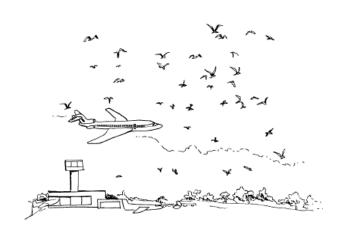
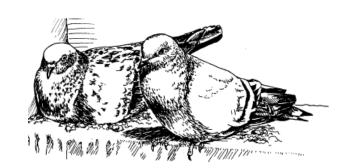
ENVIRONMENTAL ASSESSMENT

BIRD DAMAGE MANAGEMENT IN WYOMING







ENVIRONMENTAL ASSESSMENT

BIRD DAMAGE MANAGEMENT IN THE WYOMING WILDLIFE SERVICES PROGRAM

Prepared by:

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS) WILDLIFE SERVICES (WS)

In Cooperation With:

UNITED STATES DEPARTMENT OF THE INTERIOR UNITED STATES FISH AND WILDLIFE SERVICE (USFWS)

FEDERAL AVIATION ADMINISTRATION (FAA)

WYOMING GAME AND FISH DEPARTMENT (WGFD)

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Acronyms Used in the EA

AC Alpha Chloralose AI Avian Influenza

APHIS Animal and Plant Health Inspection Service AVMA American Veterinary Medical Association

BA Biological Assessment BBS Breeding Bird Survey

BGEPA Bald and Golden Eagle Protection Act

BO Biological Opinion

CDC Centers for Disease Control and Prevention CDFG California Department of Fish and Game

CE Categorical Exclusion

CEQ Council on Environmental Quality
CFR Code of Federal Regulations
DOJ Department of Justice
DP Depredation Permit

EA Environmental Assessment
EIS Environmental Impact Statement

EO Executive Order

EPA U.S. Environmental Protection Agency

ESA Endangered Species Act

FAA Federal Aviation Administration FDA Food and Drug Administration

FIFRA Federal Insecticide, Fungicide and Rodenticide Act

FY Fiscal Year

HPAI Highly Pathogenic Avian Influenza
IWDM Integrated Wildlife Damage Management

INAD Investigative New Animal Drug

LD Lethal Dose

MBTA Migratory Bird Treaty Act

MIS Management Information System
MMWR Morbidity and Mortality Weekly Report

MOU Memorandum (or Memoranda) of Understanding

NEDS National Early Detection System
NEPA National Environmental Policy Act
NHPA National Historical Preservation Act

NOA Notice of Availability

NWHC National Wildlife Health Center
NWRC National Wildlife Research Center
SHPO State Historic Preservation Office
SOP Standard Operating Procedure
T/E Threatened and Endangered Species

USC United States Code

USDA United States Department of Agriculture
USDI United States Department of the Interior
USFWS United States Fish and Wildlife Service

USGS United States Geological Survey

WADMB Wyoming Animal Damage Management Board

WDA Wyoming Department of Agriculture
WDH Wyoming Department of Health
WGFD Wyoming Game and Fish Department

WNV West Nile Virus WS Wildlife Services WSS Wyoming State Statute

SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS); U.S. Fish and Wildlife Service (USFWS); Federal Aviation Administration (FAA); Wyoming Game and Fish Department (WGFD), and Wyoming Department of Health (WDH) propose to continue the current bird damage management program in Wyoming. WS, USFWS, FAA, WGFD, and WDH use an adaptive integrated wildlife damage management (IWDM) approach to reduce bird damage to property, agricultural resources, natural resources, and to protect human health and safety. In addition, under the current program, the USFWS would continue to issue depredation permits based on need and recommendations from WS.

It is anticipated, based on historical need that the majority of Wyoming WS' bird damage management will be at buildings occupied by, or in proximity to people to reduce feral pigeon (*Columba livia*) disease risks to humans and fecal contamination in buildings. Wyoming WS also conducts activities to: 1) reduce potential aircraft/bird strikes at airports in Wyoming to minimize human health and safety risks, 2) reduce disease transmission risks to livestock, 3) minimize livestock feed consumption/contamination by birds 4) monitor wildlife diseases, and 5) evaluate damage caused by piscivorous birds at aquaculture facilities.

WS bird damage management would be conducted on public and private property in Wyoming when the resource (property) owner or manager requests assistance. An IWDM strategy would be employed, encompassing the use of practical and effective nonlethal and lethal methods to prevent or reduce damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under the current program, WS provides technical assistance and operational damage management after applying the WS Decision Model (Slate et al. 1992). Physical exclusion, localized habitat modification or harassment are recommended, as appropriate, and utilized to reduce damage. In other situations, birds may be removed in a humane manner, using shooting, trapping, registered pesticides and other products. When determining the damage management strategy, preference is given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone is the most appropriate strategy, particularly if human health and safety are compromised (i.e., by disease risks or aircraft/bird strike threats).

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

Across the United States, wildlife habitat has been altered as human populations expand and land is developed for human needs. These human uses and needs often compete with wildlife, increasing the potential for human-wildlife conflicts. In addition, certain segments of the public strive for protection of all wildlife. Such protection can create localized conflicts between humans and wildlife. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program Final Environmental Impact Statement (EIS) (USDA 1997) summarizes the relationship between wildlife values and wildlife damage in North American culture in this way:

"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."

Both sociological and biological carrying capacities must be applied when resolving wildlife damage problems. The wildlife acceptance capacity, or cultural carrying 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. Biological carrying capacity is the land or habitat's ability for supporting healthy populations of wildlife without degradation to the species' health or their environment over an extended period of time (Decker and Purdy 1988). These phenomena 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 exhibited by those directly and indirectly affected by the species and any associated damage. This damage threshold is a factor in determining the wildlife acceptance capacity. While Wyoming may have a biological carrying capacity to support a higher population of some bird species that are analyzed in this document (see section 1.2), 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 population or damage reduction methods, including the use of lethal methods, to alleviate damage or address threats to public health and safety.

The alleviation of damage or other problems caused by or related to the behavior of wildlife is termed wildlife damage management and is recognized as an integral component of wildlife management (The Wildlife Society 1992). WS uses an adaptive Integrated Wildlife Damage Management (IWDM) approach (WS Directive 2.105¹), 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 local problem analyses (Slate et al. 1992) and the informed judgment of trained personnel. Therefore, wildlife damage management is not based on the premise of punishing the offending animal(s) but on reducing future damage. The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for bird damage management is derived from the specific threats to resources. WS recognizes that birds have no *intent* to do harm. They utilize (*i.e.*, reproduce, walk, forage, deposit feces, etc.) habitats where they can find a *niche*. If they do "wrongs," people characterize

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¹ 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 has not been cited in the Literature Cited.

this as damage. *Wrongs*, unfortunately, are determined not merely in spatial terms but also with respect to time and other circumstances that define the *wrongness* (*i.e.*, birds living in the wilds of Wyoming may not be a problem while birds inhabiting an airport facility could cause human safety concerns, potential human injuries and destruction of property).

IWDM includes methods such as site-specific habitat and behavioral modification to prevent or reduce damage and additionally may require that the offending animal(s) be removed or that local populations or groups be reduced through the use of lethal methods. Potential environmental effects resulting from the application of various bird damage management techniques are evaluated in this EA.

Normally, individual wildlife damage management actions by WS could be categorically excluded (CE) from further National Environmental Policy Act (NEPA) analysis, in accordance with APHIS implementing regulations for NEPA (7 CFR 372.5(c), 60 Fed. Reg. 6,000; 6,003 (1995)). WS and the United States Fish and Wildlife Service (USFWS), Federal Aviation Administration (FAA), Wyoming Game and Fish Department (WGFD), and Wyoming Department of Health (WDH) are preparing this Environmental Assessment (EA) to: 1) facilitate planning, interagency coordination and the streamlining of program management; 2) clearly communicate to the public the analysis of individual and cumulative impacts of program activities; and 3) evaluate and determine if there are any potentially significant or cumulative adverse affects from the proposed program. The Wyoming WS program changes in small increments and this analysis updates the evolution that has taken place over the last several years. All wildlife damage management conducted in Wyoming is undertaken in compliance with relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531-1543) and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. Sec's. 703 - 711). This analysis relies on existing data contained in published documents (Appendix A and Section 1.6) and USDA (1997), to which this EA is tiered.

1.2 WS PROGRAM AND THE USFWS MIGRATORY BIRD PERMITTING PROGRAM

1.2.1 WS Program

USDA is authorized and directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for USDA is the *Act of March 2*, 1931 and the *Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (7 USC 426-426c; 46 Stat. 1468)*, as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

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

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions,

individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

Under the Act of March 2, 1931, and 7 U.S.C. §426c, APHIS may carry out these wildlife damage management programs itself, or it may enter into cooperative agreements with states, local jurisdictions, individuals and public and private agencies whereby they may fund and assist in carrying out such programs. <u>Id</u>. These laws do not grant any regulatory authority. Therefore, there are no regulations promulgated under these statutes for wildlife services or animal damage management activities.

WS' mission (www.aphis.usda.gov/ws/mission.html), developed through its strategic planning process, is: 1) "to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety." This is accomplished through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats from wildlife;
- Collection, evaluation, and dissemination of management information;
- Cooperative wildlife damage management programs;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1999).

WS is a cooperatively funded, service-oriented program. Before any wildlife damage management is conducted, a request must be received and an *Agreement for Control* must be signed by the landowner/administrator or other comparable documents must be in place. As requested, WS cooperates with land and wildlife management agencies to effectively and efficiently reduce wildlife damage according to applicable federal, state and local laws (WS Directive 2.210). WS has the responsibility for responding to and attempting to reduce damage caused by migratory birds, when funding allows, as specified in a Memorandum of Understanding (MOU) with the USFWS; WGFD defers to federal regulations and provisions for migratory bird damage management activities.

1.2.2 USFWS Migratory Bird Permitting Program

The USFWS is the primary federal agency charged with the mission 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 Migratory Bird Treaty Act (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. A list of all species of migratory birds protected by the Migratory Bird Treaty Act and subject to the regulations on migratory birds contained in subchapter B of title 50 CFR is listed in the code of federal regulations (50CFR Part 10) (http://a257.g.akamaitech.net/7/257/2422/09nov20051500/edocket.access.gpo.gov/cfr_2005/octqtr/p df/50cfr10.13.pdf).

The USFWS has authority for issuance of Depredation Permits (DPs) (50 CFR 21.41) "before any persons may take, possess, or transport migratory birds for depredation control purposes." In Wyoming, those persons issued DPs by the USFWS must also acquire a Chapter 56 permit through WGFD to legally take damage-causing and migratory birds. A federal permit is not required to control yellow-headed blackbirds (Xanthocephalus xanthocephalus), red-winged blackbirds (Agelaius phoeniceus), rusty blackbirds (Euphagus carolinus), Brewer's blackbirds (Euphagus cyanocephalus), cowbirds (Molothrus spp.), all grackles (Quiscalus spp.), crows (Corvus spp.) and magpies (Pica spp.) when found committing or about to commit depredations on ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers or manner as to constitute a health hazard or other nuisance. In all cases, WS assists the resource owner with the complaint process (filling out the form) and the resource owner submits the request for a depredation permit to the USFWS (WS Directive 2.301). Table 1-1 provides information on the number of requests for assistance WS received in fiscal years (FY) 00, 01, 02, 03, 04 and 05 for bird damage management and the number of DPs WS recommended (via the property owner) to the USFWS.

Bird Species																	
Species*	CA GO	HE GU	CA GU	RB GU	GB HE	BC NH	GH OW	MA DU	CO ME	BE KI	DC CO	AM PE	CO GO	CO TE	NO FL	GO EA	BA EA
FY00	GO	GU	GU	GC	TIL	INII	OW	DU	IVIL	KI	CO	115	do	1L	PL	LA	LA
Requests	2	0	8	2	12	3	6	8	7	10	1	3	0	0	4	1	1
Recommend	1	0	8	2	12	3	5	8	7	10	1	3	0	0	4	0	0
FY01																	
Requests	0	0	7	1	11	3	1	8	5	11	1	3	2	0	3	1	1
Recommend	0	0	7	1	10	3	1	8	5	11	1	2	2	0	3	0	0
FY02																	
Requests	1	1	3	3	2	1	0	0	1	1	0	4	0	0	3	0	0
Recommend	1	1	3	3	2	1	0	0	1	1	0	4	0	0	3	0	0
FY03																	
Requests	0	0	6	1	11	4	6	8	7	11	1	4	4	1	1	0	0
Recommend	0	0	6	1	11	4	6	8	7	10	1	4	4	1	1	0	0
FY04																	
Requests	1	0	7	1	11	5	5	7	9	11	2	7	3	0	2	0	0
Recommend	1	0	7	1	11	5	5	7	9	11	2	7	3	0	1	0	0
FY05																	
Requests	2	0	5	1	9	2	4	4	3	6	1	4	0	0	0	0	0
Recommend	1	0	5	1	9	2	3	4	3	6	1	4	0	0	0	0	0

*CAGO=Canada Goose, HEGU=Herring gull, CAGU=California gull, RBGU=Ring-billed gull, GBHE=Great blue heron, BCNH=Black-crowned night heron, GHOW=Great horned owl, COMA=Common mallard, COME=Common merganser, BEKI=Belted kingfisher, DCCO=Double-crested cormorant, AMPE=American white pelican. COGO=Common goldeneve. COTE=Common tern. NOFL=Northern flicker. GOEA=Golden eagle. BAEA=Bald eagle

DPs are necessary under the MBTA and Bald and Golden Eagle Protection Act (BGEPA) for activities which "take" bald or golden eagles. DPs are not necessary for non-lethal harassment of species protected only under MBTA, but are required for species protected under the BGEPA. Additionally, any "take" of a threatened or endangered (T/E) species (which could be protected under MBTA, BGEPA and the ESA) could require multiple permits under all three acts.

1.2.3 WGFD Chapter 56 Permit Process

This regulation authorizes the WGFD Chief Game Warden or his designee to take (kill) any wildlife in Wyoming when, in their judgment, the taking is necessary due to substantial damage to property or the creation of a human health and safety hazard. It is promulgated by authority of Wyoming State Statute (WSS) §§23-1-302(a)(viii)and(xxii).

1.3 PURPOSE OF THE EA

The purpose of this EA is to determine if the current program/proposed action could have a significant impact on the environment both for humans and other organisms, analyze other alternatives, coordinate efforts, inform the public, and to comply with NEPA. This EA analyzes the potential effects of bird damage management, as coordinated with the USFWS, FAA, WGFD, WDH and other state and federal agencies, and private entities, as appropriate, on all lands in Wyoming under MOU, Cooperative Agreement, or other comparable document. The EA also addresses the effects of bird damage management on areas where additional agreements may be signed in the future. Because the current program and the proposed action are to conduct a coordinated bird damage management program in accordance with plans, goals, and objectives developed by WS, USFWS, FAA, WGFD and WDH to reduce damage, and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional damage management efforts could occur. Thus, this EA anticipates these additional efforts and the analyses are intended to apply to actions that may occur *in any locale* and at *any time* within Wyoming as part of a coordinated program.

The purpose of bird damage management in Wyoming, under the policies of WS, USFWS, FAA, WGFD and WDH is to minimize animal and human health and safety (e.g., disease transmission, aircraft collisions) risks, and wild/feral bird damage to agriculture (e.g., crops, domestic animals), property (e.g., aircraft, structures) and natural resources (e.g., wildlife). It is anticipated, based on historical need that the majority of Wyoming WS' bird damage management will be at structures occupied by, or in proximity to, people to reduce feral pigeon disease risks. Other important functions of Wyoming WS are to reduce potential aircraft/bird strikes at airports in Wyoming in order to minimize human health and safety risks, to conduct activities at livestock facilities to reduce disease transmission risks to livestock and minimize livestock feed consumption/contamination by birds, disease monitoring and to reduce damage to aquaculture caused by piscivorous birds.

WS', USFWS's and WGFD's involvement in bird damage management provides residents of Wyoming swift and more effective program delivery. Under the proposed action, bird damage management could be conducted under cooperative agreements, MOU or other comparable documents on private, federal, state, tribal, county, and municipal lands in Wyoming upon request for WS assistance and in coordination with the USFWS and WGFD when requests for operational assistance are received. During FY00, FY01, FY02, FY03, FY04 and FY05, Wyoming WS technical and/or operational assistance was requested on 146 occasions when birds were damaging agricultural resources and on 266 occasions when birds were damaging property or natural resources and/or threatening human health/safety (Management Information System (MIS) 2000, 2001, 2002, 2003, 2004 and 2005).

WS identified 30 bird species for which requests for assistance or information were received or for which operational bird damage management was provided (Table 1-2). The species analyzed in this EA include: American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*), bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), red-winged blackbirds, Brewer's blackbirds, brownheaded cowbirds, common grackles (*Quiscalus quiscula*), European starlings (*Sturnus vulgaris*), house sparrows (*Passer domesticus*), feral pigeons (*Columba livia*), great horned owls (*Bubo virginianus*), great blue herons (*Ardea herodias*), black-crowned night herons (*Nycticorax nycticorax*), double-crested cormorants (*Phalacrocorax auritus*), California gulls (*Larus californicus*), herring gulls (*Larus*

argentatus), ring-billed gulls (Larus delawarensis), belted kingfishers (Ceryle alcyon), mallards (domestic/wild) (Anas platyrhynchos), common mergansers (Mergus merganser americanus), common goldeneyes (Bucephala clangula), northern flickers (Colaptes auratus), downy woodpeckers (Picoides pubescens), hairy woodpeckers (Picoides villosus), American white pelicans (Pelecanus erythrorhynchos), black-billed magpies (Pica pica), turkey vultures (Cathartes aura), Canada geese (Branta canadensis), snow geese (Chen caerulescens) and other feral, domestic and exotic birds. For emergency situations involving the protection of human health and safety (i.e., disease risks, bird/aircraft strikes), WS may take action on a case-by-case basis².

		RESOU	RCES PROTE	CTED	
SPECIES	Human Health & Safety (Aviation)	Agriculture (aquaculture)	Agriculture (Field Crops)	Livestock (Feed or Health)	Property (Buildings, Structures, Turf)
American crow ¹	X		X		X
Common raven	X		X	X	X
Red-winged blackbird	X		X	X	
Black-billed magpie	X	X	X	X	
Brewer's blackbird	X		X	X	
Brown-headed cowbird	X		X	X	
Common grackle	X	X	X	X	
European starling	X		X	X	
House sparrow	X			X	X
Pigeon (feral)	X			X	X
Great horned owl ¹	X	X		X	
Belted kingfisher ¹		X			
Great blue heron ¹	X	X			
Black-crowned night heron ¹		X			
Double-crested cormorant	X	X			
California gull ¹	X	X	X	X	X
Herring gull ¹	X	X	X	X	X
Ring-billed gull ¹	X	X	X	X	X
Canada goose ¹	X		X		X
Snow goose ¹			X		
Mallard ²	X	X			X
Common Merganser	X	X			
Common Goldeneye	X	X			
American white pelican ¹	X	X			
Turkey vulture ¹	X			X	X
Northern flicker ¹					X
Downy woodpecker ¹					X
Hairy woodpecker ¹					X
Bald eagle ¹	X			X	
Golden eagle ¹	X			X	

Work will not be conducted on this species until USFWS reauthorizes take under Wyoming WS' migratory bird DP.

1.4 NEED FOR ACTION

1.4.1 Need for Bird Damage Management to Protect Human Health and Safety, Livestock Health and Property

² This protocol is established via the USFWS Migratory Bird DP (permit # MB715711-0) issued to Wyoming WS. These actions and any take of species that results from these actions are not anticipated to exceed several individuals of each species annually.

² A case-by-case determination will be made concerning the status of mallards for each damage situation (i.e., domestic or wild birds).

1.4.1.1 Human Health and Safety (Diseases). The transmission of zoonotic diseases from birds to humans *can* be influenced by limiting populations of gregarious bird species (pigeons, starlings) that spread the disease via fecal accumulations at roosting sites. Certain bird species are known vectors of zoonotic diseases, or they act as reservoirs that infect a host which spreads the disease to humans (Weber 1979, Conover 2002) (Table 1-3). Starlings, pigeons and house sparrows are a few species that are carriers of zoonotic diseases. In addition, areas that are contaminated by bird feces, usually from starlings and pigeons, have a tendency to promote the growth of the fungus *Histoplasma capsulatum*, which is endemic to the United States (Southern 1986, Cleary et al. 1996). When disturbed, fungal spores become airborne and, if inhaled, may cause the respiratory disease histoplasmosis. However, infected people are usually asymptomatic. In dry climates (as in Wyoming), such fungal diseases are relatively unimportant. Ornithosis (*Chlamydia psittaci*) is another respiratory disease that can be contracted by humans, livestock, and pets. Pigeons are most commonly associated with the spread of ornithosis to humans. Ornithosis is a viral disease that is spread via fomites that become airborne after infected bird feces are disturbed.

