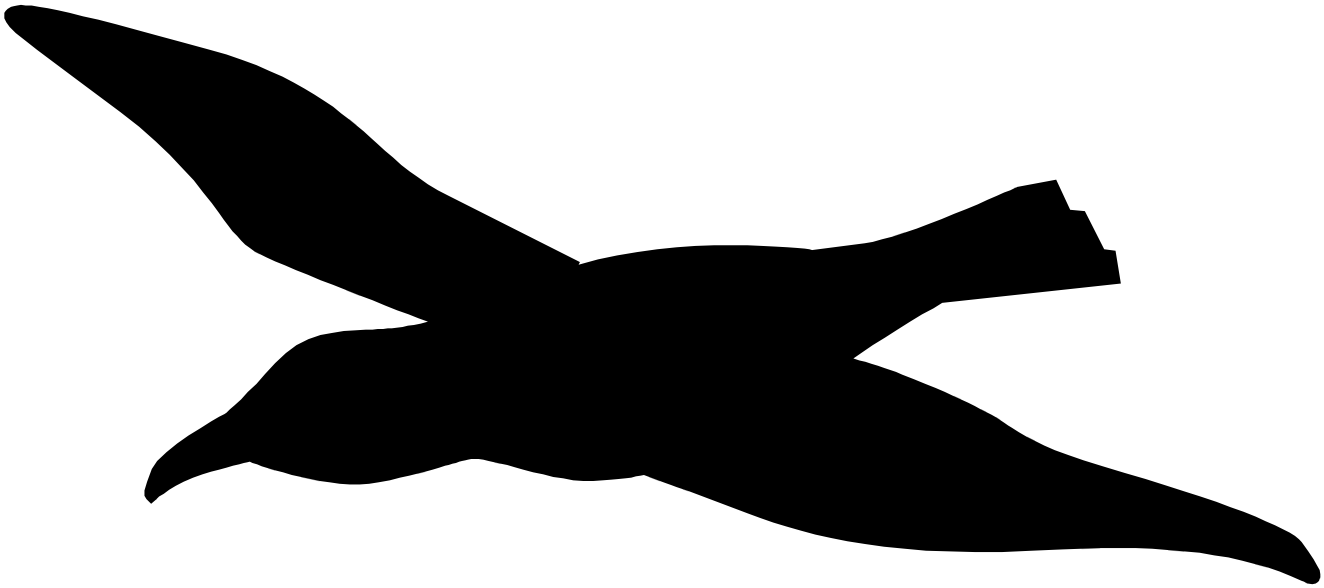
ENVIRONMENTAL ASSESSMENT

Bird Damage Management in Alaska



Prepared by:

UNITED STATES DEPARTMENT OF AGRICULTURE
Animal and Plant Health Inspection Service
Wildlife Services

April 2010

TABLE OF CONTENTS

ACRONYMS USED IN THE EA

AAC	Alaska Administrative Code
AAS	Anchorage Audubon Society
ADFG	Alaska Department of Fish and Game
ADOTPF	Alaska Department of Transportation and Public Facilities
AI	Avian Influenza
AK	Alaska
ANC	Anchorage International Airport
APHIS	Animal and Plant Health Inspection Service (USDA agency)
AVMA	American Veterinary Medical Association
BBS	Breeding Bird Survey
BDM	Bird Damage Management
BGEPA	Bald and Golden Eagle Protection Act
CDFG	California Department of Fish and Game
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CY	Calendar Year
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FONSI	Finding Of No Significant Impact
FR	Federal Register
FY	Fiscal Year (October 1 through September 30)
HP	Highly Pathenogenic
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NWRC	National Wildlife Research Center
OSHA	Occupational Safety and Health Administration
TA	Technical Assistance
T&E	Threatened and Endangered
TWS	The Wildlife Society
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WHA	Wildlife Hazard Assessment
WHMP	Wildlife Hazard Management Plan
WS	Wildlife Services

EXECUTIVE SUMMARY

Across the United States, wildlife habitat changes as human populations expand and land is transformed to meet varying human needs. These changes often compete with wildlife and inherently increase the potential for conflicts between wildlife and people. Wildlife damage management is the alleviation of damage or other problems caused by, or related to, the habits of wildlife and recognized as an integral component of wildlife management (The Wildlife Society 1992). WS uses an adaptive, Integrated Wildlife Damage Management (IWDM) approach, commonly known as Integrated Pest Management, where a combination of methods may be used or recommended to reduce wildlife damage.

Bird Damage Management (BDM) is the combination of Technical Assistance (TA) and operational damage management to reduce or eliminate bird damage, or the threat of damage, to a particular resource. TA includes recommendations, guidance, and instruction on how to use BDM methods that can be safely and effectively applied by cooperators. A range of legal operational damage management methods are available for reducing bird damage. These methods fall into two categories: preventive (*e.g.*, habitat modification, deterrents, exclusion) and corrective (*e.g*., harassment and removal). BDM would be conducted when requested on public and private lands where an *Agreement for Control* is signed.

The need for action is based on the necessity for a program to protect human health and safety from damage by birds and to respond to requests for assistance from property owners. Bird-related damage recorded by WS for FY05 through FY09 totaled $2,621,740. The damage included $2,613,215 to property (*e.g*. aircraft, buildings, equipment) and $8,525 to human health and safety. For calendar years (CY) 2005 through 2008, the FAA recorded a total of $1,134,596 in damages from wildlife-aviation conflicts and 208 strikes over the same time period. The Air Force recorded $288,821 in damages for the same time period.

This EA analyzes potential impacts of WS' BDM and addresses those activities on all lands under *Cooperative Agreement* or *Agreements for Control* within AK, or those written in the foreseeable future. Because the proposed action is to implement an adaptive, integrated BDM program, and because WS' goals and responsibility are to provide service when requested within the constraints of available funding and workforce, it is conceivable that additional damage management efforts could occur. Thus, this EA anticipates and analyzes the effects of additional efforts as part of the proposed program. This EA emphasizes significant issues as they relate to specific areas whenever possible; however, the issues that pertain to BDM and resulting management are the same, for the most part, wherever they occur and are treated as such.

CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

Across the United States, wildlife habitat changes as human populations expand and land is transformed to meet varying human needs. These changes often compete with wildlife and inherently increase the potential for conflicts between wildlife and people. Some species adapt and thrive in the presence of humans and the changes being made. These species, in particular, are often implicated in conflicts between humans and wildlife. The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services' (WS) Final Environmental Impact Statement (EIS) (USDA 1997[1]) summarizes American values toward wildlife values and wildlife damage:

> *"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife generally is 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 values 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."*

1.1.1 Wildlife Acceptance Capacity

The wildlife acceptance capacity, also known as the cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can reasonably coexist with local human populations. Biological carrying capacity is the land or habitat's ability to support healthy populations of wildlife without degradation to the species' health or their environment over an extended period of time (Decker and Purdy 1988). These principles are especially important because they define the sensitivity of a community to a wildlife species. For any given damage situation, there are varying thresholds of tolerance by people directly and indirectly affected by wildlife and any associated damage. This damage threshold is a factor in determining the wildlife acceptance capacity. While Alaska (AK) may have a biological carrying capacity for a particular area or locality that can support

[1] USDA (1997) may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

larger bird populations, in many cases the wildlife acceptance capacity is lower or has been met. Once the wildlife acceptance capacity is met or exceeded, people begin to implement damage reduction methods, including lethal and potentially illegal methods, to alleviate damage and human health or safety threats. When requested, WS implements an adaptive, Integrated Wildlife Damage Management (IWDM) program.

1.1.2 Integrated Wildlife Damage Management (IWDM)

Wildlife damage management is the alleviation of damage or other problems caused by, or related to, the habits of wildlife and recognized as an integral component of wildlife management (The Wildlife Society 1992). WS uses an adaptive, IWDM approach, commonly known as Integrated Pest Management, where a combination of methods may be used or recommended to reduce wildlife damage. IWDM is the application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on a local problem analysis and the informed judgment of trained personnel. IWDM includes localized habitat and behavioral modification, removal of the offending animal(s), or local populations or groups through lethal methods. Wildlife damage management is not based on punishing offending animals but is a means to reduce future damage and is implemented using the WS' Decision Model[2] (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for damage management is derived from the specific threats to resources. WS implements IWDM in accordance with the WS Decision Model to address site specificity, maximize effectiveness, and select the most appropriate tool or method for the situation. As a result of this approach, WS implements the most practical and effective method(s) proven to reduce or alleviate bird damage.

[2] The WS Decision Model is not a written process but rather a mental problem solving process similar to other professions to determine appropriate management actions to take.

1.1.3 The WS Decision Model

WS' personnel receive requests for assistance that encompass a wide range of damage, problems, species, locations, and resources. Each request is unique and access to a variety of methods allows personnel to formulate a more responsible and successful strategy. Implementation of these methods is coordinated through the use of the Decision Model, illustrated in Figure 1.1, as described in WS' Programmatic EIS (USDA 1997). Once the problem has been identified, methods and tools are identified for consideration for use in each situation. Methods may be eliminated due to legal, administrative, environmental, economic, or sociocultural considerations. Once a strategy is formulated and the resource manager agrees to the plan, methods are employed and results are monitored for effectiveness and impacts. Methods may be re-evaluated and other selections may be made, or new facts may change the initial assessment of the problem. Projects are concluded when WS personnel are no longer directly involved in management activities for a specific problem. Some projects may be relatively short term, requiring only technical assistance (TA), while others may be ongoing, such as chronic threats from wildlife at airfields.

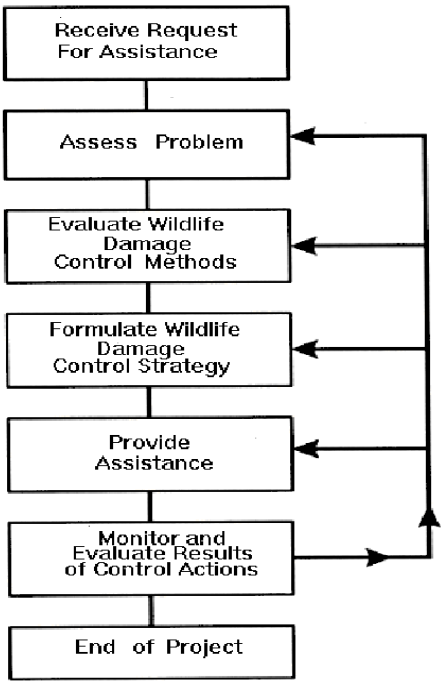


Figure 1.1 WS Decision Model for Developing Strategies to Respond to Wildlife Conflicts

1.1.4 Cooperators

WS is authorized to enter into cooperative agreements with federal and state agencies, local jurisdictions, individuals, organizations, and institutions to reduce risks from injurious/nuisance animal species and those species that are reservoirs for zoonotic diseases. WS activities and assistance are contingent upon funding from those cooperating and/or requesting WS' services and/or upon appropriations or specific authorization from the State or federal legislatures.

Before WS conducts wildlife damage management activities, Agreements for Control, Work Plans, or other comparable documents, must be executed between WS and the requester of services or land owner/administrator/agency representative (WS Directive 2.210[3]). WS cooperates with other land and wildlife management agencies, when requested and as appropriate, to combine efforts to effectively and efficiently resolve wildlife damage problems in compliance with applicable federal, state, and local laws and Memoranda of Understanding (MOUs) (WS Directive 2.210)

1.1.5 Affected Environment

Alaska contains approximately 373 million acres, 63% (237.8 million acres) of which is owned by the Federal government, while 24.1% (89.8 million acres) is owned by the State of Alaska, and 12.1% (45.2 million acres) is privately owned including land held by Native Corporations. Land in private, non-Native Corporation ownership totals less than 1% of AK. These are areas where people live, work, shop, and recreate, and where there is a chance that human-wildlife conflicts may occur (Alaska Department of Natural Resources 2006). WS' mission is to alleviate conflicts between humans and wildlife, so areas of AK that are not occupied by humans are not likely candidates for WS Bird Damage Management (BDM). This limits the amount of area in AK where WS may be requested to work, and in turn, reduces the likelihood of impacts.

1.1.5.1 Bird Species in Alaska

The United States Geological Survey (USGS) documents that more than 445 bird species inhabit AK on either a seasonal or year-round basis (USGS 2009). Most of these birds do not cause problems to human interests; however, some birds may frequent places and threaten human health and safety, either through damage to property, spread of disease, or by their presence (*e.g.*, birds on airports).

1.1.5.2 Threatened and Endangered Species in Alaska

WS is required to consult with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service to prevent adverse impacts to federally

[3] The WS Policy Manual provides WS personnel guidance in the form of program directives. Information contained in the WS Policy Manual and its associated directives has been used throughout this EA, but have not been cited in the Literature Cited appendix. WS Directives can be found at: http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml

listed species and their habitat. WS has reviewed the current list of threatened and endangered (T&E) species in AK and has consulted on those that have the potential to be affected by the proposed action (USFWS 2007).

Table 1-1. Species Listed as Threatened and Endangered in Alaska. (USFWS 2010)

Short-tailed Albatross	*Phoebastria albatrus*	**Blue Whale**	*Balaenoptera musculus*
Eskimo Curlew	*Numenius borealis*	**Fin Whale**	*Balaenoptera physalus*
Steller's Eider	*Polsticta stelleri*	**Leatherback Sea turtle**	*Dermochelys coriacea*
Spectacled Eider	*Somateria fischeri*	**Northern Sea Otter**	*Enhydra lutris kenyoni*
Bowhead Whale	*Balaena mysticetus*	**Steller Sea Lion**	*Eumetopias jubatas*
Humpback Whale	*Megaptera nocaeanglinae*	**Polar Bear**	*Ursus maritimus*
Sperm Whale	*Physeter catodon*	**Aleutian Shield Fern**	*Polystichum aleuticum*

1.2 Bird Damage Management in Alaska

BDM is the combination of TA and operational damage management to reduce or eliminate bird damage, or the threat of damage, to a particular resource. TA includes recommendations, guidance, and instruction on how to use BDM methods that can be safely and effectively used by cooperators. WS in not responsible for the application of methods by cooperators as a result of TA and has Categorically Excluded TA from NEPA (7CFR372.5(c)). Operational damage management is applied by WS personnel for situations where professional expertise is needed (*e.g*., trapping and lethal management). Resource owners requesting operational damage management assistance are also encouraged to use non-lethal management strategies[4] when and where appropriate to help reduce damage and minimize lethal take whenever possible (WS Directive 2.101).

A range of legal operational damage management methods are available for reducing bird damage. These methods fall into two categories: preventive (*e.g.*, habitat modification, deterrents, exclusion) and corrective (*e.g*., harassment and removal). BDM would be conducted when requested on public and private lands where an *Agreement for Control,* or other appropriate document, is signed. All BDM would comply with applicable federal,

[4] The implementation of non-lethal methods may be a prerequisite to obtaining state or federal wildlife control permits.

state, and local laws, permitting processes and current MOUs, Memorandums of Agreements, or work plans between WS and the various management agencies (WS Directive 2.210).

1.2.1 Permits

All BDM is conducted under the appropriate permits issued by USFWS and ADFG. ADFG issues WS "Public Safety" and "Scientific" permit for protecting public safety at airports and for sampling birds for Highly Pathenogenic H5N1 Avian Influenza. USFWS issues WS a standard Depredation Permit and an Eagle Depredation Permit. The eagle depredation permit allows only the harassment of eagle when there is a high probability of a bird strike/threat to human health and safety. The permit does not authorize the harassment of nesting eagles or their young. The USFWS depredation permit authorizes the take of any migratory bird species (except T&E listed species and bald and golden eagles) that pose an immediate threat to aviation or human health and safety. WS may be requested to assist airports and conduct management actions under those permits at any time.

1.3 PURPOSE OF THIS EA

This EA evaluates WS' BDM on private and public lands in AK for the protection of human health and safety and property. According to APHIS procedures for implementing NEPA, individual BDM actions considered in this analysis may be afforded a Categorical Exclusion (CE) (7 CFR §372.5(c), 60 Federal Register (FR) 6,000, 6,003, 1995). Recommendations for TA are categorically excluded through WS' Programmatic NEPA implementation regulations and guidance. This EA was prepared to facilitate planning, interagency coordination, streamline program management, to evaluate and determine if any potentially significant or cumulative impacts could occur, and to clearly communicate to the public the analysis of cumulative effects of the alternatives. All WS BDM in AK would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA) (WS Directive 2.210). Notice of the availability of this document will be published consistent with the agency's National Environmental Policy Act (NEPA) procedures.

1.4 PROPOSED ACTION

WS proposes to continue an adaptive integrated BDM program in AK for the protection of human health and safety by responding to requests for assistance by implementing integrated and adaptive BDM strategies using the WS Decision Model. Under the proposed

action, WS would encourage the use of practical, effective, and legal methods, used alone or in combination, to meet the needs of requesters to resolve conflicts. In accordance with WS Directive 2.101, preference is given to practical and effective non-lethal methods[5]. Most wildlife damage situations require professional expertise, an organized damage management effort, and the use of multiple damage management methods to sufficiently resolve them; this will be the task of WS personnel who are trained and equipped to handle most damage situations. WS personnel use the APHIS-WS Decision Model to evaluate strategies in the context of their availability (legal and administrative) and suitability based on biological and social considerations[6]. Following this evaluation, the method(s) deemed to be practical are implemented into a management strategy for the situation. WS' BDM is coordinated with and serves to provide effective resolution of bird damage problems. The protected resource, species, location and type of damage, and available biologically sound, efficient, and legal methods will be analyzed by WS personnel to determine a course of action to alleviate each conflict.

WS responds to requests for assistance with TA or operational BDM (when funding is provided). When operational BDM is conducted, IWDM would be implemented. WS employees provide TA on a variety of methods that resource owners/managers may use, including localized habitat modification and exclusion[7]. TA can be used to resolve certain problems where resource owners can safely and effectively apply methods and/or where funding is not available for WS personnel to conduct operational BDM. Non-lethal methods[8] implemented under the Proposed Action include: harassment, exclusionary devices, auditory and visual deterrents, repellents, recommendations for habitat modification, live trap and release or translocation. Lethal methods implemented under the Proposed Action include egg addling/oiling/removal, euthanasia following live capture, and shooting.

The primary bird species for which WS has received requests for assistance and provided the greatest extent of BDM assistance are listed in Table 1-2. AK WS anticipates continuing to conduct lethal and non-lethal BDM for these species and will analyze take of these species in detail (Section 3.4.1.2). WS may also provided BDM assistance on the bird species listed in Appendix C for Fiscal Year (FY) 05 – FY 09 and anticipates continuing to

---

[5] Immediate threats to human health and safety may take precedence over the implementation of non-lethal methods and the removal of individual birds may occur concurrently with the implementation of non-lethal strategies.

