildlife Disease Biologist
WS	Wildlife Services

CHAPTER 1: PURPOSE AND NEED FOR ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) completed an Environmental Assessment (EA) on mammal damage management in 2006 (USDA 2006) in response to persistent conflicts and complaints relating to mammals in Indiana. The EA analyzed the potential environmental effects of alternatives for managing damage by and conflicts with mammals at private and public property sites or facilities within Indiana wherever such management is needed and assistance is requested from the WS program. The management alternative selected in the 2006 Decision and Finding of No Significant Impact (FONSI) involves the use of an integrated wildlife damage management (IWDM) approach, including non-lethal and lethal methods to manage mammal damage.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage 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. 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 individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

WS is a cooperatively funded, service-oriented program that receives requests for assistance with wildlife damage management from private and public entities, including other governmental agencies. 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.

Individual actions on the types of sites encompassed by this analysis may be categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c)) (60 Federal Register 6,000, 6,003 (1995)). WS prepared the original EA and this supplement to assist in planning MDM activities and to clearly communicate with the public the analysis of cumulative impacts for a number of issues of concern in relation to alternative means of reducing mammal damage in Indiana. The analysis in the EA relied on existing data contained in published documents and agency (WS, USFWS, Indiana Department of Natural Resources (INDR) data and reports. Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing the alternatives and selecting the final management decision. This supplement adds to the analysis in the 2006 EA and FONSI. All information and analyses in the 2006 EA and FONSI remain valid unless otherwise noted below.

1.1 Purpose

This supplement to the environmental assessment (EA) has been prepared to evaluate the environmental impacts of mammal damage management (MDM) in Indiana and to reconsider WS' decision regarding the selection of a management alternative. The purpose is to address and evaluate the potential impacts on the human environment from alternatives for WS involvement in the protection of agricultural resources, natural resources, property, livestock, and public health and safety from damage and risks associated with mammals in Indiana.

Mammal species addressed in this supplement include: white-tailed deer (*Odocoileus virginianus*), coyotes (*Canis latrans*), raccoons (*Procyon lotor*), opossums (*Didelphis virginianus*), red fox (*Vulpes fulva*), gray fox (*Urocyon cinereoargenteus*), feral cats (*Felix* sp.), striped skunk (*Mephitis mephitis*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), woodchuck (*Marmota monax*), feral swine (*Sus scrofa*), domestic/feral dog (*Canis familiaris*), Norway rat (*Rattus norvegicus*), black (roof) rat (*Rattus rattus*), house mouse (*Mus musculus*), deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), and meadow vole (*Microtus pennsylvanicus*).

1.2 Need for Action

The need for action remains as described in the EA section 1.2 and the 2006 EA, except as noted below. Conflicts between humans and wildlife are common in Indiana. The need for action in Indiana is based on the requests for assistance with the protection of agriculture, property, livestock, natural resources, and human health and safety from mammal damage. The IDNR has management responsibility for resident mammals, and conducts mammal management programs for furbearers, game species, and non-game mammals. WS' potential involvement in MDM in Indiana would be to provide basic recommendations and referral of callers to the IDNR, and to provide direct management assistance with the implementation of MDM programs upon request and as permitted or otherwise authorized by the IDNR.

Since 2006, there have been additional requests for assistance in mammal damage management at airports, industrial facilities, and wildlife management areas. Indiana disease monitoring has increased since 2006, with project sampling focused on bovine tuberculosis, chronic wasting disease, lyme disease, and toxoplasmosis. There have been other emergent disease surveillance activities for tularemia, leptospirosis, and canine parvovirus in otters and raccoons. There has been an increased focus on feral swine disease surveillance in which swine samples have been taken on several properties in Indiana. Due to this increase in MDM requests and disease surveillance, the maximum predicted WS take in Indiana is projected to increase for the following species: feral swine (500), cottontail rabbits (200), and woodchucks (200). Requests for assistance with both cottontail rabbits and woodchucks have increased due to the increase in the number of airports WS serves and favorable reproductive conditions during the past five years.

1.3 Proposed Action

WS proposes to continue the current damage management program that responds to mammal damage in the State of Indiana. An Integrated Wildlife Damage Management (IWDM) approach would continue to reduce mammal damage to property, agricultural resources, and natural resources, to reduce adverse mammal impacts on human and livestock health and safety, and to obtain samples for surveillance of wildlife diseases. Damage management would be conducted on public and private property when the resource owner (property owner) or manager requests assistance or, in the case of animal disease management and surveillance, when assistance is requested by an appropriate state, federal or local government agency. The IWDM strategy would encompass 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, non-lethal methods like 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, and registered pesticides and other 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. WS involvement in MDM is closely coordinated with the IDNR. All WS actions are conducted in compliance with applicable federal, state, and local laws, regulations, policies, orders and procedures.

1.4 Decisions to be Made

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

- Should WS continue an integrated MDM strategy, including technical assistance and direct control, to meet the need for MDM in Indiana?

- If not, should WS attempt to implement one of the alternatives to an integrated MDM strategy as described in the 2006 EA?

- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an Environmental Impact Statement (EIS)?

1.5 Scope of Environmental Assessment Analysis

Actions Analyzed
The EA and this supplement evaluate MDM by WS to protect: 1) property; 2) agricultural resources; 3) natural resources; and 4) public health and safety in Indiana. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

Period for which this EA is Valid
If it is determined that an EIS is not needed, this supplement would remain valid until the WS program in Indiana 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 and supplement would be conducted each year to ensure that the EA and supplement are sufficient.

Site Specificity
This supplement analyzes the potential impacts of MDM and addresses activities on all lands in Indiana under MOUs, Cooperative Service 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 supplement 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 supplement 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 Indiana (see Chapter 3 in the EA for a description of the Decision Model and its application).

The analyses in this supplement are intended to apply to any action that may occur in any locale and at any time within the State of Indiana. In this way, 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.

Summary of Public Involvement
Wildlife Services released a pre-decisional EA for public comment on July 11, 2006 and ending on August 15, 2006. The notice of availability was published in the Indianapolis Star and was also mailed directly to agencies, organizations, and individuals with probable interest in the supplement, including those agencies and individuals who commented on the original EA. No comments were received.

This supplement has been made available to the public for a 30 day comment period. A notice of availability has been published in The Statewide Issue of the Indianapolis Star and has also been mailed directly to agencies, organizations, and individuals with probable interest in the supplement, including those agencies and individuals who commented on the original EA. A copy of the pre-decisional supplement and a notice regarding the opportunity for public comment on the supplement has also been made available at (http://www.aphis.usda.gov/wildlife_damage/nepa.shtml). Public notification procedures are in compliance with new WS NEPA implementation procedures published in the Federal Register March 21, 2007 (Vol. 72, No. 54: 13237-13238).

1.6 Relationship to Other Environmental Documents

USDA 1994/97 FEIS: Animal Damage Control Programmatic Environmental Impact Statement
WS has determined that this matter is best assessed at the state level in an EA. WS' decision and actions regarding MDM in Indiana rely solely and exclusively on the decision document and record on this supplement. The 2006 EA on MDM in Indiana incorporated by reference, sections, discussions, appendices, or other portions thereof, of USDA 1994/97. This Supplemental EA does not incorporate by reference to USDA 1994/97.

Environmental Assessment: Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Foxes, and Coyotes in the United States. In 2010, WS revised its environmental assessment and Finding of No Significant Impact for its program to aid in the control of specific rabies variants in the U.S. including efforts to prevent the spread of raccoon variant rabies from the Eastern U.S. (USDA 2010). The supplement includes analysis of potential WS rabies research and management actions in Indiana.

1.7 Compliance with Federal Laws

Several federal and state laws authorize, regulate, or otherwise affect WS wildlife damage management. Laws with particular relevance to the proposed action are described in EA Section 1.8.4. WS complies with these laws, and consults and cooperates with other agencies as appropriate. The section below provides additional information regulations relevant to the supplement.

Archaeological Resources Protection Act (ARPA) of 1979, as amended (16 USC 470). The Archaeological Resources Protection Act expands the protections provided by the Antiquities Act of 1906 by protecting archaeological resources and sites located on public and Indian lands. The ARPA defines "archaeological resources" as items: 1) of archaeological interest over 100 years old; and 2) found in an

archaeological context on federal or Indian lands and requires finders to obtain a federal permit before excavating these objects.