Various bird species are also known reservoirs for the *Flavivirus* spp. that are responsible for outbreaks of West Nile Virus (WNV), a serious illness in the United States and WNV is potentially a serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and persists into the fall. Symptoms may be severe and can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent. Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes, upon biting, can then spread WNV to humans and other animals when they bite.

WS received 2, 6, 12, 9, 2 and 7 requests for information or assistance with human health and safety concerning potential effects of zoonotic disease transmission by birds in FY00, FY01, FY02, FY03, FY04 and FY05, respectively (MIS 2000, 2001, 2002, 2003, 2004, 2005).

1.4.1.2 Human Health and Safety (Aviation). Bird hazards to aircraft and subsequent risks to people represent a serious human health and safety issue. The evolution of aircraft design in the last three decades has resulted in faster and quieter aircraft. The rapid acceleration and increased speeds of jet turbine and modern propeller-driven aircraft give birds less time to react to approaching aircraft. Also, the amount of air traffic has increased substantially during the last two decades. In 1990, there were roughly 1,750 reported wildlife strikes compared to more than 4,500 in 1999 in the U.S. (Cleary et al. 2002). Between 1990 and 1999, there were 2,492 wildlife strikes in the U.S. that caused damage to aircraft; of these, 85% were caused by birds (Cleary et al. 2002). The number of airports requesting assistance from WS nationwide with wildlife issues has increased from less than 50 in 1990 to more than 400 in 2000 (Cleary et al. 2002).

The FAA is responsible for setting and enforcing the Federal Aviation Regulations (FAR) 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 any one of the following conditions occur: 1) an air carrier aircraft experiences a multiple bird strike, an engine ingestion, or a damaging collision with any wildlife; 2) wildlife of a size or in numbers capable of causing these events have access to the airport flight pattern or movement area; 3) the airport notes wildlife hazards on or near the airport via the Airport Facility Director, on Notice to Airmen, or on the Automated Terminal Information Service. Airports involved in wildlife hazard management usually refer to "Wildlife Hazard Management at Airports", a guidebook for

Disease	Human Symptoms	Potential for Human Fatality	Effects on Domestic Animals
Bacterial:			
Salmonellosis	gastroenteritis, septicemia, persistent infection	possible, especially in individuals weakened by other disease or old age	causes abortions in mature cattle, possible mortality in calves, decrease in milk production in dairy cattle
Pasteurellosis	respiratory infection, nasal discharge, conjunctivitis, bronchitis, pneumonia, appendicitis, urinary bladder inflammation, abscessed wound infections	rarely	may fatally affect chickens, turkeys and oth fowl
Listeriosis	conjunctivitis, skin infections, meningitis in newborns, abortions, premature delivery, stillbirth	sometimes - particularly with newborns	In cattle, sheep, and goats, difficulty swallowing, nasal discharge, paralysis of throat and facial muscles
Viral:			
Encephalitis (7 forms)	headache, fever, stiff neck, vomiting, nausea, drowsiness, disorientation	mortality rate for eastern equine encephalomyelitis may be around 60%	may cause mental retardation, convulsions a paralysis
West Nile virus	Fever, headache, body aches, skin rash, swollen lymph nodes; meningitis, coma in severe cases	low; higher risk in people over age 50 or those with compromised immune systems; <1% develop severe symptoms	can be fatal to horses
Mycotic (fungal):			
Aspergillosis	affects lungs and broken skin, toxins poison blood, nerves, and body cells	not usually	causes abortions in cattle
Cryptococcosis	lung infection, cough, chest pain, weight loss, fever or dizziness, also causes meningitis	possible especially with meningitis	chronic mastitis in cattle, decreased milk flo and appetite loss
Histoplasmosis	pulmonary or respiratory disease. May affect vision	possible, especially in infants and young children or if disease disseminates to the blood and bone marrow	actively grows and multiplies in soil and remains active long after birds have departe
Protozoal:			
Toxoplasmosis	inflammation of the retina, headaches, fever, drowsiness, pneumonia, strabismus, blindness, hydrocephalus, epilepsy, and deafness	possible	may cause abortion or still birth in humans, mental retardation
Rickettsial/ Chlamy			
Chlamydiosis	pneumonia, flu-like respiratory infection, high fever, chills, loss of appetite, cough, severe headaches, generalized aches pains, vomiting, diarrhea, hepatitis, insomnia, restlessness, low pulse rate	occasionally, restricted to old, weak or those with concurrent diseases	in cattle, may result in abortion, arthritis, conjunctivitis, and enteritis

conducting surveys and assessing potential wildlife risks at airports.

Bird damage to property can have important economic impacts, namely the intake of birds into jet engines and bird strikes, which cause an estimated seven fatalities and \$245 million damage to civilian and military aircraft each year (Conover et al. 1995). According to FAA records, 60 bird strikes to civil aircraft were reported in Wyoming from 1990 through September 2004 (FAA National Wildlife Strike Database, wildlife.pr.erau.edu/public/index1.html). Of those strikes reported to commercial aircraft, 38 were caused by unknown bird species; the number of bird strikes to military aircraft in Wyoming is unavailable. From 2003 through September 2005, Wyoming airports reported 22 bird/aircraft strikes at airports statewide (FAA National Wildlife Strike Database, wildlife.pr.erau.edu/public/index1.html). 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 Wyoming is most likely much higher than FAA records indicate. WS either verified or had reported seven and nine potential threats to aviation traffic from a variety of species in FY 03 and FY04, respectively

(MIS 2003, 2004). WS, on a limited basis, provided assistance to airports in Wyoming to resolve conflicts and reduce collisions between wildlife and aviation traffic and to protect the traveling public. WS has also conducted initial hazard consultations for all airports and has written formal wildlife hazard assessments for two airports (Cody, Cheyenne), has one hazard assessment (Jackson) underway and three (Gillette, Natrona County, Sheridan) pending. These written hazard assessments provide information for identifying problematic species, describe seasonal trends in species abundance, list abatement recommendations, and discuss legalities surrounding the management of these species. As wildlife/aviation hazards are identified at different airports throughout Wyoming, the number of requests for assistance may increase. The bird species discussed/analyzed in this EA occur in Wyoming and could occur on most airports in Wyoming. If these birds present an aircraft/bird strike hazard or potential hazard, WS would respond on a case-by-case basis with appropriate actions.

1.4.1.3 Livestock Health. Pigeons, starlings, sparrows, and blackbirds have been implicated in the transmission of diseases such as transmissible gastroenteritis virus, tuberculosis, and coccidiosis, which have been linked to migratory birds (Gough and Beyer 1982). Cryptococcosis is a fungal disease spread by pigeons and starlings to livestock, resulting in chronic, usually fatal, meningitis. Salmonella, another disease that can be spread by birds when consuming livestock feed, can cause abortions in mature cattle, mortality in calves and reductions in milk production. Listeriosis can cause conjunctivitis, skin infections, meningitis in newborn livestock, abortions in mature animals, premature delivery, and stillbirth. Listeriosis also causes nasal discharge and paralysis of throat and facial muscles (manifested by difficulty swallowing) in cattle, sheep, and goats.

The raven is an omnivorous species known to feed on carrion, crops, eggs, birds, small mammals, amphibians, reptiles, fish and insects (Nelson 1934). Larsen and Dietrich (1970) noted that ravens are sometimes responsible for lamb mortality on spring lambing ranges, occasionally injuring or killing newborn calves or injuring cows giving birth.

A review of the scientific literature condenses recommendations to reduce raven damage into three categories: (1) manage raven populations by reducing access to anthropogenic resources; (2) remove offending ravens or birds in specially-targeted management zones; and (3) continue research on raven ecology, behavior, and methods of reducing raven predation under an adaptive management framework (Boarman 2002).

- **1.4.1.4 Property.** Property damage caused by birds can take many forms. Such problems are usually significant only on a local or regional basis. Woodpecker and turkey vulture damage to residential dwellings on a national scale is minimal; however, on a smaller (local) scale, woodpecker damage annually causes thousands of dollars of structural damage and turkey vultures can deface property (due to accumulations of feces and vomit) and may compromise the integrity of human structures used as roosts. During FY00 through FY05, Wyoming WS received 40, 35, 61, 17, 19 and 12 complaints from resource owners that reported birds caused more than \$173,350, \$40,450, \$51,970, \$37,750, \$136,300 and \$603,958 of damage (MIS 2000, 2001, 2002, 2003, 2004, 2005).
- **1.4.1.5 Nuisances.** Certain bird species and their associated nesting material and feces may create nuisances for property owners or safety hazards. Feral pigeons and starlings, for instance, may create a nuisance with their nests and feces when they nest in large numbers on buildings or homes. Their nests may foul machinery and create aesthetic problems, especially when accumulating on the ground. Pigeon feces also can deface signs and cause significant losses to sign companies attempting to maintain billboards. Accumulations of pigeon feces may produce

an objectionable odor, accelerate deterioration of buildings and increase maintenance costs. Pigeon feces deposited on park benches, cars, statues, and unwary pedestrians are unsightly and can be a human health and safety issue. House sparrows and starlings may damage buildings by pecking foam insulation and create aesthetic problems with their droppings and nesting materials. They may also create fire hazards by placing nesting material near electrical wiring and light fixtures. Accumulations of feces and vomit from turkey vulture roosts (houses, ornamental trees, transmission towers) impose direct costs (clean up) and indirect costs (human health and safety issues). Gulls become nuisances when they attempt to acquire food from people eating outdoors (Dolbeer et al. 1990).

1.4.2 Need for Bird Damage Management to Protect Agricultural Resources

Bird damage to agricultural crops costs U.S. farmers more than \$100 million annually (Besser 1985) and can pose significant economic threats to agricultural producers (Besser et al. 1968, Dolbeer et al. 1978, Feare 1984). As the science of raising cattle progressed from range to feedlots, bird problems intensified. Cattle in feedlots and dairies provide a tremendous feeding opportunity for birds. Along with modern agriculture facilities, the concept of the complete cattle diet has transformed livestock production science. The complete diet contains all the nutrients and fiber that cattle need to increase weights, produce milk, and improve the flavor and texture of meat. The basic constituent of most rations is silage with the addition of barley, corn, or other grains which may be incorporated whole, crushed or ground. The silage/grain mixture is normally combined with hay, or other high fiber roughage. While cattle are not able to select for certain ingredients, starlings and other birds select for grains, or other items, thereby altering the composition and energy value of the feed.

Livestock feed losses to starlings have been estimated by Besser et al. (1968) in feedlots near Denver, Colorado at \$84 per 1,000 birds. Forbes (1995) reported starlings consume up to 50% of their body weight each day. Glahn and Otis (1981) reported consumption of about 10.5 lbs of pelletized feed per 1,000 bird-feeding minutes. The removal of high energy food ingredients is believed to reduce weight gains, milk yields, and is economically significant to individual producers (Feare 1984).

From FY00 thru FY05, Wyoming WS responded to 56, 26, 49, 56, 53 and 10 requests for assistance, concerning losses totaling \$69,400, \$44,360, \$44,340, \$102,950, \$48,499, and \$2,291 respectively, from resource owners concerned about aquaculture, commercial forestry/nursery production, field crops and livestock (cattle and sheep harassment and consumption/contamination of livestock feed) (MIS 2000, 2001, 2002, 2003, 2004, 2005).

1.4.3 Need for Bird Damage Management to Protect Natural Resources

Encroachment by some bird species is a concern of some resource management agencies. Starlings and house sparrows usurp nest sites from cavity excavators like woodpeckers and secondary cavity nesters such as wood ducks (*Aix sponsa*) and bluebirds (*Sialia* spp.) (Grabill 1977, Weitzel 1988, Ingold 1989). Brown-headed cowbirds parasitize songbird nests, leading to concern by some wildlife biologists for the well-being of neotropical migrant species (Brown 1994). With endangered bird species, high levels of parasitism can jeopardize the host species. Cowbirds have parasitized the nests of more than 220 host species, ranging from the black-capped vireo (*Vireo atricapillus*) and wood thrush (*Hylocichla mustelina*) to the blue-winged teal (*Anas discors*) and red-headed woodpecker (*Melanerpes erythrocephalus*). Starlings may also parasitize the nests of other species by destroying eggs or hatchlings (Fielder et al. 1990, Grabill 1977, Peterson and Gauthier 1985). Additionally, some species of piscivorous birds can transport

whirling disease between fish hatcheries.

Corvids have been documented preying on the nests or young of the following T/E species: California condor (*Gymnogyps californianus*), greater sandhill crane (*Grus canadensis tabida*), western snowy plover (*Charadris alexandrinus nivosus*), California least tern (*Sterna antillarum browni*), marbled murrelet (*Brachyramphus marmoratus*), San Clemente Island loggerhead shrike (*Lanus ludovicianus mearnsi*), least Bell's vireo (*Vireo bellii pusillus*), and the desert tortoise (*Gopherus agassizii*) (Liebezeit and George 2002). Further, avian predators have been documented as an important nest predator of sage grouse (*Centrocercus urophasianus*) (Keister and Willis 1986). In some cases, predation by crows and ravens has caused other bird species to abandon their nesting colonies and is the principal cause of nest failure for western snowy plovers in many locations (Liebezeit and George 2002).

Because of the predatory or invasive nature of certain bird species which might gain a competitive advantage from either their non-native status or a human-induced advantage, WS could be requested to help reduce such conflicts to protect and conserve bird species of concern.

Additional concerns exist about birds transmitting diseases such as Avian Influenza (AI) and WNV to other healthy bird and wildlife populations. WS is receiving increasing numbers of requests for assistance with surveillance for diseases in wild and feral birds. In 2006, WS was one of several agencies and organizations participating in surveillance for AI virus in migrating birds in North America.

1.4.3.1 Avian Influenza Surveillance and Early Detection

AI is caused by a virus in the Orthomyxovirus group. Viruses in this group vary in the intensity (virulence) of illness they may cause. Wild birds, in particular waterfowl and shorebirds, are considered to be the natural reservoirs for AI (Clark 2003). Most strains of AI rarely cause severe illness or death in birds although the H5 and H7 strains tend to be highly virulent and very contagious (Clark 2003).

Recently, the occurrence of highly pathogenic (HP) H5N1 AI virus has raised concerns regarding the potential impact on wild birds, domestic poultry, and human health should it be introduced into the U.S. One proposed method of introduction that may allow HP H5N1 AI to spread over a large geographical area is infection of migratory waterfowl followed by evolution into a strain that could transmit efficiently between humans (USGS 2005). In fact, it is thought that a change occurred in a low pathogenicity AI virus of wild birds, allowing the virus to infect chickens, followed by further change into the HP H5N1 AI. Highly pathogenic H5N1 AI has been circulating in Asian poultry and fowl, resulting in death to these species. Highly pathogenic H5N1 AI likely underwent further changes, causing infection in additional species of birds, mammals, and humans. More recently, this virus moved back into wild birds, resulting in significant mortality of some species of waterfowl, gulls, and cormorants. This is only the second time in history that a highly pathogenic form of AI has been recorded in wild birds. Potential routes for introduction of the virus into the U. S. include illegal movement of domestic or wild birds, contaminated products, and the migration of infected wild birds.

An interagency National Early Detection System (NEDS) was developed to address detection of the virus in all the North American flyways. The nationwide surveillance effort for HP H5N1 detection, a component of NEDS, was designed to provide an early warning for potentially

catastrophic mortality in North American wild birds and poultry, and minimize the potential for human exposure.

As expected, this nationwide surveillance effort, which commenced in 2006, has detected some instances of low pathogenic AI viruses. This is not surprising, given that waterfowl and shorebirds are considered to be the natural reservoirs for AI. Tens of thousands of birds have been tested, with no evidence that the HP H5N1 AI is found in North America. Of more than 700 birds tested for HP H5N1 AI in Wyoming from June 2006 through January 2007, the vast majority were collected using nonlethal methods. Table 1-4 lists lethal take associated with AI surveillance activities during this time period.

1.5 Summary of Current and Proposed Action

WS, USFWS, FAA, WGFD and WDA propose to continue to administer an adaptive IWDM program to alleviate bird damage to agriculture (e.g., crops and domestic animals), property (e.g., structures, aircraft), natural resources (e.g., wildlife competition), and animal and human health and safety (e.g., disease transmission, aircraft/bird strikes). It is anticipated, based on historical information, that the majority of the bird damage management conducted by WS will be at buildings occupied by, or in proximity to, people. Wyoming WS is also directed to reduce potential aircraft/bird strikes at instate airports in order to minimize human health and safety risks, to conduct activities at livestock facilities to reduce disease transmission risks to livestock and minimize livestock feed consumption/contamination by birds, control damage to aquaculture caused by piscivorous birds, and conduct disease monitoring.

An IWDM program would be implemented on private and public lands of Wyoming³ where a need exists, a request is received and funding is available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods to prevent or reduce damage while

Table 1-4. Birds Taken* in Wyoming by WS for 2006-2007 AI Surveillance.

SHOREBIRDS:					
Avocet, American	1				
Dowitcher, Short-billed	2				
Killdeer	6				
Phalarope, Red-necked	2				
Sandpiper, Baird's	1				
Sandpiper, Least	7				
Sandpiper, Semipalmated	2				
Sandpiper, Spotted	1				
Sandpiper, Stilt	1				
Yellowlegs, Greater	4				
Yellowlegs, Lesser	14				
WATERFOWL:					
Bufflehead	1				
Duck, Unidentified	1				
Duck, Wood	2				
Gadwall	13				
Goldeneye, Common	1				
Goose, Canada	44				
Mallard	31				
Pintail, Northern	3				
Redhead	7				
Scaup, Greater	2 4				
Scaup, Lesser	4				
Shoveler, Northern	9				
Teal, Blue-winged	8				
Teal, Green-winged	12				
Wigeon, American	32				
OTHERS:					
Gull, California	1				
Gull, Ring-billed	3				
Nighthawk, Common	1				

^{*} Figures include targeted take and incidental take (from mist nets and swim-in traps).

minimizing harmful effects of damage management measures on humans, other species, and the environment. Under the proposed action, WS would continue to provide technical assistance and operational damage management, including non-lethal and lethal management methods using the WS Decision Model⁴ (Slate et al. 1992) to help determine the most appropriate action(s) to take. When appropriate, localized habitat modifications, harassment, repellents, and physical exclusion would be

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³ This EA addresses bird damage management on a statewide basis on lands under cooperative agreement or in compliance with comparable documents because wildlife, especially birds in this case, are jointly managed by the WGFD and USFWS under statewide statutes, laws, regulations and policies. WS would consult with the WGFD and USFWS on a regular basis to ensure there are no adverse impacts to wildlife populations or other resources of the state.

The WS Decision Model is not a written process but rather a mental problem solving process to determine appropriate management actions to

recommended and utilized to reduce bird damage. In other situations, birds could be removed in a humane manner by utilizing shooting, restricted-use pesticides and live capture followed by relocation⁵ or euthanasia under permits issued by the USFWS and WGFD. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage or potential damage situation. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Bird damage management would be conducted when requested and after consultation with the USFWS, WGFD, FAA, and WDH, as appropriate, on private or public property after an *Agreement for Control* or other comparable document has been completed. During FY00, 01, 02, 03, 04, 05 and 06 WS provided technical assistance services to residents across the entire state of Wyoming. In addition, WS consultations with the USFWS were conducted to ensure no adverse effects to T/E species.

1.5.1 Area of Analysis. Wyoming encompasses a land area of about 97,105 mi². WS has *Agreements for Control* to conduct bird damage management on less than 1,000 acres (about 0.001% of the land area of Wyoming). However, WS generally only conducts bird damage management on a small portion of the properties under *Agreement* in any year. Although the area worked by WS is relatively small in relation to the state's total area, the projects are considered important to the requesters and others.

1.6 Relationship of This EA to Other Management and Environmental Documents

- **1.6.1 WS Programmatic EIS.** WS issued a programmatic EIS which analyzed program activities (USDA 1997) and Record of Decision on the National APHIS-WS program. This EA is tiered to USDA (1997).
- **1.6.2** Executive Order (EO) 13186 and MOU between USFWS and WS. EO 13186 directs 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 agencies and American Indian tribes. A national-level MOU between the USFWS and WS is being developed to facilitate the implementation of EO 13186.
- **1.6.3** Invasive Species EO 13112. Authorized by President Clinton, EO 13112 establishes guidance to 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 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, 4) provide for environmentally sound control, and 5) promote public education on invasive species.