[6] As new information or method(s) become available, they are evaluated and could be integrated into the current program/Proposed Action following NEPA compliance.

[7] BDM methods that are currently implemented and/or recommended by WS are detailed in Appendix B.

[8] In many situations, the implementation of non-lethal methods such as exclusion-type barriers, habitat modification, and repellents would be the responsibility of the requestor to implement.

Table 1-2. Species for which WS Commonly Conducts Operational Bird Damage Management in Alaska. K= killed, H= harassed.												
SPECIES	FY05		FY06		FY07		FY08		FY09		Average	
	K	H	K	H	K	H	K	H	K	H	K	H
American Green-winged Teal	45	540	33	750	74	1,421	78	1,020	61	1,939	**58**	**1,134**
American Widgeon	23	585	29	687	51	2,323	54	2,242	61	4,372	**44**	**2,042**
Barrow's Goldeneye	2	223	0	587	12	1,350	11	1,907	15	1,685	**8**	**1,150**
Black-billed Magpie	75	172	43	224	65	541	33	642	85	650	**60**	**446**
Bonaparte's Gull	0	2	1	419	52	4,528	18	963	4	1,163	**15**	**1,415**
Canada Goose	33	2,420	66	3,068	30	3,563	18	4,379	105	20,801	**50**	**6,846**
Common Goldeneye	3	194	7	1,213	7	2,105	3	322	10	1,194	**6**	**1,006**
Common Raven	44	29,210	64	50,680	194	63,811	94	64,583	121	43,319	**103**	**50,321**
European Starling	2	0	9	31	26	194	7	282	3	0	**9**	**101**
Feral Pigeon	366	35	423	32	221	58	39	43	102	19	**230**	**37**
Glaucous-winged Gull	0	1,006	137	107,685	114	9,248	27	17,041	38	6,661	**63**	**28,328**
Greater and Lesser Scaup	63	3,356	32	8,371	83	9,196	69	13,984	127	19,428	**75**	**10,867**
Greater White-fronted Goose	0	0	0	18	11	1,702	22	4,982	25	3,613	**12**	**2,063**
Herring Gull	42	4,821	99	9,121	36	7,895	70	3,869	22	5,317	**54**	**6,205**
Mallard	84	2,922	144	2,716	236	5,731	169	12,290	142	14,995	**155**	**7,731**
Mew Gull	120	1,817	88	1,850	47	1,765	71	2,952	38	1,571	**73**	**1,991**
Northern Pintail	3	123	12	378	29	703	37	796	24	3,066	**21**	**1,013**
Northern Shoveler	11	182	21	388	24	1,051	50	2,028	47	4,243	**31**	**1,578**
Northwestern Crow	0	0	5	4,625	12	2,556	17	7,757	8	4,616	**8**	**3,911**

provide minimal assistance with these species. This list should not be considered exhaustive because human/bird conflicts may occur anywhere in AK and the analysis in this EA anticipates and analyzes for that possibility. However, take of any bird species will comply with annually issued USFWS and/or Alaska Department of Fish and Game (ADFG) permits, federal laws, and applicable state laws and regulations.

WS is also part of an interagency team conducting, assisting, and/or supervising the collection of biological samples for Highly Pathenogenic (HP) H5N1 Avian Influenza (AI) surveillance. The project focuses on surveillance and detection of HP H5N1 AI virus at its earliest stage in migratory birds to increase the capabilities for agencies to respond and reduce its spread. HP H5N1 AI monitoring will be conducted on private, state, and federal lands in Alaska under agreements with cooperators. Methods used in HP H5N1 AI monitoring are detailed in Appendix C.

1.5 NEED FOR ACTION

During FY05 through FY09, AK WS technical and/or operational assistance was requested on 180 occasions and WS provided assistance on 40,232 acres (0.017% of the land area of

AK) and 20 airports under agreement when birds were damaging resources (Management Information System (MIS) 2009).

The need for action is based on the necessity for a program to protect human health and safety from damage by birds and to respond to requests for assistance from property[9] owners. Bird-related damage recorded by WS for FY05 through FY09 totaled $2,621,740. The damage included $2,613,215 to property (*e.g*. aircraft, buildings, equipment) and $8,525 to human health and safety (MIS 2010). The actual amount of damage incurred is higher because WS only receives reports from a fraction of the people experiencing wildlife damage. For calendar years (CY) 2005 through 2008, the FAA recorded a total of $1,134,596 in damages from wildlife-aviation conflicts and 208 strikes over the same time period (FAA 2009). The Air Force recorded $288,821 in damages for the same time period (G. Leboeuf, U. S. Air Force, July 2, 2009, pers. comm.).

1.5.1 Human Safety Concerns

There are approximately 490 airports in AK, servicing aviation from float planes and general aviation to large commercial and military operations. Many bird species enter airport operation areas, and due to their body-size and/or tendency to flock, may, in a aircraft/bird collision, cause substantial damage to aircraft or loss of human life. The birds commonly encountered in airport environments in AK include: waterfowl (Family *Anatidae*), gulls and terns (Family *Laridae*), corvids (Family *Corvidae*), raptors (Family *Accipitridae*), and shorebirds (Family *Charadriidae* and *Scolopacidae*)[10]. In addition to those bird groups listed above, WS also works to resolve issues with feral pigeons, starlings, cranes (Family *Gruidae*), and other birds.

The majority of WS' BDM projects in AK involve responding to requests for assistance regarding bird hazards at airports. These requests are considered serious because of the potential for loss of human life and because damage to aircraft can be extremely expensive. Airports are often in close proximity to landfills, wetlands, and other habitats that attract a variety of bird species. Many of

---

[9] AK WS does not haze or kill wildlife to address property damage complaints unless the damage has the potential to result in a compromise of public health or safety or the species involved is one of those classified as "deleterious exotic wildlife" (starlings, house sparrows, pigeons, raccoons, rats, mice gerbils, other murid rodents, and Belgian hares) (ADFG Permit # 09-060).

[10] The collision of an aircraft with birds is a serious concern at airports throughout AK and may involve many species of bird in AK including some that may not be analyzed in this EA, but provided for in the USFWS Depredation Permit.

these species feed, rest, or roost near airport runways, and pose a potential threat to air travelers, pilots, crews, and people on the ground. Large flocking birds have become an ever-increasing threat to aircraft safety. A steady growth in the populations of some large flocking birds, their successful adaptation to urban landscapes, and increased aircraft operations has contributed to a significant increase in birdstrikes (Dolbeer and Seubert 2006).

Nationally, bird strikes cause an estimated $600 million damage to aviation annually (Dolbeer and Wright 2008). Eleven people died in civil strikes from 1990-2007; ten of those were caused by birds[11] (Dolbeer and Wright 2008). In 1995, a military jet taking off at Elmendorf Air Force Base in AK crashed after striking a flock of Canada geese. All 24 crew members were killed and the $180 million aircraft was destroyed. According to FAA records, 183 bird strikes to civil aircraft were reported in AK from FY 2005 through 2007, resulting in $1,082,596 in damage and lost revenue (FAA 2009). Forty-six of these strikes involved unidentifiable bird species. Of the birds that were identified, gulls accounted for the largest number of strikes (28), followed by ducks (14), and bald eagles (11) (FAA 2009). The number of bird strikes to military aircraft in AK totaled 83 from CY05-CY08. However, it is estimated that only 20 to 25% of all bird strikes are reported (Conover et al. 1995, Dolbeer et al. 1995, Linnell et al. 1996, Linnell et al. 1999), consequently, the number of bird strikes in AK is most likely much higher than records indicate.

A MOU was developed in 1998 between the FAA and WS, established a cooperative relationship between the two agencies to resolve wildlife hazards to aviation. The FAA is responsible for setting and enforcing federal regulations and policies to enhance public aviation and safety. To ensure compliance with 14 CFR 139.337, the FAA requires certificated airports to conduct a Wildlife Hazard Assessment (WHA), and if necessary, establish a wildlife hazard management plan (WHMP) when any of the following events occur on or near an airport:

a) An air carrier aircraft experiences multiple bird strikes.
b) An air carrier aircraft experiences a damaging collision with wildlife.
c) An air carrier experiences an engine ingestion of wildlife.
d) Wildlife of a size or in numbers capable of causing an event described in *a)* or *b)* above is observed to have access to any flight pattern or movement area.

[11] The remaining single strike involved a deer.

WS has completed 45 WHA's to further asses site specific hazards that birds present at airports and continues to conduct BDM at several airports in AK. Various damage management methods are implemented simultaneously (*i.e.*, IWDM) and include static (*e.g.*, propane exploders, effigies, mylar flagging) and active (*e.g.*, harassment/shooting, pyrotechnics, and shooting) methods. Daily record keeping of wildlife presence and their movements is also part of AK BDM. AK WS evaluates the effectiveness of damage management measures by observing the number of birds using airports on a daily basis. Birds observed on-site are actively hazed with pyrotechnics and harassment/shooting. Those birds which become accustomed or do not respond to non-lethal methods may be lethally removed.

1.5.2 Human Health Concerns

Bird feces contain corrosive acids and are laden with bacteria, either of which may endanger human health (*e.g.*, excessive fecal matter on handrails, stairs and walkways, ventilation intakes, etc.). The following information outlines concerns that may be associated with the accumulation of bird feces.

1.5.2.1 Disease

Birds often foul buildings, bridges, and other structures with feces and nesting materials and are host to many naturally occurring zoonotic diseases which are transmissible to humans and pets (Weber 1979). Disease transmission may occur when people come in contact with contaminated areas or birds that are diseased. The people at greatest risk of contracting zoonotic diseases are those who come into direct contact with bird feces or are exposed to feces-contaminated dust in ventilation systems. As many as 65 zoonotic diseases, transmissible to humans or domestic animals, have been associated with pigeons, starlings, English sparrows (*Passer domesticus*), waterfowl, and other migratory birds (Weber 1979, Stickley and Weeks 1985).

Some of these zoonotic diseases include: *bacterial diseases* (*e.g.,* avian cholera, tuberculosis, salmonellosis, botulism, psittacosis, campylobacter enteritis, ornithosis); *fungal diseases* (*e.g.*, aspergillosis (brooder pneumonia), histoplasmosis, candidiasis); and *viral diseases* (*e.g.*, Newcastle disease, AI) (Stickley and Weeks 1985). Of these diseases, ornithosis[12] (also

[12] Ornithosis varies in severity but can be fatal. In the United States, herons, waterfowl, gulls, and doves are reported carriers (USGS 1999). The disease is spread through direct contact with infected birds and inhalation of infected airborne

known as psittacosis) and histoplasmosis[13] appear to present the greatest potential hazard to public health. However, glaucous-winged gulls were found to be vectors of salmonella in an epidemic associated with contaminated water supplies in Ketchikan, AK (Patton 1994).

In 2006, WS became part of an interagency team conducting, assisting, and/or supervising the collection of biological samples for HP H5N1 AI surveillance. The project focuses on surveillance and detection of HP H5N1 AI virus at its earliest stage in migratory birds to increase the capabilities for agencies to respond and reduce its spread. This information is critical to understanding the ecology of AI. This project targets functional groups identified in the WS *Implementation Plan for HPAI Surveillance in Wild Migratory Birds in the United States* (Alaska Interagency HPAI Bird Surveillance Working Group 2006) as priorities for AI surveillance. The species to be sampled are identified using Flyway Council regional AI surveillance plans, research identifying wild bird species as competent H5 and H7 reservoirs and carriers, and data from past North American HP H5N1 surveillance efforts. Emphasis is placed on bird species that tested positive for low pathogenic H5 or H7 AI during previous surveillance efforts. WS proposes to continue providing assistance in monitoring for HP H5N1 AI virus.

1.5.2.2 Accumulation of Droppings, Feathers, and Nesting Material

Physical damage to buildings, structures, and other property can lead to health and safety concerns. Bird feces and nesting material can damage vehicles, homes, buildings, aircraft, water craft, equipment, bridges, industrial facilities, and other property. Vermeer et al. (1988) noted that a $350,000 roof was estimated to last only half as long as originally credited because of chemical erosion caused by defecation and water damage resulting from the blockage of drainage pipes by feathers and nest material

---

fecal material. Serious outbreaks have occurred among poultry workers, and on a separate occasion, wildlife biologists who were thought to have become infected from handling snow geese (*Chen caerulescens*), great egrets (*Casmerodius albus*), snowy egrets (*Egretta thula*), white-winged doves (*Zenaida asiatica*), and ducks (USFWS 1987).

[13] Histoplasmosis is an infectious disease caused by inhaling the spores of a fungus called *Histoplasma capsulatum.* The fungus grows best in soils having high nitrogen content, especially those enriched with bird manure or bat droppings. The histoplasmosis organism can be carried on the wings, feet, and beaks of birds and infect the soil under roosting sites and in manure accumulations inside or outside buildings.

of gulls. Between FY05 and FY08, AK WS recorded approximately $96,950 in bird feces damage and prevention costs.

The Occupational Safety and Health Administration (OSHA) considers bird droppings in the work place hazardous. Fines may be relatively high, such as when OSHA fined a Hoboken, NJ manufacturing company $673,400 for failing to abate hazards associated with "severe accumulations of pigeon droppings" (Mansdorf 1999). OSHA sanitation standard 29 CFR 1910.141(a) (5) Vermin Control states,

"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."

Clean up and removal of large amounts feces can be a precarious task that must be conducted correctly and carefully to prevent making infectious particles airborne.

1.5.2.3 Spread of Landfill Refuse

Landfills are a dependable source of food for corvids, gulls, and other scavenging birds. The increased use by birds and associated urban nesting has led to an increase in conflicts with humans (Verbeek 1977, Bradley 1980, Burger 1981, Patton 1988, Belant and Dolbeer 1993). The management of birds is required as a minimum functional standard for solid waste handling under Alaska Administrative Code (AAC):

18 AAC 60.010. Accumulation, storage, and treatment

a) A person may not store accumulated solid waste in a manner that causes:

1) a litter violation under 18 AAC 64.015;

2) the attraction or access of domestic animals, wildlife, or disease vectors;

3) a health hazard; or

4) polluted run-off water.

18 AAC 60.230. Disease vector, wildlife, and domestic animal control

a) The owner or operator of a facility subject to the permit requirements of AS 46.03.100 and this chapter shall manage the facility so that:

1) disease vectors do not endanger public health, safety, or welfare or create a nuisance;

2) wildlife and domestic animals do not endanger public health, safety, or welfare; become harmed by contact with the waste; or become a nuisance; the requirements of this paragraph do not apply to a Class III MSWLF.

b) The owner or operator of a Class III MSWLF shall minimize, to the extent practical, access by wildlife and domestic animals to putrescible waste deposited at the MSWLF.

In 2000, a landfill in King County, Washington settled a $16.5 million lawsuit with neighbors over odor, noise, vibration, and bird problems (Seattle Post-Intelligencer 2002). BDM at landfills in AK is often necessary to prevent the spread of diseases that birds can carry from the landfill to surrounding communities (Butterfield et al. 1983).

1.5.3 Property Damage

Corrosion damage to metal structures and painted finishes, including those on automobiles, can be caused by uric acid from bird droppings. WS recorded approximately $648,815 in damage to property in AK between FY05 and FY08. Unspecified miscellaneous damage to buildings accounted for about $272,969, followed by damage from bird droppings at $9,625, and $29,000 in damage to equipment/utilities.

1.6 DECISIONS TO BE MADE

WS is the lead agency for this EA and therefore responsible for the scope, content, and decisions made. Based on the scope of this EA, the decisions to be made are:

1. How can AK WS best respond to the need to reduce bird damage to human health and safety and property?
2. What are the environmental effects from implementing various management strategies?
3. Does the proposal have significant enough effects to require an EIS?

1.7 SCOPE OF THIS EA

1.7.1 Actions Analyzed

This EA evaluates proposed BDM to protect human health and safety and property in AK.

1.7.2 Period for which this EA is Valid

This EA will remain valid until WS and other appropriate agencies determine that a new need for action is warranted, conditions change, or new alternatives having different environmental effects must be analyzed. At that time, this EA would be supplemented or reissued pursuant to NEPA with the appropriate analyses.

1.7.3 Site Specificity

This EA analyzes potential impacts of WS' BDM and addresses those activities on all lands under *Cooperative Agreement* or *Agreements for Control* within AK, or those written in the foreseeable future. Because the proposed action is to implement an adaptive, integrated BDM program, and because WS' goals and responsibility are to provide service when requested within the constraints of available funding and workforce, it is conceivable that additional damage management efforts could occur. Thus, this EA anticipates and analyzes the effects of additional efforts as part of the proposed program. This EA emphasizes significant issues as they relate to specific areas whenever possible; however, the issues that pertain to BDM and resulting management are the same, for the most part, wherever they occur and are treated as such.

By using the Decision Model, 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. WS determined that a more detailed and more site-specific level of analysis would not substantially improve the public's understanding of the proposal, the analysis, the decision-making process, and pursuing a more site-specific and more detailed analysis might even be considered inconsistent with NEPA's emphasis on reducing unnecessary paperwork (Eccleston 1995). In addition, in terms of considering cumulative impacts, one EA analyzing affects in AK will provide a better analysis than multiple EA's covering smaller zones within AK.

1.7.4 Resources Not Currently Protected by WS BDM

The current program operates on a small percentage of the area of AK and provides assistance when requested. This EA analyzes effects at the current program level

and attempts to identify increased program levels should individuals or agencies request assistance. Any increase is anticipated to be minimal.

1.7.5 AK Native Corporations

If native corporations request WS assistance, the methods employed and potential effects would be the same as for any private land upon which WS could provide services. WS would only use methods discussed in this EA and addresses concerns with corporation representatives at the time an agreement is signed. Therefore, this EA covers such actions as requested and implemented.

Currently, AK WS has no MOUs with Alaska Native Corporations. If WS enters into an agreement with an Alaska Native Corporation for BDM, this EA would be reviewed and, if appropriate, supplemented to insure compliance with NEPA. MOUs, agreements and NEPA compliance would be conducted, as appropriate, before conducting any BDM on native lands.

1.7.6 Public Lands

WS may provide BDM on public lands in AK as requested by the USFWS, USDA Forest Service, Bureau of Land Management, U.S. Army Corps of Engineers, and ADFG and/or others as permitted by the USFWS and ADFG. The strategies and methods employed would be the same on these lands as they would be on other lands upon which WS provides BDM. If AK WS were requested to conduct BDM on public lands for the protection of resources, this EA would cover such actions.