Wilderness Act of 1964 – An Act (Public Law 88-577; 88th Congress, S.4; September 3, 1964). The Wilderness Act allows federally owned lands meeting specific criteria to be designated as "wilderness areas." The act prohibits and restricts certain uses of these designated lands. The act provides special provisions to allow certain activities to take place within designated wilderness areas such as the use of aircraft to control fire, insects, and diseases (Sec. 4 (d)). APHIS WS obtains USFS Forest Supervisor or BLM State Director approval to conduct control activities in Wilderness areas where necessary.

1.8 Issues

Issues are concerns raised regarding potential environmental problems that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues relating to the reduction of wildlife damage were raised during the scoping process in the preparation of the EA. Issues related to managing damage and threats associated with mammals in Indiana were developed by WS in consultation with the IDNR. The major issues are discussed in detail in Chapter 2 of the EA (USDA 2006).

The following issues were identified as important to the scope of the analysis:

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

CHAPTER 2: ALTERNATIVES

Alternatives developed and identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2006). Potential impacts of Alternatives 1, 3, and 4 on the human environment related to the major issues have not changed from those described in the EA and thus do not require additional analyses in this report. Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the major issues (USDA 2006). The issues were identified as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 2 (proposed action/no action), as described in the EA, describes an integrated mammal damage management program in that responds to requests for mammal damage to protect property, agriculture, livestock, natural resources, and human health and safety. Chapter 3 of this supplement provides an analysis of potential impacts for each of the major issues since the completion of the EA and the proposed supplement as related to Alternative 2 (proposed action/no action alternative).

Alternative 2 was selected by the decision maker in the Decision/FONSI (2006) to respond to the issues pertaining to MDM. Additionally, Section 3.4 of the EA discussed additional alternatives that were considered but not analyzed in detail. A detailed discussion of the effects of the Alternatives is described in the EA and remains as analyzed. Below is a summary of Alternative 2.

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

The proposed action is to continue the current damage management program that responds to mammal damage in the State of Indiana. WS involvement in MDM in Indiana is closely coordinated with the

IDNR, and WS take of mammals is authorized through permits and/or other authorities granted by IDNR. An IWDM approach would be implemented to reduce mammal damage to property, agricultural resources, and natural resources, and to reduce mammal impacts on human/public health and safety. Damage management would be conducted on public and private property in Indiana when the resource owner (property owner) or manager requests assistance. The IWDM strategy would encompass the use and recommendation 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 non-lethal techniques like 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, and registered pesticides and other 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.

2.2 New Methods

Aerial shooting or aerial hunting (shooting from an aircraft) is a commonly used method. Aerial hunting is species-specific and can be used for immediate control to reduce local feral swine populations. Fixed-wing aircraft are most frequently used in flat and gently rolling terrain whereas helicopters, with better maneuverability, have greater utility and are safer over rugged terrain and timbered areas. In broken timber or deciduous cover, aerial hunting is more effective in winter when snow cover improves visibility and leaves have fallen. The WS program aircraft-use policy helps ensure that aerial hunting is conducted in a safe and environmentally sound manner, in accordance with federal and state laws. Pilots and aircraft must be certified under established WS program procedures and only properly trained WS employees are approved as gunners.

CHAPTER 3: ENVIRONMENTAL IMPACTS

This analysis is intended to update sections of the environmental impact analysis in the EA and includes an impact analysis since 2006 and information on impacts which have changed since the EA was completed. This section summarizes the existing environment relative to the identified issues. The WS program has received more requests for assistance with mammal damage management at airports as well as other public and privately owned properties. The additional requests for assistance have resulted in increased anticipated maximum annual take for some species. Except as summarized below, impacts to all other species remain as analyzed in the EA. The changes in the anticipated maximum level of annual lethal take would only apply to Alternative 2 and are addressed as such.

3.1 Summary of Wildlife Services' mammal damage management activities

In 2013, National Park Service (NPS) requested assistance from WS to remove excess white-tailed deer in order to protect sensitive species on the park. Habitat for sensitive and rare wildlife may be vulnerable to impact from high levels of deer browsing. The Karner blue butterfly (*Lycaeides melissa samuelis* Nabokov), for example, in the larval stage has a single food source—wild lupine (*Lupinus perennis*). Heavy deer browsing on wild lupine in one area was shown to have consumed 90 percent of lupine plants. WS removed 83 deer from the park during the month of March. Of those, 83 deer were recovered and donated to hunters for the hungry and to local charities. Chronic wasting disease samples were collected from each deer. All samples were negative for chronic wasting disease. In addition, samples for

Toxoplasma gondii were taken from 57 of the deer. Forty-four percent of those deer tested positive for *T.gondii* . The sampling was part a statewide effort to monitor/track various wildlife diseases.

WS removed and sampled nine feral swine from several properties in northeastern and south central counties in Indiana. To date, 50 hogs were collected from hunters and sampled for classical swine fever, canine parvovirus, leptospirosis, tularemia, toxoplasmosis, and for DNA fingerprinting. This represents a significant increase in feral hog activity compared to past years. WS personnel also submitted approximately 90 samples to for DNA testing for the genetic marker in wild Russian boar.

WS Wildlife Disease Biologist (WDB), personnel from Veterinary Services, the Indiana State Board of Animal Health, and the IDNR, and students from Purdue University College of Veterinary Medicine and Ball State University spent a 3-day weekend collecting heads and lymph nodes from hunter-harvested deer in Indiana for bovine tuberculosis (bTB) and chronic wasting disease testing (CWD). Two hundred and thirty-one samples from hunter-harvested deer were collected from Dearborn, Fayette, Franklin, Jefferson, and Union counties. Of those, 220 had no apparent lesions or abnormal appearance and were submitted to Animal Disease Diagnostics Laboratory (ADDL) for histopathology. Three of the samples sent to ADDL had some type of lesions and fresh samples were forwarded to the National Veterinary Services Laboratory (NVSL) for culture. Thirty-four were submitted directly to the NVLS because they had some type of abnormal appearance; however, all of those have been negative for bTB using histopathology and acid fast testing. All culture results at the NVSL are pending. Approximately 30 samples were collected for CWD testing.

In 2013, as part of the cooperative zoonotic disease management partnership with IDNR, WS personnel collected samples from 20 private trapper caught river otters for tularemia, avian bornavirus, leptospirosis, and canine parvovirus. WS WDB teaches a Wildlife Techniques class at Purdue University and utilized these samples for the necropsy practical for this class. IDNR sent the samples for testing to the Purdue Animal Disease/Diagnostic Laboratory.

WS WDB assisted with the investigation of a mortality event of approximately 40 waterfowl at the Fort Wayne Children Zoo. Samples have been collected and sent to the National Wildlife Health Center. WDB also collected 30 samples from raccoons from the Fort Wayne Children Zoo for canine parvovirus for the NWDP.

WS provided technical assistance on methods landowners and managers can use to reduce or prevent mammal damage and risks to human safety. From Fiscal Year (FY)[1] 2007-2013 the WS program assisted with 11,220 technical assistance calls and projects involving 10,886 people concerning MDM in Indiana. Technical assistance included personal consultations, written or telephone consultations, instructional sessions, exhibits, and site visits.

Table 2. Requests for technical assistance with damage management from mammals in Indiana from October 1, 2006 – September 30, 2013.

Species	Agriculture	Health And Safety	Natural Resource	Property	Grand Total
Armadillos, nine-banded		2		2	4
Bats		668	2	164	834
Badgers	4	12		4	28
Bears, black		2			2

[1] The federal Fiscal Year runs from 1 October to 30 September.