1.7 Decision to Be Made

Based on agency relationships, MOUs and legislative direction, WS is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. The USFWS, FAA, WGFD, and WDH had input during preparation of the EA to ensure an interdisciplinary approach in compliance with NEPA and agency mandates, policies and regulations. As cooperating agencies, the USFWS and FAA may

⁵ It is often unwise, unnecessary and biologically unsound to relocate damaging birds because they are often abundant and this would potentially cause damage in the new location or they would return to the original location. WS, however, would consider relocating birds if it is deemed biologically sound and a permit was issued by the WGFD or USFWS.

adopt this EA and make and document their own decision.

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

- Should WS, USFWS, FAA, WGFD, WDH and Wyoming Animal Damage Management Board (WADMB) conduct a coordinated bird damage management program in Wyoming to alleviate damage to agriculture, property, natural resources, and human health and safety?
- What mitigation measures should be implemented by WS, USFWS, FAA WGFD, WDH and the WADMB?
- Would the proposed action have significant impacts on the quality of the human environment and therefore require preparation of an EIS?

1.8 Scope of This Analysis

- **1.8.1** Actions Analyzed. This EA evaluates bird damage management to protect agriculture, property, natural resources, and human and animal health and safety, as coordinated with the USFWS, FAA, WGFD, WADMB and WDH.
- **1.8.2** American Indian Lands and Tribes. Currently, WS has an MOU with the Northern Arapahoe and Eastern Shoshone tribes on the Wind River Reservation. Any WS activities conducted on tribal lands would only be conducted at the request of the tribe and after appropriate authorizing documents were signed. Requests for operational assistance to resolve bird damage complaints on private properties within the boundaries of the reservation would be coordinated with the tribal government.
- **1.8.3 Resources Not Currently Protected by WS Bird Damage Management.** The current bird damage management program operates on a small percentage of properties in Wyoming, as stated in Section 1.5.1. This EA analyzes effects not only at the current program level, but at an expanded level should additional individuals or agencies request assistance. Any program expansion is anticipated to be small, with no adverse effects.
- **1.8.4 Period for which this EA is Valid.** If it is determined that an EIS is not needed, this EA will remain valid until Wyoming WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA analysis is sufficient.
- **1.8.5 Site Specificity.** This EA emphasizes major issues as they relate to specific areas whenever possible; however, many issues apply wherever bird damage, or potential bird damage occurs and management actions are taken. WS personnel use the WS Decision Model (Slate et al. 1992) as the "on the ground" site-specific procedure for each damage management action. The Decision Model is a thought process that guides WS though the analysis and development of the most appropriate individual strategy to reduce damages and detrimental environmental effects from damage management actions (see Chapter 3, Section 3.3.3 for a description of the Decision Model). The Decision Model (Slate et al. 1992) and WS Directive 2.105 describe the site-specific thought process that is used by WS. Decisions made using the model would be in accordance with plans, goals, and objectives of WS, USFWS, FAA, WGFD, and WDH and any standard operating procedures (SOP) described herein and adopted or established as part of the decision.

WS, USFWS, FAA, WGFD, and WDH analyzed the current program and proposed action, and the other alternatives in this EA against the issues that were raised. These issues were analyzed at levels that are "site specifically" appropriate for this action in Wyoming. Determining effects requires that

the agencies look at the *context* of the issue and *intensity* of the action. Birds range over a large geographic area that includes different land ownerships and political boundaries. Damage management actions are conducted on a much smaller portion of the habitat occupied by the target birds (see Section 1.5.1). As professional wildlife biologists, WS, USFWS and WGFD analyzed effects of management actions on bird populations, understanding that the damage situation with birds may change at any time in any location because wildlife populations are dynamic and mobile.

In summary, WS, USFWS, FAA, WGFD, and WDH have prepared an EA that provides as much information as possible to address and predict the locations of potential bird damage management actions and coordinates efforts between WS, USFWS and WGFD, to ensure that native bird populations remain healthy and viable in the state. Thus, the EA addresses substantive environmental issues pertaining to bird damage management in Wyoming. To reduce damages, WS provides technical assistance and demonstrations to help prevent the need for operational damage management. WS can and does provide an analysis of effects of their actions and effects to reduce bird damage within the scope of the EA. The site-specificity problem occurs when trying to predict damage locations before the damage actually occurs. By using the Decision Model (Slate et al. 1992), WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for the agencies to comply with NEPA and still be able to accomplish their missions. The cooperating agencies 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 or the decision-making process. Furthermore, 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 effects in Wyoming provides a better analysis than multiple EA's covering smaller zones within Wyoming.

1.8.6 Public Involvement/Notification. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media⁶. New issues or alternatives raised after publication of this EA will be fully considered to determine whether the EA should be revisited and, if appropriate, revised.

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four chapters and three appendices. Chapter 2 discusses the issues, issues not analyzed in detail, and the affected environment. Chapter 3 describes each alternative, alternatives not considered in detail and SOPs. Chapter 4 details the environmental impacts associated with each alternative. Chapter 5 is a list of preparers, consultants and reviewers. Appendix A is the literature cited, Appendix B discusses the legal authorities of the cooperating agencies, and Appendix C describes potential bird damage management methods available for use in Wyoming.

⁶ It is entirely possible that an urgent need, such as threats to the traveling public, could require that action be taken prior to reaching a decision. None of the planners and decision makers involved in this effort is precluded from considering comments filed in this process at any time (even after actions to deal with the threat have begun) and making appropriate adjustments to ongoing program operations.

CHAPTER 2: AFFECTED ENVIRONMENT AND ISSUES

2.1 INTRODUCTION

Chapter 2 discusses the issues, including issues that will receive detailed analysis in Chapter 4 (Environmental Consequences), and issues that will not be considered in detail with the rationale. Pertinent portions of the affected environment will be addressed in this chapter in the discussion of issues used to develop SOPs. Additional affected environments will be incorporated into the discussions of the environmental impacts in Chapter 4.

2.2 AFFECTED ENVIRONMENTS

- **2.2.1 Airports.** Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue and costly repairs to aircraft (Linnel et al. 1996), and can erode public confidence in the airport transportation industry (Conover et al. 1995). Birds as a group represent the largest hazard to aircraft, and therefore are considered a serious threat to human safety on or near airports (FAA National Wildlife Strike Database, wildlife.pr.erau.edu/public/index1.html).
- **2.2.2 Urban and Suburban Areas.** Public and private properties in urban/suburban areas (including public utilities) may also be affected when birds cause damage to landscaping, natural resources, and property, or affect human health and safety.
- **2.2.3** Agricultural, Rural and Forested Areas. Other areas of proposed action include livestock facilities, forested areas or nurseries, and rural areas where birds are causing or potentially cause damage to agriculture crops, livestock and feed, aquaculture, property, and natural resources, or pose a disease threat.

2.3 ISSUES ANALYZED IN DETAIL

The following issues have been identified as areas of concern requiring detailed analysis in Chapter 4 of this EA:

- Cumulative Effects of WS Bird Damage Management on Target Species Populations
- Effects of WS Bird Damage Management on Non-target Species Populations, Including T/E Species
- Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Animals
- Efficacy of WS Bird Damage Management Methods
 - **2.3.1** Cumulative Effects of WS Bird Damage Management on Target Species Populations. A common concern among members of the public and wildlife professionals, including WS personnel, is the effect of bird damage management on the target species population. WS' take of target species is small in comparison to the overall population of these species and many species WS works with are considered *anthropogenically abundant* (Conover 2002). Quantitative population data for most species are not available; however, population trend data (*i.e.*, qualitative) exist from the breeding bird survey (BBS) data base (Sauer et al. 2005) for most species. The anticipated take of most MBTA-protected species in a year is small enough that impacts on populations are not significant. However, the take for certain species, such as feral pigeons and starlings, could be considerably greater. WS routinely monitors take of all birds and annually reports figures for MBTA-protected species to the USFWS. A detailed analysis of the effect(s) of WS actions on target species populations is conducted in Chapter 4.

2.3.2 Effects of WS Bird Damage Management on Non-target Species Populations, Including T/E Species. WS uses an adaptive IWDM approach to reduce effects on populations of non-target species, as described in Chapter 3. To reduce the risks of adverse effects to non-target species, WS selects methods that are as target-selective as possible or applies such methods in ways to reduce the likelihood of adversely affecting non-target species. Prior to the application of DRC-1339, for example, pre-baiting is required to monitor for non-target species that may consume treated bait. If non-target species that could consume treated bait are observed, then the use of DRC-1339 is postponed, the bait location is moved, or bait is not applied. For trapping activities, WS chooses locations that are selected for by the target species and uses baits that are preferred by the target species.

WS also uses trained professional employees to conduct bird damage management programs in Wyoming. Employees would monitor work areas where bird damage management is scheduled to be conducted and notify the USFWS if a federally listed species was observed. There are 16 federally listed T/E species in Wyoming. WS prepared a BA which determined the proposed bird damage management program has no effect on all federally listed species in Wyoming except the bald eagle. The BA determined that the proposed action would not likely adversely affect the bald eagle population and may be beneficial to bald eagles and the traveling public if eagles were dispersed from airport properties (B. Kelly, Ecological Services, USFWS letter to R. Krischke, WS, December 19, 2005 and Intraagency Consultation).

2.3.3 Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets. The primary pesticide used and proposed for use by Wyoming WS is DRC-1339. DRC-1339 is one of the most extensively studied chemicals and causes a quiet, uneventful, and apparently painless death (USDA 1995, 1997). DRC-1339 is regulated by the EPA through the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), by the Technical Services Division of the WDA and by WS Directives. Based on a thorough risk assessment, APHIS concluded that, when WS program chemical methods are used according to label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997). In addition, the Wyoming WS program properly disposes of any excess solid or hazardous waste.

The use of shotguns, air rifles, and other firearms is selectively employed on target species and helps to reinforce bird scaring and harassment efforts that are often applied by cooperators prior to lethal control. Firearms use is very sensitive and a concern because of public safety and misuse issues. To help ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years (WS Directive 2.615). WS employees who carry firearms as a condition of employment are also required to certify 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.

In addition, WS may use several types of traps to capture target birds. These include: clover, funnel, and common pigeon traps, decoy traps, nest box traps, mist nets, cannon and rocket nets, net guns, pole traps, bal-chatri traps and snap traps. With the exception of snap traps, these traps are live traps or cage traps; consequently, animals can be released unharmed and the traps pose no risks to the public or domestic pets when used properly.

2.3.4 Efficacy of WS Bird Damage Management Methods. Under the current and proposed Wyoming WS program, all methods are used as effectively as practicably possible, in conformance

with the WS Decision Model (Slate et al. 1992), WS Directives and relevant federal and state laws and regulations. The efficacy of each method is based, in part, on the application of the method, the skill of the personnel using the method, and the guidance provided by WS Directives and policies for WS personnel.

WS personnel are trained in the effective use of each bird damage management method. All WS personnel applying pesticides are certified by WDA as restricted-use pesticide applicators. If shooting is determined to be an effective method for a specific bird damage problem, all personnel utilizing firearms receive training on the safe use of firearms (see Section 2.3.3).

WS believes that it is important to maintain the widest possible selection of damage management methods to effectively resolve bird damage problems. Some methods may be more or less effective, or applicable depending on weather conditions, time of year, biological considerations, economic considerations, legal and administrative restrictions, or other factors (see Appendix C for a more detailed discussion of methods).

2.4 ISSUES NOT CONSIDERED IN DETAIL, WITH RATIONALE

- **2.4.1 WS' Impact on Biodiversity.** No WS bird damage management in Wyoming is conducted to eradicate or adversely impact populations of any native wildlife species (*e.g.*, the take of any species is a small proportion of the total). WS operates according to international, federal, and state laws and regulations (and management plans thereof) enacted to ensure species viability. Any reduction of a local population or group is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed, but management actions resolve the immediate problem. The effects of the current WS program on biodiversity are minor and not significant on a national, state, or regional level (USDA 1997). The Wyoming WS operational program targets feral pigeons, which are introduced exotic species. Further, WS operates on a small percentage of the land area of the state (<0.001% of the state) (see Section 1.5.1) and the take by WS of any bird species analyzed in this EA is insignificant to the viability and health of the population.
- **2.4.2 Humaneness of WS Bird Damage Management Methods.** The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if "... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."

Suffering is described as a "... highly unpleasant emotional response usually associated with pain and distress." However, suffering "... can occur without pain ...," and "... pain can occur without suffering ..." (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) 1999), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "... probably be causes for pain in other animals..." (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1999).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay

point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since ". . . neither medical or veterinary curricula explicitly address suffering or its relief" (CDFG 1999).

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

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

Wyoming WS employs experienced and professional personnel who implement management actions in a humane manner given the constraints of current technology, staffing and funding. SOPs used to maximize humaneness are listed in Chapter 3.

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

There is some concern that the proposed action or the action alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987, USDA 1997), and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is truly a subjective term, dependent on what an observer regards as beautiful (see Section 1.1).

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

Wyoming WS recognizes that all wildlife has aesthetic values and benefits. WS conducts bird damage management only at the request of the affected home/property owner or resource manager and preference is given to nonlethal methods. Furthermore, management actions are carried out in a humane and professional manner.

2.4.4 Bird Damage is a Cost of Doing Business – a "Threshold of Loss" Should Be Established Before allowing any Lethal Bird Damage Management. WS is aware of concerns that bird damage management should not be allowed until economic losses become unacceptable. However, this type of policy would be inappropriate to apply to public health and safety situations. In addition, because only a certain level (or threshold) of loss can be expected and tolerated by agriculture producers and property owners, WS has the legal responsibility and direction to respond to requests for bird damage management, and it is program policy to aid each requester to minimize losses. The WS Decision Model (Slate et al. 1992) is used to determine an appropriate strategy.

Furthermore, in a ruling for *Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie NF, et al.*, the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part, the court found that it was only necessary to show that damage from wildlife is threatened, to establish a need for wildlife damage management (U.S. District Court of Utah 1993).

2.4.5 Bird Damage Management Should Not Occur at Taxpayers' Expense, but Should Be Fee Based. Funding for WS comes from many sources besides federal appropriations. Such non-federal sources include various state appropriations, local government funds (county or city), and private funds that are all applied toward program operations. WS was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Federal, state and local officials have decided that WS activities should be conducted by appropriating funds. Additionally, wildlife damage management is an appropriate sphere of activity for government programs, since wildlife is publicly owned and wildlife management is a government responsibility. A commonly voiced argument for publicly funded wildlife damage management is that the public should bear the responsibility for damage to private property caused by public wildlife. The protection of agricultural resources, property, and public health and safety will always be conducted by someone. A federal WS program provides a service to the agricultural producers, protects property, natural resources, and public health and safety, and conducts an environmentally, economically, and biologically sound program in the public interest.

Currently, Wyoming WS provides free bird damage management technical assistance to citizens, private business, and government agencies. Operational damage management may be initiated when the problem cannot effectively be resolved through technical assistance alone, and only after *Agreements for Control* are signed. WS operational bird damage management in Wyoming is offered as a free public service, unless the scale or scope of the problem dictates a fee-based system.

2.4.6 Impacts of West Nile Virus (WNV) on Bird Populations. WNV is a mosquito-borne virus that emerged in recent years in temperate regions of North America, with the first appearance of the virus in North America occurring in New York City in 1999 (Morbidity and Mortality Weekly Report (MMWR) 2002, Rappole et al. 2000). The virus, which causes encephalitis, or inflammation of the brain, has been found in Africa, Western Asia, the Middle East, the Mediterranean region of Europe, and, now in the United States. Mosquitoes acquire WNV from birds and pass it on to other birds, animals, and people. Mammals can become infected if bitten by an infected mosquito, but individuals in most species of mammals do not become ill from the virus. The most serious manifestation of WNV is fatal encephalitis in humans, horses, and birds. While humans and horses may be infected by the virus, there is no documentation that infected horses can spread the virus to

uninfected horses or other animals.

Migrating birds appear to play a role in spreading the disease. Since its detection in this country in 1999, WNV has rapidly spread across the United States and has been reported in all 48 coterminous states and the District of Columbia (T. Creekmore, WDH, pers. comm., July 21, 2006). WNV is typically transmitted between birds and mosquitoes.

WNV has been detected in dead birds of at least 138 species (Centers for Disease Control and Prevention (CDC) 2003, www.cdc.gov.ncidod/dvbid/westnile/birds&mammals.htm). Although birds infected with WNV can die or become ill, most infected birds survive and may subsequently develop immunity to the virus (CDC 2003, www.cdc.gov.ncidod/dvbid/westnile/birds&mammals.htm, Cornell University 2003, http://environmentalrisk.cornell.edu/WNV/Summary2.cfm). In some bird species, particularly corvids (crows, blue jays, ravens, magpies), WNV causes disease (often fatal) in a large percentage of infected birds (Audubon 2003 www.audubon.org /bird/wnv/, CDC 2003 www.cdc.gov.ncidod/dvbid/westnile/birds&mammals.htm, Cornell University 2003, http://environmentalrisk.cornell.edu/WNV/Summary2.cfm, MMWR 2002). In 2002, WNV surveillance/monitoring programs revealed that corvids accounted for 90% of the dead birds reported, with crows representing the highest rate of infection (MMWR 2002). Large birds that live in association with humans (*i.e.*, crows) have a greater likelihood of being detected when sick or after death; therefore, the reporting rates tend to be higher for these bird species; these criteria make them a good "indicator species" of the presence of WNV in a specific area (Cornell University 2003, Audubon 2003, http://environmentalrisk.cornell.edu/WNV/Summary2.cfm).

According to the U.S. Geological Survey (USGS), National Wildlife Health Center (NWHC) (2003, www.nwhc.usgs.gov/research/west nile. html), information is not currently available as to whether WNV is having an impact on bird populations in North America. USGS states that it is not unusual for a new disease to cause high rates of infection or death because birds do not have the natural immunity to the infection. Furthermore, it is not known how long it will take for specific bird populations to develop sufficient immunity to the virus.

Surveys of wild birds have shown that some birds have already acquired antibodies to WNV (USGS-NWHC 2003, www.nwhc.usgs.gov/research/west_nile.html). Based upon available Christmas Bird Counts and BBS results (USGS-NWHC, 2003, www.nwhc.usgs.gov/research/west_nile.html) there have been declines in trend data for some local bird populations; however, it is not known whether the decline can be attributed to WNV or to some other cause(s). A review of available CBC data by Audubon (2003, www.audubon.org/bird/wnv/) reveals that at least some local populations are suffering high (40-68%) WNV-related mortality, but no large scale widespread population reductions have been documented (Caffrey and Peterson 2003). USGS does not anticipate that the commonly seen species, such as crows and blue jays, will be adversely affected by WNV to the point that these bird species will disappear from the United States (USGS-NWHC 2003, www.nwhc.usgs.gov/research/west_nile.html).

2.4.7 Lethal Bird Damage Management is Futile because 50-65% of Blackbird and Starling Populations Die Each Year.

Because natural mortality in many bird species is 50-65% per year, some persons argue that this shows lethal bird damage management is futile (USDA 1997). However, the rate of natural mortality has little or no relationship to the effectiveness of bird damage management because natural mortality generally occurs randomly throughout a population and throughout the course of a year. Natural mortality is too gradual in concentrations of depredating birds to adequately reduce damage. It is apparent that the rate of mortality from bird damage management in Wyoming is well

below the extent of any natural fluctuations in overall annual mortality and is, therefore, inconsequential to regional populations. The resiliency of bird populations does not mean individual bird damage management actions are not successful in reducing damage, but that periodic bird damage management actions are necessary in many damage situations.

- **2.4.8** Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area. Some individuals might question whether preparing an EA for an area as large as the state of Wyoming 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 provides a better analysis than multiple EA's covering smaller zones. In addition, Wyoming WS conducts bird damage management in a very small portion of the state where damage is occurring or likely to occur and where assistance is requested (see Section 1.5.1).
- **2.4.9 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 bird damage management?" 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 increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS WS Program."

One example is the management of some wildlife species to protect other wildlife species, such as T/E species. Civil values have been assigned for many common species of wildlife and can be used to calculate their value. In the case of T/E species, their value has been judged "*incalculable*" (*Tennessee Valley Authority vs Hill*, US Supreme Court 1978), making it more difficult to specifically quantify the economic benefit to restore or protect T/E species.

2.4.10 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.

CHAPTER 3: ALTERNATIVES

3.1 INTRODUCTION

This Chapter consists of five parts: 1) introduction, 2) description of alternatives considered and analyzed in detail, including the No Action/Proposed Action (Alternative 1), 3) bird damage management strategies and methods available to WS in Wyoming, 4) alternatives considered but not analyzed in detail with the rationale, and 5) SOPs for bird damage management techniques. Three alternatives were recognized, developed and analyzed in detail by WS, the USFWS, FAA, WGFD and WDH. Four additional alternatives were considered but not analyzed in detail.

3.2 DESCRIPTION OF THE ALTERNATIVES

3.2.1 Alternative 1 – Continue the Current WS Adaptive Integrated Bird Damage Management Program (No Action/Proposed Action). The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the CEQ's (1981) definition.