1.8 Laws and Regulations

The WS program carries out their federal wildlife damage management responsibility to resolve problems that occur when human activity and wildlife are in conflict, while recognizing that wildlife are an important public resource greatly valued by the American people. The authorities imparted to the Secretary of Agriculture by the Act of March 2, 1931, as amended, and the Act of December 22, 1987, have been delegated to APHIS, a USDA agency. Within APHIS, these authorities have been delegated to the WS program. Accordingly, WS' authorities support and authorize its mission of providing federal leadership and expertise to reduce problems caused by injurious and/or nuisance wildlife to human health and safety[14], to agricultural and other natural resources, including other

[14] See www.aphis.usda.gov/ws/mission.html. Examples of APHIS-WS activities include: 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; cooperative wildlife damage management

wildlife and T&E wildlife; and minimizing potential wildlife harm or threats. WS' Policy Manual reflects this mission and provides guidance for conducting wildlife damage management.

The current WS program is subject to legal/administrative authorities (*i.e.,* Act of March 2, 1931, as amended) and other federal and state laws and statutes, and takes into account the biological, physical, and socio-cultural environment when evaluating BDM actions and methods to resolve conflicts. Other federal and state agencies are tasked with various aspects in managing public resources, and are integral to the application of IWDM. For a detailed discussion of agencies, laws, and regulations, see Appendix A. Below is a brief discussion of agencies and regulations that apply to the analysis.

Consulting Agencies:

United States Fish and Wildlife Service. The USFWS is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife resources and their habitats.

Federal Aviation Administration. The FAA's authority for managing wildlife hazards at airports is based on 14 CFR, Part 139.337. The FAA is the federal agency responsible for developing and enforcing air transportation safety regulations and is authorized to reduce wildlife hazards at commercial and non-commercial airports.

Alaska Department of Fish and Game. The harassment or lethal removal of game for wildlife control purposes is regulated by Alaska Statute (16.05.920 Prohibited Conduct Generally).

Alaska Department of Transportation and Public Facilities. The ADOTPF's authority for managing airports is based on Title 17 of the AAC.

Compliance with Federal Laws, Executive Orders and Regulations

WS consults and cooperates with other federal and state agencies as appropriate to ensure that all WS activities are carried out in compliance with all applicable federal laws.

National Environmental Policy Act: All federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). WS and the USFWS follow the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500 et seq.), USDA (7 CFR 1b), and

---

programs; informing and educating the public on how to reduce wildlife damage; and providing data and a source for limited-use management materials and equipment, including pesticides.

WS follows the APHIS Implementing Guidelines (7 CFR 372) as a part of the decision-making process.

Endangered Species Act: Under the ESA, all federal agencies are charged with a responsibility to conserve endangered and threatened species and to utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). WS conducts Section 7 consultations with the USFWS to utilize 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* . . ." (Sec.7 (a) (2)). WS conducts formal Section 7 Consultations with the USFWS at the national level (USDI 1992) and consultations with the USFWS at the local level (USFWS 2007), as appropriate.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as amended: The MBTA provides the USFWS regulatory authority to protect species of birds that migrate outside the U.S... The law prohibits any "take" of these species by private entities, except as permitted by the USFWS; therefore the USFWS issues permits to reduce bird damage (50 CFR 21.41). Starlings, pigeons, house sparrows and domestic waterfowl are not classified as protected migratory birds and therefore have no protection under the MBTA. USFWS Depredation Permits (DPs) are also not required for "yellow-headed, red-winged, rusty, and Brewer's blackbirds, cowbirds, all grackles, crows, and magpies found committing or about to commit depredation upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance" (50 CFR 21.43).

Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978): The BGEPA prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. Transport includes convey or carry by any means; also deliver or receive for conveyance.

National Historical Preservation Act (NHPA) of 1966 as amended: The NHPA and its implementing regulations (CFR 36, 800) require federal agencies to initiate the section 106 process if an agency determines that the agency's actions are undertakings as defined in Sec. 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under section 106.

Native American Graves Protection and Repatriation Act: 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.

Occupational Safety and Health Act of 1970: The Occupational Safety and Health Act of 1970 and its supplementing 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 birds that may cause safety and health concerns at workplaces.

Environmental Justice and Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations: Environmental Justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. The nature of WS's BDM activities is such that they do not have much, if any, potential to result in disproportionate environmental effects on minority or low-income populations. Therefore, no such adverse or disproportionate environmental impacts to such persons or populations are expected.

Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks: Children may suffer disproportionately from environmental health and safety risks, including their developmental physical and mental status, for many reasons. Based on the Risk Assessment (USDA 1997, Appendix P) concluded that when WS program chemicals and non-chemical methods are used following label directions and normally accepted safety practices and WS standard operating procedures, such use has negligible impacts on the environment or on human health and safety, which includes the health and safety of children.

Executive Order 13112 - Invasive Species: Authorized by former President Clinton, EO 13112 establishes guidance to federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The EO, in part, states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law: 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations and provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species.

Executive Order 13186 and MOU between USFWS and WS: EO 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration between WS and the USFWS, in coordination with state, tribal, and local governments. A national-level MOU between the USFWS and WS has been drafted to facilitate the implementation of EO 13186.

1.9 RELATED ENVIRONMENTAL DOCUMENTS

1.9.1 WS Programmatic EIS

WS issued a final EIS (USDA 1997) and Record of Decision on the USDA-APHIS-WS nationwide program. The final EIS (USDA 1997) discussed BDM at the nationwide level and concluded that nationwide the WS program did not impact bird populations. Pertinent portions of the EIS are incorporated by reference in this EA.

1.9.2 USFWS EA on Geese in Anchorage

The Final EA and Finding of No Significance Impact (FONSI) for "*Canada Goose Population Management in Anchorage, Alaska*" (USFWS 1998) analyzed alternatives and impacts for managing the growing population of Canada geese in the Anchorage area. Pertinent and current information available in "*Canada Goose Population Management in Anchorage, Alaska*" has been incorporated by reference.

CHAPTER 2 ALTERNATIVES AND METHODS

2.1 INTRODUCTION

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), *"Methods of Control*" (Appendix J in USDA 1997), and the *"Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program"* (Appendix P in USDA 1997). Four alternatives were recognized, developed, and analyzed in detail and three alternatives (Section 2.4) were considered but not analyzed in detail with rationale.

2.2 DESCRIPTION OF ALTERNATIVES ANALYZED IN DETAIL

2.2.1 Alternative 1 - Continue the Current AK WS Bird Damage Management Program, Non-lethal Preferred Over Lethal Control (No Action/Proposed Alternative).

This alternative is used as the baseline for comparison with the other alternatives, therefore, detailed information and descriptions provided under this alternative and under the analysis of its possible environmental effects may be extended to the other alternatives. Alternative 1 is also the "No Action" Alternative. The "No Action" Alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), and is a viable and reasonable alternative that could be selected.

This alternative consists of the current program of adaptive IWDM TA and operational BDM on federal, state, county, city, and private lands under Cooperative Agreement, Agreement for Control, or other comparable documents. When determining the damage management strategy, preference is given to practical and effective non-lethal methods (WS Directive 2.101). However, not all non-lethal methods are practical and effective for every damage situation. The current program employs methods specific to the risk/level of damage being caused and species involved.

WS uses the most effective and biologically sound damage management methods (*i.e.*, IWDM) to resolve damage caused by birds. In general terms, IWDM is comprised of practical and effective methods to resolve a particular wildlife problem. The methods may include recommending the alteration of habitat and cultural practices, exclusion devices, non-lethal harassment, and/or lethal removal (Appendix B). Methods are implemented at the field level according to WS Directive 2.101, 2.105, and through the WS Decision Model (Slate et al. 1992), and guided by permits, laws and regulations, and consultations. WS BDM activities are coordinated, when appropriate, with the USFWS and ADFG to avoid adverse effects.

2.2.2 Alternative 2 – Implement All Non-lethal Methods Before Using Lethal Methods

Alternative 2 requires that all non-lethal methods be implemented regardless of practicality or effectiveness before any lethal methods are used by WS. With this alternative, WS would be required to implement the entirety of non-lethal methods prior to implementing lethal methods. WS does not propose to implement any method that could adversely affect (*e.g.*, sub-lethal effects) non-target or ESA-listed species, violate state or federal laws, or considered unsafe to conduct. The APHIS-WS Decision Model (Slate et al. 1992) would not fully apply to this approach for resolving bird damage.

This alternative differs from Alternative 1 in that it would require AK WS to use every non-lethal method and find them to be inadequate/ineffective for each damage situation before lethal methods could be implemented. Even if lethal removal may appear to be warranted (*e.g.*, resolving an immediate life-threatening situation), it must be delayed until all nonlethal methods, including those that could be considered impractical or ineffective, are implemented before lethal actions are used.

2.2.3 Alternative 3 - Technical Assistance BDM Program Only

WS would not conduct operational BDM activities in AK. If requested, WS would only offer TA. Alternative 3 is a modification of Alternative 1 (Non-lethal Preferred), wherein no operational BDM would be provided by WS. However, WS could recommend operational BDM, but it would be implemented by the affected agency or resource owner (*e.g.*, home or business owner). WS would use the WS Decision Model (Slate et al. 1992) to determine the recommendations to implement.

2.2.4 Alternative 4 - No WS BDM Program

This alternative would terminate WS' role in BDM in AK. Affected agency and resource owners would need to contact other wildlife management agencies or would be left to their own devices to stop/reduce damage caused by birds.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

The following alternatives were evaluated and eliminated from further consideration.

2.3.1 Lethal Methods Only Alternative

The Lethal Methods Only Alternative was analyzed in USDA (1997). This alternative would require WS to attempt to reduce or alleviate bird damage or the threat of

damage through strictly lethal means. This alternative was eliminated for being unrealistic and socially and environmentally unacceptable and would not comply with the WS Decision Model (Slate et al. 1992).

2.3.2 Eradication of Native Bird Species

An eradication alternative would direct all WS Program efforts toward total elimination of problematic or nuisance birds (*e.g.*, native and non-native[15]) in cooperating boroughs or larger defined areas in AK. The eradication of damaging birds in AK is not a desired goal of state or federal wildlife management agencies, including WS. Eradication as a general objective for BDM will not be considered by WS in detail because eradication of birds in AK:

- would be extremely difficult, if not impossible to accomplish;
- is cost-prohibitive in most situations;
- is not acceptable to most members of the public; and
- is not a required strategy for protecting property and human health and safety.

2.3.3 Wildlife Damage Should Be an Accepted Loss

WS is aware that some people feel that BDM should not be allowed until economic losses become unacceptable. Although some loss of resources to wildlife can be expected and tolerated, WS has a legal obligation to respond to requests for wildlife damage management, and it is WS policy to aid each requestor to minimize losses. WS uses the Decision Model (Slate et al. 1992) to determine an appropriate strategy (ies).

In a ruling for the Southern Utah Wilderness Alliance, et al. versus Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the U.S. District Court of Utah upheld the determination that a wildlife damage management program may be established based on the threat of damage. In part, the court found that a forest supervisor need only show that the threat of damage (from predators) exists in order to establish a need for IWDM (Civil No. 92-C-0052A, 20 January 1993). Thus,

[15] In damage situations involving invasive, deleterious exotic, or other non-native species, eradication may be a desired goal (locally or state-wide) as directed by Executive Order 13112. Any efforts towards eradication of such species would be conducted in cooperation with or at the request of ADFG and/or USFWS.

there is precedence for conducting damage management activities when the threat of damage is present.

2.4 BDM STRATEGIES USED BY AK WS

BDM strategies vary according to the resource being protected, species involved, location of the damage, time of year, and other factors. However, WS damage management efforts are site-specific and targeted to reduce the specific damage problem.

During more than 90 years of resolving wildlife damage problems, WS has considered, developed, and used numerous methods to reduce damage problems (USDA 1997). WS' efforts include research and development of new methods and implementation of effective strategies to reduce and prevent wildlife damage. WS employs different strategies to reduce wildlife damage problems, commonly referred to as IWDM. IWDM is the implementation and application of safe and practical methods to prevent and reduce damage caused by wildlife based on local problem analyses and the informed judgment of trained personnel. The WS Program applies IWDM to reduce damage using the WS Decision Model (Figure 1.1) (Slate et al. 1992). The philosophy behind IWDM is to implement effective management techniques, in a cost-effective manner while minimizing the potentially harmful effects to humans, target and non-target species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques for each specific situation. IWDM may incorporate cultural practices, localized habitat and animal behavior modification, removal of individual animals, local population reduction, or any combination of these, depending on the characteristics of the specific damage problem.

2.4.1 Technical Assistance (TA)

TA is defined as advice, recommendations, information, equipment, literature, instructions, and materials provided to others to prevent or reduce wildlife damage and understand wildlife damage management principles and techniques. Explanation of the biology, behavior, and population ecology of the species responsible for damage is occasionally sufficient to satisfy the resource owner's information needs and may result in no damage management actions being taken.

WS also provides lectures, demonstrations, and/or training to private property owners, airport and oil industry personnel, and other interested groups and frequently cooperates with other agencies with educational 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 updated on damage management technology, laws, regulations, and agency policies.

Recipients of WS TA are responsible for the legal and responsible implementation of recommended damage management actions. The WS program has no regulatory authority or control of the actions, if any, taken by others.

2.4.2 Operational Bird Damage Management

Operational BDM is defined as field activities conducted by WS personnel. Operational BDM may be implemented when it has been determined that the problem cannot reasonably be resolved by TA or that the professional skills of WS employees are required for effective problem resolution. Operational BDM is often initiated when the wildlife damage involves several land ownerships, sensitive species, or complex damage management problems requiring actions by professional wildlife personnel. Operational BDM would only be conducted upon request after written authorization from the landowner, cooperator, or other authorized officials is obtained. Possible BDM methodologies are detailed in Appendix B.

2.4.2.1 Preventive Bird Damage Management

Preventive BDM is the practice of applying damage management strategies before damage occurs. Preventive BDM is based on historical problems and the probability of the damage recurring or an imminent threat to human health or safety. As requested WS personnel would take action to prevent historical losses from recurring or reduce the risk of potential losses from occurring. Some examples include the harassment and/or removal of a bird(s) (or nesting materials) from rooftops near ventilation intakes before the bird(s) has caused damage or threatened human health and safety, or at airports to reduce bird-aircraft collisions.

2.4.2.2 Corrective Bird Damage Management

Corrective BDM is the practice of applying damage management to stop or reduce existing losses. As requested, WS personnel take appropriate action (*e.g.*, harass, remove, etc.) towards birds that are in the act of causing damage.

2.4.3 Educational Efforts

Education is an important element of AK WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, instructional courses and demonstrations are provided to

producers, homeowners, state and borough agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in educational and public information efforts. Additionally, WS personnel and scientists with the WS National Wildlife Research Center[16] (NWRC) routinely provide technical papers 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.

2.4.4 Research and Development

The NWRC functions as the research arm of WS by providing scientific information for the development and improvement of biologically-sound wildlife damage management methods. The NWRC, under this EA analysis, could study and develop additional BDM methods to reduce bird damage and protect resources. New methods studied and developed with other agency wildlife managers, researchers, field specialists, and others would comply with state and federal laws and statutes. As new methods are developed they could be incorporated into the current BDM program.

WS also participates in the banding efforts of other federal and state entities by reporting all bands recovered to the appropriate authorities.

2.5 MINIMIZATION MEASURES AND SOPs FOR BDM TECHNIQUES

Minimization measures are any feature of an action that serves to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide, uses many minimization measures, and these are discussed in detail in Chapter 5 of USDA (1997). The following measures apply to some or all of the alternatives analyzed for the AK WS program, as indicated by an "X" in the column on the right side of Table 2-1.

- Alternative 1 – Continue the Current AK WS Bird Damage Management Program,
- Alternative 2 – Implement All Non-lethal Methods Before Using Lethal Methods
- Alternative 3 - Technical Assistance BDM Program Only
- Alternative 4 - No WS BDM Program

[16] WS' NWRC is headquartered in Fort Collins, Colorado and operates field stations across the United States. It is staffed by scientists from disciplines including: animal behavior, veterinary medicine, wildlife biology, physiology, ornithology, mammalogy, zoology, chemistry, and statistics.

Table 2-1. Minimization Measures Implemented for Each Alternative	Alternatives			
	1	2	3	4
The WS Decision Model (Slate et al. 1992) is used to identify the most effective biologically and ecologically sound BDM strategies and their impacts.	X			
Research on selectivity and humaneness of management practices would be monitored and adopted as appropriate.	X	X	X	
The use/recommendation of capture equipment would conform to current laws and regulations administered by USFWS, ADFG and WS Policy Directives (APHIS 2010).	X	X	X	
Captured non-target animals would be released unless it is determined by the AK WS personnel that the animal would not survive.	X	X		
WS personnel are trained and experienced on all BDM methods to select the most appropriate method to reduce damage while minimizing take of target animals while excluding non-target species. Training details are outlined in the WS Policy Manual (APHIS 2010).	X	X		
WS Specialists would recommend the use of traditional and newly developed proven nonlethal methods.	X	X	X	
Euthanasia procedures approved by the American Veterinary Medical Association (AVMA 2007). These guidelines incorporate input from several professional societies and international authorities (*e.g.* American Ornithologists Union, American Society of Mammalogists, American Association of Avian Pathologists, World Organization for Animal Health, International Association of Fish and Wildlife Agencies).	X	X		
Operational BDM conducted on public lands would be coordinated with the management agency.	X	X		
WS consulted with the USFWS and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.	X	X		
AK WS' take is provided to the USFWS and ADFG and considered with the statewide hunter harvest (AK WS take and other take) when estimating the impact on wildlife species.	X	X		
Management actions would be directed toward localized populations and/or individual offending animals, dependent on the magnitude of the problem.	X	X		
Potential impacts on T&E species in AK have been assessed. No adverse effects are likely to occur from WS actions (USFWS 2007, WS 2010).	X			

CHAPTER 3 ENVIRONMENTAL CONSEQUENCES

3.1 ENVIRONMENTAL CONSEQUENCES

NEPA requires federal agencies to identify and assess the reasonable alternatives to a proposed action that will avoid or minimize adverse effects of these actions upon the quality of the human environment (40 CFR 1500.2e). Chapter 3 provides the information needed for making informed decisions for selecting the appropriate alternative or meeting the need for action and purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative analyzed in detail in Chapter 2 in relation to the issues identified for detailed analysis.

The following criteria will aid in determining the environmental consequences in regards to each issue (Section 3.2) to determine if the impacts are greater than, less than, or the same as the

3.1.1 Non-significant Impacts

The following resources within AK are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, flood plains, visual resources, air quality, or prime and unique farmlands. These resources will not be analyzed further.

3.1.2 Irreversible and Irretrievable Commitments of Resources

No irreversible or irretrievable commitments of resources are expected, other than minor uses of fuels for motor vehicles and other similar materials. These will not be discussed further.