Beavers	163	37	1	142	343
Bobcats	1	29		4	34
Cats, feral/free ranging		41		7	48
Cattle, feral		1		1	2
Chipmunk		45		139	184
Coatis		1			1
Coyotes	38	615	1	104	758
Deer, white-tailed (captive)		5	3		8
Deer, white-tailed (wild)	86	692		133	911
Dogs, feral, free-ranging and hybrids	2	23		4	29
Domestic animal				1	1
Ferrets, European		3			3
Fishers	1				1
Foxes, gray	1	13		4	18
Foxes, red	16	441	1	33	491
Goat, feral		1			1
Gopher, pocket		1			1
Swine, feral	13	6	7	10	36
Woodchucks	2	115		573	690
Lions, mountain	1	58		2	61
Mice, deer	1	2		2	5
Mice, house		20		13	33
Mink	2	4		3	9
Moles	2	16		128	146
Muskrats	1	36		166	203
Nutrias				1	1
Opossums, Virginia	3	497		127	627
Otters, river	5	8	2	3	18
Porcupine		1			1
Rabbits, cottontail	4	445		77	526
Rabbit, desert cottontail		2			2
Rabbit, feral		1		3	4
Raccoons	52	1874	2	1516	3444
Rats, Norway		19		10	29
Shrews		4		9	13
Skunks, striped	5	706		178	889
Squirrels, eastern gray, fox, red, flying	17	406		254	677
Squirrels, ground		1		15	16
Voles	8	3		43	54
Weasel	6	6		2	14
Wolves		4			4
Mammals, unidentifiable		11		5	16
Grand Total	434	6,885	19	3,882	11,220

The WS program gives preference to non-lethal methods where practical and effective. Non-lethal methods used and recommended by WS may include exclusion, harassment, live capture (padded foothold traps, cage traps, catch pole, nets, and hand capture) and relocation, capture and release on site (usually for disease surveillance), and sanitary measures like feeding pets indoors and keeping household refuse in a secure container. Table 3 lists the mammals dispersed with non-lethal harassment methods and animals live-captured and either freed or relocated during FY2007-FY2013.

Table 3. Wildlife freed, relocated (F/R) or dispersed (D) by Indiana WS during damage management projects from October 1, 2006 – September 30, 2013. The number of animals dispersed represents the number of animals impacted by dispersal programs and may include multiple incidents of dispersing a single individual.

	FY 07		**FY 08**		**FY 09**		**FY 10**		**FY 11**		**FY 12**		**FY 13**		**Totals**
Species	**F/R**	**D**	**F/R**	**D**	**F/R**	**D**	**F/R**	**D**	**F/R**	**D**	**F/R**	**D**	**F/R**	**D**	
Bats (all)[1]									2				1		**3**
Cats, Feral/Free Ranging							10					3	1	6	**20**
Coyotes	4			1		3		3		3		13		10	**37**
Deer, White-tailed (wild)				27		1		3		5		36		30	**102**
Dogs, Feral, Free Ranging and Hybrid			1									1			**2**
Foxes, Red														1	**1**
Woodchucks (all)			1					2		4					**7**
Opossums, Virginia	1		17		5		2								**25**
Rabbits, Cottontail								1				7		17	**25**
Raccoons	1	1	22				1		2	2	3		3	1	**36**
Squirrel, Fox														1	**1**
Skunks, Striped			2						1	1		1	1		**6**
Totals	**3**	**1**	**43**	**28**	**5**	**4**	**13**	**9**	**5**	**16**	**3**	**50**	**6**	**66**	**265**

Mammals can venture onto airfields and become a direct threat to planes that are landing and taking off. Twenty-three of the 3,038 national mammalian strikes reported from 2006-2013 occurred in Indiana with two strikes resulting in substantial damage to the aircraft (FAA 2013). WS advised airport managers on ways to exclude mammals from airports and, if needed, used non-lethal methods, and trapping and shooting on airport property and adjacent lands to reduce the occurrence of mammals on the airfield.

The EA concluded that the proposed WS MDM program would not have a significant impact on target mammal populations. Table 4 summarizes WS lethal mammal take from FY2007-FY 2013 and maximum annual lethal take anticipated and analyzed in the EA. Tables 5 and 6, contains information on animals taken by licensed hunters and trappers in Indiana for comparison to WS take. For most species, WS take was below the maximum anticipated annual take analyzed in the EA. For hunted species, WS take was also only a small portion of the total number of animals taken by licensed hunters.

IDNR population indices indicate stable or increasing population trends for the state raccoon, striped skunk, and Virginia opossum populations (Rossler 2013). This information and the fact that WS take is a relatively low proportion of total take indicates that the WS program is not having a cumulative adverse impact on populations of these species.

IDNR population index data indicate populations of coyote, red and gray fox are stable to slightly decreasing in the state. The IDNR hypothesizes that these trends may be related to competition with coyote and with habitat changes. The increasing raccoon population and associated distemper virus may also be adversely impacting coyote and fox populations, particularly gray fox which appear to be especially vulnerable to the virus (Rossler 2013). However, despite recent declines, the IDNR still allows licensed harvest of red and gray fox (Table 4). WS had no take of gray fox and only 0.2% of the licensed red fox harvest. This level of take is not of sufficient magnitude to contribute substantively to existing population trends for these species. All WS take is conducted in accordance with authorizations from the IDNR and is less than 0.01% of authorized take by licensed hunters.

Target Species Population Impact Analysis

WS' total take for the seven-year period has not exceeded the maximum predicted annual take of any mammalian species except for the take of cottontail rabbits and woodchucks. However, the take of rabbits and woodchucks never reached a level to be considered of high magnitude. Excluding captive raised cervids, the highest level of take over the seven-year period was the take of raccoons. The average hunter harvest take of up to 133,952 individual furbearers and 2,155 deer during the seven-year period has not affected those species' populations. WS take is less than 0.7% of hunter harvested deer and less than 0.055% of hunter harvested furbearers. Take of those species has been within the annual take evaluated in the EA. The permitting of the take by the IDNR ensures cumulative take by WS and other entities does not adversely affect populations and that cumulative take is considered as part of population management objectives established by the IDNR for those species, including population trend data and mortality factors. The take of captive raised bovids and cervids taken during disease management activities has not adversely affected wildlife populations.

Table 4. Number of animals lethally taken by the Indiana WS program during MDM activities from FY2007-FY2013.

SPECIES	FY 07	FY 08	FY 09	FY 10	FY 11	FY12	FY13	Total	Maximum Predicted WS Take
Beavers	0	0	0	0	1	9	4	14	200
Bison	0	0	1	0	0	0	0	1	limited
Cats, Feral/Free Ranging	0	0	0	1	0	0	1	2	20
Coyotes	5		3	17	8	24	15	75	200
Deer, Fallow	0	0	80	0	0	0	0	80	limited
Deer, White-tailed (Captive)	0	0	1	0	0	0	0	1	limited
Deer, White-tailed (Wild)	0	0	4	3	0	2	86	95	500
Elk, Wapiti (Captive)	0	0	48	0	0	0	0	48	limited
Foxes, Red	1	0	0	0	2	3	2	8	200
Swine, Feral	0	0	0	0	9	0	0	9	200
Marmots/Woodchucks	12	1	4	5	5	22	27	76	20
Mice, Deer	0	6	0	0	0	3	0	9	limited
Mink	0	0	0	0	0	0	1	1	20
Muskrat	1	0	0	0	0	3	13	17	200
Opossums, Virginia	1	10	0	6	5	0	4	28	200
Rabbits, Cottontail	0	0	0	8	0	26	54	99	20
Raccoons	0	4	21	10	36	24	22	117	200
Skunks, Striped	0	4	1	3	5	12	4	29	200
Squirrels, Ground	0	3	0	0	0	0	1	4	20
Squirrels, Fox	0	0	0	0	0	0	3	4	20
Voles (All)	0	1	0	0	0	0	0	1	20

Table 5. Wildlife Services take relative to harvest by licensed hunters and trappers in Indiana- Oct 1, 2006 to Sept 30, 2012.

Species	[1]Average Take by Trappers 2007-2012	Average Take 2008-2009 and 2010-2011 by Hunters for Small Game and Furbearer	Total Take by WS From FY2007-FY2013
Muskrat	51,537	N/A	17
Eastern Cottontail	N/A	223,843	99
Fox Squirrel	N/A	345,242	4
Gray Squirrel	N/A	186,789.5	0
Raccoon	780,274	133,331	117
Red Fox	968	3,281	8
Gray Fox	196	816	0
Mink	1968	N/A	1
Opossum	3664	6,636	28
Skunk	351	1,779[2]	29
Beaver	2758	N/A	14
Coyote	4208	35,945	75
Long-tailed Weasel	10	N/A	0
Total	**845,931**	**937,663**	**392**

[1] Average of five years, data for FY2007 was trappers estimated harvest .
[2] Harvest data only available for 2010-2011.

Table 6. Deer harvest per Hunting Season compared to WS Take per FY.