The current and proposed program is an adaptive integrated Wyoming WS bird damage management program for the protection of agricultural and natural resources, property, and public health and safety. It is anticipated, based on historical information, that the majority of Wyoming WS bird damage management will be conducted at buildings occupied by, or in proximity to, people with the purpose of reducing disease risks. Other important objectives of the Wyoming WS bird damage management program include reduction of potential livestock health risks, livestock food consumption and contamination, reduction of human health and safety risks associated with aircraft/bird strikes at airports, and disease monitoring in Wyoming. Currently, managers/owners of aquaculture facilities in Wyoming deal with their own bird depredation problems through DPs issued by USFWS after WS evaluates each case and recommends site-specific take figures.

A major goal of the program is to minimize bird-related losses. To meet this goal, WS would continue to respond to requests for assistance with, at a minimum, technical assistance, or where appropriate when permitted by the USFWS and WGFD, and when cooperative funding is available, operational damage management whereby WS personnel would conduct bird damage management actions. City managers, agricultural producers, airport managers, property owners and others requesting assistance would be provided information regarding the use of non-lethal and lethal techniques, as appropriate. Non-lethal methods include, but are not limited to: habitat/behavior modification, decoy and other live traps, exclusionary devices, nest destruction, hazing/frightening devices, chemical repellents, and alpha-chloralose (AC). Lethal methods considered by WS include: shooting, egg addling/destruction/oiling, snap traps, DRC-1339, and American Veterinary Medical Association-approved euthanasia techniques, such as CO₂. WS may recommend hunting or DPs to resource owners when these methods are deemed appropriate for specific bird depredation problems. Bird damage management would be allowed in the state, when requested, on private or public property where a need has been documented and an Agreement for Control or other comparable document has been completed. All management actions would comply with appropriate laws, orders, policies, and regulations.

3.2.2 Alternative 2 – Technical Assistance Only Program. This alternative would not allow for WS operational bird damage management in Wyoming. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or

others could conduct bird damage management using traps, shooting, Avitrol⁷, or any non-lethal method that is legal. Currently, DRC-1339 (technical grade) and alpha chloralose (AC) are available only for use by WS personnel. Therefore, use of these chemicals by private individuals would be illegal.

This "technical assistance only" alternative would place the immediate burden of operational damage management on state agencies, individuals and requesters. Individuals experiencing bird damage would, independently or with WS recommendations, carry out and fund damage management activities. Individual producers could implement bird damage management as part of the cost of doing business, or a state or other federal agency could assume a more active role in providing operational damage management assistance.

If Alternative 2 was selected, operational bird damage management would be left to state agencies, federal agencies other than WS, or individuals. Some agencies or individuals may choose not to take action to resolve wildlife damage. Other situations may warrant the use of legally available management methods because of public demands, mandates, or individual preference. Methods and devices could be applied by people with little or no training and experience, and with no professional oversight or monitoring for effectiveness. This in turn could require more effort and cost to achieve the same level of problem resolution, and could cause harm to the environment, including a higher take of non-target animals, and illegal use of pesticides could be greater than present.

3.2.3 Alternative 3 - No WS Bird Damage Management Program

This alternative would terminate the WS program for bird damage management (operational and technical assistance) on all land classes in Wyoming. However, other federal, state and county agencies and private individuals could conduct bird damage management, but requesters of WS services would not have WS input. WS would not be available to provide technical assistance or make recommendations to airport and landfill managers, property owners, agricultural producers or others requesting assistance. In some cases, damage management methods applied by non-WS personnel could be used contrary to their intended or legal use. In addition, DRC-1339 (technical grade) and AC are available only for use by WS employees. Therefore, use of these products by private individuals would be illegal; however, Avitrol could be used by any state-certified restricted-use pesticide applicator. With no WS bird damage management program, the USFWS would likely be shouldered with additional complaints, stretching existing law enforcement capabilities.

A "no control" alternative was also evaluated in USDA (1997), to which this EA is tiered.

3.3 BIRD DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN WYOMING

The strategies and methodologies described below are common to Alternatives 1 and 2. Under Alternative 2, WS personnel would only provide technical assistance recommendations and conduct demonstrations. Alternative 3 would terminate both WS technical assistance and operational bird damage management in Wyoming. The methods used or recommended by WS would be supported by the WS Decision Model (Slate et al. 1992).

3.3.1 Integrated Wildlife Damage Management (IWDM). The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially.

Avitrol could only be used by state certified pesticide applicators in Wyoming.

The philosophy behind IWDM is to implement effective management methods in a cost-effective⁸ manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM draws from an array of options to create a combination of methods for the specific circumstances. IWDM may incorporate cultural practices (*i.e.*, animal husbandry), small scale habitat modification (*i.e.*, exclusion), animal behavior modification (*i.e.*, hazing/frightening), local population reduction, or any combination of the aforementioned, depending on the characteristics of the specific damage problem. In selecting management techniques for specific damage situations consideration is given to:

- Species responsible for the damage
- Magnitude of the damage
- Geographic extent of the damage
- Duration and frequency of the damage
- Prevention of future damage
- Presence of non-target species
- Impacts to the environment

3.3.2 The IWDM Strategies That WS Employs

3.3.2.1 Technical Assistance Recommendations involve the implementation of damage management actions by the requester; however, WS personnel provide information, demonstrations, and advice on available and appropriate wildlife damage management methods. Technical assistance includes demonstrations on the proper use of management devices (*i.e.*, propane exploders, exclusionary devices, pyrotechnics, etc.) and information on animal husbandry, habitat management, and animal behavior modification that could reduce damage. Technical assistance is generally provided following consultation or an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and practical application.

3.3.2.2 Operational Damage Management Assistance is the conduct or supervision of bird damage management by WS personnel. Operational damage management assistance is initiated when the problem cannot effectively be resolved through technical assistance, and when *Agreements for Control* or other comparable documents provide for WS operational damage management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if restricted-use pesticides are proposed, or the problem is complex requiring the direct supervision of wildlife professional. WS considers the biology and behavior of the damaging species and other factors. The recommended strategy(ies) may include any combination of preventive and corrective actions that could be implemented by the requester, WS, or other agency personnel, as appropriate. Two strategies are available: 1) preventive damage management and 2) corrective damage management.

3.3.2.2.1 Preventive Damage Management is the practice of applying wildlife damage management strategies before damage occurs, based on historical problems and the probability of the damage recurring or an imminent threat to public health, or disease transmission. As requested and appropriate, WS personnel provide information and conduct demonstrations or take

⁸ The cost of management may be secondary because of environmental, legal, human health and safety, animal welfare, or other concerns.

action to prevent historical losses from recurring or reduce the risk of potential losses from occurring. Examples would be applying bird-proof netting over fruit trees before the fruit becomes attractive to birds and the removal of a bird(s) from a food processing plant, restaurant, industrial plant, or a feedlot before the bird(s) has/have caused damage or threatened public or livestock health, or hazing birds at airports.

- **3.3.2.2.2 Corrective Damage Management** is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations, or with the appropriately signed *Agreement for Control* or other comparable document, take action to prevent additional losses. For example, in areas where birds are consuming livestock feed, WS may provide information to the resource owner about exclusionary methods, animal husbandry, mechanical scare devices and pyrotechnics, or conduct operational damage management to reduce losses.
- **3.3.2.3 Educational Efforts.** Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures, instructional courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.
- **3.3.2.4 Research and Development.** The National Wildlife Research Center (NWRC) functions as the research arm of WS, providing scientific information and developing methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. The NWRC was instrumental in the development of the repellent methyl anthranilate (MA) and DRC-1339, and is currently testing new experimental agents that inhibit bird reproduction. In addition, NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.
- **3.3.3 WS Decision Making.** The WS Decision Model⁹ is a decision making procedure for evaluating and responding to damage complaints (Figure 3-1). WS personnel are frequently contacted only after requesters have tried non-lethal methods and found them to be inadequate for reducing damage to an acceptable level. WS personnel evaluate the appropriateness of strategies, and methods are evaluated for their availability (legal and administrative) and suitability based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results with the damage

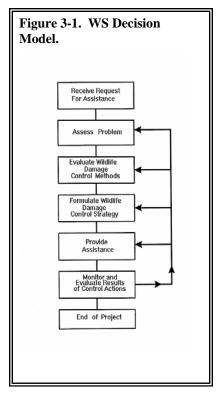
⁹ The WS Decision Model is not a written process but a mental problem-solving process common to most, if not all professions to determine appropriate actions to take.

3.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL, WITH RATIONALE

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

3.4.1 Compensation for Bird Damage Losses

The Compensation Alternative would require the establishment of a system to reimburse persons/businesses impacted by bird damage for those species without hunting seasons. This alternative was eliminated from further analysis because no federal or state laws/policies or regulations exist to authorize such payments for bird damage to resources other than agriculture crops or legally hunted species. In Wyoming, the WGFD is mandated by state statute to pay damage claims for migratory waterfowl and gamebirds. Under this alternative, WS would not provide any technical assistance or operational bird damage management to requesters. Aside from the lack of legal authority, analysis of this alternative in USDA (1997) indicates it has many drawbacks, some of which are:



- It would require larger expenditures of money and labor to investigate and validate all losses, and administer appropriate compensation.
- Compensation would most likely be below full market value.
- It would be difficult to make timely responses to all requests.
- Many losses could not be verified; for example, it would be impossible to prove conclusively in some situations that birds were responsible for disease outbreaks.
- Compensation would provide less incentive to limit losses through improved husbandry or cultural practices, or other management strategies.
- Not all entities would rely completely on compensation and lethal damage management would most likely continue as permitted by law.
- Compensation would not be practical for reducing threats to public health and safety.

3.4.2 Bounties

Bounties are payments of funds for killing birds suspected of causing losses. This alternative is not supported by wildlife and agricultural agencies such USFWS, WADMB and WGFD. WS does not have the authority to establish a bounty program and does not support this concept because:

- Bounties are generally not effective in reducing damage and it would be difficult to measure overall efficacy.
- Circumstances surrounding the bounty of birds are completely unregulated.
- There is a tendency for fraud. It is difficult or impossible to prevent claims for birds taken from outside damage management areas.

3.4.3 Short Term Eradication and Long Term Population Suppression

In Wyoming, eradication of any bird species is not a desired population management goal of any

wildlife management agency. Although generally difficult to achieve, eradication of a local population of birds (including nonnative species such as pigeons or starlings) may be the goal of individual bird damage management projects. This could, in part, be because feral pigeons and starlings are not native to North America and are only present because of human introduction. However, eradication as a general strategy for reducing damage caused by native bird species would not be considered in detail because:

- WS and USFWS oppose eradication of any native wildlife species.
- WGFD opposes the eradication of native Wyoming wildlife species.
- Eradication is not acceptable to most members of the public.
- Regional or statewide attempts at eradication of any native bird species would be next to impossible under the restrictive methods and in those areas where bird damage management could be used in Wyoming.

Suppression would direct efforts toward managed reduction of local populations or groups of birds. In areas where damage could be attributed to localized populations, WS could decide to implement local population suppression, if supported by the WS Decision Model (Slate et al. 1992) and after consulting with the WGFD and/or USFWS. However, with the constraints on bird damage management methods and the relatively small geographic area of the state worked by Wyoming WS, widespread population suppression would be difficult to achieve, let alone maintain.

Problems with the concept of suppression are similar to those described above for eradication. It is not realistic or practical to consider large-scale population suppression as the basis of the WS program in Wyoming. Typically, WS activities in the state would be conducted on a very small portion of the sites or areas inhabited or frequented by the targeted species, as discussed in Section 1.5.1.

3.4.4 Bird Damage Management Should Be Conducted Using Only Non-lethal Methods. The concept of employing a non-lethal repellent to reduce wildlife depredation arose early in agricultural history and has been pursued vigorously ever since (Rogers 1978). However, a consideration and the measure of success of a non-lethal bird damage management program depends on where target birds relocate because a new site can also be a problem. In addition, most animals adjust and ignore a new sound, a process called habituation (Bomford and O'Brien 1990). Numerous non-lethal techniques have been used to reduce damage caused by many bird species with most having limited success, being labor intensive, impractical, expensive or not effective in reducing damage (Parkhurst et al. 1987, Dolbeer et al. 1988, Tobin et al. 1988, Bomford 1990, Bomford and O'Brien 1990, Mott and Boyd 1995, Stickley et al. 1995, Andelt and Hopper 1996, Belant et al. 1996, Belant et al. 1998). Some methods, however, had limited success, such as distress calls to repel black-crowned night herons and starlings and changing management practices when the changes allow the enterprise to remain viable (Spanier 1980, Twedt and Glahn 1982, Bomford and O'Brien 1990). Important points when using frightening strategies include the timing of their application and the choice of devices employed. An aggressive and integrated frightening program is essential and may include lethal methods to reinforce nonlethal methods (Bomford and O'Brien 1990). Playing animal vocalizations to disperse birds during the night, though, can be annoying to people trying to sleep, and could cause other disturbance to domestic animals and wildlife and people. In addition, using sounds based on animal vocalizations must have a certain degree of expertise and motivation to be successful (Bomford and O'Brien 1990).

Many aversive agents have been tested to condition birds to avoid foods, roosts and nest sites. Despite extensive research, the efficacy of these techniques remains unproven or inconsistent (Bomford and O'Brien 1990). In addition, most reported bird repellents are not currently registered

by the EPA or WDA for this use and therefore, cannot be legally used or recommended by WS for this purpose.

Limiting bird damage management to only non-lethal methods would not allow for a full range of IWDM techniques to resolve damage management problems. WS is authorized and directed by Congress to protect American agricultural and natural resources, and property. The alternatives selected for detailed analysis in this EA include non-lethal bird damage management methods and it is believed that analysis of only non-lethal methods would not allow WS the ability to address every damage situation in the most effective manner; furthermore, expediency is required for addressing public health and safety risks.

3.5 STANDARD OPERATING PROCEDURES FOR BIRD DAMAGE MANAGEMENT TECHNIQUES

SOPs are features of an action that serve to prevent, reduce, or compensate for unwanted effects that otherwise might result from that action. The current WS program, nationwide and in Wyoming, uses many such measures, which are discussed in detail in Chapter 5 of USDA (1997). The following measures apply to the alternatives in this EA, as indicated in the columns.

SOPs		Alternatives	
	Current	Technical	No WS
	Program	Assistance	Program
Animal Welfare and Humaneness of Method	ds Used by W	'S	
Research on selectivity and humaneness of management practices would be adopted as appropriate.	X	X	
The WS Decision Model (Slate et al. 1992) would be used to identify effective biological and ecologically sound bird damage management strategies and their impacts.	X	X	
Euthanasia procedures approved by the AVMA would be used for live birds.	X		
The use of newly developed, proven non-lethal methods would be encouraged when appropriate.	X	X	
WS would continue to improve the selectivity and humaneness of management devices.	X	X	
Chemical immobilization/euthanasia procedures that do not cause pain would be used.	X		
All live traps would be maintained with food and water, if appropriate.	X		
Safety Concerns Regarding WS Damage Mana	igement Meti		
The WS Decision Model (Slate et al. 1992), designed to identify the most appropriate damage management strategies and their impacts, would be used to determine bird damage management strategies.	X	X	
All pesticides used by WS are registered with the EPA and WDA and therefore undergo additional scrutiny to ensure no long-tern damage to the environment.	X		
EPA-approved label directions would be followed.	X		

SOPs	Alternatives			
	Current Program	Technical Assistance	No WS Program	
Most avicides and live traps would be primarily used on private lands.	X			
Pesticide use would be by trained and certified personnel.	X			
WS employees who use pesticides participate in WDA- approved continuing education to keep abreast of developments and maintain their certifications.	X			
Live traps would be placed so that captured animals would not be readily visible from any road or public area.	X			
Avicide use, storage, and disposal conform to label instructions and other applicable laws and regulations, and Executive Orders 12898 and 13045.	X			
Material Safety Data Sheets for avicides are provided to all WS personnel involved with specific bird damage management activities.	X			
Research is being conducted to: 1) improve bird damage management methods and strategies, 2) increase selectivity for target species, 3) develop effective non-lethal methods, and, 4) evaluate non-target hazards and environmental impacts.	X	X		
Concerns about Impacts of Damage Management on Target Species Concern, and Non-target Species		cies, Species o	f Special	
WS and the USFWS determined there would be no effect or a not likely to adversely affect to T/E species and would continue to adhere to all applicable measures to ensure protection of T/E species.	X			
Management actions would be directed toward localized populations or groups and/or individual offending birds.	X			
WS personnel are trained and experienced to select the most appropriate methods for removing targeted birds and excluding non-target species.	X			
WS would reinitiate consultation with the USFWS following any incidental take of T/E species.	X			
WS take of birds would be provided to the USFWS and WGFD for monitoring the potential impacts to bird populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of bird populations (See Chapter 4)	X			
WS consulted with the USFWS regarding the nationwide program and would continue to abide by all applicable measures identified by the USFWS to ensure protection of T/E species.	X	X		

SOPs	Alternatives		
	Current	Technical	No WS
	Program	Assistance	Program
The presence of non-target species is monitored before using avicides at feedlots and dairies to reduce the risk of mortality to non-target species.	X		
If non-target species are present or likely to be present where avicides are being applied, WS would remain on site to discourage non-target visitation, apply such avicides in locations where non-target species would not be encountered or take further actions to mitigate risk.	X		
WS personnel would contact cooperating agencies to determine peregrine falcon nesting and roosting locations in areas where pigeon damage management is proposed.	X		

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 provides information needed for making informed decisions and in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2 and comparison with the proposed action to determine if the real or potential impacts are greater, lesser, or similar.

4.2 ENVIRONMENTAL CONSEQUENCES

The following resource values in Wyoming are not expected to be adversely affected by the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, wilderness, and range. These resources will not be analyzed further. In addition, no issues have been identified relative to bird damage management that are inconsistent with EO 12898, 13045, 13112, or 13186 (see Appendix B).

- **4.2.1 Social and Recreational Concerns.** It is not anticipated that the proposed action would result in any adverse cumulative effects to social and recreational resources. Further discussions of WS activities on social and recreational concerns are found in Section 4.3 and USDA (1997).
- **4.2.2 Wastes (Hazardous and Solid).** When bird damage management treated bait cannot be used or when baits are not totally consumed, the bait is disposed of according to label instructions or directions provided by the WDA. It is not anticipated that the proposed action would result in any adverse cumulative effects from solid or hazardous wastes.
- **4.2.3** Target and Non-target Wildlife Species. Cumulative impacts to potentially affected bird species are addressed in detail in Section 4.3.1.
- **4.2.4** Irreversible and Irretrievable Commitments of Resources. Other than relatively minor uses of fuels for motor vehicles and electricity for office operations, no irreversible or irretrievable commitments of resources result from the Wyoming WS program. Based on these estimates, the Wyoming WS program has negligible effects on the supply of fossil fuels and electrical energy.
- **4.2.5** Cumulative and Unavoidable Impacts. Cumulative and unavoidable impacts of each alternative to target and non-target populations are discussed and analyzed in this chapter (Section 4.3.1 and 4.3.2) and effects from this management plan are discussed in relationship to bird species/groups. This EA recognizes that the total annual removal¹⁰ of birds by all causes is the cumulative mortality. Cumulative impacts would be mortality caused by Wyoming WS bird damage management and other known causes of mortality (USDA 1997).

Estimating wildlife densities is not precise and populations and habitats are, as a rule, dynamic; therefore, professional judgment is required to account for unknowns and variables. Some of these variables include weather, predation, recruitment, the ability of habitats to support populations of animals and the effects of habitat variability on population stability. In addition, wildlife populations can change considerably from one year to the next due to factors such as drought, food shortages or

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¹⁰ It is recognized that other mortality factors wildlife (i.e., road kills, disease, natural mortality, etc.) occurs throughout Wyoming but no reliable system exists for documenting this information.

disease. Therefore, adverse effects assessments are based on conservative estimates and trends to better ensure that no unwanted adverse wildlife population impacts occur.

Analysis of Wyoming WS' bird "take," combined with other possible mortality, indicates that cumulative annual impacts would not be significant, and through close cooperation and consultation with the USFWS and WGFD would not be expected to adversely affect bird populations. The Wyoming WS program is not expected to have any adverse cumulative effects on wildlife populations or their habitats, including T/E species. Furthermore, bird damage management, as implemented by WS, would not jeopardize public health and safety.