3.1.3 Evaluation of Significance of Cumulative and Unavoidable Impacts

Each issue analyzed in detail is evaluated under each alternative and the direct, indirect, and cumulative impacts are analyzed. NEPA regulations describe the elements that determine whether or not an impact is *"significant*." Significance is dependent upon the context and intensity of the action. The following factors were used to evaluate the significance of impacts in this EA that relate to context and intensity (adapted from USDA 1997) for this proposal:

3.1.3.1 Magnitude of the Impact (size, number, or relative amount of impact)

Magnitude is defined in USDA (1997) as ". . . a measure of the number of animals killed in relation to their abundance" and may be determined either quantitatively or qualitatively. Quantitative analysis is used whenever possible as it is more rigorous and is based on allowable harvest levels, abundance estimates, and harvest data. Qualitative analysis is based on

abundance trends and harvest data or trends and modeling. Recreational and subsistence harvest levels were obtained from ADFG and USFWS. *"Other Harvest"* includes the known other take, sport harvest, and other information obtained from the ADFG and USFWS. "*Total Harvest"* is the sum of the birds removed by AK WS combined with the "*Other Harvest*."

3.1.3.2 Duration and Frequency of the Impact.

Duration and frequency of BDM in AK is highly variable. Abiotic and biotic factors affecting wildlife behavior affect the duration and frequency of BDM activities conducted by WS in AK. BDM in specific areas may be long duration projects, but the frequency of individual actions may be highly variable depending upon any number of factors affecting the behavior of the animals that are causing damage and the location of the potential damage. BDM would only be conducted by WS when a request for assistance is received and a demonstrated need is present.

3.1.3.3 Geographic Extent.

BDM could occur anywhere in AK where damage management has been requested, agreements for such actions are in place, and action is warranted as determined by implementing the WS Decision Model (Slate et al. 1992). Actions would be limited to areas receiving damage from birds (primarily human population centers), areas with historical bird damage, or areas where a threat of damage exists.

3.2 ISSUES ANALYZED IN DETAIL

The following environmental issues were identified as relevant to this EA and analyzed in detail in Section 3.4.

- *Effect of methods on non-target and ESA-listed species.*
- *Effect of methods on populations of target species.*
- *Humaneness of methods.*
- *Effectiveness of BDM Program in Alaska.*

3.3 ISSUES NOT ANALYZED IN DETAIL WITH RATIONALE

3.3.1 WS' Impact on Biodiversity

AK WS does not conduct BDM to eradicate any native wildlife species. WS operates according to federal and state laws and regulations (and management plans thereof)

enacted to ensure species viability. The effects of the current WS program on biodiversity are minor and not significant nationwide, statewide, or region-wide. WS operates on an extremely small percentage (0.0001%) of the land area of AK[17] and WS' take of any wildlife species analyzed in this EA is a small proportion of the total population and insignificant to the viability and health of the total population. Therefore, there is no evidence to suggest that AK WS BDM, as proposed, would have any adverse direct, indirect, or cumulative effects on biodiversity.

3.3.2 Appropriateness of Preparing an EA (Instead of an EIS)

Some individuals might question whether preparing an EA for an area as large as the state of AK 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 EA's covering smaller zones. In addition, AK WS only conducts BDM in a very small area of the State (0.0001%) where damage is occurring or likely to occur (see Section 1.3).

3.3.3 Cost Effectiveness of Bird Damage Management

Perhaps a better way to state this issue is by the question "Does the value of damage avoided equal or exceed the cost of providing BDM?" CEQ does not require a formal, monetized cost-benefit analysis to comply with NEPA (40 CFR 1502.23) and consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. USDA (1997, Appendix L) states:

> *"Cost effectiveness is not, nor should it be, the primary goal of the APHIS WS program. Additional constraints, such as the environmental protection, land management goals, and others, are considered whenever a request for assistance is received. These constraints may increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS WS Program."*

An analysis of cost-effectiveness in many BDM situations is exceedingly difficult or impossible to perform because the value of benefits is not readily determined. For example, the potential benefit of reducing bird risks at airports or eliminating

[17] Primarily human population centers and in areas with developments (*i.e.,* airports, landfills and waste transfer stations, industrial areas, etc.)

pigeons from nesting in industrial buildings could reduce bird strikes or incidences of illness among unknown numbers of building users. Since some bird strikes or bird-borne diseases are potentially fatal, or severely debilitating, the value of the benefit may be high. However, no studies of disease problems with and without BDM have been conducted, and, therefore, the number of cases *prevented* by effective BDM is not possible to estimate.

3.3.4 Bird Damage Management Should Be Conducted by Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce bird 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, they are not required to comply with NEPA, 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, airport managers, and cities and towns may prefer to use WS because of security and safety issues, legal requirements to be accountable to the public through NEPA compliance and reduced administrative burden.

3.3.5 Impacts to Alaska Natives

WS' proposed alternative does not affect local populations of wildlife or habitat associated with those species, and therefore will not affect Alaska Natives or their opportunities for subsistence harvest.

3.3.6 Perception of Aesthetics

Aesthetics is the philosophy dealing with the nature of beauty or the appreciation of beauty. Therefore, aesthetics is subjective in nature, dependent on what an observer regards as beautiful or distasteful. The mere knowledge that wildlife exists is a positive benefit to many people (Fulton et al. 1996). Human dimensions of wildlife damage management include identifying how people are affected by problems or conflicts between them and wildlife, attempting to understand people's reactions, and incorporating this information into policy and management decision processes and programs (Decker and Enck 1996, Decker and Chase 1997). Aesthetically speaking, a passerby may view a large flock of feeding birds with great delight, whereas another person, such as a property-owner experiencing wildlife damage, may view the same birds with displeasure.

Some bird species have increased in abundance to where their current populations are much higher than they were historically, and are often the result of human-induced environmental changes. Conover (2002) states that there is no word or phrase to describe species whose current population exceeds historical levels due to human-caused environmental changes, hence these species are referred to as being "anthropogenic abundant." Many native birds we think of as common due to their current abundance are anthropogenic abundant and they often cause environmental changes, but when these changes are not to society's liking, we call it environmental degradation or destruction (Conover 2002). For instance, many anthropogenically abundant species have contributed to the decline of some native species, including endangered species, through excessive predation, competition, or disease transmission (Goodrich and Buskirk 1995). The exponential increase of urban geese in Anchorage, which occurred in the 1990s (USFWS 1998), provides a recent example of an anthropogenically abundant species.

"Wildlife acceptance capacity" is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). Wildlife acceptance capacity is also known as the "cultural carrying capacity." These terms are important because they define the sensitivity of a local community to a specific wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected. This threshold of damage or potential damage is a primary limiting factor in determining the wildlife acceptance capacity. The wildlife acceptance capacity reflects the acceptance of one key constituency for a species at a given point in time, thus, different key constituency groups can simultaneously have different wildlife acceptance capacities that reflect their particular set of pertinent limiting factors relative to a particular wildlife population (Decker and Purdy 1988).

WS recognizes the aesthetic importance of wildlife and associated viewing and recreational opportunities. Under the current program there may be a local, site-specific effect on people's opportunities to view some individual birds or flocks. However, bird populations as a whole have not been negatively affected by AK WS, and there has been no measurable decline in public viewing opportunities. This trend would be expected to continue.

3.4 ALTERNATIVES ANALYZED IN DETAIL

3.4.1 Alternative 1: Continue the Current WS BDM Program, with Non-lethal Preferred Over Lethal Control (No Action/Proposed Alternative)

Alternative 1 is the "No Action" Alternative, which is a procedural NEPA requirement (40 CFR 1502.14(d)). This alternative would continue the current program, an adaptive IWDM approach, which includes the use of a combination of non-lethal and lethal methods based on case-by-case situations. Non-lethal methods are preferred and used first when they are deemed practical and effective (WS Directive 2.101).

3.4.1.1 Effect of Damage Management Methods on Non-target and ESA-listed Species

WS conducted a Section 7 consultation with the USFWS in order to determine whether the proposed action will affect listed species. USFWS made a determination of *not likely to adversely affect* on the portions of the proposed action that WS determined have the potential to affect T&E species (USFWS 2007).

The methods used under Alternative 1 are selective for target species. There has not been a measurable adverse effect observed on non-target species and no effect on ESA-listed species. Operational damage management conducted by AK WS may include harassment, exclusion, shooting, capture and euthanasia, and other methods discussed in Appendix B which are determined to be practical, legal, and effective. All capture and removal methods allow for positive identification of target species prior to initiating damage management actions.

3.4.1.2 Effect of Methods on Populations of Target Species

BDM incorporates a variety of methods (Appendix B), both lethal and non-lethal to reduce damage or risk of damage to human health and safety and protect property. WS may conduct lethal damage management to enhance a behavioral response to non-lethal methods[18]. This is typically required when bird population densities are relatively high and non-lethal methods are ineffective or the birds have habituated to the non-lethal method. Appendix

[18] At airports, primarily Anchorage International Airport (ANC) and Elmendorf Air Force Base, threats to human health and safety take precedence over the implementation of non-lethal methods and the immediate removal of individual birds may occur concurrently with the implementation of non-lethal strategies.

C shows a table of birds killed and harassed by WS from FY05 to FY09 and a graph demonstrating the proportion of lethal to non-lethal management actions.

In the following analysis, the magnitude of WS' effect is limited primarily to the species most often lethally removed during BDM actions. The analysis for magnitude of effect generally follows the process described in Chapter 4 of USDA (1997), which defines magnitude as "*... a measure of the number of animals killed in relation to their abundance*." Magnitude can be determined either quantitatively or qualitatively[19].

Most of WS' efforts are currently directed toward waterfowl, gulls, corvids, and feral pigeons. All species harassment and lethal take when compared to abundance is low, so the effect of these actions at the local, regional, and national population scale is insignificant. Below is the analysis for the primary bird species and groups on which AK WS conducted lethal damage management[20]. All averages for AK WS take are a 5-year average for activities from FY05 through FY09. The analysis below considers the level of take anticipated by AK WS' staff to sufficiently reduce damages and meet future requests for assistance. Because new wildlife damage situations arise routinely and WS may be asked to provide assistance at any time, the level of take analyzed if higher than what is currently being conducted.

3.4.1.2.1 Waterfowl

Migratory waterfowl, including swans (*Cygnus* spp.), are managed and protected by the USFWS and ADFG. These species are legally hunted in AK with seasons and bag limits set by both agencies. Waterfowl may be lethally removed by WS in response to emergency human health and safety threats at airports (USFWS Depredation Permit # MB736445-0, MB-736445-2; ADFG Permit #09-060). At the current level of take by WS for any of the species included in this analysis, there is no indication of potential negative impacts to those populations (see analysis below).

---

[19] Some species analyses use estimates of breeding populations, which are conservative when compared to an entire population estimate.

[20] Species may be encountered by WS on airports that are not analyzed in detail. Species selected for analysis were selected because they were identified as the most common damaging species and WS anticipates similar trends in the future. Under the current ADFG permit, "up to 10 birds per species [not listed on the existing permit], excluding bald and golden eagles and T&E species, may be taken [annually], however, there is no limit on the number taken at airports in emergency situations" (ADFG Permit No. 10-029).

Mallard Population Impacts

The estimated mallard (*Anas platyrhynchos*) breeding population in AK in 2009 was 503,000 (USFWS 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 22,126 mallards in AK (Raftovich et al. 2009). Between FY05 and FY09, WS collected 3 eggs, non-lethally dispersed an average of 7,731 birds, and lethally removed an average of 155 mallards per year on projects relevant to this EA. Based on the annual average, WS removed about 0.03% of the estimated mallard population in AK[21]. The Breeding Bird Survey (BBS) population trend data from 1966 to 2007 shows the mallard population is steadily increasing in AK (Sauer et al. 2008). Though not anticipated, WS could take up to 500 mallards per year, equaling 0.09% of the estimated population, and would not significantly impact the distribution, abundance, or population trend of the species.

American Wigeon Population Impacts

The estimated American wigeon (*A. americana*) breeding population in AK in 2009 was 805,000 (USFWS 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 9,901 wigeon in AK (Raftovich et al. 2009). Between FY05 and FY09, WS non-lethally dispersed an average of 2,042 birds and lethally removed an average of 44 wigeon per year on projects relevant to this EA. Based on the yearly average, WS took about 0.005% of the estimated wigeon population in AK. BBS population trend data from 1966 to 2007 shows wigeon populations have steadily increased in AK since 1968 (Sauer et al. 2008). Though not anticipated, WS could take 250 wigeon per year, equal about 0.03% of the estimated population, and would not significantly impact the distribution, abundance, or population trend of the species.

American Green-winged Teal Population Impacts

The estimated American green-winged teal (*A. creeca*) breeding population in AK in 2009 was 658,000 (USFWS 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 9,396 green-winged teal in AK (Raftovich et al. 2009). Between FY05 and FY09, WS non-lethally dispersed an average of 1,134 birds and lethally removed an average of 58 green-winged teal per year on projects relevant to this EA. Based on the yearly average, WS took about 0.009% of the

[21] Percent of population taken by WS is calculated by taking the average of the 5-year take totals and dividing them by the most recent population estimates. This applies to all species for which this value is calculated.

estimated green-winged teal population in AK. BBS population trend data from 1966 to 2007 shows the green-winged teal population has steadily increased in AK since about 1978 (Sauer et al. 2008). Though not anticipated, WS could take up to 250 green-winged teal per year, equaling 0.04% of the estimated population, and would not significantly impact the distribution, abundance, or populations trend of a species.

Northern Shoveler Population Impacts

The estimated northern shoveler (*A. clypeata*) breeding population in AK in 2009 was 464,000 (USFWS 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 1,515 shovelers in AK (Raftovich et al. 2009). Between FY05 and FY09, WS non-lethally dispersed an average of 1,578 shovelers and lethally removed an average of 31 shovelers per year on projects relevant to this EA. Based on the yearly average, WS took about 0.007% of the estimated shoveler population in AK. The BBS population trend data from 1966 to 2007 shows the shoveler population is increasing in AK (Sauer et al. 2008). Though not anticipated, WS could take up to 250 shovelers per year, totaling 0.05% of the estimated population, and would not significantly impact the distribution, abundance, or population trend of the species.

Northern Pintail Population Impacts

The estimated northern pintail (*A. acuta*) breeding population in AK in 2009 was 930,000 (USFWS 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 7,779 northern pintail in AK (Raftovich et al. 2009). Between FY05 and FY09, WS non-lethally dispersed an average of 1,013 pintails and lethally removed an average of 21 pintails per year on projects relevant to this EA. Based on the yearly average, WS took about 0.002% of the estimated northern pintail population in AK. The BBS population trend data from 1966 to 2007 shows the population of northern pintail is increasing in AK (Sauer et al. 2008). Though not anticipated, WS could take up to 100 pintail per year, equaling 0.01% of the estimated population, and not significantly impact the distribution, abundance, or population trend of the species.

Scaup (Greater and Lesser) Population Impacts

The estimated scaup (*Aythya affinis and A. marila*) breeding population in AK in 2009 was 821,000 (USFWS 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 606 scaup in AK (Raftovich et al. 2009). Between FY05 and FY09, WS non-lethally dispersed an average of 10,999 and lethally

removed an average of 76 scaup per year on projects relevant to this EA. Based on the yearly average, WS took about 0.009% of the estimated scaup population in AK. The BBS population trend data from 1966 to 2007 shows the population of lesser scaup is stable in AK (Sauer et al. 2008), while greater scaup trends were not available. Though not anticipated, WS could take up to 250 scaup per year, equaling 0.03% of the estimated population, and would not significantly impact the distribution, abundance, or population trend of the species.

Goldeneye (Barrow's and common) Population Impacts

Goldeneye (*Bucephala islandica and B. clangula)* are common in AK and the ranges of both species overlap, however the common goldeneye are more abundant than the Barrow's. The estimated goldeneye breeding population in AK in 2009 was 31,900 (Mallek and Groves 2009), and during the 2008 regulated waterfowl hunting season, sport hunters harvested 4,647 goldeneye in AK (Raftovich et al. 2009). Between FY05 and FY09, WS non-lethally dispersed an average of 2,156 and lethally removed and average of 14 goldeneye per year on projects relevant to this EA. Based on the yearly average, WS took about 0.04% of the estimated goldeneye population in Alaska. The BBS population trend data from 1966 to 2007 shows that common goldeneye abundance is relatively stable, while the abundance of Barrow's goldeneye abundance is increasing in AK (Sauer et al. 2008). Though not anticipated, WS could take up to 100 per year, equaling 0.3% of the estimated population, and would have no significant impact on the distribution, abundance, or population trend of the species.

Geese[22]

Canada Goose Population Impacts

Canada geese (*Branta canadensis*) are the familiar geese in AK and across North America and are classified into more than 15 subspecies varying in size and shading (http://www.adfg.alaska.gov/pubs/notebook/bird/canada.php). The USFWS's

[22] Based on consultation with ADFG, WS has evaluated its impacts on dusky Canada geese and Tule greater white-fronted geese. Neither species has commonly encountered during WS BDM activities at current or anticipated locations. Birds encountered in the protection of human health and safety may be removed under permit from ADFG and USFWS, and take is reported accordingly. Should WS encounter a damage situation where dusky Canada geese or Tule greater white-fronted geese pose a hazard to human health and safety and the remedy for that damage situation is anticipated to cause an adverse effect on the population, WS will coordinate with ADFG.

estimate places the total number of resident Canada geese in the U.S. at about 5 million birds with the population increasing dramatically during the past several decades (Sauer et al. 2008) and Canada geese are relatively long-lived birds. The absence of waterfowl hunting in urban areas provides additional protections to those portions of geese in urban populations. Given these characteristics, most resident Canada goose populations are continuing to increase in rural and urban areas.

The USFWS' EA and FFONSI on Canada Goose Population Management in Anchorage, AK (USFWS 1998), discusses WS' involvement in the management of Canada geese. During the 2008 regulated waterfowl hunting season, sport hunters took 5,422 Canada geese in AK (Richkus et al. 2008). The BBS population trend data from 1966 to 2007 shows that breeding populations of Canada geese increased since 1980 and have remained relatively stable the past 10 years in AK (Sauer et al. 2008). From FY05 through FY08, WS dispersed an average of 6,846, and lethally removed an average of 50 Canada geese per year on projects relevant to this EA. WS removed 0.9% of the take by sport hunters, and is unlikely to have any impact on the abundance, distribution, or population trend of the species. NEPA analyses for urban Canada goose-related activities in AK are discussed in greater detail by the USFWS (USFWS 1998). That information is incorporated by reference and the reader is referred to that EA.