	Deer Harvest per Hunting Season (CY) by licensed Hunters	Deer Harvested per CY on the Damage Control Program from IN Division of Fish and Wildlife DNR	WS Take for Deer per FY
2007	124,427	2,181	0
2008	129,748	2,777	0
2009	132,752	3,126	4
2010	134,004	2,282	3
2011	129,018	2,358	0
2012	136,248	2,359	2
2013	data unavailable	data unavailable	86
Total	**661,770**	**15,083**	**95**

3.2 Effects on Target Mammal Species

The issue of the effects on target species arises from the use of non-lethal and lethal methods identified in the EA to address the need for reducing damage and threats associated with those species. Methods employed in an integrated approach to reduce damage and threats are categorized into non-lethal and lethal methods. Non-lethal methods are employed to exclude, harass, and/or disperse wildlife from areas where damage or threats are occurring. Lethal methods are often employed to reinforce non-lethal methods and to remove mammals that have been identified as causing damage or posing a threat to human safety. Both non-lethal and lethal methods have the potential to impact mammalian populations.

The EA evaluated those potential impacts and found that when WS' activities are conducted within the scope analyzed in the EA, those activities would not adversely impact mammalian populations in Indiana (USDA 2006). WS' Standard Operating Procedures (SOP) are designed to reduce the effects on mammalian populations and are discussed in section 4.1.1 of the EA (USDA 2006).

A common concern when addressing damage associated with wildlife species are the effects on the populations of those species from methods used to manage damage. Although adverse effects are not often associated with the use of non-lethal methods, lethal take of mammals can result in local reductions in those species' populations in the area where damage or threats of damage were occurring.

The analysis of magnitude is described 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. WS' take is monitored by comparing numbers of animals killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations. The following is a summary of WS' activities to manage damage and threats caused by mammals in Indiana as requested by those seeking assistance since the completion of the EA.

Population Impact Analysis of the Proposed Supplement to the EA

To further analyze WS' mammal damage management activities and to clearly communicate to the public the potential individual and cumulative impacts of those activities, WS has prepared the following summary.

Feral Swine

Feral swine are a non-native species and are primarily found in the southern portions of the state. IDNR currently considers feral swine as an invasive species and does not track harvest or population densities. However, the IDNR did find that feral swine are documented in six counties. Given current land use trends and the adaptability of feral swine, biologists with WS and the IDNR are observing an increase in reports of feral swine sightings and activity, and are concerned that feral swine numbers in Indiana may be increasing. Although WS has not received any requests to provide assistance with feral swine damage management from private landowners, WS has received requests to take swine tissue samples for use in a national feral swine disease surveillance effort. Management of conflicts associated with feral swine are being addressed in this EA so that WS may immediately assist land managers and/or state and federal agencies in minimizing the impacts of this non-native species on people and ecosystems in the state. WS could be requested to assist with the removal of feral swine either for the reduction of damage to agricultural and natural resources, for reduction of risks to human health and safety, or for the purposed of disease surveillance and management. Based upon current and anticipated increases in future work, it is anticipated that not more than 500 feral swine would be killed annually by WS in Indiana.

Feral swine often have negative impacts on the environment. Therefore, these animals are considered by many wildlife biologists to be an undesirable component of North American wild and native ecosystems. Any reduction in feral swine populations could be considered a beneficial impact to the environment. Executive Order 13112 B Invasive Species directs Federal agencies to use their programs and authorities to prevent the spread of or to control populations of invasive species that cause economic or environmental harm, or harm to human health. Although a reduction in the number of feral swine may be desirable, the proposed level of feral swine control is unlikely to result in more than a temporary reduction of feral swine numbers at specific sites.

Rabbits
Indiana WS receives complaints on the Eastern cottontail, the most abundant and widespread of the rabbits in the U.S. Population densities for cottontail rabbits vary with habitat quality, but one rabbit per 0.4 hectares (one acre) is a reasonable average (Craven 1994). Rabbits live only 12-15 months, but they can raise as many as six litters per year of one to nine young (usually four to six; National Audubon Society 2000). No population estimates were available for cotton-tailed rabbits in Indiana. Cottontails are a regulated game species in Indiana and the IDNR has established seasons and limits for this species but does not require hunters to record their harvest although the IDNR does conduct harvest surveys (Table 5). The annual harvest for cottontails has averaged 223,843 animals in the past several years.

WS estimates that no more than 200 cottontail rabbits may be taken per year for MDM. WS take of 200 rabbits would represent 0.09% of the average annual harvest by sportsmen. Almost all of these would be removed from urban, airport, commercial, or industrial habitats where hunting is not likely to occur. Cottontail rabbit damage management activities would target single rabbits 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. Given the high productivity of cottontail rabbits and that WS actions will be confined to very small, scattered portions of the state that are usually not subjected to hunting, WS' limited lethal take of cottontail rabbits would have no adverse impacts on overall rabbit populations in the state.

Woodchucks
The IDNR is responsible for the management of the states woodchuck population. Populations of woodchucks are currently unknown. There is no season restriction for hunting woodchucks and no limit on the number of animals that may be harvested.

To analyze potential impacts of WS' activities on woodchuck populations, the best available information will be used to estimate a statewide population. There are over 15 million acres of currently active farmland in the State of Indiana (USDA 2002). Based on Fergus (2001), there may be an average of one woodchuck per acre of farmland. Using a modest estimate of one woodchuck for every acre of farmland, a conservative statewide woodchuck population could be estimated at approximately 15 million individuals. Considering woodchucks are likely to inhabit more than the active farmland of the state, and may exist at much higher densities, an estimate of 15 million woodchucks is likely low.

Based on previous activities conducted by WS and in anticipation of receiving additional requests for assistance, up to 200 woodchucks could be lethally removed by WS. Based on a population estimated at 15 million woodchucks, take of up to 200 woodchucks annually by WS would represent 0.001% of the estimated population. The number of woodchucks lethally removed annually by other entities to alleviate damage is unknown; however, take by other entities to alleviate damage caused by woodchucks is not likely to reach a magnitude where adverse effects would occur to the statewide population.

3.3 Effects on Other Wildlife Species, Including Threatened and Endangered Species

The issue of non-target species effects, including effects on threatened and endangered species arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS' minimization measures and standard operating procedures are designed to reduce the effects of damage management activities on non-target species' populations which were discussed in the EA (USDA 2006). To reduce the risks of adverse effects to non-target wildlife, WS selects damage management methods that are as target-selective as possible or applies such methods in ways that reduces the likelihood of capturing non-target species. Before initiating management activities, WS also selects locations which are extensively used by the target species and employs baits or lures which are preferred by those species.

Despite WS' best efforts to minimize non-target take during program activities, the potential for adverse effects to non-targets exists when applying both non-lethal and lethal methods to manage damage or reduce threats to safety. The potential effects on the populations of non-target wildlife species, including T&E species, are analyzed below.

Non-target Species Analysis from WS' Activities from FY 2007 through FY 2013
The EA concluded that WS' damage management activities would have no adverse effects on other wildlife species (non-target), including threatened and endangered species throughout the state when those activities were conducted within the scope analyzed in the EA. No non-target wildlife were captured or killed from FY07 to FY13. Methods used by WS are essentially selective for target species when applied appropriately. As discussed previously, the primary methods used during direct operational assistance by WS from FY07 through FY13 to resolve requests for assistance were shooting with firearms, traps (e.g., cage traps, snap traps, body-gripping traps, corral traps, and gas cartridges.

No adverse effects to non-targets were observed or reported to WS during previous activities conducted to alleviate damage. WS would continue to monitor annually the take of non-target species to ensure program activities or methodologies used in mammal damage management do not adversely impact non-targets. WS' activities are not likely to adversely affect the viability of any wildlife populations from damage management activities.

Non-target Species Impact Analysis under the Proposed Supplement to the EA
Take of non-target wildlife would be expected under the supplement to the EA, but would likely be similar to the take levels that have occurred from FY 2007 through FY 2013. Take of other wildlife species is expected to be extremely low to non-existent. All non-target take would be evaluated annually to ensure non-target take does not reach a level that would cause adverse effects to non-target species. All non-target take is reported to the IDNR to ensure WS' take is considered as part of the management objectives. The take of non-targets under the supplement is not expected to reach a magnitude that would cause adverse effects to those non-target populations likely to be taken during activities.

Those additional methods discussed in the proposed supplement to the EA that are available to manage damage associated with mammals, that have become available since the completion of the EA, allow for methods discussed in the EA to be employed more effectively and to be more target specific.