4.2.6 Evaluation of Significance

Each major issue is evaluated under each alternative and the direct, indirect and cumulative impacts were 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 WS' actions analyzed in this EA that relate to context and intensity (adapted from USDA 1997):

- **4.2.6.1** Magnitude of the Impact (size, number, or relative amount of impact) (intensity). Magnitude is defined in USDA (1997) as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, predetermined harvest levels, and actual harvest data. Qualitative analysis is based on population trends and harvest data or trends and modeling. "Other Harvest" includes the known sport harvest, and other information obtained from the WGFD and USFWS. "Total Harvest" is the sum of the Wyoming WS kill combined with the "Other Harvest."
- **4.2.6.2 Duration and Frequency of the Action.** Factors affecting bird behavior will affect the duration and frequency of bird damage management activities conducted by WS in Wyoming. Bird damage management at airports may be long term projects, but the frequency of individual bird damage management operations may be short, depending upon spatial and temporal factors affecting the behavior of the birds that are causing or potentially causing the damage. For instance, the removal of several birds that continue to loaf near runways may be very infrequent if non-lethal techniques prevent additional birds from habituating to the area. Projects involving feral pigeons or starlings will generally be short in duration, but may happen frequently at different sites.
- **4.2.6.3 Likelihood of the Impact.** Bird damage management in Wyoming has a low magnitude of impact on overall populations as compared to natural mortality factors that these populations experience. Because all wildlife populations may experience compensatory and additive mortalities year round, the effect of WS bird damage management will generally not result in adverse effects to populations.
- **4.2.6.4 Geographic Extent.** Bird damage management could occur anywhere in Wyoming 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 generally be limited to areas receiving damage by birds, areas with historical bird damage, or areas where a threat of damage exists.

4.3 ISSUES ANALYZED IN DETAIL

This section analyzes the environmental consequences of the issues analyzed in detail using the current program as the baseline for comparison with the other alternatives to determine if the real or potential impacts are greater, lesser or the same (Table 4-4). Four key issues of this program have been identified, and each of these issues is analyzed for each alternative. The four issues are:

- Cumulative Effects of WS Bird Damage Management on Target Species Populations
- Effects of WS Bird Damage Management on Non-target Species Populations, Including T/E Species
- Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets
- Efficacy of WS Bird Damage Management Methods.

4.3.1 Cumulative Effects of WS Bird Damage Management on Target Species Populations

Analysis of this issue is related primarily to those species most often removed during WS bird damage management, or which could be intentionally dispersed during bird damage management activities. Generally, WS conducts damage management on species whose population densities are high (*e.g.*, overabundant or anthropogenically abundant (Conover 2002)) and/or invasive species and only after they have caused damage or an identified potential damage risk exists and a request is received. The analysis for magnitude of impact on populations of these species generally follows the process described in USDA (1997 Chapter 4).

WS conducts damage reduction activities involving bird species protected by the USFWS under the MBTA. These species (with the exception of starlings, house sparrows, and feral pigeons, which are non-native species and not protected under the MBTA) are taken in accordance with applicable federal laws and regulations authorizing take of migratory birds, their nests and eggs within the constraints of the USFWS permitting process¹¹. The USFWS, as the agency with migratory bird management responsibility, could impose restrictions on depredation take as needed to assure cumulative take does not adversely affect the continued viability of specific populations. This should assure that cumulative impacts on species protected under the MBTA would have no significant adverse impact on the quality of the human environment and long-term viability of the population.

With the exception of snow geese, the target species in this EA were selected because Wyoming WS has received requests for assistance with these species and they could be taken or dispersed to protect agricultural and natural resources, property and people from injury or damage (*i.e.*, disease threats or to reduce or prevent risks to the traveling public from bird strikes to aircraft). Only WGFD has received damage complaints relating to snow geese. In addition, other target bird species, nests and eggs could be removed and/or relocated under an emergency situation by Wyoming WS as provided by WS' MBTA permit MB715711-0, Section G when birds pose an immediate threat to human health and safety or where the health of the bird is jeopardized.

4.3.1.1 Alternative 1 – Continue the Current WS Adaptive Integrated Bird Damage Management Program (No Action/Proposed Action)

Alternative 1 would continue the current Wyoming WS adaptive bird damage management program. Based on historical information, the majority of Wyoming WS bird damage management will be conducted at buildings occupied by, or in proximity to, people with the purpose of reducing disease risks. Other important objectives of the Wyoming WS bird damage

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¹¹ It is entirely possible that an urgent need or emergency, such as threats to the traveling public, could require that action be taken prior to reaching a decision. None of the planners and decision makers involved in this effort is precluded from considering comments filed in this process at any time (even after actions to deal with the threat have begun) and making appropriate adjustments to ongoing program operations.

management program include reduction of potential livestock health risks and predation as well as livestock feed consumption and contamination, reduction of human health and safety risks associated with aircraft/bird strikes at airports and disease monitoring in Wyoming.

As stated earlier, additional agreements may be signed by WS in the foreseeable future to assist landowners/managers with bird damage problems; however, these additional agreements are not anticipated to significantly increase WS activities or to adversely affect bird populations. The majority of bird species (with the exception of such species as feral pigeons) targeted by WS are migratory and range from northern to southern latitudes during the year. This analysis focuses on statewide and regional populations using BBS population trend data (see Section 4.3.1.1.1).

Many bird population trends are best monitored by using data from the BBS¹² which is a national survey coordinated by the USGS, Patuxent Wildlife Research Center (Sauer et al. 2005) that annually gathers data during the nesting season, primarily in June, regarding breeding birds. The survey consists of about 2,700 routes across the U.S. and Canada. The BBS was started in 1966 in the eastern United States and 1968 in the western United States. Routes are surveyed from late May through June by individuals skilled in identifying the local avifauna by sight and sound. The stated primary objective of the BBS has been to generate an estimate of population change (trend) for birds. Populations of birds tend to fluctuate, especially locally, as a result of variable annual local habitat and climatic conditions. Trends in relative abundance are estimated by using appropriate population equations, which can be statistically tested to evaluate their significance. The significance of a trend's "change" is reflected in the calculated *P*-value (probability) for that species.

To use the BBS, though, a few assumptions need to be made:

- All birds within ¼ mile of the observer are seen or heard at all stops on a BBS route (e.g., the probability of detection does not change); this assumption is faulty because observers often cannot see or hear ¼ mile radius at all stops due to obstructions such as hills, trees, and dense shrubs and because some bird species are elusive. Even though many factors (time of year, observer, route, effort) can be controlled for, given the sight/hearing limitations mentioned above, the number of birds seen or heard on a given route would provide a conservative estimate of abundance at best. In states like Wyoming, the detectability of birds would vary based on terrain and cover features. Indeed, other factors, such as observer, weather, time of year, species, sex, age, breeding status, and road type also influence detection rates of individual birds.
- Birds are equally distributed throughout the survey area (*i.e.*, Wyoming, BBS Western Region or USFWS Region 6)
- Routes are randomly selected. In actuality, the starting point and direction of travel are
 randomly generated first, and are then matched with the nearest accessible two-track, dirt,
 gravel, or paved road. Some birds tend to congregate along roadsides and others avoid
 roadside areas.

Data from USFWS Region 6 and the BBS Western Region are used because the boundaries of these geographical units are ecologically based, making conclusions more meaningful in terms of migratory bird numbers and movements. Although WS, USFWS and WGFD recognize the limitations inherent in the sampling methodology, these agencies believe that the BBS represents the best scientific data available to evaluate bird populations and population trends. Because bird

¹² Although these data have been processed successfully on a computer system at the USGS, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty.

damage management is generally directed at individual birds or local populations of overabundant/anthropogenically abundant (Conover 2002) species, the statistical significance of population trends over a large area is only marginally related to local populations where bird damage management occurs. In addition, federal agencies have been ordered to reduce damages attributed to exotic species such as pigeons and starlings (Executive Order 13112), both nonnative species protected neither by federal nor state laws.

Non-lethal Damage Management Activities

Preference is given to non-lethal damage management when practical and effective (WS Directive 2.101). Wyoming WS dispersed about 5,000 starlings in FY00, 21 turkey vultures in FY01, 9,500 crows in FY02, 24,000 crows and 17,550 starlings in FY03 and 24 Canada geese, 27 pelicans and 6,530 common grackles in FY04 using non-chemical harassment methods such as propane exploders and pyrotechnics to protect resources. One advantage of dispersing birds is that no cumulative impacts occur. However, there is the possibility that the birds could return to the damage site and inflict additional damage or move to another site and continue to cause damage. Normally, large scale relocation activities are limited to wild and feral/domestic waterfowl in and around urban areas. Live capture and relocation is not normally practical for smaller birds such as starlings and pigeons because of: 1) the number of birds WS encounters, 2) potential public safety and health issues (i.e., capturing birds at an airport where they were involved with aircraft hazards and relocating those birds to another area where they could return to an airport and continue to be a safety hazard to aircraft), 3) competition for food resources and other limiting factors with other birds and wildlife, 4) the difficulty in finding acceptable release sites, 5) increased relocation costs due to the great distance required to relocate birds when trying to prevent them from returning to the original site, and 6) the disease transmission potential relocated birds continue to pose to people or livestock in the relocation area.

Lethal Damage Management Activities

Lethal damage management is implemented when a bird damage management problem cannot be resolved effectively through non-lethal damage management techniques or when used to reinforce hazing techniques and where *Agreements for Control* or other comparable documents provide for operational damage management. Table 4-1 provides information on the number of birds Wyoming WS killed by method during in FY00, FY01, FY02, FY03, FY04, FY05 and FY06.

USFWS Depredation Permits

DPs are necessary under the MBTA and BGEPA for activities related to migratory bird damage management. DPs are not necessary for non-lethal harassment of species protected only under MBTA, but a Section 7 consultation and permit could be required for WS to conduct damage management on migratory birds listed under the ESA.

The USFWS has authority for managing migratory birds and issuance of DPs (50 CFR 21.41). In Wyoming, those persons issued DPs by the USFWS must also acquire a Chapter 56 permit through WGFD to legally take damage-causing birds. In addition, for state-listed T/E bird species, WS will consult with the WGFD Avian Ecologist to examine effects of WS activities upon these species.

WS has the responsibility for responding to and attempting to reduce damage caused by migratory birds when funding allows, as specified in an MOU with the USFWS. In cases where intermittent damage is occurring and it is not feasible or practical for WS to provide operational assistance, WS could recommend to the USFWS the issuance of a DP to the resource owner (WS Directive 2.301). Table 1-1 provides information on the number of requests for assistance WS

received in FY00, 01, 02, 03, 04 and 05 for bird damage management and the number of DPs WS recommended and forwarded to the USFWS; Table 4-2 provides take under those permits.

WS conducted an ESA Section 7 consultation with the USFWS to ensure that WS activities do not adversely affect T/E species. Guidelines for issuance of permits have been developed and implemented by the USFWS. WS and the USFWS believe the analysis contained in this EA will address the environmental consequences of the USFWS issuing DPs and WS receiving and implementing issued permits.

It should be noted that starlings, house sparrows and feral pigeons are considered non-indigenous, invasive species, and because of their negative impacts and competition with native birds, are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. These three species are not protected by MBTA or state law. Any reduction in starling, house sparrow or feral pigeon populations in North America, even to the extent of complete eradication, could be considered beneficial to native bird species. Additionally, blackbird, grackle, crow and magpie populations are healthy, and the problems they cause great enough, that the USFWS has established a "standing depredation order" (50 CFR

Table 4-1. Target Birds Killed by WS* during FY 00, FY01, FY02, FY03, FY04, FY05 and FY06.

FY	Species	Damage Management Method				
		Trapping	Shooting	DRC- 1339*	Non- chemical Other	
00	Flickers	6	2	0	0	
	Pigeons	0	104	0	0	
	Turkey Vultures	0	3	0	0	
	Woodpeckers	1	0	0	0	
	Ravens	0	104	0	0	
01	Flickers	0	5	0	0	
	White Pelicans	0	6	0	0	
	Pigeons	0	49	71	16	
	Turkey Vultures	0	6	0	0	
	Ravens	0	62	9	0	
02	Flickers	6	0	0	0	
	Pigeons	0	91	37	44	
	Starlings	0	18	0	0	
	Crows	0	44	0	0	
	Ravens	0	5	0	0	
03	Pigeons	0	613	0	0	
	Crows	0	37	0	0	
	Ravens	0	53	0	0	
04	Flickers	0	1	0	0	
	White Pelicans	0	6	0	0	
	Pigeons	0	173	85	54	
	Starlings	0	50	0	0	
	Turkey Vultures	0	8	0	0	
	Crows	0	180	0	0	
	Ravens	0	4	40	0	
	Flickers	0	1	0	0	
05	Pigeons	64	827	63	134	
	Ravens	0	0	446	0	
	Flickers	0	1	0	0	
06	Pigeons	428	1237	0	224	
	Ravens	1	0	473	0	
	CA Gulls	0	58	0	0	
	Turkey Vultures	0	2	0	0	

* Data based on the number of birds recovered after the application of DRC-1339 bail (except for FY05, which is an estimate).

21.43) for use by the public. Under this standing depredation order, no federal permit is required by anyone to remove these birds if they are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, aquaculture, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance. Additionally, under Section 8 of the Wyoming Nongame Wildlife Regulation, the state of

Wyoming has determined that a state permit is not required of any person to shoot or trap blackbirds (Brewer's, redwinged, rusty and yellow-headed), cowbirds, crows. grackles and magpies when found committing or about to commit depredations upon agricultural crops. livestock, ornamental or shade trees or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

4.3.1.1.1 WS, at Times, Conducts Lethal Bird Damage

Table 4-2. Birds Killed in Wyoming by WS and Other Permittees Under DPs* Issued by the USFWS.							
Species	2000	2001	2002	2003	2004	2005	2006
American White Pelican	8	19	29	36	19	3	7
Belted Kingfisher	3	3	3	8	0	12	24
Black-billed Magpie	0	0	0	1**	0	0	0
Black-crowned Night Heron	2	0	0	42	0	7	2
Burrowing Owl	0	0	1**	0	0	0	0
California Gull	20	20	7	18	5	7	58
Canada Goose	0	0	0	0	3***/1 +	0	0
Cliff Swallow	0	9	12**	0	0	0	0
Common Grackle	0	0	0	36	0	0	0
Common Goldeneye	0	0	0	2	0	0	0
Common Merganser	5	2	4	20	0	0	3
Ferruginous Hawk	0	9**	10**	5**	9**	0	0
Common Raven	104	71	5	53	44	443	474
Franklin's Gull	1	0	0	0	0	0	0
Golden Eagle	0	2***	0	4***	6***	0	0
Great Blue Heron	15	6	5	53	12	21	44
Great Horned Owl	0	0	0	2	0	0	1
Herring Gull	1	0	2	0	0	0	0
Mallard	0	0	0	64	0	5	7
Northern Flicker	0	8	4	0	1	1	3/3***
Northern Harrier	0	0	0	0	2***	0	0
Osprey	1**	3**	0	0	0	0	0
Ring-billed Gull	1	0	0	0	2	2	0
Swainson's Hawk	0	1**	2**	1**	0	0	0
Turkey Vulture	3	6	0	0	8	0	2

^{*} USFWS data are summarized and reported on a calendar year basis

Management on the Species Below to Protect Resources¹³.

Starling Biology and Population Impacts

Starlings were introduced into North America in 1890-91 when about 80 pairs were released into New York City's Central Park (Bump and Robbins 1966). In just 100 years, starlings colonized the United States, expanded into Canada and Mexico, and have become one of the most common birds in North America (Feare 1984).

Precise counts of starlings and blackbirds do not exist, but one estimate placed the United States summer population at more than one billion (USDA 1997) and the winter population at 500 million birds (Royall 1977). Meanley and Royall (1976) estimated 538 million blackbirds and starlings in winter roosts across the country during the winter of 1974-75. Of this total, about 74% or about 400 million were in the eastern United States (Meanly and Royall 1976).

The nationwide starling population has been estimated at 140 million (Johnson and Glahn 1994) and Meanly and Royall (1976) report that the 1974-75 winter starling population in the eastern states was estimated at about 112 million birds. The estimated natural mortality of starlings is about 50%. Based on the 1974-75 wintering population estimate, about 56 million starlings die

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^{**} Nests affected during the calendar year

^{***} Birds relocated

⁺ Reported eggs destroyed

¹³ Avian disease surveillance and monitoring take results (Table 1-4) are not included in these data because that effort was conducted under a special permit issued by the USFWS and are not for WS operational damage management activities and that take is generally very small and does not adversely affect species populations.

annually in the eastern states and about 70 million starlings die annually to natural mortality nationally (Meanly and Royall 1976). An extensive population survey by Dolbeer and Stehn (1983) showed that in the northwestern United States, the number of breeding starlings tripled between 1968 and 1981.

In Wyoming, WS killed 18 starlings in FY02 and 50 starlings in FY04. BBS data (Sauer et al. 2005) indicate starling breeding populations have increased in Wyoming and USFWS Region 6 from 1966-2004, but are decreasing in the BBS Western Region. WS could remove up to 5,000 starlings annually during operational damage management activities. This information, plus the fact that an estimated 70 million starlings die annually of natural causes, indicates that the impact from Wyoming WS starling damage management is of a low magnitude and has no impact on starling populations.

Feral Pigeon Biology and Population Impacts

Feral pigeons, also known as rock doves, are an introduced species in North America and are not protected by law. Any lethal Wyoming WS bird damage management would generally be restricted to sites where pigeons are causing damage, or are considered a health threat or nuisance, and reduction or removal of a local population could be attempted. This action would be considered beneficial by those affected by the pigeons (not to mention most ecologists) since it would reduce disease threats and alleviate property damage/destruction.

Wyoming WS received eight requests to address property damage and human health and safety concerns caused by feral pigeons in FY00, nine in FY01, 17 in FY02, 11 in FY03, eight in FY04 and seven in FY05 to protect resources. In response to those requests, Wyoming WS killed 104 feral pigeons during FY00, 136¹³ feral pigeons during FY 01, 172¹⁴ during FY02, 613 during FY03, 312¹³ feral pigeons during FY04, 1,088¹³ during FY05 and 1,889¹³ during FY06 (Table 4-1) and used 85, 39, 28 and 87 grams of DRC-1339 in FY01, FY02, FY04, and FY05, respectively.

Wyoming BBS population trend data (Sauer et al. 2005) indicate that pigeon populations are slightly decreasing in Wyoming, but are slightly increasing in USFWS Region 6 and in the BBS Western Region. The current Wyoming WS bird damage management program is not having an adverse effect on pigeon populations in Wyoming, in USFWS Region 6 or the BBS Western Region. In addition, it is believed that WS could take up 3,000 pigeons annually for the protection of the public from disease threats or aircraft strikes (*i.e.*, human health and safety) and property protection and not adversely impact pigeon populations. Because pigeons are considered a nonnative, invasive species and BBS indicates that populations are increasing in USFWS Region 6 and in the BBS Western Region, and are not protected by law under the MBTA, any mortality could be considered beneficial to native species and WS' activities would have a low magnitude of impact.

Woodpecker Biology and Population Impacts

Woodpeckers have strong bills, sharply pointed for chipping and digging into tree trunks or branches for wood-boring insects, but also chisel holes into structures, presumably for nesting cavities (Robbins et al. 1997). They use their stiff tails as props to aid in chiseling. In addition, most species "drum" on resonant limbs, poles, drainpipes, or other structures. Woodpeckers chisel a cavity into a tree branch or trunk to nest. Woodpecker¹⁵ damage to structures is the

¹⁵ WS killed one "woodpecker" in FY00; however, because the Wyoming WS bird program may expand, WS may remove up to 10 woodpeckers

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¹⁴ This number refers to the number of birds recovered during damage management operations, but it is recognized that additional birds may have been killed during DRC-1339 baiting operations.

primary reason people request WS assistance.

Northern Flicker Biology and Population Impacts

Flickers have black spots on a tannish-white breast and belly and are about 11 inches in length. Males have a black or red "mustache" extending from the gape of the beak to below the eyes. In summer, flickers are distributed from Alaska to the southern regions of the United States (Short 1982) and migrate to Mexico and the southern United States during winter. The habitats of the flicker are diverse, from shrub deserts and tree-bordered streams of the Great Plains to everglade hammocks, city parks, mountain fir forests, and farm pastures.

The diet of the flicker consists of ants, termites, beetles, crickets, aphids, caterpillars, including their eggs, pupae, and larvae, and other insects obtained from trees and the ground (Short 1982). Vegetation such as berries and other fruits make up a large part of the diet in the autumn and winter. The nesting season in Wyoming begins in April/May. Males claim territories and attract females by "drumming," vocalizing, wing flicking, and other displays. "Nests" are constructed in cavities of dead trees, buildings, fence posts, telephone poles, etc.

Wyoming WS received 20 requests for assistance with flicker damage in FY00, 17 in FY01, 16 in FY02, seven in FY03, eight in FY04 and two in FY05 to protect resources. Wyoming WS killed eight flickers in FY00, five in FY01, six in FY02, none in FY03, one in FY04, one in FY05 and one in FY06 to protect resources (Table 4-1).