Greater White-Fronted Goose Population Impacts

Greater white-fronted geese (*Anser albifrons*) breed across AK in two different populations, the pacific population and mid-continent population. The estimated number for both breeding populations totaled 1,288,400 in 2009 (Mallek and Groves 2009). WS killed an average of 12 and dispersed an average of 2,063 geese per year from FY05 through FY09. Because of recent increases in greater white-fronted geese use at several AK airports, WS anticipates possibly taking up to 200 individuals per year, amounting to 0.02% of the estimated population. This take would have no significant impact on the abundance, distribution, or population trend of the species and would be a low magnitude of impact.

3.4.1.2.2 Gulls

Gulls are managed and protected by the USFWS and ADFG. Gulls have been dispersed and lethally removed by WS to protect human health and safety at airports and in urban environments.

Glaucous-winged Gull Population Impacts

Under the current program (Alternative 1), WS would continue to primarily use non-lethal methods to alleviate glaucous-winged gull (*Larus glaucensens*) *damage*. WS dispersed an average of 28,328 and lethally removed an average of 63 glaucous-winged gulls per year on projects related to this EA. The Anchorage Audubon Society (AAS) Birds of Anchorage Checklist showed the glaucous-winged gull as "common" in the spring, summer, and fall (AAS, 1993). That is, this species occurs in nearly all suitable habitats throughout the Anchorage area, and the region regularly hosts large numbers of the species. Population estimates put the breeding population in AK at 400,000 individuals (Denlinger 2006). Based on a yearly average and anticipated projects, WS could possibly remove up to 150 glaucous-winged gulls per year to protect resources. While not anticipated, WS could increase take to 300 glaucous-winged gulls per yea, equaling 0.08% of the estimated population, and not significantly impact the distribution, abundance, or population trend of the species.

Herring Gull Population Impacts

WS removed an average of 335 nests and 247 eggs, dispersed an average of 6,205 , and lethally removed an average of 54 herring gulls (*L. argentatus*)per year. The AAS shows the herring gull as "common" in spring, and occurs in nearly all suitable habitats throughout the Anchorage area (AAS 1993). BBS population trend data for herring gulls in AK indicated that populations have been stable from 1966–2007 (Sauer et al. 2008). Herring gulls routinely occur on airport facilities and cause risk to the traveling public and aircraft from bird strikes. Though not anticipated, WS could take up to 200 herring gulls and not impact the distribution, abundance, or population trend of the species.

Mew Gull Population Impacts

The North American BBS reports high indices for mew gulls (*L. canus*) on a regular basis and the USFWS Beringian Seabird Colony lists 69 colonies with 14,400 individuals on coastal lands and islands in the eastern Bering Sea and Gulf of Alaska (Denlinger 2006). Additional colonies exist throughout AK as well. The AAS shows the mew gull as "common" in the spring, summer, and fall. That is, it occurs in nearly all suitable habitats throughout the Anchorage area (AAS 1993). Native subsistence hunters harvested almost 6,689 eggs annually between the early 1990s and 2000 (Denlinger 2006). WS removed an average of 103 nests and 109 eggs per year, and dispersed an average of 1,991, and lethally removed an average of 73 mew gulls per year. Though not anticipated, WS could take up to 250 per yea, estimated

to be less than 2% of the estimated population, and would not impact the abundance, distribution, or population trend of the species.

Bonaparte's Gull Population Impacts

Bonaparte's gulls (*L. philadelphia*) are observed in groups of 100,000+ individuals in a single location in areas of its range. While the population in AK is thought to be in the tens of thousands (Denlinger 2006), WS dispersed an average of 1,415 and lethally removed an average of 15 Bonaparte's Gulls per year. Trend data is currently unavailable. WS anticipates the need to possibly remove up to 50 Bonaparte's gulls per year to protect resources and based on the current Bonaparte's gull population, but though not anticipated, WS could remove up to 100 Bonaparte's gulls per year, 0.1% of the estimated population, and would not significantly impact the distribution, abundance, or population trend of the species.

3.4.1.2.3 Corvids

Through depredation orders, the USFWS authorized individuals to lethally remove, without a Federal permit, crows (*Corvus* sp.), and magpies (*Pica* sp.) when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance (50 CFR §21.43).

Common Raven Population Impacts

Ravens (*Corvus corax*) breed across AK with the estimated population of 140,000 in AK (RMBO 2009) and raven populations throughout North America and AK have been increasing at a steady rate from 1966 to 2007 (Sauer et al. 2008). WS dispersed an average of 50,531 and lethally removed an average of 103 common ravens per year. Trend and dispersal information suggests that WS' BDM activities on ravens have not adversely affected the raven population in AK. AK WS activities have removed about 0.07% of the ravens found in AK and resulted in no impact on raven population. Under the current program (Alternative 1), WS would continue to primarily use non-lethal methods to alleviate raven damage. Though not anticipated, WS could take up to 300 ravens per year, 0.2% of the estimated populations, with no significant impacts to distribution, abundance, or population trend of the species.

Northwestern Crow Population Impacts

Northwestern crow (*C. caurinus*) populations in AK are healthy with an estimated population of 500,000 individuals (RMBO 2009). AK WS dispersed an average of 3,911 and lethally removed and average of 8 northwestern crows per year from FY05 through FY08. BBS trend information indicates that northwestern crow populations have increased substantially since 1966 in AK (Sauer et al. 2008). WS' management actions removed about 0.002% of the population and WS' activities have not adversely affected the population in AK. WS will continue to primarily use non-lethal methods to alleviate northwestern crow damage. Though not anticipated, WS could take up to 100 northwestern crows per year, 0.02% of the estimated populations, with no significant impact to the abundance, distribution, or population trend of the species.

Black-billed Magpie Population Impacts

Black-billed magpie (*Pica hudsonia*) populations in AK are healthy with an estimated population of 180,000 individuals (RMBO 2009) and the damages they cause are great enough that the USFWS has established a Federal Depredation Order (50 CFR 21.43). Populations of magpies in AK have increased since 1966 and have been stable since 1988 (Sauer et al. 2008). WS removed an average of 3 nests per year, dispersed an average of 446, and lethally removed an average of 60 black-billed magpies per year from FY05 through FY08. WS will continue to primarily use non-lethal methods to alleviate magpie damage. WS' BDM activities removed about 0.0003% of the magpies in AK and are not adversely affecting the population in AK. Though not anticipated, WS could take up to 150 black-billed magpies per year, about 0.8% of the estimated population, with no significant impact on abundance, distribution, or population trend of the species.

3.4.1.2.4 Invasive Species

Invasive species are defined under EO 13112 as a species that is non-native (or exotic) to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm, or harm to human health. Invasive species such as the European starling and feral pigeon may occur in small but increasing numbers in urban and agricultural areas throughout AK.

Feral Pigeon and European Starling Population Impacts

Feral rock pigeons (*Columbia livia*) and European starlings (*Sturnus vulgaris*) are listed as deleterious, exotic species under AK state law. However, a permit from the ADFG is required to harass, trap, or kill these species (a hunting license is a form of a

permit). These species are not protected by the USFWS and the birds, their eggs, and nests may be removed by any legal method.

AK's feral pigeon and starling populations appear concentrated in habitats where they are associated with people, and although numbers may have been reduced at local sites. AK BBS trend data indicate that feral pigeons are increasing in AK (Sauer et al. 2008) and currently have an estimated population of 180,000 (RMBO 2009). WS removed and average of 1 nest and 2 eggs, dispersed an average of 37, and lethally removed an average of 230 feral pigeons per year from FY05 through FY08.

The nationwide starling population has been estimated at 140 million (Hygnstrom et al. 1994) and AK has an estimated population of about 50,000 birds (RMBO 2009). AK BBS trend data indicate that starling numbers have increased in AK, and between 1980 and 1990 the number increased substantially in AK (Sauer et al. 2008). WS has dispersed 507 and lethally removed 44 European starlings from FY05 through FY08.

The AK WS program is not having an adverse effect on feral pigeon or starling populations in AK. As deleterious, exotic species and because of their negative impacts and competition with native birds, feral pigeons and starlings are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in these species in AK, even to the extent of complete eradication, could be considered beneficial to the human environment.

3.4.1.3 Humaneness of Methods

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but very complex concept. Kellert and Berry (1980), in a survey of American attitudes toward animals, related that 58% of their respondents,"*...care more about the suffering of individual animals...than they do about species population levels.*" Schmidt (1989) indicated that vertebrate pest control 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.*"

Suffering has been 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..." (American Veterinary Medical Association (AVMA) 1987). 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..." [California Department of Fish and Game (CDFG) 2004], such as with shooting.

Defining pain as a component of humaneness may be a greater challenge than that of suffering. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*...probably are causes for pain in other animals...*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 2004). Some WS damage management methods may thus cause varying degrees of pain in different animal species for varying time frames.

Pain and suffering, as they relate to a review of WS BDM methods to capture animals, have professional and lay points of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since *"...neither medical nor veterinary curricula address suffering or its relief ..."* (CDFG 2004).

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of wild animals but also the welfare of pets or humans, if damage management methods were not used. Therefore, humaneness, in part, appears to be a person's experience with the problem wildlife and their 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 suffering with the constraints imposed by current technology and funding.

WS has improved the selectivity of management devices through research and is striving 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 methods are used in those situations when nonlethal damage management methods are not practical or effective. AK WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce, and funding. SOPs used to maximize humaneness are listed in Section 2.5.

3.4.1.4 Effectiveness of BDM Program in Alaska

Effectiveness of the AK BDM program is defined as the timely and successful application of safe and selective methods to prevent and alleviate damage caused by birds. Under the current program, all methods are as selective and effective as possible, in conformance with the WS Decision Model (Slate et al. 1992), WS Directives, and state and federal laws. By using the Decision Model, WS implements the most selective and efficient methods to resolve damage situations. Under Alternative 1, WS would have the fullest array of BDM methods at its professional discretion at all times. In situations where human safety is at risk, immediate and decisive action may be required to prevent injury or death. This alternative would allow the implementation of lethal removal to resolve immediate risks to human health and safety when nonlethal control is inadequate. Should there not be an immediate threat to human health and safety, WS would give preference to non-lethal methods but lethal removal may be necessary. Therefore, Alternative 1 provides for the most effective approach to insuring human health and safety and resolving BDM problems.

3.4.2 Alternative 2 - Implement All Non-lethal Methods Before Using Lethal Methods

Alternative 2 requires that all non-lethal methods be implemented regardless of practicality or effectiveness before any lethal methods are used by WS. With this alternative, WS would be required to implement the entirety of non-lethal methods prior to implementing lethal management. WS does not propose to implement any method that could adversely affect non-target or ESA-listed species, violate state or federal laws, or considered unsafe. Anyone requesting TA would be provided with information regarding the use of practical and effective non-lethal and lethal techniques and information DP issued by the USFWS and ADFG. The WS Decision Model (Slate et al. 1992) could be used under this alternative, however the most effective and practical method(s) would not always be applied under this alternative.

3.4.2.1 Effects of Methods on Non-target and ESA-listed Species

As with Alternative 1, WS would have no effect on non-target or ESA-listed species. However, non-WS individuals may choose to implement non-lethal or lethal control, because they do not want damage to continue while waiting for WS to exhaust the use of non-lethal methods. Use of methods by untrained individuals could negatively affect non-target and ESA-listed

species because untrained persons may apply these methods in an unsafe or illegal manner.

3.4.2.2 Effect of Methods on Populations of Target Species

As with Alternative 1, WS would have no affect on target species. However, non-WS individuals may choose to implement non-lethal or lethal control because they do not want damage to continue while waiting for WS to exhaust the use of non-lethal methods. Use of methods by untrained individuals could negatively affect some target species because untrained persons may apply these methods in an unsafe or illegal manner.

3.4.2.3 Humaneness of Methods

The methods used by WS are equally humane under Alternatives 1 and 2. Individuals requesting immediate assistance with damage situations may not be willing to wait for WS to exhaust the use of non-lethal methods before applying lethal control. This could result in private individuals taking action against actual or perceived damaging species. WS would continue to only recommend and apply the most selective and humane methods possible, but the humaneness of their application by untrained individuals cannot be controlled. This alternative may be less humane than Alternative 1 depending on the application of method(s) by untrained non-WS entities.

3.4.2.4 Effectiveness of BDM Program in Alaska

Effectiveness of the AK BDM program is defined as the timely and successful application of safe and selective methods to prevent and alleviate damage caused by birds. Alternative 2 requires that all non-lethal methods be implemented regardless of practicality or effectiveness before any lethal methods are used by WS. This could exacerbate the problem by allowing more damage to accrue and damaging species' numbers increase. Recruitment and reproduction may occur while nonlethal methods are being attempted, requiring more individuals to be removed if lethal methods are later necessary. Deferring the use of lethal removal could increase the time necessary to resolve the problem, further reducing the overall effectiveness under Alternative 2. Therefore, BDM under Alternative 2 could be less effective than under the Proposed Alternative.

3.4.3 Alternative 3. Technical Assistance BDM Program Only

Alternative 3 would require WS to offer only TA to resolve bird damage problem.

3.4.3.1 Effects of Methods on Non-target and ESA-listed Species

Under this alternative, WS would have no direct affect on non-target and ESA-listed species. While WS can analyze its own implementation of BDM methods, the effects of implementation of the same methods by non-WS individuals cannot be fully anticipated. The inability to fully predict potential effects from a non-WS entity implementing BDM makes Alternative 3 a less responsible choice. The absence of operational BDM by WS may increase the use of illegal or inappropriate methods by individuals when they do not receive operational BDM assistance from WS. While WS cannot provide operational BDM under this alternative, requestors could obtain authorization to use lethal control through USFWS or ADFG. Unintentional harassment and take of non-target and ESA-listed species by non-WS personnel could be greater than or less than those anticipated under Alternative 1 depending on the extent of management and the amount of expertise with which BDM is implemented. Even some non-lethal methods, if applied improperly, can have adverse sub-lethal or lethal effects and be detrimental to sensitive species. The use of lethal methods by non-WS personnel could result in increased take of non-target species, including ESA and state-listed species. The application of BDM methods by untrained personnel would likely result in a greater potential impact to non-target and ESA listed species than the BDM proposed under Alternative 1.

3.4.3.2 Effects of Methods on Populations of Target Species

WS would have no direct effect on target populations under Alternative 3. The same discussion (section 3.4.3.1) of effects regarding non-target and ESA-listed species applies to target populations.

3.4.3.3 Humaneness of Methods

The methods recommended by WS, if properly applied, are equally humane under Alternatives 1, 2, and 3. WS would continue to only recommend the most selective and humane methods possible, but the humaneness of their application by untrained individuals cannot be controlled. This alternative may be less humane than Alternative 1 or 2 depending on how the methods are used.

3.4.3.4 Effectiveness of BDM Program in Alaska

Effectiveness of the AK BDM program is defined as the timely and successful application of safe and selective methods to prevent and alleviate damage caused by birds. WS conducts BDM for the protection of human health and

safety and property. Some damage situations require an immediate response using harassment or lethal removal. Failure to have WS respond to immediate risks to human health and safety and property under a complete IWDM program could exacerbate the problem by allowing more damage to accrue. Therefore, BDM under Alternative 3 would be less effective than under the Proposed Alternative.

3.4.4 Alternative 4 - No WS Program

Under Alternative 4, WS would not administer or conduct a BDM program in AK. Taking no action could reasonably be expected to be the least effective of all of the alternatives examined in this EA. WS would not provide TA or operational BDM.

The FAA requires certificated airports to implement measures to alleviate or eliminate wildlife hazards to air carrier operations (14 CFR 139.337(d)). In the absence of WS, the USFWS and ADFG may continue to issue DPs directly to airports and property owners. Airports would still be required to perform wildlife hazard management per FAA guidelines, without any assistance or recommendations from WS. Other entities could contract with non-WS wildlife control sources or conduct BDM on their own without oversight or recommendations from WS.

3.4.4.1 Effect of Methods on Non-target and ESA-listed Species

Under this alternative, WS would not affect non-target and ESA-listed species. WS would offer no TA or operational damage management assistance on practical and effective methods for BDM. It is possible that frustration caused by an inability to reduce damages could lead to the misapplication of methods causing negative effects to non-target and ESA-listed species. The effect of non-WS personnel implementing BDM is unknown, but would likely be more adverse to non-target and ESA listed species than the proposed alternative.

3.4.4.2 Effect of Methods on Populations of Target Species

Under this alternative, WS would not affect target species. WS would offer no TA or operational BDM regarding practical, effective, and safe methods for resolving bird damage. Airports would still be required to perform wildlife hazard management per FAA guidelines, without any assistance or recommendations from WS. Those experiencing bird damage or potential bird damage could contract with non-WS wildlife control sources or conduct BDM on their own, without oversight or recommendations from WS. It is possible that frustration caused by an inability of individuals to reduce losses

could lead to the misapplication of methods. The effect of non-WS personnel implementing BDM is unknown, but would likely be more adverse to target species than the proposed alternative.

3.4.4.3 Humaneness of Methods

Under this alternative, WS would not recommend or provide practical, effective, and safe methods for reducing bird damage and threats to human health and safety. As such, WS could not affect application of methods or the humaneness of methods use. The humaneness of methods applied by untrained individuals would be unknown. Frustrated resource owners could implement methods not usually recommend by WS, use WS BDM methods incorrectly, or that attempt illegal BDM. As such, this alternative would likely be less humane than Alternative 1.

3.4.4.4 Effectiveness of BDM Program in Alaska

Under the No WS Program Alternative, WS would not administer a BDM program and ineffective at resolving bird damage problems in Alaska. This leaves would-be-cooperators to choose and implement whatever methods are available.

3.5 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts on the environment that result from the incremental impact of an 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. As shown in Table 3.1, BDM methods used or recommended by AK WS will have no cumulative adverse effects on target, non-target, or ESA-listed wildlife species. The discussion below analyzes the cumulative impacts of potential methods use or recommended by WS for BDM in AK.

3.5.1 Cumulative Impact Potential from WS BDM Methods

Non-chemical methods used or recommended by WS' BDM program include exclusion (various types of barriers), localized habitat modification (structures or vegetation), live trapping followed by euthanasia, dispersal of birds or bird flocks, nest and egg destruction, and shooting.

All WS BDM shooting activities in AK conform to federal, state, and local laws and AK WS does not use lead shot. Consequently, no deposition of lead in nontoxic shot zones would occur as a result of AK WS BDM actions.

No cumulative impacts are expected from the combination of WS activities and recreational and subsistence harvest in AK. WS take of target individuals is infinitesimally small, less than 0.39% of WS total take and harassment, and insignificant in conjunction with recreational and subsistence harvest. Harvest records for subsistence activities are incomplete, but generally show a low level of harvest for bird species associated with this EA. There are no foreseeable cumulative impacts from WS activities.