Night vision equipment and forward looking infrared (FLIR) devices are most often used in association with the use of firearms and are employed to allow activities to be conducted at night. These tools allow for the identification of target species during night activities, which reduces the risks to non-targets and reduces human safety risks. Since night vision equipment and FLIR devices only aid in the identification of wildlife and are not actual methods of take, the use of visual aids would not contribute to the take of non-targets or threatened and endangered species.

Under this alternative, WS would use helicopters to identify where feral swine exist and for aerial sharpshooting to remove feral swine. There have been concerns that the use of aircraft might disturb other wildlife species populations to the point that their survival and reproduction might be adversely affected. When used for surveillance, helicopters are likely to make a single pass through an area on a given day. The helicopters would not remain in one location for an extended period of time or make multiple repeated trips through and area. Aerial sharpshooting would only be conducted on private and public lands where WS is requested to assist in feral swine removal and where permission from the landowners/ managers is attained prior to beginning work. Indiana WS would use aerial sharpshooting to remove feral swine in accordance with applicable permits issued by state and/or federal agencies. In areas with swine, aircraft would be in the area longer to remove feral swine than for surveillance but the time spent on any given property will be minimal and limited to several hours per year. Overall duration

and frequency of flights in an area is not expected to be sufficient to constitute a "chronic" disturbance (see below). Wildlife Services would not conduct aerial sharpshooting in the vicinity of active bald eagle nests or eagle roosting and feeding congregations. Wildlife Services specialists must have a clear view of the animal before shooting, so the risk of shooting a non-target animal is negligible.

Aerial operations would generally be conducted with helicopters between the months of December through April when the foliage has fallen; however, aircraft could be used at any time of year. The amount of time spent conducting aerial operations varies depending on the severity of damage, the size of the area where damage or threats were occurring, and the weather, as low-level aerial activities would be restricted to visual flight rules and would be impractical in high winds or at times when animals were not easily visible.

A number of studies have looked at responses of various wildlife species to aircraft overflights. The United States Department of the Interior (1995) reviewed the effects of aircraft overflights on wildlife and suggested that adverse effects could occur to certain species. Some species will frequently or at least occasionally show an adverse response to even minor overflights. In general though, it appears that the more serious potential adverse effects occur when overflights are chronic (*i.e.*, they occur daily or more often over long periods). Chronic exposures generally involve areas near commercial airports and military flight training facilities. Aerial operations conducted by Wildlife Services rarely occur in the same areas on a daily basis and little time is actually spent flying over those particular areas.

The effects on wildlife from military-type aircraft have been studied extensively (Air National Guard 1997*a*, Air National Guard 1997*b*), and were found to have no expected adverse effects on wildlife. Examples of species or species groups that have been studied with regard to the issue of aircraft-generated disturbance are as follows:

Waterbirds and Waterfowl**:** Low-level overflights of two to three minutes in duration by a fixed-wing airplane and a helicopter produced no "*drastic*" disturbance of tree-nesting colonial waterbirds, and, in 90% of the observations, the individual birds either showed no reaction or merely looked up (Kushlan 1979). Belanger and Bedard (1989, 1990) observed responses of Greater snow geese (*Chen caerulescens atlantica*) to man-induced disturbance on a sanctuary area and estimated the energetic cost of such disturbance. Belanger and Bedard (1989, 1990) observed that disturbance rates exceeding two per hour reduced goose use of the sanctuary by 50% the following day. They also observed that about 40% of the disturbances caused interruptions in feeding that would require an estimated 32% increase in nighttime feeding to compensate for the energy lost. They concluded that overflights of sanctuary areas should be strictly regulated to avoid adverse effects. Conomy et al. (1998) quantified behavioral responses of wintering American black ducks (*Anas rubripes*), American wigeon (*A. americana*), gadwall (*A. strepera*), and American green-winged teal (*A. crecca carolinensis*) exposed to low-level military aircraft and found that only a small percentage (2%) of the birds reacted to the disturbance. They concluded that such disturbance was not adversely affecting the "*time-activity budgets*" of the species. Aerial operations conducted by WS would not be conducted over federal, state, or other governmental property without the concurrence of the managing entity. Those flights, if requested, would be conducted to reduce threats and damages occurring to natural resources and should not result in impacts to bird species. Thus, there is little to no potential for any adverse effects on waterbirds and waterfowl.

Raptors: The Air National Guard (1997*a*) analyzed and summarized the effects of overflight studies conducted by numerous federal and state government agencies and private organizations. Those studies determined that military aircraft noise initially startled raptors, but negative responses were brief and did not have an observed effect on productivity (see Ellis 1981, Fraser et al. 1985, Lamp 1989, USFS 1992 as cited in Air National Guard 1997*a*). A study conducted on the impacts of overflights to bald eagles (*Haliaeetus leucocephalus*) suggested that the eagles were not sensitive to this type of disturbance (Fraser

et al. 1985). During the study, observations were made of more than 850 overflights of active eagle nests. Only two eagles rose out of either their incubation or brooding postures. This study also showed that perched adults were flushed only 10% of the time during aircraft overflights. Evidence also suggests that Golden eagles (*Aquila chrysaetos*) are not highly sensitive to noise or other aircraft disturbances (Ellis 1981, Holthuijzen et al. 1990). Finally, one other study found that eagles were particularly resistant to being flushed from their nests (see Awbrey and Bowles 1990 as cited in Air National Guard 1997*a*). Therefore, there is considerable evidence that eagles would not be adversely affected by overflights during aerial operations.

Andersen et al. (1989) conducted low-level helicopter overflights directly at 35 red-tailed hawk (*Buteo jamaicensis*) nests and concluded their observations supported the hypothesis that red-tailed hawks habituate to low level flights during the nesting period; results showed similar nesting success between hawks subjected to overflights and those that were not. White and Thurow (1985) did not evaluate the effects of aircraft overflights, but found that Ferruginous hawks (*B. regalis*) were sensitive to certain types of ground-based human disturbance to the point that reproductive success may be adversely affected. However, military jets that flew low over the study area during training exercises did not appear to bother the hawks, nor did the hawks become alarmed when the researchers flew within 100 feet in a small fixed-wing aircraft (White and Thurow 1985). White and Sherrod (1973) suggested that disturbance of raptors by aerial surveys with helicopters may be less than that caused by approaching nests on foot. Ellis (1981) reported that five species of hawks, two falcons (*Falco spp.*), and golden eagles (*Aquila chrysaetos*) were "*incredibly tolerant*" of overflights by military fighter jets, and observed that, although birds frequently exhibited alarm, negative responses were brief and the overflights never limited productivity.

Passerines: Reproductive losses have been reported in one study of small territorial passerines ("*perching*" birds that included sparrows, blackbirds) after exposure to low altitude overflights (see Manci et al. 1988 as cited in Air National Guard 1997*a*), but natural mortality rates of both adults and young are high and variable for most species. The research review indicated passerine birds cannot be driven any great distance from a favored food source by a non-specific disturbance, such as military aircraft noise, which indicated quieter noise would have even less effect. Passerines avoid intermittent or unpredictable sources of disturbance more than predictable ones, but return rapidly to feed or roost once the disturbance ceases (Gladwin et al. 1988, USFS 1992). Those studies and reviews indicated there was little or no potential for aerial operations to cause adverse effects on passerine bird species.

Domestic Animals and Small Mammals: A number of studies with laboratory animals (*e.g.*, rodents [Borg 1979]) and domestic animals (*e.g.*, sheep [Ames and Arehart 1972]) have shown that these animals can become habituated to noise. Long-term lab studies of small mammals exposed intermittently to high levels of noise demonstrate no changes in longevity. The physiological "*fight or flight*" response, while marked, does not appear to have any long-term health consequences on small mammals (Air National Guard 1997*a*). Small mammals habituate, although with difficulty, to sound levels greater than 100 dbA (USFS 1992).

In general, the greatest potential for impacts to occur would be expected to exist when overflights are frequent such as hourly and over many days that could represent "*chronic*" exposure. Chronic exposure situations generally involve areas near commercial airports and military flight training facilities. Even then, many wildlife species become habituated to overflights that appear to naturally minimize any potential adverse effects where such flights occur on a regular basis. Therefore, it is logical to conclude that the aircraft used in aerial hunting for feral swine should have far less potential to cause any disturbance to wildlife than military aircraft because the military aircraft produce much louder noise and are flown over certain training areas many more times per year, and yet were found to have no expected adverse effects on wildlife (Air National Guard 1997*a*, Air National Guard 1997*b*).