BBS trend data (Sauer et al. 2005) indicate that breeding flicker populations are slightly decreasing to stable in Wyoming, USFWS Region 6 and in the BBS Western Region. The current Wyoming WS bird damage management program is not having an adverse effect on flicker populations in Wyoming, in USFWS Region 6 or the BBS Western Region. In addition, it is believed that WS could take up to 30 flickers annually for the protection of structures and not adversely affect flicker populations or have adverse cumulative impacts on flicker populations. As a result, under a DP issued by the USFWS, WS' activities would result in a low magnitude of impact.

Hairy Woodpecker Biology and Population Impacts

Hairy woodpeckers are common in Wyoming and are found in suburban areas, parklands, orchards and forests. They have white vertical stripes on their back and are considered a medium sized bird, being somewhat larger than the similar appearing downy woodpecker (Robbins et al. 1997); hairy woodpeckers are between 9 and 13 inches in length.

The BBS trend data (Sauer et al. 2005) indicate that breeding hairy woodpecker populations are increasing in Wyoming, stable in USFWS Region 6 and increasing in the BBS Western Region. WS did not remove or disperse any hairy woodpeckers during FY 00 through FY05, but did remove one unidentified woodpecker in FY00. WS may receive requests for assistance and could remove damaging hairy woodpeckers in the future. As a result, under a DP issued by the USFWS, WS could remove up to 10 damaging hairy woodpeckers. This maximum take figure would result in a low magnitude of impact and no cumulative impact on hairy woodpecker populations.

Downy Woodpecker Biology and Population Impacts

(hairy and downy) in the future under a DP issued by the USFWS.

The downy woodpecker is the most common North American woodpecker, and also the woodpecker reported most frequently by Project FeederWatch participants (www.birdsource.org/gbbc/birdid/dowp/). During the 1996-1997 Project FeederWatch season, more than 69% of the participants reported downy woodpeckers, making them the fourth most common Project Feeder Watch bird. They are seen in suburbs, orchards and wooded areas. They are similar in appearance to hairy woodpeckers, only smaller (the downy woodpecker is approximately $6\frac{1}{2}$ inches in length). Downy woodpeckers have plumage that is a sharply contrasting pattern of black and white. The downy woodpecker breeds over a widespread area encompassing most of North America.

BBS trend data (Sauer et al. 2005) indicate that breeding downy woodpecker populations are stable in Wyoming, in USFWS Region 6, and in the BBS Western Region. WS did not remove any downy woodpeckers from FY 00 through FY05, but did remove one unidentified woodpecker in FY00. WS may also receive requests for assistance to remove damaging downy woodpeckers in the future. If this occurs, under a DP issued by the USFWS, WS could remove up to 10 damaging downy woodpeckers. This level of take would result in a low magnitude of impact and no cumulative impact on downy woodpecker populations.

American Crow Biology and Population Impacts

American crows are distributed north to south from the Yukon Territory, Canada, to Baja, California and the Gulf of Mexico, and are found from the west coast to the east coast (Johnston 1961). American crows can be found throughout the year in Wyoming. From their spring nesting colonies, or autumn and winter roosts, they forage for insects, grain, and carrion. Johnston (1961) reports that crows reach their peak abundance in agricultural areas where there are wooded areas, and have increased in numbers where agricultural practices have intensified.

According to the BBS population trend results, crow populations in Wyoming have sharply increased, increased in USFWS Region 6 and have remained relatively stable in the Western BBS Region from 1966 to 2004 (Sauer et al. 2005). In addition, crow populations are healthy, and the problems they cause great enough, that the USFWS has established a standing depredation order for use by the public. Under this "order" (50 CFR 21.43), no federal permit is required by anyone to remove crows if they are *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.*

Wyoming WS received 22 requests for assistance with crow damage in FY01, 54 in FY02, 12 in FY03, 19 in FY04 and one in FY05 to protect resources. WS killed 44 crows in FY02, 37 in FY03, 180 in FY04, none in FY05 and none in FY06 to reduce damages. If damage continues, or if crows at airport facilities present a threat to the traveling public or aircraft from aircraft strikes, WS could remove up to 250 crows (under CFR 21.43) or disperse several hundred more crows without adversely affecting crow populations. In summary, WS activities would result in a low magnitude of impact to crow populations in Wyoming, USFWS Region 6 or the Western BBS Region.

Common Raven Biology and Population Impacts

A relative of the crow, the common raven is a large black bird with iridescent feathers. The bill is large and slightly curved. At maturity, it is between 22 to 27 inches in length, with a wingspan double that. Apart from its greater size, ravens differ from crows by having a larger and heavier beak, and a deeper and more varied barking call. Other differences are the shaggy throat feathers

and a longer, wedge-shaped tail.

Ravens can thrive in varied climates and they range from the Arctic to the deserts of North Africa, and to islands in the Pacific Ocean, having the largest range of any member of the genus. They are omnivorous, known to feed on carrion, crops, eggs, birds, small mammals, amphibians, reptiles, fish and insects (Nelson 1934). In some areas of high human population densities, ravens take advantage of increased food supplies and have undergone a surge in population.

Once paired, ravens tend to nest together for life, usually in the same location. The pair will build a nest on a cliff ledge or in a tall tree (or on a building ledge in the city). The female will lay from three to seven eggs; both parents keep the eggs warm, and take turns feeding the chicks. As with many bird species, pairing does not necessarily mandate sexual monogamy, and raven habits show fluidity in this regard.

Ravens have also impressed us with their intelligence and insight. Experiments have shown that members of the crow family are capable of using tools; in one classic experiment, when some desirable item is placed in a bottle, some of the ravens were able to form a hook to reach the item. Like other corvids, ravens can imitate sounds from their environment, including human speech.

Knight and Call (1981) summarized a number of studies on raven territories and home ranges in the western U.S. Nesting territories ranged in size from 3.62/mi² to 15.7/mi² in Wyoming and Oregon and home ranges varied from 2.53/mi² to 6/mi² in Utah and Oregon. Information on actual raven densities in the analysis area is not available, but population trend information is available from two different sources. National Audubon Society Christmas Bird Count trend data (1968-2006) indicate that raven populations in Wyoming are increasing; this conclusion is also supported by BBS (1968-2005) data. If current raven densities in Wyoming were conservatively estimated at about 1 raven/6.5 mi², there would be an estimated minimum population of about 15,000 ravens in Wyoming. If raven populations are increasing at an annual rate of just 10%, then about 1,500 ravens could presumably be removed annually without impacting the raven population in Wyoming.

WS did not remove any ravens during damage management operations in Wyoming between 1993 and 1995. However, Wyoming WS received three requests for assistance with raven damage in FY00, nine in FY01, seven in FY02, none in FY03, none in FY04 and two in FY05 to protect agricultural resources, property, and human health and safety. Analyses of verified loss for ravens included: \$5,950 in FY00, \$3,050 in FY01, \$6,370 in FY02, \$4,785 in FY03, \$4,050 in FY04 and \$4,370 in FY05 to protect livestock. Because of these losses, WS killed 104 ravens in FY00, 71 in FY01, 5 in FY02, 53 in FY03, 44 in FY04, 446 in FY05 and 474 in FY06 (MIS 2000, 2001, 2002, 2004, 2005, 2006). The analysis above supports that WS could take up to 1,500 ravens annually for the protection of the public from disease threats or aircraft strikes (*i.e.*, human health and safety) and property protection without adversely impacting raven populations (as allowed under federal migratory bird permit MB715711-1 issued to WS in Wyoming by USFWS). Because BBS data indicate that populations of ravens are increasing in Wyoming, USFWS Region 6 and in the BBS Western Region, and because of oversight provided by the USFWS, activities conducted by Wyoming WS resulting in the removal of a maximum of 1,500 ravens annually would have a low magnitude of impact on raven populations.

Turkey Vulture Biology and Population Impacts

This species breeds from Canada to southern South America, adapting equally well to deserts, forests, and tropical lowlands (Wilbur 1983). Adult turkey vultures are black in color with a

bright-red, naked head (Robbins et al. 1997), while immature vultures have black heads. Turkey vultures migrate to Wyoming in spring, nest, and return to their winter range in the fall. Turkey vultures nest in caves, hollow trees, thickets, or old buildings (Jackson 1983, Ritter 1983). Usually two eggs are laid during nesting but as many as four eggs have been documented (Jackson 1983).

Turkey vultures are carrion feeders, eating fresh meat or carrion in advanced stages of decay, and will readily feed on mammal and bird carcasses of various sizes but may also attack and kill vulnerable livestock. In search of food, vultures soar in circle-type patterns. When food is located by a single bird, other birds are quickly attracted to the site by behavioral cues exhibited by the feeding bird.

Local vulture populations have been known to increase and decline (Wilbur 1983), which suggests that food availability could be a limiting factor. A major range expansion into the northeastern United States began after 1920, possibly caused by a decline in bison carrion in the west and an increase of white-tailed deer populations and other road-killed animals.

The BBS population trend data from 1966 to 2004 indicate that turkey vulture breeding populations have increased in USFWS Region 6 and in the BBS Western Region (Sauer et al. 2005) and have sharply increased in Wyoming.

Wyoming WS received three requests for assistance with turkey vulture damage in FY00, four in FY01, five in FY02, one in FY03, two in FY04 and one in FY05 to protect resources. WS killed three turkey vultures in FY00, six in FY01, eight in FY04 and two in FY06 for protection of agricultural resources (livestock). WS did not recommend any DPs be renewed by the USFWS for turkey vulture damage problems in FY05. Since turkey vulture population trends appear to be increasing in Wyoming, in USFWS Region 6 and in the BBS Western Region, WS could take up to 20 turkey vultures per year under a DP issued by the USFWS to protect human health and safety, property and agricultural resources without adversely affecting populations. Based upon the low level of anticipated take and the increasing turkey vulture population, WS activities would have a low magnitude of impact and no cumulative impact on turkey vulture populations.

American White Pelican Biology and Population Impacts

American white pelicans are gregarious birds with large, webbed feet and an oversized throat pouch. They work cooperatively to surround fish in shallow water, scooping them into their pouches. Taking in both water and fish, the pelicans then hold their bills vertically to drain out the water before swallowing the food.

The white pelican is found in the western part of the United States around inland lakes and marshes. Pelicans are heavy-bodied birds with short legs, thick plumage and a wingspan between 8 and 9½ feet. During mating season, the male develops an orange bill and a fibrous plate on the upper part of the beak; this latter feature is a unique characteristic of the white pelican. White pelicans nest in large colonies; nests, usually built above the ground, are constructed of sticks, grasses, and reeds. Two to four chicks hatch after an incubation period of one month. Both parents help in feeding the young. Feeding involves regurgitation of food by the parents, which the young eat directly from the beak.

Wyoming WS received three requests for assistance with pelican damage in FY00, two in FY01, three in FY02, three in FY03, one in FY04 and three in FY05 to protect resources. WS killed six pelicans in FY01 and six pelicans in FY04 to protect aquaculture (Table 4-1). WS recommended 11 DPs be renewed by the USFWS for pelican damage problems in FY04 and four in FY05.

Since pelican population trends appear to be significantly increasing in Wyoming and increasing to stable in USFWS Region 6 and the Western BBS area, WS could take up to 50 pelicans per year under a DP issued by the USFWS to protect human health and safety, property and aquaculture resources without adversely affecting populations. Based upon the low level of anticipated take and an increasing pelican population, WS activities would have a low magnitude of impact and no cumulative impact on pelican populations.

California Gull Biology and Population Impacts

In North America, the California gull is distributed north to south from the Northwest Territory and Nunavut Territory, Canada, to Mono Lake and south San Francisco Bay, California, and from the Dakotas in the east to the Pacific Ocean (Winkler 1996). Average life expectancy is unknown, but the oldest band-recovered bird was 27 years old. The annual sub-adult survival is 92% and 75%-79% for adults (Winkler 1996).

In North America, this species is widely distributed and increasing (Conover 1983, USDA 1997) throughout the provinces of Canada and Great-Lakes region, west to the Pacific coast, and south from Washington state to central Mexico, the Gulf of Mexico and eastward through the Mississippi Valley and along the Atlantic coast north to Massachusetts. An estimated 3 to 4 million individuals inhabited North America in 1990.

From FY00 through FY05, Wyoming WS did not kill any California gulls, but in FY06 killed 58 to protect resources or human health and safety (Table 4-1) and did not respond to any requests for assistance. BBS population trend data indicate that California gulls are increasing in Wyoming and USFWS Region 6, and were relatively stable in the BBS Western Region from 1966 through 2004 (Sauer et al. 2005). Because California gulls could occur on airport facilities and cause risk to the traveling public and aircraft from bird strikes and damage or potential damage to other resources, WS may remove up to 200 damaging or potentially damaging California gulls. Based on the above information, in combination with USFWS oversight, this level of take by WS in Wyoming would have a low magnitude of impact and no cumulative impact on local, statewide, or regional California gull populations.

4.3.1.1.2 WS Did Not Conduct Lethal Bird Damage Management on the Species Below, but did Provide Technical Assistance or Non-lethal Operational Bird Damage Management.

Even though WS did not provide any lethal bird damage management to reduce damage from the species listed below, occasions could arise whereby lethal bird damage management would be required to reduce damages to acceptable levels or reduce health and safety risks or threats. Lethal management would be coordinated through permits issued by the USFWS for species protected under the MBTA before actions would be taken.

Goose Biology and Population Impacts

The challenges facing wildlife managers are primarily problems associated with goose concentrations and harvest regulation. Major management issues are short-stopping, crop and other property damages, and management of growing resident flocks in rural and urban areas. Because geese learn migratory routes from their parents, those that find safe stops, such as parks and golf courses, have higher survival rates. Therefore, geese increasingly use these areas with each successive year. Programs to displace birds, such as reducing refuge foods and open water, and harassment techniques, have met with limited success. Concurrently, large populations of reestablished geese continue to increase at rates of up to 200% every 3 years. When these

individuals damage crops, turf, gardens, contaminate water and beaches, or endanger human life at airports, intensive management programs are needed. The forecast for the production of geese in North America in 2005 is generally favorable and improved from that of 2004.

Canada Goose Biology and Population Impacts

The Canada goose is the most familiar and common goose in Canada and the United States. This species is found across North America in lakes, bays, rivers and marshes. Canada geese are often seen feeding in open grasslands and stubble fields and become a semi-domesticated bird in city parks, golf courses and on reservoirs. They are chiefly grazers, feeding on turf and marsh vegetation as well as stubble in agricultural fields. Canada geese select open, grassy shorelines where visibility is good, food is abundant, and predator escape cover (open water) is in close proximity.

A Canada goose clutch usually contains 5-6 eggs, which hatch over a 24-hour period, starting on or about the 26th day after the last egg is laid. Canada goose nest success typically ranges from 60% to 80%.

Resident Canada geese are typically more problematic than their migratory counterparts; hence, the majority of damage management activities will be directed at resident geese. From FY 00 through FY05, WS did not capture nor kill any resident Canada geese; however, WS provided technical assistance once in FY00, twice in FY01, twice in FY03 once in FY04 and twice in FY05 for damage reduction. BBS trend data (Sauer et al. 2005) indicate that breeding Canada geese populations are sharply increasing in Wyoming, in USFWS Region 6 and the BBS Western Region. Even though WS did not remove or disperse any Canada geese from FY 00 through FY05, WS may receive requests for assistance involving removal of threatening or damaging Canada geese. As a result, under a DP issued by the USFWS, WS may remove up to 50 nuisance Canada geese; this would result in a low magnitude of impact and no cumulative impact on Canada goose populations.

Snow Goose Biology and Population Impacts

The snow goose is a cosmopolitan species. It is smaller than the domestic goose and is white with black wing tips, pink bills with black "lips", and pink legs; the dark morph (termed "blue goose"), has the standard pink bill, but the white head and upper neck contrast with a dark body and wings; young birds of both morphs have dark bills and legs and are light to dark gray. Usually four to eight white eggs are laid in a sparsely lined nest on the tundra. The snow goose breeds in arctic regions of North America and extreme eastern Siberia. From their breeding grounds, snow geese can migrate to the southern United States, particularly in the Gulf Coast region. The spring population has increased with a growth rate of approximately 9% per year, about twice the rate of the mid-continent population. The population has been doubling about every 8 years, but there are indications from midwinter surveys that the population may be leveling out or declining slightly (www.fws.gov/migratorybirds/reports/snowgoose.gsg.pdf).

From FY 00 through FY05, WS did not capture nor kill any snow geese and did not provide any technical assistance with snow goose problems. WS may receive requests for assistance involving removal of threatening or damaging snow geese. As a result, under a DP issued by the USFWS, WS may remove up to 200 damaging snow geese; this number would result in a low magnitude of impact and no cumulative impact on snow goose populations.

Mallard (Wild) Biology and Population Impacts

The mallard is the world's most familiar duck (Gooders and Boyer 1986) and is the most adaptable waterfowl species, occupying a wide range of habitats. Clutch sizes vary from 10-12 eggs and incubation takes about 28 days. One of the mallard's foraging strategies is to utilize agricultural grain crops as well as natural aquatic foods (Johnsgard 1975).

The decline of mallard populations is not fully understood; however, most waterfowl biologists agree that recurring drought conditions in nesting areas in Canada are an important factor. Duck production depends upon water conditions: when water is abundant, production is good; when water is scarce, production is poor. Other factors that may influence mallard population trends include predation, limited nesting habitat, liberal hunting regulations, and harvest of females. BBS population trend data from 1966 to 2004 indicate that breeding populations of mallards are stable to increasing in Wyoming, stable in the Western BBS Region and increasing in USFWS Region 6 (Sauer et al. 2005).

Wyoming WS did not move or disperse nor lethally remove any mallards from FY00 through FY05. The USFWS issued DPs which resulted in the removal of 64 mallards in 2003. If WS received a request to conduct lethal damage management of mallards or any other wild waterfowl, WS would consult with USFWS and WGFD and conduct activities under a permit. This consultation process, coupled with the fact that mallard breeding populations appear to be healthy, assures that WS activities have resulted in a low magnitude of impact on the population and minimal impacts on hunting opportunities.

Common Goldeneye Biology and Population Impacts

The common goldeneye is a cold-hardy, medium-sized diving duck that breeds worldwide in northern boreal forests. In flight, its wings make a distinctive whistling sound, giving rise to its colloquial name "whistler." This species readily nests in boxes, facilitating studies of its reproductive biology. It is an aggressive and territorial duck and often dominates interactions with other species for food and nest sites. Its spectacular courtship displays probably evolved from aggressive posturing behavior. Fish, crustaceans, and mollusks are an important part of its diet.

Estimates of the continental population of the common goldeneye were once placed at around 1.25 million, based on partial counts taken during summer on the breeding grounds (Bellrose 1980). More recent USFWS surveys indicate a smaller population (Eadie et al. 1995); however, North American populations have remained relatively stable since waterfowl surveys began (Perry and Deller 1994, Eadie et al. 1995). Overall, population data for the western United States is sparse, but in some areas (*e.g.*, Caribou Parkland of British Columbia), numbers have been increasing. Long-term trends may be influenced by such such factors as the creation of reservoirs, which have altered preferred habitats.

Wyoming WS did not move, disperse or lethally remove any common goldeneyes from FY00 through FY05. The USFWS issued DPs which resulted in the removal of two common goldeneyes in 2003. WS, if requested to conduct lethal damage management on common goldeneyes, would consult with the USFWS and WGFD and conduct activities under a permit. This consultation process, coupled with the fact that common goldeneye breeding populations appear to be healthy in the Western BBS Region (Sauer et al. 2005), assures that WS activities have a low magnitude of impact and minor impacts on hunting opportunities.

Common Merganser Biology and Population Impacts

Common mergansers breed throughout the forested boreal portion of the Holarctic region. In the continental United States west of the Great Plains, they breed from the Canadian border to northern California, throughout Montana, Wyoming, and into central and western Colorado. Eastward, they breed from northern Minnesota and Wisconsin to Maine (Mallory and Metz, 1999). An estimated 13,000 birds are shot annually in the United States (Carney et al. 1983) and about 19,600 in Canada (Lévesque et al 1993). Total harvest is estimated at only 5% of the population, but overhunting may occur locally in some regions (Mallory and Metz 1999).

Wyoming WS did not move, disperse or lethally remove any common mergansers from FY00 through FY05. The USFWS issued DPs which resulted in the removal of 5, 2, 4, 20 and 0 common mergansers in 2000, 2001, 2002, 2003 and 2004. If WS received a request to conduct lethal damage management of common mergansers, WS would consult with USFWS and WGFD and conduct activities under a permit. This consultation process, coupled with the fact that common merganser breeding populations appear to be stable to increasing in Wyoming, USFWS Region 6 and in the Western BBS Region (Sauer et al. 2005), assures that WS activities have resulted in a low magnitude of impact and have low impacts on hunting opportunities.