3.6 SUMMARY

No significant cumulative environmental impacts are expected from the Proposed Alternative in this EA (Table 3-1). Under the Proposed Alternative, the lethal removal of birds by WS would not have a significant impact on overall bird populations in AK, USFWS Region 7, or in the BBS Western Region, but some very localized reductions of some species may occur. WS maintains ongoing contact with USFWS and ADFG to ensure local, state, and regional knowledge of wildlife population trends.

No risk to public safety is expected when WS' services are provided to requesting individuals under Alternative 1, because only trained and experienced wildlife biologists/specialists would conduct and/or recommend BDM activities. There is an increased risk to public safety when persons reject WS assistance and recommendations, conduct their own BDM (Alternatives 2 and 3), or when no WS operational BDM is provided (Alternatives 3 and 4). Although some persons will likely be opposed to WS' participation in BDM activities on public and private lands in AK, the analysis in this EA indicates that an adaptive integrated BDM program would not result in significant cumulative adverse impacts on the quality of the human environment.

This EA will be reviewed periodically to assure conformance with current environmental regulations and project scope. Substantial changes in the project scope or changes in environmental regulations may require revisions or a new EA be produced.

Table 3.1. Summary of Environmental Consequences for each issue and alternative analyzed compared to the Proposed Alternative (Alternative 1).

Alternatives Issues	Alternative 1 (Current Program)	Alternative 2 (Exhaust Non-lethal)	Alternative 3 (TA Only)	Alternative 4 (No WS Program)
Effects of Methods on Non-Target and ESA-Listed Species.	Low	Low to Moderate	Low to High	Low to High
Effects of Methods on Target Species.	Low	Low	Low to High	Low to High
Humaneness of Methods.	High	High	Moderate	Low to Moderate
Effectiveness of Methods	High	Low	Low	Low

CHAPTER 4 CHAPTER 4: LIST OF PREPARERS, REVIEWERS AND PERSONS CONSULTED

4.1 PREPARERS AND REVIEWERS

Jason Gilsdorf, USDA-APHIS-WS, Palmer, Alaska

Kenneth Gruver, USDA-APHIS-WS, Olympia, Washington

David Hayes, USDA-APHIS-WS, Billings, Montana

Erica McDonald, USDA-APHIS-WS, Olympia, Washington

Laurence Schafer, USDA-APHIS-WS, Olympia, Washington

Terry Smith, USDA-APHIS-WS, Palmer, Alaska

Roger Woodruff, USDA-APHIS-WS, Olympia, Washington

4.2 PERSONS CONSULTED

Russell M. Oates, USFWS, Anchorage, Alaska

Anna Walker, Alaska DOT, Anchorage, AK

Tom Schumacher, ADFG, Juneau, Alaska

Dan Rosenberg, ADFG, Anchorage, AK

David Wahto, FAA, Anchorage, AK

Literature Cited

Alaska Department of Natural Resources. 2006. Who Owns/Manages Alaska? Online. http://forestry.alaska.gov/pdfs/07who_owns_alaska_poster.pdf

Alaska Interagency HPAI Bird Surveillance Working Group. 2006. Sampling protocol for highly Pathenogenic Asian H5N1 avian influenza in migratory birds in Alaska. Interagency planning report, Anchorage, AK.

AAS (Anchorage Audubon Society). 1993. Birds of Anchorage checklist. http://www.anchorageaudubon.org/content/view/15/30/

APHIS. 2010. Wildlife Services Policy Manual. Online. http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml

AVMA (American Veterinary Medical Association). 1987. J. Amer. Vet. Med. Assoc.. Panel Report on the Colloquim on Recognition and Alleviation of Animal Pain and Distress. 191:1186-1189.

AVMA. 2007. AVMA Guidelines on Euthanasia. Online. http://www.avma.org/issues/animal_welfare/euthanasia.pdf

Belant, J. L. and R. A. Dolbeer. 1993. Popualtions status of nesting Laughitn Gulls int eh Inted States 1977-1991. Am. Bird 47:220-224.

Bradley, T. W. 1980. Gull-scaring trials for landfill studies. Surveyor 155:6-7.

Burger, J. 1981. Feeding competition between Laughing Guls and Fering Gulls aat a sanitary landfill. Condor 83:328-335.

Butterfield, J., Coulson, J.C., Kearsey, S.V., McCoy, J.H., Spain, G.E., 1983. The herring gull Larus argentatus as a carrier of salmonella. J. Hyg. Camb. 91, 429±436.

CDFG (California Department of Fish and Game). 2004. California Department of Fish and Game, Final Environmental Document – Bear Hunting. California Code of Regulations (Title 14, Sections 265, 365, 366, 367, 367.5). CDFG, CA.

Conover, M. 2002. Resolving Human-Wildlife Conflicts: The Science of Wildlife Damage Management. CRC Press LLC, New York.

Conover, M. R., W. C. Pitt, K. K. Kessler, T. J. Dubow, and W. A. Sanborn. 1995. Review of human injuries, illnesses and economic-based losses caused by wildlife in the United States. Wildl. Soc. Bull. 23:407-414.

Decker, D. J. and K. G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. Wildl. Soc. Bull. 16:53-57.

Decker, D. J. and J. W. Enck. 1996. Human dimensions of wildlife: Knowledge for agency survival in the 21st century. Human Dimension of Wildlife. 1(2):60-71.

Decker, D. J. and L. C. Chase. 1997. Human Dimensions of living with wildlife- A management challenge for the 21st century. Wildlife Society Bulletin. 25(4):788-795.

Denlinger, L. M. 2006. Alaska Seabird Information Series. Unpubl. Report, U.S. Fish and Wildlife Service. Migratory Bird Management, Nongame Program, Anchorage AK.

Dolbeer, R. A. and J. L. Seubert. 2006. Canada goose populations and strikes with civil aircraft: positive trends for aviation industry. Proceedings of the 8th Bird Strike Committee USA/Canada Annual Meeting.

Dolbeer, R.A., and S. E. Wright. 2008. Wildlife strikes to civil aircraft in the United States, 1990-2007. Washington, DC: US Department of Transportation, Federal Aviation Administration, Office of Airport Safety and Standards.

Dolbeer, R. A., S. E. Wright, and E. C. Cleary. 1995. Bird and other wildlife strikes to civilian aircraft in the U. S., 1994 Interim report DTFA01-91-Z-02004. USDA for FAA, FAA Technical Center, Atlantic City, New Jersey. P8.

Eccleston, C. 1995. Determining when an analysis contains sufficient detail to provide adequate NEPA coverage. Federal Facilities Environmental J., Summer pp. 37-50.

FAA. 2009. Bird Strike Database. Online. wildlife.pr.erau.edu/public/index1.html

Goodrich, J. M. and S. W. Buskirk. 1995. Control of abundant native vertebrates for conservation of endangered species. Conservation Biology 9:1357-1364.

Hygnstrom, S. E., and S. R. Craven. 1994. Hawks and owls. Pp. E53-E62 in Prevention and Control of Wildlife Damage. S. Hygnstrom, R. Timm, and G. Larson, eds. Coop. Ext. Serv., Univ. of Nebr., Lincoln.

Kellert, S. R. and J. K. Berry. 1980. Knowleds, affection, and basic attitudes towards animals in AMeircan society. USFWS. 162 pp.

Leopold, A. 1933 . Game Management. Charles Scribner's Sons, New York, NY, USA.

Linnell, M. A., M. R. Conover, T. J. Ohashi. 1996. Analysis of bird strikes at tropical airport. J. Wildl. Manage. 60:935–945.

Linnell, M.A., M. R. Conover, and T. J. Ohashi. 1999. Biases in bird strike statistics based on pilot reports. J. Wildl. Manage. 63:997-1003.

Mallek, E. J. and D. J. Groves. 2008. Alaska-Yukon waterfowl breeding population survey. U.S. Fish and Wildlife Service. Fairbanks and Juneau, AK, USA.

Mansdorf, F. 1999. Failure to Abate Leads to Bigger Fines. EHS Today. Online. http://ehstoday.com/news/ehs_imp_32598/.

MIS (Management Information System). 2009. WS State Director's Office, 720 O'Leary St NW, Olympia, WA 98502.

Patton, S. R. 1988. Abundance of gulls at Tampa Bay Landfills. Wildon Bull. Ibis 100:431-442.

Raftovich, R.V., K.A. Wilkins, K.D. Richkus, S.S. Williams, and H.L. Spriggs. 2009. Migratory birds hunting activity and harvest during the 2007 and 208 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

Richkus, K. D., K. A. Wilkins, R. V. Raftovich, S. S. Williams, and H. L. Spriggs. 2008. Migratory bird hunting activity and harvest during the 2006 and 2007 hunting seasons: Preliminary estimates. U. S. Fish and Wildlife Service. Laurel, Maryland. USA.

RMBO (Rocky Mountain Bird Observatory). 2009. Partners in Flight Database. Online. http://rmbo.org/pif_db/laped/PED3.aspx

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966–2007. Version 10.13.2007. USGS Patuxent Wildlife Research Center, Laurel, MD (From http://www.mbr-pwrc.usgs.gov/bbs/bbs.html)

Schmidt, R. H. 1989. Vertebrate pest control and animal welfare. pp. 63-68 *in* ASTM STP 1055. Vertebrate Pest Control and Management Materials. Vol. 6. K. A. Fagerstone and R. D. Curnow, eds. American Society for Materials and Testing. Philadelphia.

Seattle Post-Intelligencer. 2000. County Oks settlement of Cedar Hills landfill suit. Tuesday, May 16.

Slate, D. A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. Trans. N. A. Wildl. Nat. Res. Conf. 57:51-62.

Stickley, A. R., Jr., and R. J. Weeks. 1985. Histoplasmosis and its impact on blackbird-starling roost management. Proc. Eastern Wildl. Damage Control Conf. 2:163-171.

The Wildlife Society. 1992. Conservation policies of the Wildlife Society: a stand on issues important to wildlife conservation. The Wildlife Society, Bethesda, MD. 24 pp.

USDA. 1997, revised. Animal Damage Control Program, final environmental impact statement. USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.

USDI. 1992. Biological Opinion. Animal Damage Control Program U.S. Fish and Wildlife Service, Washington D.C.

USFWS. 1998. Final Environmental Assessment: Canada Goose Population Management in Anchorage, AK. Region 7.

USFWS. 2007. Letter to Mr. Bill Wilmoth. Re" Bird Hazing at the Deadhorse Airport. Fairbanks, AK.

USFWS. 2009. Waterfowl Populations Status, 2009. U. S. Department of the Interior, Washington D. C. USA.

USFWS. 2010. Listings and Occurrences for Alaska. Online. http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=AK

USGS. 2009. Online. Bird Checklist of Alaska http://www.npwrc.usgs.gov/resource/birds./chekbird/r7/alaska.htm

Verbeek, N. A. M. 1977. On the feeding ecolofy of the Herring Gull Larus Argentatus and Lesser Black-backed Gulls Larus fuscusI. Ardea 59:75-188.

Vermeer, K., D. Power, G. E. John Smith. 1988. Habitat Selection and Nesting Biology of Roof-nesting Glaucous-winged Gulls. Colonia Waterbirds. Vol. 11, No. 2.

Weber, W. J. 1979. Health hazards from pigeons, starlings, and English sparrows. Thompson Publ., Fresno, Calif. 138 pp.

WS. 2010. No Effect Determination. Admin. Record. WA/AK State Office, 720 O'Leary St NW, Olympia, WA 98502.

APPENDIX A AUTHORITIES AND COMPLIANCE

Wildlife Services. WS' activities are conducted at the request of and in cooperation with other federal, state, and local agencies, private organizations, and individuals. WS is directed by the U.S. Congress to protect American agriculture, property, natural resources and human health and safety from damage associated with wildlife (Act of March 2, 1931, as amended (46 Stat. 1486; 7 United States Code (USC). 426-426c). "Wildlife damage management" is defined as, *the reduction or alleviation of damage or other problems caused by, or related to, the presence of wildlife,* and it is an integral component of wildlife management (Leopold 1933, , Conover 2002, The Wildlife Society 2004).
United States Fish and Wildlife Service. The USFWS is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife resources and their habitats. The USFWS mission is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. Responsibilities are shared with other federal, state, tribal, and local entities; however, the USFWS has specific responsibilities for endangered species, migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters they administer for the management and protection of these resources.

The USFWS regulates the taking of migratory birds under the four bilateral migratory bird treaties the United States entered into with Great Britain (for Canada), Mexico, Japan, and Russia. Regulations allowing the take of migratory birds are authorized by the MBTA (16 U.S.C. Sec's. 703 - 711), and the Fish and Wildlife Improvement Act of 1978 (16 U.S.C. Sec. 712). The Acts authorize and direct the Secretary of the Interior to allow hunting, taking, and killing of migratory birds subject to the provisions of, and in order to carry out the purposes of, the four migratory bird treaties.

Federal Aviation Administration. The FAA's authority for managing wildlife hazards at airports is based on 14 CFR, Part 139.337. The FAA is the federal agency responsible for developing and enforcing air transportation safety regulations and is authorized to reduce wildlife hazards at commercial and non-commercial airports. Many of these regulations are codified in the Federal Aviation Regulations (FARs). The FAA is responsible for setting and enforcing the FARs and policies to enhance public safety. For commercial airports, 14CFR, Part 139.337 (Wildlife Hazard Management) directs the airport sponsor to conduct a wildlife hazard assessment if an air carrier aircraft experiences multiple wildlife strikes or an air carrier aircraft experiences substantial damage from striking wildlife. At non-commercial airports, the FAA also expects that the airport be aware of wildlife hazards in and around their airport and take corrective action if warranted; the FAA uses Advisory Circular 150/5200-33 to guide their decision making process.

The FAA is empowered to issue airport operation certificates to airports serving air carriers, and to establish minimum safety standards for the operation of airports. Some of these regulations and polices directly involved the management of wildlife and wildlife hazards on and/or near airports. Under FAR 139.337, Wildlife Hazard Management, an airport is required to conduct a WHA and a Wildlife Management Plan when specific wildlife event(s) occur. Under the FAA/WS MOU, the WS program supports all of the requirements contained in FAR 139.337. FAA Certalert No. 97-02 further clarifies the roles of, and relationships between, the FAA and WS with regards to wildlife hazards on or near airports (USDA Managing Wildlife Hazards at Airports 1998)

Alaska Department of Fish and Game. The ADFG recognizes wildlife as a public trust belonging to all Alaskans. ADFG respects the diversity of public values associated with wildlife, and support uses that reflect sound conservation principles and public desires. ADFG is an organization of individuals committed to interacting professionally with one another and the public, and to using scientific data and public input to conserve AK's wildlife. ADFG functions include management of wildlife populations and habitats; research to develop and refine management techniques and provide new biological and use information; sharing information with the legislature, board, public and other agencies; regulatory activities; public service projects such as hunter and firearms safety education, Project WILD conservation education; and responding to public and agency inquiries for information or help with wildlife problems. The harassment or lethal removal of game for wildlife control purposes is regulated by Alaska Statute (16.05.920 Prohibited Conduct Generally).

5 AAC §92.990(a)(73) – Effective September 13, 2007, defines as Nuisance Wildlife as any animal that invades or comes to occupy a dwelling, vessel, vehicle, structure, or storage container; causes property damage, or is an invasive or introduced nonnative species that poses immediate or long-term threats to human health, safety, or property or to native wildlife, wildlife health, or habitat.

5 AAC §92.990(a)(76) – Effective September 13, 2007, defines: “invasive species” as a nonnative species whose introduction does or is likely to cause economic or environmental harm or harm to human health; this includes all of the species listed in 5 AAC §92.990(52).

Alaska Department of Transportation and Public Facilities. The Alaska Department of Transportation & Public Facilities is a department within the government of AK. The Department provides for the safe movement of people and goods and the delivery of State services. The department constructs, operates, and maintains AK's transportation infrastructure, which includes more than 5,000 miles of paved and gravel highways, some

300 aviation facilities, more than 40 small harbors, and a ferry system covering 3,500 nautical miles and serving more than 30 coastal communities. The department operates through three regions: the Northern Region, headquartered in Fairbanks, the Central Region in Anchorage, and the Southeast Region in Juneau. The ADOTPF's authority for managing airports is based on Title 17 of the AAC.

Compliance with Federal Laws, Executive Orders and Regulations

National Environmental Policy Act: All federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). WS and the USFWS follow CEQ regulations implementing NEPA (40 CFR 1500 et seq.), USDA (7 CFR 1b), and WS follows the APHIS Implementing Guidelines (7 CFR 372) as a part of the decision-making process. These laws, regulations, and guidelines generally outline five broad types of activities to be accomplished as part of any project: public involvement, analysis, documentation, implementation, and monitoring. NEPA also sets forth the requirement that all major federal actions be evaluated in terms of their potential to significantly affect the quality of the human environment for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. Federal activities affecting the physical and biological environment are regulated in part by CEQ through regulations in 40 CFR, Parts 1500-1508. In accordance with CEQ and USDA regulations, APHIS Guidelines Concerning Implementation of NEPA Procedures, as published in the Federal Register (44 CFR 50381-50384) provide guidance to APHIS regarding the NEPA process.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed program, informs decision-makers and the public of reasonable alternatives capable of avoiding or minimizing adverse impacts, and serves as a decision-aiding mechanism to ensure that the policies and goals of NEPA are infused into federal agency actions. This EA was prepared by integrating as many of the natural and social sciences as warranted, based on the potential effects of the proposed action. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

Endangered Species Act: Under the ESA, all federal agencies are charged with a responsibility to conserve endangered and threatened species and to utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). WS conducts Section 7 consultations with the USFWS to utilize 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* . . ." (Sec.7 (a) (2)). WS conducts formal Section 7 Consultations with the USFWS at the national level (USDI 1992) and consultations with the USFWS at the local level as appropriate (USFWS 2007).

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as amended: The MBTA provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. The law prohibits any "*take*" of these species by private entities, except as permitted by the USFWS; therefore the USFWS issues permits to private entities for reducing bird damage (50 CFR 21.41). WS provides on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of TA or operational assistance. In severe cases of bird damage, WS provides recommendations to the USFWS for the issuance of DPs to private entities. Starlings, pigeons, house sparrows and domestic waterfowl are not classified as protected migratory birds and therefore have no protection under the MBTA. USFWS DPs are also not required for "yellow-headed, red-winged, rusty, and Brewer's blackbirds, cowbirds, all grackles, crows, and magpies found committing or about to commit depredation upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance" (50 CFR 21.43).

Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978): The BGEPA prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. Transport includes convey or carry by any means; also deliver or receive for conveyance. If compatible with the preservation of bald and golden eagles, the Secretary of the Interior may issue regulations authorizing the taking, possession and transportation of these eagles for scientific or exhibition purposes, for religious purposes of Indian tribes or for the protection of wildlife, agricultural or other interests. Bald eagles may not be taken for any purpose unless the Secretary issues a permit prior to the taking. § 668a.

National Historical Preservation Act (NHPA) of 1966 as amended: The NHPA and its implementing regulations (CFR 36, 800) require federal agencies to initiate the section 106 process if an agency determines that the agency's actions are undertakings as defined in Sec. 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under section 106. Each of the bird damage management methods described in this EA that might be used operationally by WS does not cause major ground disturbance, does not cause any physical destruction or damage to property, does not cause any alterations of property, wildlife habitat, or landscapes, and does 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.

Noise-making methods such as propane exploders, pyrotechnics, or firearms that are used at or in close proximity to historic or cultural sites for the purposes of hazing or removing nuisance birds have the potential for audible effects on the use and enjoyment of a historic property. 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.

Native American Graves Protection and Repatriation Act: 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.

Occupational Safety and Health Act of 1970: The OSHA of 1970 and its supplementing 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 birds that may cause safety and health concerns at workplaces.

Environmental Justice and Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations: Environmental Justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. 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. A critical goal of Executive Order 12898 is to improve the scientific basis for decision-making by conducting assessments that identify and prioritize environmental health risks and procedures for risk reduction. Environmental Justice is a priority within USDA, APHIS, and WS. APHIS plans to implement Executive Order 12898 principally through its compliance with the provisions of NEPA.

WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to ensure Environmental Justice. WS personnel use BDM methods as selectively and environmentally conscientiously as possible. WS assistance is provided on a request basis in cooperation with State and local governments and without discrimination against people who are of low income or in minority populations. The nature of WS's BDM activities are such that they do not have much, if any, potential to result in disproportionate environmental effects on minority or low-income populations. Therefore, no such adverse or disproportionate environmental impacts to such persons or populations are expected.

Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks: Children may suffer disproportionately from environmental health and safety risks, including their developmental physical and mental status, for many reasons. Because WS makes it a high priority to identify and assess environmental health and safety risks, WS has considered the impacts that alternatives analyzed in this EA might have on children. All WS BDM is conducted using only legally available and approved damage management methods where it is highly unlikely that children would be adversely affected at all, let alone in any disproportionate way. Based on the Risk Assessment (USDA 1997, Appendix P) concluded that when WS program methods are used following normally accepted safety practices and WS standard operating procedures, such use has negligible impacts on the environment or on human health and safety, which includes the health and safety of children.

Executive Order 13112 - Invasive Species: Authorized by former President Clinton, Executive Order (EO) 13112 establishes guidance to federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The EO, in part, states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law: 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations and provide for restoration of native species and habitats, 3) conduct research on invasive species and

develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species.

The EO also established an Invasive Species Council (Council) whose members include the Secretary of State, the Secretary of the Treasury, the Secretary of Defense, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Transportation, and the Administrator of the U.S. Environmental Protection Agency. The Council shall be Co-Chaired by the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of Commerce. The Council oversees: 1) the implementation of this order, 2) that federal agency activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, 3) the development of recommendations for international cooperation in addressing invasive species, 4) the development, in consultation with the CEQ, of guiding principles for federal agencies, 5) the development of a coordinated network among federal agencies to document, evaluate, and monitor impacts from invasive species on the economy, the environment, and human health, 6) the establishment of a coordinated, up-to-date information-sharing system and 7) preparation and issuance of a national Invasive Species Management Plan.

Executive Order 13186 and MOU between USFWS and WS: EO 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration between WS and the USFWS, in coordination with state, tribal, and local governments. A national-level MOU between the USFWS and WS has been drafted to facilitate the implementation of EO 13186.

APPENDIX B BIRD DAMAGE MANAGEMENT METHODS

Non-Lethal Methods

Non-lethal methods can be integrated with lethal methods to increase the efficacy of a management program. Birds may acclimate to some non-lethal methods if they are applied for too lengthy a time period or incorrectly. On rare occasions, a bird may die from some non-lethal methods listed here. Many factors, including weight, stomach contents, or physiology may make individual birds more or less susceptible to certain non-lethal management methods. Therefore, conditions unknown to WS or beyond the control of WS may be responsible for some mortality during implementation of non-lethal damage management techniques.

Habitat Modification is the practice of altering the habitat in an area to make it less attractive to wildlife in general or it can target a specific species of wildlife. Wildlife presence is directly related to the availability and quality of habitat, so habitat can be managed to reduce or eliminate use of an area by some wildlife. Habitat management is appropriate when the potential for damage can be reduced without increasing a resource owner's costs beyond an acceptable level or diminishing their ability to manage resources. When wildlife is damaging property, removing or altering the source of the attraction is the ultimate goal, but may take time to achieve. Seasonal changes may warrant variations in habitat modification plans to be effective.

Relocation of damaging birds to other areas following live capture generally is not cost-effective, as those species causing damage are usually common and numerous throughout AK. Relocation of damaging species may cause similar problems at a new location, but often involves stress to the relocated animal which may result in poor survival rates. Relocated individuals may also leave the area they are released and return to former sites.

However, there may be situations where bird relocation is the preferred methods. That decision may be based on available funding, species involved, personnel availability and probability of success. Relocation of damaging birds might be a viable solution and acceptable to the public when the birds are considered to have high value, such as migratory waterfowl or T&E species. In these cases, WS consults with the USFWS and ADFG to coordinate capture, transportation, and selection of suitable relocation sites.

Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. Permits are not required to remove the nest of most birds if eggs or chicks are not present in the nest. Nest destruction is usually feasible only when

dealing with a limited number of birds or nest sites. This method is used to discourage birds from constructing nests in areas, which may create nuisances or safety concerns for home and business owners. Nest destruction poses no imminent danger to pets or the public.

Exclusion devices, such as overhead wire grids, conventional netting and fencing can be effective but are often cost-prohibitive, particularly because of the mobility of birds. Exclusion that is adequate to stop bird movements can also restrict movements of livestock, people, and other wildlife (Fuller-Perrine and Tobin 1993). Some birds may be excluded from ledges, hand railings, ponds or other areas using overhead wires/lines (Fairies 1992, Lowey 1993). Wire/lines should be made visible to the birds by hanging streamers or other objects at intervals along the wires. The objective is to discourage bird loafing or feeding activities and not cause injury or death.

Overhead wire networks generally require little maintenance other than ensuring proper wire tension and replacing broken wires, though the expense of maintenance may be burdensome. Overhead wires have been demonstrated to be most effective on sites less than 2 acres, but may be considered unsightly or aesthetically unappealing to some people. In addition, wire grids can render a pond unusable for boating, swimming, fishing, and other recreational activities. Installation costs are about $1,000 per surface acre for materials. Heavy plastic strips hung vertically in open doorways have been successful in some situations for excluding birds (Johnson and Glen 1994).

Porcupine wire (or similar materials) can be placed on ledges to prevent birds from perching or nesting on the ledges. This material can be expensive and debris often collects in the projections making it ineffective and unsightly.

Visual scaring techniques, such as Mylar tape, (highly reflective surface produces flashes of light that startles birds), eye-spot balloons (the large eyes supposedly give a visual cue that a large predator is present), flags, lasers and effigies (scarecrows), are occasionally effective in reducing bird damage. Mylar tape has produced mixed results in its effectiveness to frighten birds (Delbert et al. 1986, Tobin et al. 1988). Birds quickly learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics.

Lasers are a relatively new technique used to frighten and disperse birds from their roosts or loafing area. Studies have shown that several bird species, such as double-crested cormorants, Canada geese, other waterfowl, gulls, vultures, and American crows exhibited avoidance of laser beams during field trails (Glen et al. 2001, Blackwell et al. 2002). The lower power levels, directionality, accuracy over distance, and silence of laser devices make them safe and effective species-specific alternatives to pyrotechnics,

shotguns, and other traditional avail dispersal tools (APHIS 2003). Best results are achieved under low-light conditions (*i.e.,* from sunset through sunrise) by targeting structures or trees proximal to roosting birds where the beam is projected. In field situations, habituation to lasers has not been observed (APHIS 20031).

The avian eye generally filters most damaging (*e.g*., short-wavelength) radiation from the sun. In tests conducted with double-crested cormorants exposed to a relatively low-power Class-III B laser at a distance of 1 meter, no ocular damage was noted (APHIS 2001). However, unlike the eye of birds, the human eye, with the exception of the blink reflex, is essentially unprotected from thermal damage to retinal tissue associated with concentrated laser radiation. The Class II, battery-powered, 68-mW, 650-nm, diode Avian Dissuader is used by WS in AK. Because of the risk of eye damage, safety guidelines and specifications have been developed and are strictly followed by the user (OSHA 1991, Glahn and Blackwell 2000).

Auditory frightening devices such as sirens, horns, propane exploders, pyrotechnics, harassment shooting, electronic guards, and bioacoustics use sounds to scare birds. Auditory frightening devices are often not practical in suburban, urban, or rural areas if they disturb people, livestock, or pets. Birds may quickly habituate to frightening devices if not reinforced with other techniques (Bomford and O'Brien 1990).

Paintball guns are an effective tool that can be used to disperse and move birds from an area. Paintballs are not fired directly at the birds with the intention to hit them, but in the direction of the bird. The firing of a paintball gun produces a gunshot-like report that will often frighten birds. In addition to an auditory stimulus, there is also a visual and auditory stimulus from the paintball hitting and breaking near the bird. The combination of stimuli increases the efficacy of a frightening device.

Other harassment methods include the incorporation of a human physical presence or presence of a vehicle. Physical harassment in the form of human voice, waving arms, and clapping of hands will often work in many situations when other frightening devices are not applicable. In addition, vehicle harassment is also often effective in scaring birds from an area. Vehicle harassment involves simply driving towards or near a bird causing it to leave the area.

Hand-capture is an effective way to capture juvenile birds or birds that are unable to fly due to injury or molting of flight feathers.

Drive nets are used to catch molting (flightless) waterfowl. Long nest form a funnel to a holding pen. Birds will often flock together on land or water and can be carefully herded into the holding pen.

Clover, funnel, cage, and decoy traps are enclosure traps made of netting, hardware cloth, or other light fencing material and come in many different sizes and designs, depending on the species of birds being captured. The entrances of the traps also varies greatly from swinging-door, one-way door, or funnel entrance. Traps are baited with grain or other food material to attract target birds. Decoy traps maintain live birds in the trap with sufficient food, water, and shelter to assure their survival. Feeding behavior and calls of the decoy birds attract other birds, which enter and become trapped themselves. WS' standard procedure when conducting trapping operations is to ensure that an adequate supply of food and water is in the trap to sustain captured birds for several days. Active traps are checked daily, every other day, or as appropriate, to replenish bait and water and to remove captured birds. Cage/live traps, as applied and used by WS, pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Nest box traps are used to capture local breeding and post-breeding starlings and other targeted cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Remote activated nets can be used to capture ground-nesting birds or birds at baits. The nets may have frames of various sizes and shapes or may be frameless, depending on the number of individuals and species targeted. The nets are fired by a remote controlled release trigger. Triggering the device may either release a frame to close over an area or a net may be propelled over a target flock.

Mist nets are more commonly used for capturing small birds such as passerines or shorebirds, but can be used to capture larger birds such as waterfowl. The mist net is a fine black silk or nylon net, usually 3 to 10 feet wide and 25 to 35 feet long. Net mesh size determines which birds can be caught and overlapping "pockets" in the net cause birds to entangle themselves when they fly into the net. Mist nets can be use over land or water. Mist nets are monitored to ensure non-targets caught are released quickly and reported appropriately.

Cannon nets/rocket nets are normally used for birds such as feral pigeons, gulls, and waterfowl and use mortar projectiles to propel a net over birds, which have been baited to a particular site. This type of net is especially effective for waterfowl that are flightless due to molting and other birds which are typically shy of other capture devices.

Net guns are effective for capturing individual birds in situations where the use of other capture devices is not feasible. A net gun is a heavily modified firearm that uses a blank cartridge to propel a net over a target. Nets with different sizes of mesh are

available to capture birds of different sizes. Weights attached to the corners of the net are placed in four barrels on the gun, while the net is carefully placed in a container between the barrels. When fired, gasses from the cartridge drive the weights out of the barrels and carry the net over the target.

Pole traps are generally set for raptors which perch on poles while hunting for food. Hawks and owls can be safely trapped using a small padded-jaw leg-hold trap, snare, or tangle snares set on the top of poles. Poles that are 5 to 10 feet high are erected where they can be easily seen, and a trap is placed on top of the pole. A wire is run through the trap ring and secured to the base of the pole so that trapped birds may slide to the ground where they can rest. Pole traps are monitored consistently to quickly remove captured birds.

Bal-chatri traps are small traps used for capturing birds of prey such as hawks and falcons. Live bait (*e.g*., pigeon, starling, a rodent) is used to lure raptors into landing on the trap. The trap is made of chicken wire or other wire mesh material and formed into a Quonset hut-shaped cage which holds the live bait and is anchored securely to the ground. The outside top and sides are covered with many nooses consisting of strong monofilament line or stiff nylon string that entangle the raptor's feet and hold the bird.

Swedish goshawk traps are a type of large cage-trap. Like the Bal-chatri, they use live bait (*e.g*., pigeons, starlings, rodents) to lure a raptor into the trap. The live bait is secured in an additional cage inside the trap so the raptor cannot harm the animals used as bait. While attempting to get the bait, the raptor releases a trigger that closes the doors of the trap, securing the bird inside the large cage.

Leghold/Foothold traps (padded jaw) are a common and effective way to catch animals. The trap consists of 2 steel jaws, at least one spring, a pan, and dog (trigger), and come in numerous sizes to catch different sizes of animals. When the animal steps on the pan, the jaws are released and the spring(s) close the jaws around the foot, securely holding the animal. The jaws of the trap may be laminated, offset, or padded to reduce pressure on the animal's leg/foot.

Non-Lethal Chemical Methods

Methyl Anthranilate is a food flavoring (artificial grape flavoring) that is approved by the Food and Drug Administration as an additive to both human and livestock feeds (Timm 1994). It is a naturally occurring chemical and is the characteristic odor/flavor of Concord grapes. Methyl anthranilate is a taste repellent to birds, causing them to avoid using or feeding in areas where it has been applied. Methyl anthranilate is not

fundamentally toxic to mammals or birds and at room temperature it is an oily yellowish liquid.

Lethal Methods

Egg removal/Egg Addling/Oiling/Destruction may take place when nest destruction is used to discourage birds from nesting in areas that require protection and is a method of suppressing reproduction of local nuisance bird populations by destroying eggs and embryos prior to hatching. Eggs that are collected during nest/egg removal activities may be donated to charitable organizations or disposed of in a landfill. The removal of nests and eggs often discourages birds from nesting in an area, causing them to abandon the site. Egg addling is conducted by vigorously shaking an egg causing detachment of the embryo from the egg sac. Egg destruction can also be accomplished in several other ways, but the most commonly used methods are manually gathering eggs, or by oiling or spraying the eggs with a liquid which covers the entire egg and prevents the embryo from obtaining oxygen.

Shooting is a very selective method used to remove birds and reinforce non-lethal methods. Shooting is more effective as a dispersal technique than as a way to reduce bird densities when a large number of birds are present. Shooting with shotguns, air rifles, and rifles may be used to reduce bird damage problems when lethal methods are determined to be appropriate. All employees who use firearms receive firearms safety and handling training in compliance with WS Directives 2.615 and WS Firearm Safety Training Manual.

To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend approved firearms safety training and receive 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.

Hunting and Depredation Permits. WS will sometimes recommend that resource owners consider legal hunting as an option for reducing damage caused by species of game birds. Although legal hunting is impractical and/or prohibited in many urban/suburban areas, it can be used to reduce the use of a resource by a local populations of game birds in the appropriate areas. Legal hunting also reinforces harassment programs (Kadlec 1968). WS may recommend that resource owners receive DPs from the USFWS to legally take bird species that are protected under the MBTA. In these situations, WS will investigate the complaint and provide this

information to the USFWS either recommending or advising against the permit application by submitting a Form 37 (Permit Review Form).

Body-gripping traps are constructed of round bar steel, are square or round in shape, and are available in different sizes depending on the species being targeted. One or two springs provide the tension for closing the trap. Body-gripping traps can be placed in tunnels or other constricted openings that animals (*e.g*., pigeons) use to access an area. Body-gripping traps quickly and humanely euthanize animals that are caught by quickly closing on the body.

Snap traps can be effective in removing offending birds. The trap is affixed to the building with the trigger pointed downward in the vicinity of the damage. The trap is baited with nuts (walnuts, almonds, or pecans) or suet. If multiple areas are being damaged, several traps can be used.

Snares are a simple and effective method to capture animals. Snares made of cable or other line can be used to catch target animals. A snare can be place in a tunnel or other small opening used by an offending animal (*e.g*., pigeon). When an animal walks through the loop in the snare, a lock slides down the cable and constricts around the animal, holding it in place. A stop can be placed on the snare to stop the constriction of the snare and to avoid euthanizing the animal if desired.

Euthanasia Methods

Cervical dislocation may be used to euthanize birds which are captured in live traps. The AVMA approves this technique as a humane method of euthanasia and states that cervical dislocation, when properly executed, is a humane technique for euthanasia of poultry and other small birds (AVMA 2007). Cervical dislocation rapidly induces unconsciousness, does not chemically contaminate the tissue, and is rapidly accomplished (AVMA 2007).

Carbon dioxide (CO_2) is a colorless, odorless gas approved by the AVMA as a euthanasia agent (AVMA 2007) and used by WS in cases where live caught animals need to be euthanized. . The advantages of using CO_2 are: 1) its well established rapid depressant, analgesic, and anesthetic effects, 2) its ready availability (*e.g*., can be purchased in compressed gas cylinders), 3) its broad safety margin (*e.g*., poses minimal hazard to personnel when used with properly designed equipment), and 4) its negligible bioaccumulation potential. Inhalation of CO_2 causes little distress to the birds, suppresses nervous activity, and induces death within 5 minutes. In addition, inhalation of CO_2 at a concentration of 7.5% increases the pain threshold, and higher concentrations of CO_2 have a rapid anesthetic effect (AVMA 2007).

Literature Cited

APHIS. 2003. Tech Note: Use of Lasers in Avian Dispersal. USDA/APHIS/WS. 2 pp.

AVMA. 2007. AVMA Guidelines on Euthanasia. Online. http://www.avma.org/issues/animal_welfare/euthanasia.pdf

Blackwell, B. F., G. E. Bernhardt, and R. A. Dolbeer. 2002. Lasers as nonlethal avian repellents. Journal of Wildlife Management 66:250–258.