The fact that Wildlife Services would only conduct aerial hunting on a very small percentage of the land area of the state indicates that most wildlife would not be exposed to aerial gunning overflights in the state. Further lessening the potential for any adverse impacts is that such flights would occur infrequently throughout the year.

Threatened and Endangered Species Analysis from WS' Activities from FY 2007 through FY 2013
No threatened and endangered species were taken or adversely affected by WS' actions conducted from FY 2007 through FY 2013. A review of threatened and endangered species listed by the USFWS and the National Marine Fisheries Service showed that additional listings of in Indiana have occurred since the completion of the EA in 2006. Appendix B of this supplement to the EA contains the current list of threatened and endangered species listed by the USFWS, NMFS, and the State of Indiana.

Analysis of the Proposed Supplement to the EA on Threatened and Endangered 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 minimization measures. SOPs to avoid T&E effects are described in Chapter 3 of the EA (USDA 2006).

The USFWS has developed a website that provides up-to-date species occurrence information and provides an outline for action agencies to assist in determining whether consultation for projects is needed under Section 7 of the ESA. WS would review the website and the online measures on a site-by-site basis to determine if any T&E species are located within the project area in order to conclude with a determination of effects.

WS has obtained and reviewed the list of T&E or species of special concern (see Appendix B) in this supplement) designated by the IDNR and has determined that the proposed WS' activities would have no effect on any species listed as vulnerable or threatened and endangered. If WS' activities are requested that may be beneficial to species listed by the state as vulnerable, threatened, or endangered by enhancing reproduction or survival of individuals through reduction of harassment, competition, or predation associated with mammals, WS would initiate consultation with the state prior to start of any action.

3.4 Effects on Human Health and Safety

Based on the analyses in the EA, when WS' activities are conducted according to WS' directives and SOPs, federal, state, and local laws, and label requirements, those activities pose minimal risks to human safety (USDA 2006). The analyses in the EA also concluded that WS' activities to reduce damage and threats associated with mammals were likely to have positive benefits to human health and safety by addressing safety issues and disease transmission associated with those mammal species.

The cooperator requesting assistance is made aware through a MOU, cooperative service agreement, or a similar document that those methods agreed upon could potentially be used on property owned or managed by the cooperator; thereby, making the cooperator aware of the use of those methods on property they own or manage to identify any risks to human safety associated with the use of those methods.

Human Safety Analysis from WS' Activities from FY2007 through FY2013
Mammal management activities conducted by WS from FY2007 through FY2013 did not result in any injuries or illness to any members of the public or to WS' personnel. WS' program activities had a positive impact in those situations that reduced the risks of potential injury, illness, and loss of human life from injurious mammal species. The EA concluded that an integrated approach to wildlife damage

management had the greatest potential of successfully reducing potential risks to human health and safety in Indiana.

Analysis of the Proposed Supplement to the EA on Human Safety

Those methods described in the EA inherently pose minimal risks to human safety when used appropriately and in consideration of human safety. WS would continue to incorporate those SOPs described in Chapter 3 of the EA into activities to manage damage that would minimize the risks to human safety. Based on the use patterns of the methods available, an increase in the use of those methods to address those activities described in the supplement to the EA would not increase risks to human safety. WS' employees are trained in the proper use of methods to ensure the safety of the employee and the public. An increase in the number of methods used or an increase in the frequency that a method is used would not increase risks to human safety when consideration of human safety is part of the use pattern associated with those methods.

Since night vision equipment, trap monitors, and FLIR devices only aid in the identification of wildlife and are not actual methods of take, the use of visual aids would not adversely affect safety. In fact, night vision and FLIR equipment may enhance safety as vision and detection effects are improved during nighttime operations.

Aerial wildlife operations, like any other flying, could result in an accident. WS' pilots and crewmembers are trained and experienced to recognize the circumstances that lead to accidents and have thousands of hours of flight time. The National Wildlife Services Aviation Program has increased its emphasis on safety, including funding for additional training, the establishment of a Wildlife Services Flight Training Center and annual recurring training for all pilots.

In 2007 and 2008, WS conducted a programmatic safety review to assess and improve employee safety (USDA 2008). The review covered nine WS program areas including the aviation program. The review of the aviation program was conducted by the Interagency Committee on Aviation Safety. The review team concluded that the WS aviation program is being operated in a safe, efficient and effective manner and that the program met the Interagency Committee on Aviation Safety requirements for the Gold Standard Certificate for Excellence. At the time of the report, the WS program was the only USDA aviation program to be awarded this certification. WS' pilots and contractors are highly skilled with commercial pilot ratings and have passed proficiency tests in the flight environment encountered by WS. WS' pilots are trained in hazard recognition and surveillance flights would only be conducted in safe environments. Federal aviation regulations require pilots to fly a minimum distance of 500 feet from structures and people, and all employees involved in these operations are mindful of this. Although the goal of the aviation program is to have no accidents, accidents may still occur. However, the protective measures implemented by WS keep the risk of aircraft accidents and injuries to the public and aircraft crew low.

Fuel Spills and Environmental Hazard from Aviation Accidents: A representative of the National Transportation Safety Board has stated previously that aviation fuel is extremely volatile and will evaporate within a few hours or less to the point that even its odor cannot be detected (USDA 2005). Helicopters used for aerial wildlife operations carry less fuel than fixed-wing aircraft with 30 gallons the maximum for most helicopters. In some cases, little or none of the fuel would be spilled if an accident occurs. Thus, there should be little environmental hazard from un-ignited fuel spills.

3.5 Impacts to Stakeholders, including Aesthetics

As described in the EA, WS would employ methods when requested that would result in the dispersal, exclusion, or removal of individuals or small groups of target mammal species to resolve damage and threats. In some instances where mammals are dispersed or removed, the ability of interested persons to observe and enjoy those mammals would likely temporarily decline. However, the populations of those mammal species in those areas would likely increase upon cessation of damage management activities.

Even the use of exclusionary devices can lead to the dispersal of mammals if the resource being damaged was acting as an attractant. Thus, once the attractant has been removed or made unavailable, mammals would likely disperse to other areas where resources are more vulnerable making them unavailable for viewing or enjoyment.

Stakeholder Impact Analysis from WS' Activities from FY2007 through FY2013
The EA concluded the effects on aesthetics would be variable depending on the damage situation, stakeholders' values towards wildlife, and their compassion for those persons who are experiencing damage from mammals. The WS program only conducts activities at the request of the affected property owner or resource manager. Upon receiving a request for assistance, WS addresses issues/concerns and explanations are given for the reasons why a particular method or group of methods would be the most effective in reducing damage for the specific situation. Methods employed to reduce or resolve damage is agreed upon by the cooperator according to a cooperative service agreement.

Information in this supplement to the EA indicates that WS' take of mammal species has been minimal and of a low magnitude when compared to the populations of those species. WS' take has not reached a magnitude of take that would severely limit the ability to view and enjoy mammals. Only those mammals identified as causing damage were targeted by WS during damage management activities and only after a request for such action was received. However, mammals can be viewed outside the area where damage management activities were conducted if a reasonable effort is made to locate those species of mammals outside of the damage management area. WS receives requests to conduct damage management activities on only a small portion of the land area in Indiana. Therefore, activities are not conducted over large areas that would greatly limit the aesthetic value of mammals.

Analysis of the Proposed Supplement to the EA on Stakeholder Impacts
The increased take of those species addressed in the supplement to the EA could result in a greater number of mammals being lethally taken at a location or could result in an increase in the number of locations where mammals are lethally removed. The use of lethal methods could result in temporary declines in local populations resulting from the removal of target mammal species to resolve requests for assistance. WS' goal is to respond to requests for assistance and to manage those mammals responsible for the resulting damage. Therefore, the ability to view and enjoy mammals in Indiana would remain if a reasonable effort were made to locate those species of mammals outside the area in which damage management activities occurred.

3.6 Humaneness and Animal Welfare Concerns of Methods Used

As discussed in the EA, a common issue often raised is concerns about the humaneness of methods available under the alternatives for resolving mammal damage and threats. The issues of method humaneness relating to the alternatives are discussed below.