Blackbird Biology and Population Impacts

Precise counts of starlings and blackbirds do not exist, but one estimate placed the United States summer population at more than one billion (USDA 1997) and the winter population at 500 million birds (Royall 1977). Meanley and Royall (1976) estimated 538 million blackbirds and starlings in winter roosts across the country during the winter of 1974-75. Of this total, about 74% or about 400 million were in the eastern United States (Meanly and Royall 1976).

WS did not intentionally kill any blackbirds in Wyoming from FY00 through FY05. Red-winged blackbird population trends from 1966 to 2004 show that the population is increasing in Wyoming and relatively stable in USFWS Region 6 and the Western BBS Region (Sauer et al. 2005). Population trends for the Brewer's blackbird from 1966 to 2004 in Wyoming show a relatively stable population in Wyoming, in USFWS Region 6 and a slightly decreasing population in the BBS Western Region (Sauer et al. 2005). Trend data for brown-headed cowbirds indicate that populations are relatively stable in Wyoming, USFWS Region 6 and the BBS Western Region (Sauer et al. 2005). Trend data for common grackles show an increasing population in Wyoming and relatively stable populations in USFWS Region 6 and the BBS Western Region (Sauer et al. 2005). Since Wyoming WS targeted only starlings and has not targeted or baited any red-winged blackbirds, Brewer's blackbirds, brown-headed cowbirds or common grackles, there would be negligible cumulative effects from WS bird damage management activities on these species. However, it is possible that some of these species could be present and in flocks of starlings where Wyoming WS conducts bird damage management or requests for damage management could be received in the foreseeable future. Because of this possibility, Wyoming WS could potentially take up to 500 of each of these species. WS has determined that bird damage management would have no cumulative impacts on populations of these blackbirds based on BBS population trends as described by Sauer et al. (2005), and the reproductive potential and natural mortality factors of these species (see Section 2.4.4). Therefore, removal of damaging blackbirds would have a low magnitude of impact on populations of these species. Additionally, the size of blackbird populations, coupled with the scope of the problems blackbirds cause, led the USFWS to establish a standing depredation order. Under this "Order" (50 CFR 21.43), no federal permit is required by anyone to remove blackbirds if they are 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. All of the above information indicates that populations of blackbirds are healthy and viable in Wyoming, USFWS Region 6, the BBS Western Region and nationwide.

House Sparrow Biology and Population Impacts

House sparrows are the most abundant songbirds in North America and the most widely distributed birds on the planet (www.nabluebirdsociety.org/sparrow.htm). House sparrows are not actually sparrows, but are Old World weaver finches, a family of birds noted for its ingenious nest-building abilities.

House sparrows, also known as English sparrows, were introduced to North America from England in 1850 on the mistaken premise that they would help reduce crop insect pests. Since then, they have spread across the continent (Fitzwater 1994). Within 25 years, biologists realized the consequences of this introduction; house sparrows can now be found almost everywhere in Canada, the United States, and Mexico. Their populations increased at an explosive and alarming rate, and the birds can cause extensive damage to crops and fruit trees. They also usurp the nesting sites of native cavity-nesting birds. Males that begin guarding territories early in the season often prevent later-arriving migratory species from nesting. Additionally, sparrows have been known to evict birds that attempt to nest in sparrow territory. In displacing a nesting pair, male sparrows destroy eggs, kill nestlings, and sometimes even kill incubating females. For this reason, the presence of house sparrows is believed to be a factor in the decline of many native bird species, such as eastern bluebirds (*Sialia sialis*) and tree swallows (*Tachycineta bicolor*).

The breeding season for house sparrows begins early in the spring or even in midwinter, and each pair may produce up to four broods a season. The male house sparrow's bond with his nest site is stronger than his bond with a mate (e.g., he may lose a mate, but he won't give up his nest site). Although they usually prefer to nest in a cavity, house sparrows will settle for any nook or cranny they can find. They will also occasionally nest in coniferous trees and in the nests of cliff swallows ($Petrochelidon\ pyrrhonota$) and northern orioles ($Icterus\ galbula\ galbula$). The female lays three to five white/brown speckled eggs and incubates for 11-14 days. The young sparrows fledge after 14-16 days. They are not migratory, but flocks of birds move about within a $1\frac{1}{2}$ - 2 square mile area. House sparrows are primarily seed eaters, although they eat some insects during the summer. They will also dine on garbage. Feedlots and farmsteads are particularly attractive to sparrows as such sites provide an abundant source of food, as well as shelter and plenty of nesting sites.

This species is not protected by federal or state laws. Like starlings and feral pigeons, house sparrows, because of their negative impacts on, and competition with, native bird species, are considered by many wildlife biologists, ornithologists and naturalists to be an undesirable component of North American native ecosystems. House sparrows are found in nearly every habitat except dense forest, alpine, and desert environments. They prefer human-altered habitats, and are equally at home on farms, as well as in cities and suburbs (Robbins et al. 1997).

From FY00 and FY05, WS responded to three requests for assistance with house sparrow complaints, but did not kill any house sparrows (Table 4-1). Because house sparrows are not afforded protection by the MBTA, DPs are not required before they can be killed by the public. BBS population trends from 1966-2004 show that house sparrow populations are increasing in Wyoming, but declining in USFWS Region 6 and are relatively stable in the BBS Western Region (Sauer et al. 2005).

Any bird damage management involving lethal damage management by WS would probably be restricted to individual sites. Furthermore, any reduction in house sparrow populations, even to the extent of complete eradication at certain sites, could be considered beneficial to populations of native bird species since house sparrows are considered an invasive species.

Gull Biology and Population Impacts

During most of the last several decades, several gull species (*i.e.*, ring-billed, herring, and California gulls) have expanded their range, with subsequent substantial increases in populations. In addition to increases in gull populations in natural habitats, there has been an increase in populations in urban areas, where gulls have established colonies on buildings (Dolbeer et al. 1990).

WS responded to eight requests for assistance between FY00 and FY05 to reduce gull damage. After investigating complaints, WS recommended that the USFWS issue or renew one DP in 2005. In addition, the USFWS reported that 23, 20, 9, 18 and 7 gulls of all species were killed under DPs in 2000, 2001, 2002, 2003 and 2004, respectively (Table 4-2).

Ring-billed Gull Biology and Population Impacts

Ring-billed gulls are similar in appearance to California and herring gulls but smaller, with yellow feet, a yellow bill and a black band near the tip. Ring-billed gulls are a common gull, with populations concentrated near lakes, reservoirs, and other large bodies of water. Like most gulls, ring-billed gulls are omnivorous, feeding on animal and plant matter. Common feeding sites are open refuse dumps, livestock feedlots, fish hatcheries, open fields and food processing plants. Spring arrival of migrants in Wyoming begins in March/April and autumn migration is normally completed in October; however, some ring-billed gulls may remain longer.

Three ring-billed gulls were removed under DPs between FY00 and FY05 (Table 4-2) and WS responded to eight requests for assistance with general gull problems during the same time period.

BBS population trend data indicate that ring-billed gulls in Wyoming and USFWS Region 6 have sharply increased from 1966 to 2004 and remained stable during that same time period in the BBS Western Region (Sauer et al. 2005). Because ring-billed gull population trend data indicate that populations are increasing, WS could remove up to 200 damaging or potentially damaging ring-billed gulls without adversely affecting populations. Based on the above information, with USFWS oversight, this level of take by WS in Wyoming would have a low magnitude of impact and no cumulative impact on local, statewide, or regional ring-billed gull populations.

Herring Gull Biology and Population Impacts

Adult herring gulls are similar to California gulls but are larger, have pinkish legs, a yellow iris, paler backs, and a slightly thicker yellow bill. Herring gulls winter and breed on most of the land masses in the northern hemisphere. Most adults remain near breeding grounds throughout the year while non-breeding birds show a greater tendency to migrate (Drury and Nisbett 1972, Moore 1976). Herring gulls have a life expectancy ranging from 15-20 years (Kadlec 1976) and an annual adult survival rate of 80-85% (Coulson and Butterfield 1986). Their main winter range includes the Pacific and Atlantic coasts,

the southern United States, the coast of the Gulf of Mexico, and a few Caribbean islands. In the lower Great Lakes area, the species can be found year-round. Herring gulls become sexually mature at 4 years of age (Kadlec and Drury 1968).

The herring gull is second only to the mew gull (*Larus brachyrhynchos*) in its nesting habitat selection flexibility (Vermeer et al. 1993). This species has steadily increased in numbers due to its opportunistic nature, taking advantage of man-made food sources and urban nesting sites. Its breeding range is circumboreal, including much of Europe, Central Asia and Canada. It nests colonially or individually in relatively predator-proof areas near water, such as offshore islands, rocky islets, marshy hummocks, barrier beaches and on flat gravel-covered roofs. Once a colony is well established, site fidelity is strong and individuals are reluctant to settle elsewhere. Some individuals may use the same nesting site for 10–20 years. In most areas, clutches of three eggs are laid by mid-May, when incubation begins. Eggs are normally incubated for 26-28 days.

Foraging takes place at sea, on lakes and rivers, in intertidal zones, on sandy beaches and mudflats, in dumps and recently plowed fields and around picnic areas and fish processing plants. Herring gulls have a knack for finding places where food is abundant, such as garbage dumps. Dietary studies in the Great Lakes area showed that most fecal pellets in colonies near large urban centers contained remains of garbage as well as various fish species.

The herring gull is not common to Wyoming, but can be seen during spring/fall migration (Robbins et al. 1997). It is the largest of the species of gulls found in Wyoming, with a body length of about 20 inches and a wing span of about 55 inches. The most distinctive adult characteristics are a red dot on the lower bill and pinkish legs and feet.

From FY00 through FY05, three herring gulls were removed to protect resources and human health and safety (Table 4-2). Herring gulls are included in this analysis because they migrate through Wyoming and sometimes occur in mixed flocks; hence, requests could be received to remove them in damage or potential damage situations.

Herring gull BBS population trend data indicate that populations have been relatively stable from 1966 to 2004 in the BBS Western Region (Sauer et al. 2005). Because herring gulls could occur on airport facilities and cause risk to the traveling public and aircraft from bird strikes and damage or potential damage to other resources, WS may remove up to 200 damaging or potentially damaging herring gulls. Based on the above information and USFWS approval, this level of take by WS in Wyoming would have a low magnitude of impact on local, statewide, or regional herring gull populations and no cumulative impact on herring gull populations.

Black-billed Magpie Biology and Population Impacts

Like ravens and crows, black-billed magpies are omnivorous and very opportunistic in their feeding habits (Hall 1994). A common and very conspicuous bird of western North America, the black-billed magpie is found in urban as well as rural areas. They inhabit open woodlands, savannas or brush-covered country near streams. Their large, bulky, domelike nests are constructed of twigs and have two entrances. Magpies are not usually communal nesters, but sometimes will nest in loose colonies. The female lays 6-9 eggs that are greenish, brown freckled and blotched with grey. Magpies range from Alaska and western Canada south into California and east to the Great Plains.

WS did not kill any magpies between FY00 and FY05 (Table 4-1), nor were any moved or dispersed by non-lethal methods. Between FY00 and FY05, WS received five requests for assistance with magpie damage management.

According to BBS population trend results, black-billed magpie populations in Wyoming and USFWS Region 6 are slightly decreasing and relatively stable in the BBS Western Region (Sauer et al. 2005). Because magpie populations are healthy, and the problems they cause often significant, the USFWS has established a standing depredation order for use by the public. Under this "order" (50 CFR 21.43), no federal permit is required by anyone to remove black-billed magpies if they are 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. Based on the above information, WS in Wyoming would have a low magnitude of impact and no cumulative impact on local, statewide, or regional black-billed magpie populations.

Great Horned Owl Biology and Population Impacts

The great horned owl is common in Wyoming and throughout the United States and the largest owl in North America. It is found throughout North America from the northern treeline into Central and South America. They are primarily nonmigratory; however, birds living in the northern part of the range of this species may migrate.

The great horned owl's color pattern is similar to that of the long-eared owl (*Asio otus*); however, great horned owl "ear tufts" are larger and farther apart and the feathers on their bellies are finely barred in a horizontal pattern. They are found in woods, mountain forests, desert canyons, marshes, city parks, and urban forests. Great horned owls prefer open areas to dense woodlands and typically nest close to the forest edges where they hunt. Activity generally begins at dusk, but in some regions, great horned owls may be seen in late afternoon or early morning. They hunt by perching on snags and poles and watching for prey, or by gliding slowly above the ground. A great horned owl may take prey 2 to 3 times heavier than itself. They also hunt small prey by walking on the ground or by wading in water. They have been known to walk into chicken coops to take domestic fowl. An extremely wide range of prey species (at least 253 identified) has been documented, but rabbits and hares are its preferred prey. Great horned owls commonly occupy the abandoned nests of large birds, but will also nest in tree cavities, stumps, caves or on rocky ledges.

Great horned owls are one of the earliest nesting birds: eggs (1-3, but typically 2) may be laid from February through April. The young fledge at 45-55 days of age. Parents are extremely aggressive when defending the nest and will continue to attack until the intruder is killed or driven off. They are a long-lived owl: captive birds have been known to live 29 to 38 years, and wild owls up to 13 years.

From FY00 through FY05, two great horned owls were killed by non-WS individuals under a DP to protect resources (Table 4-2). In addition, WS received 22 requests for assistance for great horned owl damage management to protect valued resources.

BBS population trends for Wyoming indicate that great horned owl populations have slightly decreased and remain stable in USFWS Region 6 and the BBS Western Region (Sauer et al. 2005). Because great horned owl populations appear to be healthy and relatively stable in Wyoming, in USFWS Region 6 and the BBS Western Region, annual removal of up to ten

damage-causing great horned owls by WS under a DP issued by the USFWS would result in a low magnitude of impact and no cumulative impact on populations.

Great Blue Heron Biology and Population Impacts

One of the tallest birds in Wyoming, the great blue heron stands about 38 inches tall and has a wing span of about 70 inches (Robbins et al. 1997). Great blue herons are the most widely distributed herons in the United States and are commonly seen in Wyoming during the spring, summer, and autumn. Herons feed on fish and other aquatic vertebrates and are commonly observed standing or wading on the shores of ponds, creeks, and rivers. The head of the heron is largely white with dark underparts and the body is primarily bluish in color.

Great blue herons nest in colonies called rookeries in swampy areas but will occasionally nest as isolated pairs. Adults begin to gather at colony sites in March. They build large platform nests of plant stems and twigs, often lined with small twigs or grasses, in the tops of tall trees. The female lays three to five pale, bluish-green eggs.

Loss of nesting habitat and degradation of wetland foraging areas are the greatest threats to great blue herons. However, BBS population trend data for Wyoming, USFWS Region 6 and the BBS Western Region indicate that great blue heron populations have remained stable from 1966 to 2004 (Sauer et al. 2005).

From FY00 through FY05, WS did not kill any great blue herons (Table 4-1) but did provide technical assistance with 56 incidents of great blue heron damage and recommended that nine DPs be issued by the USFWS in 2005 (Table 1-1). Great blue herons killed under DPs issued by the USFWS were 15, 6, 5, 53 and 12 in 2000, 2001, 2002, 2003 and 2004, respectively (Table 4-2). Because great blue heron populations appear to be stable in Wyoming, in USFWS Region 6 and the Western BBS Region, a DP issued by the USFWS for removal of ten damaging herons by WS under the current program would result in a low magnitude of impact and no cumulative impact on local, statewide, or regional great blue heron populations.

Black-crowned Night Heron Biology and Population Impacts

Black-crowned night-herons, characterized by heavy bodies, short, thick necks, and short legs, can be found from Canada through South America. The neck and belly are white and the wings are light gray. The back and crown of the head are black (Robbins et al. 1997).

They are expert at "still fishing", standing motionless for long periods in shallow water, on pilings at high tide and on floating docks watching and waiting for prey. With a quick thrust of its bill, the night heron readily catches small fish. It also can swim well searching for food. The diet of the night heron consists of fish, crustaceans, aquatic insects, frogs, and small mammals (King and Pyle 1966). This species is normally a nocturnal hunter (Bent 1963). The black-crowned night heron is extremely adaptable: it eats whatever is most plentiful.

The black-crowned night heron nests in small to large colonies in almost any habitat: groves of trees near lakes, cattail marshes on prairies, clumps of tall grass on dry ground, and tall trees in city parks. They nest with other heron species. The female lays 3-5 pale blue-green eggs.

BBS population trend data indicate that black-crowned night herons are increasing in USFWS Region 6 and remain relatively stable in the BBS Western region. In addition, in USFWS Region 6, black-crowned night heron surveys indicate that populations have increased between 1966 and 2004 by about 400% (Sauer et al. 2005).

From FY00 through FY05, WS did not kill any black-crowned night herons (Table 4-1). Eighteen incidents of black-crowned night heron damage were reported to WS between FY00 and FY05 and upon investigation, WS recommended two DPs be issued by the USFWS in 2005. Black-crowned night herons killed under DPs issued by the USFWS were 2 in 2000 and 42 in 2003 (Table 4-2). Because black-crowned night heron populations appear to be increasing in USFWS Region 6 and are stable to increasing in the BBS Western Region, the removal of up to 10 damaging black-crowned night herons by WS would result in a low magnitude of impact and no cumulative impact to the species.

Belted Kingfisher Biology and Population Impacts

Belted kingfishers are common in summer, but generally absent in the winter in Wyoming; they generally migrate into Wyoming in April and leave in September and October. Belted kingfishers occur in summer mainly along the shores of inland streams where they nest. They breed from Alaska east to middle Labrador and Newfoundland, south to the Gulf States and southern California. They winter from southeastern Alaska, southern British Columbia, and occasionally in other parts of extreme southern Canada, south to the West Indies and Panama.

Belted kingfishers have bluish-gray heads with a ragged crest, a white spot in front of the eye, a bold white band around the neck, not quite meeting behind, back, wings and tail bluish-gray, wings and tail flecked with rows of small white dots, a bluish-gray band across the breast, with under parts otherwise white, and a stout, bluish-black bill.

Kingfishers can be destructive to trout and young salmon in fish hatcheries and rearing ponds; under such scenarios, damage management measures may be applied under these conditions. In its natural habitat the bird takes those fish most readily caught; it is fair to assume that in the process of feeding, it destroys enough sluggish, coarse fish to offset the few fast-swimming young trout and salmon it may be able to capture.

From FY00 through FY05, Wyoming WS did not kill any kingfishers (Table 4-1), but responded to 50 requests for assistance with kingfisher damage (Table 1-1). After on-site investigations and damage assessments, Wyoming WS recommended that 49 DPs be issued by the USFWS. Belted kingfishers killed under DPs issued by the USFWS were 3, 3, 3, 8, 0, 0 in 2000, 2001, 2002, 2003, 2004 and 2005, respectively (Table 4-2). BBS trend data (Sauer et al. 2005) indicate that breeding kingfisher populations are relatively stable in the BBS Western Region and in USFWS Region 6. Because belted kingfisher populations appear to be relatively stable, WS, under authorization by the USFWS, is permitted to remove up to 10 damaging kingfishers under the current program; this level of take results in a low magnitude of impact and no cumulative impact on kingfisher populations.

Feral, Domestic and Exotic Bird Biology and Population Impacts

WS is requested to provide bird damage management for losses or nuisances created by feral, free-ranging, domestic, non-indigenous, and exotic birds (WS Directive 2.320). The terms "feral" and "free-ranging" relate to domestic animals which have permanently escaped confinement or have been released into the wild, rural areas, city parks, etc. Feral and free-ranging birds are not necessarily dependent upon people for food or care. A domestic duck, commonly found on farms and urban lakes and ponds, is a product of the domestication of the mallard, a larger bird than generally found in wild populations. Examples of other domestic or domestic hybrid birds include muscovy ducks, peacocks, golden pheasants, monk parakeets, etc. "Domestic" refers to birds such as chickens, turkeys, guinea fowl, racing pigeons, domestic ducks

and geese, ostriches, emus, etc. that have escaped (or have been released) temporarily from their confinements or owners but are still totally dependent on people for food and care. "Exotic" and "non-indigenous" refer to birds not native to Wyoming which have been illegally or accidentally introduced or released into the wild.

Birds classified or termed feral, free-ranging, domestic, and exotic are not considered wildlife and are not afforded lawful protection or managed by the USFWS or WGFD. Therefore, trend data do not typically exist for these species.

In Wyoming, WS uses a combination of methods to distinguish feral ducks (unprotected) from wild ducks (protected under MBTA). Feral ducks are distinguished by feather coloration not typical of wild ducks (*i.e.*, all white, a combination of white and other colors in a random pattern (*i.e.*, mottled) or very dark plumage on hens), weight (ducks in excess of 3¾ lbs (1.7 kg) during most of the year or 4½ lbs (2.0 kg) from November through January are considered feral) and/or flight ability (*i.e.*, many domestic ducks cannot fly or fly very poorly). Flight ability alone is not used as a determining factor, especially during the summer molt. Most feral ducks exhibit two or more of these characteristics.