Bomford, M. and R.H. O'Brein. 1990. Sonic deterrent in animal damage control: a review of device tests and effectiveness. Wildlife Society Bulletin. 18:411-422.

DeHaven, R. W. and J. L. Guarino. 1969. A nest box trap for starlings. Bird Banding 40:49–50.

Dolbeer, R. A., P. P. Woronecki, and R. L. Bruggers. 1986. Reflecting tapes repel blackbirds from millet, sunflowers, and sweet corn. Wildlife Society Bulletin 14:418–425.

Fairaizl, S. D. 1992. An integrated approach to the management of urban Canada geese depredations. Proceedings of the Vertebrate Pest Conference 15:105–109.

Fuller-Perrine, L. D., and M. E. Tobin. 1993. A method for applying and removing bird exclusion netting in commercial vineyards. Wildlife Society Bulletin 21:47–51.

Glahn, J. F., and B. F. Blackwell. 2000. Safety guidelines for using the Desman laser and Dissuader laser to disperse double-crested cormorants and other birds. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services' National Wildlife Research Center, Fort Collins, Colorado, USA.

Glahn, J. F., G. Ellis, P. Fioranelli, and B. Dorr. 2001. Evaluation of moderate- and low-power lasers for dispersing double-crested cormorants from their night roosts. Proceedings of the Eastern Widlife Damage Management Conference 9:34–45.

Johnson, R. J. and J. F. Glahn. 1994. European starlings. Pages E109–120 *in* S. E. Hygnstrom, R. M. Timm, and G. E. Larson, editors. Prevention and control of wildlife damage. University of Nebraska Cooperative Extension, Lincoln, USA.

Kadlec, J.A. 1968. Bird reactions and scaring devices. Appendix 1. Federal Aviation Advisory. Circular 15052009.

Knittle, C. E. and J. L. Guarino. 1976. Reducing a local population of starlings with nest-box traps. Proceedings of the Bird Control Seminars 7:65–66.

Lowney, M. S. 1993. Excluding non-migratory Canada geese with overhead wire grids. Proceedings of the Eastern Wildlife Damage Management Conference 6:85–88.

Occupational Safety and Health Administration. 1991. Guidelines for laser safety and assessment. Publication 8-1.7. United States Department of Labor, Occupational Health and Safety Administration, Washington, DC, USA.

Timm, R. M. Vertebrate pesticides-description of active ingredients. Page G-43 *in* S. E. Hygnstrom, R. M. Timm, and G. E. Larson, editors. Prevention and control of wildlife damage. University of Nebraska Cooperative Extension, Lincoln, USA.

Tobin, M. E, P. P. Woronecki, R. A. Dolbeer, and R. L. Bruggers. 1988. Reflecting tape fails to protect ripening blueberries from bird damage. Wildlife Society Bulleting 16:300–303.

APPENDIX C HP AI SURVEILLANCE

1. Investigation of Illness/Death in Birds (morbidity/mortality events): A systematic investigation of illness and death in wild birds may be conducted to determine if HP H5N1 AI is causing the illness and death of birds. This strategy offers the best and earliest probability of detection if HP H5N1 AI if introduced by migratory birds into the US. Illness and death involving wildlife are often detected by, or reported to natural resource agencies and entities. This strategy capitalizes on existing situations of birds without handling or killing additional birds.

2. Surveillance in Live Wild Birds: This strategy involves sampling live-captured, apparently healthy birds to detect the presence of HP H5N1 AI virus. Bird species believed to have the highest risk of exposure to or infection with, HP H5N1 include birds that may have been in contact with species from Asia with reported HP H5N1 outbreaks and birds that tested positive for low pathogenic H5 or H7 AI during the 2006 HP H5N1 surveillance; these birds would be targeted. Where possible, this sampling effort will be coordinated with projects that intend to capture and handle the desired birds. Coordinating sampling with ongoing projects conducted by state and federal agencies, universities, and others maximizes use of resources and minimizes the need for additional bird capture and handling.

3. Surveillance in Hunter-killed Birds: Check stations for waterfowl hunting provide an opportunity to sample harvested birds to determine the presence of HP H5N1 and other AI viruses, and supplement data collected during other surveillance efforts. Birds will not be harvested by WS for the sole purpose of AI surveillance.

4. Environmental Sampling: AI is released by waterfowl through the intestinal tract and viable virus can be found in feces and the water in which the birds swim, defecate and feed. This is the principal means of virus spread to new birds and potentially to poultry, livestock, and humans. Analysis of water and fecal material from waterfowl habitat can provide evidence of AI circulating in wild bird populations, the specific AI subtypes, and pathogenicity. Monitoring of water and/or fecal samples gathered from waterfowl habitat is a reasonably cost effective, technologically achievable means to assess risks to humans and poultry.

Details regarding AI sample collection, packaging and shipping can be found in the Alaska Interagency HPAI Bird Surveillance Working Group (2006) manual. Samples will be screened to determine if "Type A" influenza virus is present; if the test is positive, the sample will be tested for the presence of H5 and H7. Samples testing positive for H5 or H7

will be sent to National Veterinary Services Laboratory for further testing and final diagnosis.

APPENDIX D WS BDM TAKE

TableD-1. AK WS Complete Take for FY05-FY09.

	FY05		FY06		FY07		FY08		FY09		Average	
Species	**Killed**	**Harass**	**Killed**	**Harass**	**Killed**	**Harass**	**Killed**	**Harass**	**Killed**	**Harass**	**Killed**	**Harass**
Aleutian Cackling Goose	0	0	1	52	0	340	0	315	0	0	0.2	175
American Coot	0	0	0	0	0	0	1	24	0	14	0.2	6
American Golden-plover	0	0	0	21	0	0	0	19	2	16	0.4	9
American Green-winged Teal	45	540	33	750	74	1,421	78	1,020	61	1,939	58.2	1,182
American Kestrel	0	2	0	6	0	10	0	6	4	218	0.8	42
American Pipit	0	0	0	0	1	100	0	0	0	0	0.2	33
American Robin	0	0	3	15	0	6	0	130	0	20	0.6	30
American Wigeon	23	585	29	687	51	2,323	54	2,242	61	4,372	43.6	2,089
Arctic Tern	0	32	1	99	1	18	0	5	1	6	0.6	30
Baird's Sandpiper	0	0	0	0	0	0	0	2	0	0	0	0
Bald Eagle	0	362	0	4,183	0	11,040	0	26,492	0	12,988	0	11,018
Bank Swallow	0	0	0	0	0	0	0	52	0	0	0	9
Barn Swallow	0	10	0	0	0	0	0	0	0	0	0	2
Barrow's Goldeneye	2	223	0	587	12	1,350	11	1,907	16	1,685	8.2	1,184
Belted Kingfisher	0	0	0	1	0	3	0	8	0	6	0	4
Black-bellied Plover	0	0	0	0	0	0	0	2	1	44	0.2	8
Black-billed Magpie	75	172	43	224	65	541	33	642	85	650	60.2	462
Black-legged Kittiwake	0	15	269	621	0	0	0	4,250	0	841	53.8	955
Blue-winged Teal	0	2	0	0	0	0	0	0	0	9	0	2
Bohemian Waxwing	0	0	0	70	2	1,150	1	13,279	0	6,640	0.6	3,715
Bonaparte's Gull	0	2	1	419	52	4,528	18	963	1	1,163	14.4	1,934
Boreal Owl	0	0	0	3	0	0	0	0	0	0	0	1
Bufflehead	1	56	1	67	6	97	2	575	5	1,440	3	389
Canada Goose	33	2,420	66	3,068	30	3,563	18	4,379	105	20,801	50.4	6,299
Canvasback	0	18	0	201	1	130	0	143	3	1,812	0.8	406
Chukar	0	0	0	0	0	0	1	0	0	0	0.2	0
Cinnamon Teal	0	0	0	0	1	0	0	0	0	0	0.2	0
Cliff Swallow	0	0	0	0	0	100	0	6	1	278	0.2	81
Common Goldeneye	3	194	7	1,213	7	2,105	3	322	10	1,194	6	1,189
Common Loon	0	0	0	0	0	0	0	0	0	3	0	1
Common Merganser	0	4	0	0	5	10	0	120	0	198	1	57
Common Raven	44	29,210	64	50,680	194	63,811	94	64,583	121	43,319	103.4	52,569
Common Redpoll	0	0	0	12	0	0	0	1,506	0	1,826	0	557
Common Sandpiper	0	0	0	0	0	3	0	0	0	0	0	1
Dark-eyed Junco	0	0	0	0	0	0	0	1	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0	0	2	0	0	0	0
Dunlin	0	0	0	0	0	0	0	0	0	27	0	5
Eurasian Green-winged Teal	0	0	1	0	38	0	0	0	0	0	7.8	0
Eurasian Wigeon	0	0	1	0	1	0	1	0	0	13	0.6	2
European Starling	2	0	9	31	26	194	7	282	3	0	9.4	117
Feral Ducks	0	0	0	0	0	0	0	0	1	0	0.2	0

Fox Sparrow	0	0	0	0	0	12	0	2	0	0	0	4
Gadwall	0	0	0	2	4	13	3	0	0	14	1.4	7
Glaucous Gull	0	0	3	5	0	27	4	26	7	50	2.8	23
Glaucous-winged Gull	0	1,006	137	107,685	114	9,248	27	17,041	38	6,661	63.2	25,148
Golden-crowned Sparrow	0	0	0	0	0	0	0	0	0	9	0	2
Great Blue Heron	0	0	0	0	2	20	0	57	5	22	1.4	20
Great Horned Owl	0	17	0	9	0	22	0	81	0	37	0	31
Greater Scaup	63	3,356	32	8,371	83	9,196	69	13,984	120	15,413	73.4	9,919
Greater White-fronted Goose	0	0	0	18	11	1,702	22	4,982	25	3,613	11.6	2,003
Greater Yellowlegs	3	0	0	6	1	14	2	143	1	225	1.4	67
Ruddes Grouse	0	0	0	0	0	0	0	0	0	1	0	0
Herring Gull	42	4,821	99	9,121	36	7,895	70	3,869	26	5,317	54.6	6,486
Harlequin	0	0	0	0	0	6	0	3	1	42	0.2	10
Hooded Merganser	0	0	0	0	0	0	0	15	0	100	0	19
Horned Grebe	0	2	0	6	0	13	0	4	5	106	1	24
Horned Lark	0	0	0	0	0	0	0	0	0	1	0	0
Horned Puffin	0	0	0	0	0	0	0	1	0	0	0	0
Killdeer	0	0	0	0	4	11	3	29	1	20	1.6	12
King Eider	0	0	1	0	0	25	0	0	0	0	0.2	8
Lapland Longspur	0	0	8	112	0	400	0	142	0	210	1.6	211
Least Sandpiper	0	0	2	0	0	1	0	5	1	37	0.6	7
Lesser Scaup	0	0	0	0	0	0	4	659	7	4,015	2.2	779
Lesser Snow Goose	0	75	6	37	0	30	0	95	1	29	1.4	49
Lesser Yellowlegs	0	0	0	1	0	27	0	28	6	179	1.2	44
Lincoln's Sparrow	0	0	0	0	0	15	0	0	0	0	0	5
Long-billed Dowitcher	0	0	1	1	0	52	1	325	0	42	0.4	79
Long-tailed Duck	0	0	2	0	0	91	0	26	4	98	1.2	51
Long-tailed Jaeger	0	0	0	0	0	0	0	1	1	35	0.2	6
Long-toed Stint	0	0	0	0	0	0	0	0	1	0	0.2	0
Mallard	84	2,922	144	2,716	236	5,731	169	12,290	142	14,995	155	7,398
Merlin	0	2	0	1	0	27	0	51	0	27	0	23
Mew Gull	120	1,817	88	1,850	47	1,765	71	2,952	49	1,573	75	1,954
Mourning Dove	0	0	0	0	0	1	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	1	0	0	0	0	0	0
Northern Goshawk	0	9	0	21	0	2	0	6	0	3	0	7
Northern Harrier	0	55	0	71	0	33	0	44	0	68	0	51
Northern Hawk Owl	0	0	0	0	0	1	0	4	0	64	0	12
Northern Pintail	3	123	12	378	29	703	37	796	24	3,066	21	962
Northern Shoveler	11	182	21	388	24	1,051	50	2,028	47	4,243	30.6	1,491
Northern Shrike	0	0	0	0	0	0	0	8	0	4	0	2
Northwestern Crow	0	0	5	4,625	12	2,556	17	7,757	8	4,616	8.4	3,685
Osprey	0	0	0	0	0	7	0	3	0	26	0	7
Pacific Golden Plover	0	0	2	15	0	72	0	0	1	1	0.6	27
Pacific Loon	0	1	2	0	0	82	0	28	2	42	0.8	39
Parasitic Jaeger	0	0	1	0	0	30	0	19	1	5	0.4	14
Pectoral Sandpiper	0	0	0	0	4	8	0	15	0	92	0.8	21
Peregrine Falcon	0	0	0	2	0	1	0	0	0	8	0	2
Pied-billed Grebe	0	0	0	0	0	2	0	4	0	4	0	2

Redhead	0	2	1	7	3	1	0	3	0	5	0.8	3
Red-breasted Merganser	0	0	0	0	0	0	0	178	0	56	0	39
Red-legged Kittywake	0	40,264	0	2,189	0	10,692	0	50,077	4	46,615	0.8	26,755
Red-necked Grebe	0	18	0	54	2	637	0	419	0	296	0.4	344
Red-necked Phalarope	0	0	14	4	0	55	0	24	2	91	3.2	38
Red-tailed Hawk	0	71	0	99	0	260	1	244	0	243	0.2	196
Ring-necked Duck	0	34	1	13	4	66	3	197	1	221	1.8	100
Red-winged Blackbird	0	0	0	0	0	0	0	7	0	0	0	1
Rock Dove (Feral Pigeon)	366	35	423	32	221	58	39	43	102	19	230.2	41
Rock Sandpiper	0	0	0	0	0	0	0	0	0	6	0	1
Rough-legged Hawk	0	5	0	19	0	25	0	83	0	254	0	69
Ruddy Duck	0	0	0	0	0	0	0	3	0	0	0	1
Ruddy Turnstone	0	0	0	0	0	0	0	0	0	12	0	2
Ruffed Grouse	0	0	0	0	0	0	0	1	0	1	0	0
Rusty Blackbird	0	0	0	0	0	2	0	3	0	0	0	1
Sabine's Gull	0	0	0	0	0	0	0	0	0	1	0	0
Sandhill Crane	0	157	5	59	6	24	1	202	3	527	3	166
Savannah Sparrow	0	0	0	0	2	58	0	54	0	0	0.4	28
Semipalmated Plover	0	3	28	13	15	24	1	30	2	72	9.2	28
Semipalmated Sandpiper	0	0	0	0	0	0	0	5	0	0	0	1
Sharp-tailed Sandpiper	0	0	0	0	0	0	0	0	0	1	0	0
Sharp-shinned Hawk	0	0	0	0	0	2	0	0	0	0	0	1
Short-billed Dowitcher	0	0	0	2	0	0	0	0	0	0	0	0
Short-eared Owl	0	4	1	17	0	18	1	50	16	165	3.6	45
Snow Bunting	0	0	0	188	0	20	0	342	0	862	0	239
Snowy Owl	0	0	0	1	0	1	0	7	0	7	0	3
Solitary Sandpiper	0	0	0	0	1	0	0	0	0	1	0.2	0
Song Sparrow	0	0	0	2	0	0	0	0	0	0	0	0
Spectacled Eider	0	0	0	0	0	4	0	1	0	13	0	4
Spotted Sandpiper	0	0	0	0	1	5	1	22	0	5	0.4	6
Spruce Grouse	0	2	0	2	0	13	1	0	0	0	0.2	5
Steller's Jay	0	0	0	0	0	3	0	0	0	2	0	1
Stilt Sandpiper	0	0	0	0	0	3	0	0	0	0	0	1
Surf Scoter	0	0	1	2	0	13	0	12	0	54	0.2	16
Thayer's Gull	0	0	0	1	0	12	5	35	10	696	3	126
Tree Swallow	0	0	0	6	0	403	0	451	1	7,807	0.2	1,512
Trumpeter Swan	0	0	0	1	0	14	0	72	0	40	0	24
Tundra Swan	0	0	0	1	0	39	0	168	0	91	0	56
Upland Sandpiper	0	0	0	0	0	0	1	1	0	4	0.2	1
Violet-green Swallows	1	145	0	23	2	0	0	104	0	115	0.6	65
Wandering Tattler	0	0	0	0	0	0	0	0	3	0	0.6	0
Western Sandpiper	0	0	0	0	0	0	0	0	0	35	0	6
Whimbrel	0	0	7	181	10	111	8	372	3	31	5.6	134
White-crowned Sparrow	0	0	0	31	0	0	0	14	0	23	0	11
White-winged Scoter	0	13	0	13	0	0	0	2	0	192	0	37
Wilson's Snipe	0	0	4	6	4	38	0	73	2	13	2	28

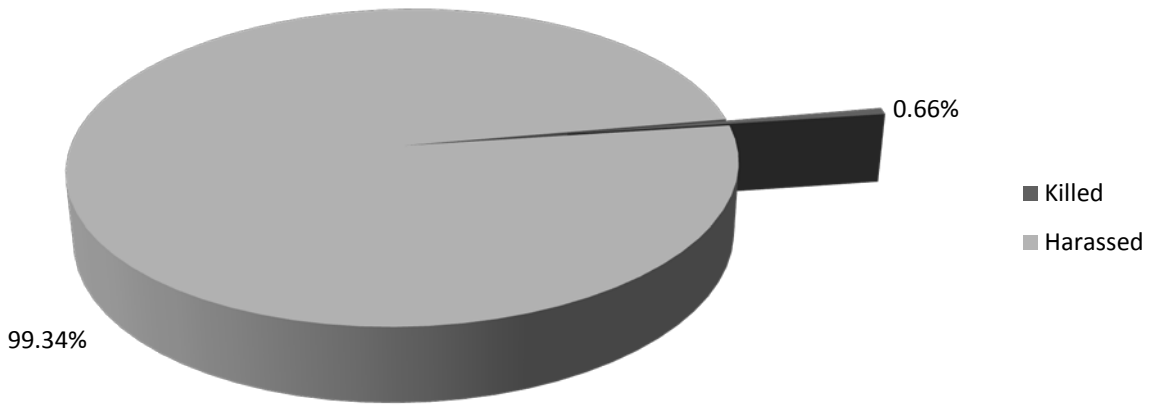


Figure D- 1. Visual Representation of the Proportion of Lethal Control to Non-lethal Control Conducted by AK WS from FY05 through FY 09.