Humaneness Analysis from WS' Activities from FY2007 through FY2013
Methods used in mammal damage management activities from FY2007 through FY2013 and their potential impacts on humaneness and animal welfare did not change from those analyzed in the EA. All methods employed by WS to alleviate mammal damage were discussed in the EA (USDA 2006). WS continued to employ methods as humanely as possible to minimize distress. Live-captured mammals addressed in the EA were euthanized using methods considered appropriate for wild mammals by the American Veterinary Medical Association (AVMA). Therefore, the analyses of the humaneness of methods used by WS to manage damage and threats caused by mammals from FY2007 through FY2013 did not change from those analyzed in the EA.

Analysis of the Proposed Supplement to the EA on Stakeholder Impacts
Since those methods described in Appendix B of the EA would continue to be available under the proposed supplement, the issue of humaneness would be similar despite the increase in frequency of the use of methods. Those methods considered inhumane by certain segments of society would be considered inhumane no matter the frequency of the use of those methods. Those methods considered inhumane that were addressed in the EA would continue to be considered inhumane under the supplement. Therefore, the analyses in the EA for the humaneness of methods would not change under the supplement. WS would continue to employ methods as humanely as possible and would continue to employ euthanasia methods recommended for wild mammals by the AVMA.

CHAPTER 4: 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 the selected Alternative, WS would continue address damage associated with mammals in situations throughout the state. The Indiana WS mammal damage management program is the primary federal program with mammal damage management responsibilities; however, some state and local government agencies may conduct mammal damage management activities in Indiana as well. Through ongoing coordination and cooperation with the IDNR, WS is aware of other mammal damage management activities and may provide technical assistance in such efforts. WS does not normally conduct operational damage management activities concurrent with other agencies in the same area, but may conduct damage management activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct damage management activities in the same area. The potential cumulative impacts analyzed in this EA could occur either as a result of WS mammal damage management, or as a result of the effects of other agencies and individuals. Those activities and the mammals removed are tracked by the IDNR through their permitting system to insure no long-term cumulative adverse effects on bird populations.

Cumulative Impacts on Wildlife Populations

Evaluation of WS' activities relative to wildlife populations indicated that program activities will likely have no cumulative adverse effects on populations in Indiana. WS' actions would be occurring simultaneously, over time, with other natural processes and human-generated changes that are currently taking place. Those activities include, but are not limited to:

- Natural mortality of wildlife
- Human-induced mortality through private damage management activities
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in population densities

All those factors play a role in the dynamics of wildlife populations. In many circumstances, requests for assistance arise when some or all of those elements have contrived to elevate target species populations or place target species at a juncture to cause damage to resources. WS' actions taken to minimize or eliminate damage are constrained as to scope, duration and intensity, for the purpose of minimizing or avoiding impacts to the environment. WS evaluates damage occurring, including other affected elements and the dynamics of the damaging species; determines appropriate strategies to minimize effects on environmental elements; applies damage management actions; and subsequently monitors and adjusts/ceases damage management actions (Slate et al. 1992). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

No cumulative adverse impacts on wildlife populations are expected from WS' actions based on the following considerations:

Historical outcomes of WS' programs on wildlife
No cumulative adverse effects have been identified for wildlife as a result of program activities implemented over time based on analyses contained in the EA, from annual monitoring reports, or from analyses contained in the proposed supplement. WS continues to implement an integrated damage management program that adapts to the damage situation and the species involved with causing the damage. WS only targets wildlife causing damage and only after a request for assistance is received. All program activities are coordinated with appropriate federal, state, and local entities to ensure WS' activities do not adversely impact the populations of any native wildlife species.

Since the completion of the EA, the number of species and the total number of mammal species addressed by WS in Indiana has increased annually which provides some indication that WS' activities are not cumulatively impacting populations. WS continues to implement an integrated program that employs primarily non-lethal dispersal and harassment methods. WS will continue to provide technical assistance to those persons requesting assistance to identify and alleviate damage.

SOPs built into WS' program
SOPs are designed to reduce the potential negative effects of WS' actions on wildlife, and are tailored to respond to changes in wildlife populations which could result from unforeseen environmental changes. This would include those changes occurring from sources other than WS. Alterations in program activities are defined through SOPs, and implementation is insured through monitoring, in accordance with WS' Decision Model (Slate et al. 1992).

Summary of Cumulative Impacts

No significant cumulative environmental impacts are expected from any of the proposed actions analyzed in this supplement. Under the Current/Proposed Action, the lethal removal of mammals by WS has not and would not have a significant impact on overall mammal populations in Indiana or nationwide; however, some local reductions may occur. No risk to public safety is expected when WS' services are provided and accepted by continuing the MDM program with the included supplemental actions since only trained and experienced wildlife biologists/specialists would conduct and recommend mammal damage management activities. Although some persons will likely be opposed to WS' participation in mammal damage management activities on public and private lands in Indiana, the analysis in this supplement indicates that WS integrated mammal damage management program would not result in significant cumulative adverse impacts on the quality of the human environment.

CHAPTER 5: LIST OF PREPARERS AND PERSONS CONSULTED

4.1 List of Preparers/Reviewers

Judy Loven	USDA-APHIS-Wildlife Services
Christopher Croson	USDA-APHIS-Wildlife Services
Solange Muñoz Eifler	USDA-APHIS-Wildlife Services

4.2 List of Persons Consulted

Chad Stewart	Indiana Department of Natural Resources/White-tailed deer Biologist
Dean Zimmerman	Indiana Department of Natural Resources/District Biologist
Scott Johnson	Indiana Department of Natural Resources/Non-Game Biologist
Shawn Rossler	Indiana Department of Natural Resources/Furbearer Biologist
Katie Smith	Indiana Department of Natural Resources/Threatened and Endangered Species Program
Daniel East	Indiana Department of Natural Resources/Law Enforcement Division
Linnea Petercheff	Indiana Department of Natural Resources
Jennifer House	Indiana State Health Department
Steven Hoosier	Purdue Veterinary School
Scott Pruitt	U.S. Fish and Wildlife Service/Bloomington Office
Ed White	Office of the Indiana State Chemist

APPENDIX A
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APPENDIX B

STATE AND FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

COMMON NAME	LATIN NAME	FEDERAL STATUS	STATE STATUS
MAMMALS			
Allegheny woodrat	*Neotoma magister*		Endangered
Evening bat	*Nyticeius humeralis*		Endangered
Franklin's ground squirrel	*Spermophilus franklinii*		Endangered
Gray bat	*Myotis grisescens*	Endangered	Endangered
Indiana bat	*Myotis sodalis*	Endangered	Endangered
Swamp rabbit	*Sylvilagus aquaticus*		Endangered
Badger	*Taxidea taxus*		Special Concern
Eastern small-footed myotis	*Myotis leibii*		Special Concern
Eastern pipistrelle	*Pipistrellus subflavus*		Special Concern
Eastern red bat	*Lasiurus borealis*		Special Concern
Hoary bat	*Lasiurus cinereus*		Special Concern
Least weasel	*Mustela nivalis*		Special Concern
Little brown bat	*Myotis licifugus*		Special Concern
Northern bat	*Myotis septentrionalis*	Proposed Endangered	Special Concern
Plains pocket gopher	*Geomys bursarius*		Special Concern
Pygmy shrew	*Sorex hoyi*		Special Concern
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*		Special Concern
Silver-haired bat	*Lasionycteris noctivagans*		Special Concern
Smokey shrew	*Sorex fumeus*		Special Concern
Southeastern bat	*Myotis austroriparius*		Special Concern
Star-nosed mole	*Condylura cristata*		Special Concern
BIRDS			
American bittern	*Botaurus lentiginosus*		Endangered
Barn owl	*Tyto alba*		Endangered
Black rail	*Laterallus jamaicensis*		Endangered
Black tern	*Chlidonias niger*		Endangered
Black-crowned night heron	*Nycticorax nycticorax*		Endangered
Cerulean warbler	*Dendroica cerulean*		Endangered
Common moorhen	*Gallanula chloropus*		Endangered
Golden-winged warbler	*Vermivora chrysoptera*		Endangered
Henslow's sparrow	*Ammodramus henslowii*		Endangered
King rail	*Rallus elegans*		Endangered
Kirtland's warbler	*Dendroica kirtlandii*		Endangered
Least bittern	*Ixobrychus exilis*		Endangered
Least tern	*Sterna antillarum*	Endangered	Endangered
Loggerhead shrike	*Lanius ludovicianus*		Endangered
Marsh wren	*Cistothorus palustris*		Endangered
Northern harrier	*Circus cyaneus*		Endangered

Osprey	*Pandion haliaetus*		Endangered
Peregrine falcon	*Falco peregrinus*		Endangered
Piping plover	*Charadrius melodius*	Endangered	Endangered
Sedge wren	*Cistothorus platensis*		Endangered
Short-eared owl	*Asio flammeus*		Endangered
Trumpeter swan	*Cygnus buccinator*		Endangered
Upland sandpiper	*Bartramia longicauda*		Endangered
Virginia rail	*Rallus limicola*		Endangered
Whooping crane	*Grus Americana*		Endangered
Yellow-crowned night heron	*Nyctanassa violacea*		Endangered
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*		Endangered
American Golden-Plover	*Pluvialis dominica*		Special Concern
Bald eagle	*Haliaeetus leucocephalus*		Special Concern
Black-and-white warbler	*Mniotilta varia*		Special Concern
Broad-winged hawk	*Buteo platypterus*		Special Concern
Buff-breasted Sandpiper	*Tryngites subruticollis*		Special Concern
Common nighthawk	*Chordeiles minor*		Special Concern
Great egret	*Ardea alba*		Special Concern
Greater Yellowlegs	*Tringa melanoleuca*		Special Concern
Hooded warbler	*Wilsonia citrine*		Special Concern
Mississippi kite	*Ictinia mississippiensis*		Special Concern
Red-shouldered hawk	*Buteo lineatus*		Special Concern
Sandhill crane	*Grus Canadensis*		Special Concern
Sharp-shinned hawk	*Accipiter striatus*		Special Concern
Short-billed Dowitcher	*Limnodromus griseus*		Special Concern
Solitary Sandpiper	*Tringa solitaria*		Special Concern
Ruddy Turnstone	*Arenaria interpres*		Special Concern
Western meadowlark	*Stunella neglecta*		Special Concern
Wilson's Phalarope	*Phalaropus tricolor*		Special Concern
Whip-poor-will	*Caprimulgus vociferous*		Special Concern
Worm-eating warbler	*Helmitheros vermivorum*		Special Concern
AMPHIBIANS			
Crawfish frog	*Rana areolata*		Endangered
Green salamander	*Aneides aeneus*		Endangered
Hellbender	*Cryptobranchus alleganiensis*		Endangered
Plains leopard frog	*Rana blairi*		Endangered
Red salamander	*Pseudotriton rubber*		Endangered
Blue-spotted salamander	*Ambystoma laterale*		Special Concern
Common mudpuppy	*Necturus maculosus*		Special Concern
Four-toed salamander	*Hemidactylium sculatum*		Special Concern
Northern leopard frog	*Rana pipens*		Special Concern
Streamside Salamander	*Ambystoma barbouri*		Special Concern
Northern Cricket Frog	*Acris crepitans*		Special Concern
REPTILES			
Alligator snapping turtle	*Macrochelys temminckii*		Endangered
Blanding's turtle	*Emydoidea blandingii*		Endangered
Butler's garter snake	*Thamnophis butleri*		Endangered

Copperbelly water snake	*Nerodia erythrogaster neglecta*	Threatened	Endangered
Cottonmouth	*Agkistrodon piscivorus*		Endangered
Eastern mud turtle	*Kinosternon subrubrum*		Endangered
Kirtland's snake	*Clonophis kirtlandii*		Endangered
Massasauga	*Sistrurus catenatus*	Candidate	Endangered
Ornate box turtle	*Terrapene ornate*		Endangered
Scarlet snake	*Cemophora coccinea*		Endangered
Smooth green snake	*Liochlorophis vernalis*		Endangered
Southeastern crowned snake	*Tantilla coronata*		Endangered
Spotted turtle	*Clemmys guttata*		Endangered
Timber rattlesnake	*Crotalus horridus*		Endangered
Eastern Box Turtle	*Terrapene Carolina*		Special Concern
Red-bellied Mudsnake	*Farancia abacura*		Special Concern
Rough green snake	*Opheodrys aestivus*		Special Concern
Western ribbon snake	*Thamnophis proximus*		Special Concern
FISHES			
Bantam sunfish	*Lepomis symmetricus*		Endangered
Channel darter	*Percina copelandi*		Endangered
Gilt darter	*Percina evides*		Endangered
Greater redhorse	*Moxostoma valenciennesi*		Endangered
Lake sturgeon	*Acipenser fulvescens*		Endangered
Northern brook lamprey	*Ichthyomyzon fosser*		Endangered
Northern cavefish	*Amblyopsis spelaea*		Endangered
Pallid shiner	*Hybopsis amnis*		Endangered
Redside dace	*Clinostomus elongates*		Endangered
Variegate darter	*Etheostoma variatum*		Endangered
Banded pygmy sunfish	*Elassoma zonatum*		Special Concern
Bigmouth shiner	*Notropis dorsalis*		Special Concern
Cisco	*Coregonus artedi*		Special Concern
Cypress darter	*Etheostoma proelaire*		Special Concern
Lake whitefish	*Coregonus clupeaformis*		Special Concern
Longnose dace	*Rhinichthys cataractae*		Special Concern
Longnose sucker	*Catostomus catostomus*		Special Concern
Northern madtom	*Noturus stigmosus*		Special Concern
Ohio River Muskellunge	*Esox masqinongy ohioensis*		Special Concern
Pugnose shiner	*Notropis anogenus*		Special Concern
Slimy sculpin	*Cottus cognatus*		Special Concern
Spotted darter	*Etheostoma maculatum*		Special Concern
Tippecanoe darter	*Etheostoma Tippecanoe*		Special Concern
Trout-perch	*Percopsis omiscomaycus*		Special Concern
Western sand darter	*Ammocrypta clara*		Special Concern
MOLLUSKS			
Rayed bean	*Villosia fabalis*	Endangered	Endangered
Clubshell	*Pleurobema clava*	Endangered	Endangered
Eastern fanshell	*Cyprogenia stegaria*	Endangered	Endangered
Fat pocketbook	*Potamilus capax*	Endangered	Endangered
Longsolid	*Fusconaia subrotunda*		Endangered
Northern riffleshell	*Epioblasma tortulosa rangiana*	Endangered	Endangered

Orangefoot pimpleback	*Plethobasus cooperianus*		Endangered
Pink mucket	*Lampsilis abrupta*		Endangered
Pyramid pigtoe	*Pleurobema rubrum*		Endangered
Rabbitsfoot	*Quadrula cylindrical cylindrica*	Threatened	Endangered
Rough pigtoe	*Pleurobema plenum*	Endangered	Endangered
Sheepnose	*Plethobasus cyphyus*	Endangered	Endangered
Snuffbox	*Epioblasma trequetra*	Endangered	Endangered
Tubercled blossom	*Epioblasma torulosa torulosa*		Endangered
White catspaw	*Epioblasma obliquata perobliqua*	Endangered	Endangered
White wartyback	*Plethobasus cicatricosus*		Endangered
Ellipse	*Venustaconcha ellipsiformis*		Special Concern
Kidneyshell	*Ptychobrachus fasciolaris*		Special Concern
Little spectaclecase	*Villosa lienosa*		Special Concern
Ohio pigtoe	*Pleurobema cordatum*		Special Concern
Pointed cameloma	*Campeloma decisum*		Special Concern
Purple lilliput	*Toxolasma lividus*		Special Concern
Salamander mussel	*Simpsonaias ambigua*		Special Concern
Swamp lymnaea	*Lymnaea stagnalis*		Special Concern
Wavyrayed lampmussel	*Lampsilis fasciola*		Special Concern
INSECTS			
Karner blue butterfly	*Lycaeides Melissa samuelis*	Endangered	
Mitchell's satyr butterfly	*Neonympha mitchellii mitchellii*	Endangered	
PLANTS			
Eastern prairie fringed orchid	Plantathera leucophaea	Threatened	
Mead's milkweed	Asclepias meadii	Threatened	
Pitcher's thistle	Cirsium pitcheri	Threatened	
Running buffalo clover	Trifolium stoloniferum	Endangered	
Short's goldenrod	Solidago shortii	Endangered	