Where practical, WS will use non-lethal methods to solve problems caused by feral, domestic and exotic birds, including adoption of captured birds by the public when appropriate. Any lethal bird damage management by WS would be on a site-specific basis. In those cases where birds are causing damage or are a nuisance, complete removal of the local population is desirable. This would be considered beneficial to the human environment, since it would be requested by the affected property owner, administrator, or resource management agency.

From FY00 through FY06, WS did not capture nor kill any exotic or feral birds in Wyoming; however, because of the status of these birds, lethal removal would not be considered to have an adverse effect on native species.

Other Target Species

In addition to the bird species analyzed above, other target species could be killed or have nests removed in small numbers by WS during avian disease surveillance and monitoring ¹⁶ or damage management activities. Most of these birds are protected by the USFWS under the MBTA and are hunted species (http://www.fws.gov/migratorybirds/reports/reports.html) and the WS' take is limited by permit. Therefore, these birds are taken into account with applicable state and federal laws and regulations authorizing take of migratory birds and their nest and eggs on a case-by-case basis. The USFWS, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on populations of this species would have no significant adverse impact on the quality of the human environment.

Based upon an anticipated increase in future requests for WS assistance, WS predicts that generally fewer than 10 individuals and fewer than 10 nests of other target species would be removed annually. Because none of the "other target species" are expected to be taken by Wyoming WS at a level that would adversely affect respective bird populations, WS anticipates a low magnitude of impact.

¹⁶ Avian disease surveillance and monitoring take results (Table 1-4) are not included in these data because that effort was conducted under a special permit issued by the USFWS and are not for WS operational damage management activities and that take is generally very small and does not adversely affect species populations.

4.3.1.2 Alternative 2 - Technical Assistance Only

Under this alternative, WS would have no adverse effect on target species populations directly. Private efforts to reduce or prevent damage and perceived disease transmission risks to humans and livestock could increase, resulting in increased potential impacts on those bird populations and humans. For the same reasons shown in Section 4.3.1.1, it is unlikely that populations of starlings, pigeons or other target species would be adversely affected by implementation of this alternative. Impacts and hypothetical risks of illegal toxicant use would be greater under this alternative than Alternative 1. DRC-1339 and AC are currently only available for use by WS employees. It is hypothetically possible that frustration caused by the inability to reduce losses would lead to illegal use of toxicants by others, which could increase adverse effects to an unknown level.

4.3.1.3 Alternative 3 - No WS Bird Damage Management

Under this alternative, WS would not have any impact on populations of target species in the state or region. Private efforts to reduce or prevent depredations would increase, which could result in varying degrees of impacts to populations of target species. Impacts to target species under this alternative could be the same, less, or more than those of the current or proposed program, depending on the level of effort expended. For the same reasons shown in the population impacts analysis in Section 4.3.1.1, it is unlikely that starlings, pigeon or most other target species populations would be adversely affected by implementation of this alternative. AC and DRC-1339 are currently available for use only by WS employees. It is hypothetically possible that frustration caused by the inability to reduce losses would lead to illegal use of toxicants by others which could increase impacts to an unknown level.

4.3.2 Effects of WS Bird Damage Management on Non-target Species Populations, Including T/E Species

4.3.2.1 Alternative 1 - Continue the Current WS Adaptive Integrated Bird Damage Management Program (No Action/Proposed Action)

Adverse Effects on Non-target (non-T/E) Species. Direct effects occur to non-target species when WS program personnel inadvertently kill, injure, or harass animals that are not targeted by management actions. In general, these effects result from the use of methods that are not completely selective for target species. Non-target migratory bird and other non-target wildlife are usually not affected by WS management methods, except for occasional hazing from harassment devices. In these cases, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity from which they were frightened, but would likely return after cessation of the action. WS' take of non-target species during bird damage management activities has been extremely low and is not expected to increase above current levels of take.

According to Wyoming WS Annual Reports, two non-target birds (one goose, one grouse) were known to have been killed during WS' bird damage management from FY00 through FY04. If DRC-1339 prebaiting observations or prior history suggest a likelihood of non-target bird presence, then any treated bait applied to a site would be constantly monitored to ensure that non-target birds do not consume bait. Alternatively, some type of structure or feeding station could be used that would preclude access by all non-target species; conversely, the baiting operation can be deferred until non-target species are not present.

While every precaution is taken to safeguard against killing non-target birds, changes in local flight patterns and other unanticipated events could occasionally result in the incidental death of unintended species. These incidents are rare and have not occurred during Wyoming WS activities in the recent past and would not affect the populations of any species under the current program.

Beneficial Effects on Non-target Species. Programs to reduce damage and interspecific competition between native species and invasive species can benefit native wildlife species that are adversely affected by predation or competition for habitat. Interspecific nest competition has been well documented with some non-indigenous species. Miller (1975) and Barnes (1991) reported starlings were responsible for a severe depletion of the eastern bluebird population due to nest competition. Nest competition by starlings has also been known to adversely affect American kestrels (*Falco sparverius*) (Nickell 1967, Von Jarchow 1943, Wilmers 1987), redbellied woodpeckers (*Melanerpes carolinus*) (Ingold 1994, Kerpez and Smith 1990), and wood ducks (*Aix sponsa*) (Shake 1967, Heusmann et al. 1977, Grabill 1977, McGilvery and Uhler 1971). Weitzel (1988) reported nine native species of birds have been displaced by starling nest competition, and Mason et al. (1972) reported starlings evicting bats from nest holes. Reduction of nest site competition could be beneficial for some native species. Although such reductions are not likely to be significant as a result of any WS activities, the benefits would probably outweigh any adverse effects from any take of non-target species.

Interspecific brood parasitism is defined as the laying of an egg or eggs by one species of bird into a host nest of another species of bird. Unaware of the foreign eggs, the host normally accepts and incubates the egg(s) and raises the young as its own. The brown-headed cowbird is one of five species of cowbirds that are brood parasites (Orians 1985), which have lost the instinct to build nests, incubate eggs, and care for young (Smith 1977). As a result of brood parasitism, egg and chick survival of the host species is jeopardized. In most cases of brood parasitism, the young of the host species die because they are unable to compete with the cowbird chick(s) for food and space inside the nest. Aggressive nesting area colonizers such as gulls will force other species, such as terns and plovers, from prime nesting areas. Cormorants, besides competing for nesting space, indirectly destroy vegetation at colony sites as their droppings accumulate, making these areas unsuitable for rapid repopulation by many colonial nesting species. Such programs to reduce interspecific competition between native species and invasive species have the greatest chance of successfully reducing bird damage and conflicts to wildlife species, since all bird damage management methods could be implemented or recommended by WS.

T/E Species Effects. Special efforts are made to avoid jeopardizing T/E species through biological assessments of the potential effects and the establishment of restrictions or minimization measures. A Section 7 Programmatic Consultation and USFWS Biological Opinion (BO) between the USFWS and WS (USDI 1992), determined that certain damage management methods "may affect" American peregrine falcons (*Falco peregrinus*), bald eagles, and whooping cranes (*Grus americana*). The BO concluded that damage management methods previously mentioned in this EA which are used in bird damage management will not jeopardize the continued existence of, or adversely modify, critical habitats of those species. SOPs to avoid negative impacts to T/E species, such as bait placement within or under structures, as well as label restrictions and the inherent safety of DRC-1339 preclude hazards to non-target and T/E species as described in USDA (1997 Appendix F) and in Section 3.5 of this EA. Wyoming WS reviewed the list of T/E species occurring in Wyoming and determined that the use of bird damage management methods will have no effect on T/E species or their critical habitats with the exception of the bald eagle, for which a "may affect, not likely to adversely affect" determination was made (B. Kelly, Ecological Services, USFWS letter to R. Krischke, WS, December 19,

2005). Furthermore, WS has determined that the use of AC and lasers will have no effect on any listed T/E species.

SOPs listed in Chapter 3 preclude negative effects and the low non-target risk associated with WS methods precludes other adverse effects. In addition, WS bird damage management may benefit some of the species of special concern (*e.g.*, starling damage management could potentially reduce secondary nest cavity competition). In addition, listed species should benefit from this alternative because of the control in issuing permits to minimize effects at known sites.

Wyoming WS has conferred with the WGFD, which has determined that the current and proposed WS actions have no effect on Wyoming state-listed or species of special concern or their habitats and ecosystems. The WGFD, under its Comprehensive Wildlife Conservation Strategy, identifies and addresses the needs of species of special concern in the state. WS will periodically consult with the WGFD, Bureau of Endangered Resources to ensure that no actions taken in compliance with this EA will adversely affect Wyoming-listed species. SOPs to avoid T/E effects were described in Chapter 3 (Section 3.5).

4.3.2.2 Alternative 2 - Technical Assistance Only

Adverse Effects on Non-target Species, including T/E Species. Alternative 2 would not allow any WS operational bird damage management in Wyoming. There would be no adverse effect on non-target or T/E species from WS bird damage management under this alternative. Technical assistance or self-help information would be provided when requested to city managers, agricultural producers, airport managers, property owners, or others. Although technical assistance could lead to more selective use of bird damage management methods by private entities than that which would occur under Alternative 3, private efforts to reduce or prevent damage could result in less experienced persons implementing bird damage management methods and lead to greater risks to non-target wildlife. Hazards to raptors, bald eagles, and other T/E species could be greater under this alternative than Alternative 1. It is possible that, similar to Alternative 3, frustration from the resource owner due to the inability to reduce losses could lead to illegal use of toxicants, or other non-specific damage management methods could lead to unknown effects to non-target species populations, including T/E species. Potential hazards and threats to raptors, bald eagles and other T/E species could therefore be greater under this alternative if methods that are less selective or toxicants that cause secondary poisoning are used by frustrated private individuals or property managers.

Beneficial Effects on Non-target Species. The ability to reduce negative effects caused by birds to wildlife species and their habitats, including T/E species, would be variable based upon the skills and abilities of the person implementing actions. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 3 since WS would be available to provide information and advice but less of a chance of reducing damage than Alternative 1.

4.3.2.3 Alternative 3 - No WS Bird Damage Management

Adverse Effects on Non-target Species. Alternative 3 would not allow any WS bird damage management in Wyoming. There would be no impact on non-target or T/E species from WS bird damage management under this alternative. However, private efforts to reduce or prevent damage could increase, resulting in less experienced persons implementing damage management methods and could lead to greater take of non-target wildlife than the *No Action/Proposed Action* Alternative. Hazards to raptors, bald eagles, and other T/E species could, therefore, be greater

under this alternative than Alternative 1. As in Alternative 2, possible frustrations caused by the inability to reduce losses could lead to illegal use of toxicants by others, which could impact local non-target species populations, including T/E species.

<u>Beneficial Effects on Non-target Species.</u> The ability to reduce negative effects caused by birds to wildlife species and their habitats, including T/E species, would be variable based upon the skills and abilities of the person implementing control actions.

4.3.3 Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets

The effects of WS bird damage management upon safety include potential benefits by fostering a safer environment through reduced disease transmission and bird/aircraft strikes, and potential negative effects that might result from the exposure of the public to bird damage management methods. WS uses chemical methods that are deemed appropriate to reduce a variety of damage problems, and WS personnel are aware of the potential risks to non-target species and humans (See Appendix C for a detailed description of bird damage management methods and chemicals potentially used by WS). The use of pesticides by WS is regulated by the EPA through the FIFRA, by state law, the WDA and by WS Directives. Labeling requirements and use restrictions are built-in minimization measures which assure that use of registered chemical products would avoid significant adverse effects on human or pet health. Along with effectiveness, cost and social acceptability, risk is an important criterion for the selection of damage management strategies. Determination of risks to non-target animals, the public, and WS personnel are important prerequisites for successful application of the IWDM approach. Based on a thorough Risk Assessment (USDA 1997 Appendix P), APHIS concluded that, when chemicals used by WS are applied according to label directions, they are selective for target individuals or populations, and such use has negligible adverse effects on the environment.

4.3.3.1 Alternative 1 - Continue the Current WS Adaptive Integrated Bird Damage Management Program (No Action/Proposed Action)

Under this alternative, bird damage management conducted by WS in Wyoming is guided by WS, APHIS, and USDA Directives, Cooperative Agreements and MOUs with other agencies, and federal, state, and local laws and regulations. WS is not aware of any record of harm or injury that has occurred to the public or pets as a result of WS bird damage management in Wyoming. The bird damage management methods used by Wyoming WS are discussed in more detail in Appendix C of this EA and USDA (1997) and used as prudently as possible. In addition, the current damage management strategies will continue to address complaints on a case-by-case basis, providing the most flexibility in addressing damage complaints.

DRC-1339 is the primary avicide used for bird damage management in Wyoming. This chemical is one of the most extensively researched and evaluated pesticides ever developed. More than 35 years of studies have demonstrated the safety and efficacy of this pesticide. Factors that help eliminate any risk of public health problems from possible future use of this chemical are:

- Its use is prohibited within 50 feet of standing water and it cannot be applied directly to food or feed crops (contrary to some misconceptions, DRC-1339 is not applied to feed materials that livestock can access).
- DRC-1339 is highly unstable and degrades rapidly when exposed to sunlight, heat, or ultraviolet radiation. The half-life is about 25 hours; in general, treated bait material is nearly 100% broken down within a week.

- It is more than 90% metabolized in target birds within the first few hours after they consume the bait. Therefore, little material is left in bird carcasses that may be found or retrieved by people or pets.
- Application rates are extremely low (less than 0.1 lb. of active ingredient per acre).
- A human or pet would need to ingest the internal organs of birds found dead from DRC-1339 to have any chance of receiving even a minute dose of the chemical or its metabolites into his/her system. This is highly unlikely to occur.
- The EPA has concluded that, based on mutagenicity (the tendency to cause gene mutations in cells) studies, this chemical is not a mutagen or a carcinogen (*i.e.*, cancer-causing agent). Regardless, the extremely controlled and limited circumstances in which DRC-1339 is used would prevent any exposure of the public to this chemical.

<u>Carbon dioxide (CO₂) gas</u> is a colorless, odorless, noncombustible gas approved by the AVMA as a euthanasia method (Beaver et al. 2001) and is a common euthanasia agent apparently because of its ease of use, safety, and efficacy for euthanizing many animals in a short time span. The advantages of using CO₂ are its: 1) rapid depressant, analgesic, and anesthetic effects; 2) ready availability in convenient compressed gas cylinders; 3) low cost; 4) chemical features (nonflammable, non-explosive, of minimal hazard to personnel when used with properly designed equipment); and 5) lack of residual accumulation in animal tissues.

Other Bird Damage Management Chemicals. Non-lethal bird damage management chemicals that might be used or recommended by WS would include repellents such as: 1) methyl or dimethyl anthranilate (artificial grape flavoring used in foods and soft drinks sold for human consumption), which has been used as an area repellent, 2) anthraquinone, presently marketed as Flight ControlTM, 3) Mesurol, a taste aversion repellent, and 4) the tranquilizer AC. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before the EPA or the Food and Drug Administration (FDA) will register them. Any operational use of these chemicals would be in accordance with labeling requirements under FIFRA, FDA and state laws and regulations which are established to avoid unreasonable adverse effects on the environment.

Mechanical Damage Management Methods

Many mechanical damage management methods may be used or recommended by WS to reduce damage or the potential for damage (Appendix C). Some of these methods include:

- Resource management, which include practices that may be used by resource owners to reduce the potential for wildlife damage.
- Cultural practices, which generally involve modifications to the level of care or attention given to the resource; these may vary depending on the age, size, and location of the resource.
- Environmental/habitat modification is an integral part of bird damage management designed to render sites less attractive to certain bird species. Most habitat management revolves around airports and bird aircraft strike problems and blackbird and starling roosts.
- Animal behavior modification refers to tactics that alter the behavior of wildlife in order to reduce damages. Animal behavior modification may use scare tactics or exclusion to deter or repel birds that cause loss or damage (Twedt and Glahn 1982).

- Live traps, designed to capture birds, are made of nylon netting or hardware cloth and come in many different sizes and designs, depending on the species of birds being targeted. Traps are baited with grains or other appealing food.
- Egg addling/destruction is the practice of destroying the embryo (only) prior to hatching or the entire egg, respectively.
- Shooting is more effective as a dispersal technique than as a way to reduce bird densities when a large number of birds are present; however, some birds may be removed using shooting when warranted (*i.e.*, at airports if the birds are difficult to disperse).
- Snap traps are spring-activated traps with wooden bases (e.g., rat traps) which can be used effectively to kill offending birds, such as woodpeckers damaging structures.

The above analysis indicates that human and pet health risks from use of DRC-1339 or any other WS method would be virtually nonexistent.

4.3.3.2 Alternative 2 - Technical Assistance Only Program

Under this alternative, operational bird damage management assistance by WS would not be authorized in the state. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing chemical or other damage management methods and leading to a greater risk than the current/proposed action. WS would only provide advice and, in some cases, equipment or materials (*i.e.*, by loan or sale) to persons who would then conduct their own damage management actions. Concerns about human or pet health risks from WS' use of bird damage management chemical methods would be alleviated because no such use would occur.

Commercial pest control services would be able to use Avitrol if certified and such use would likely occur to a greater extent in the absence of WS' assistance. Use of Avitrol, in accordance with label requirements, should preclude any hazard to the public or pets. However, hazards to humans and pets could be greater under this alternative than under Alternative 1 if chemicals that are less selective or that cause secondary poisoning are used. Frustration caused by the inability to reduce losses could lead to illegal use of toxicants by others, which could lead to unknown impacts to humans and pets.

4.3.3.3 Alternative 3 - No WS Bird Damage Management Program

Alternative 3 would not allow any WS bird damage management in Wyoming. The absence of WS bird damage management in Wyoming could result in adverse effects on human health and safety because of the possibility of transmission of avian-borne diseases and increases in bird-aircraft strikes. Property managers fear that the absence of bird damage management activities would lead to accumulation of bird feces and feathers (*i.e.*, from pigeons, starlings, etc.) at rooftop ventilation systems and in work areas, which may increase the risk of disease transmission or other health risks to humans. WS assists airport management to resolve wildlife hazards to aviation in Wyoming. Airport managers and air safety officials are concerned that the absence of a WS bird damage management program would fail to adequately address complex wildlife hazard problems faced by the aviation community. Hence, potential effects of not conducting such work could lead to an increased incidence of human injuries, property damage or loss of life due to bird strikes to aircraft.

However, commercial pest control services and private individuals would be able to use Avitrol, if certified and such use would likely occur to a greater extent in the absence of WS' assistance, potentially resulting in less experienced persons implementing damage management methods and

leading to a greater risk than the *No Action/Proposed Action* Alternative. Use of Avitrol, in accordance with label requirements, would preclude any hazard to members of the public. However, hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate bird damage could lead to illegal use of certain toxicants, and could pose secondary poisoning hazards to pets and to mammalian and avian scavengers under this alternative. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

4.3.4 Efficacy of WS Bird Damage Management Methods

Under the current program, all methods are used as effectively as practically possible, in conformance with the WS Decision Model (Slate et al. 1992) and WS Directives. The efficacy of each method is based, in part, on the application of the method, the skill of the personnel using the method and the guidance provided by WS Directives and policies for WS personnel.

The efficacy of each alternative is based on the types of methods employed under that alternative. WS personnel are trained in the use of each method, and are certified by the WDA as restricted-use pesticide applicators for each pesticide that is used. Some methods may be more or less effective, or applicable depending on weather conditions, time of year, biological considerations, economic considerations, legal and administrative restrictions, or other factors. Because these various factors may at times preclude use of certain methods, it is important to maintain the widest possible selection of damage management methods to most effectively resolve bird damage problems (see Appendix C for a more detailed discussion of methods).

4.3.4.1 Alternative 1 - Continue the Current WS Adaptive Integrated Bird Damage Management Program (No Action/Proposed Action)

The following are some methods that would be available under Alternative 1 (see Appendix C for more detail).

Animal Behavior Modification. This refers to tactics that alter the behavior of wildlife in order to reduce damages. Animal behavior modification may employ scare tactics or exclusion to deter or repel birds that cause loss or damage (Twedt and Glahn 1982).

Methyl anthranilate is a non-lethal bird repellent derived from a human food additive. The chemical is effective at reducing food consumption and area-use and is selective in that it primarily repels birds.

Mesurol is a chemical repellent used for non-lethal taste aversion. It is registered by the EPA for aversive conditioning egg treatment to reduce predation from common ravens and American crows on the eggs of protected species, T/E species, or eggs of other species designated to be in need of special protection (EPA Reg. No. 56228-33). Mesurol is registered for WS use only.

Anthraquinone is a secondary repellent causing illness or discomfort in birds after ingestion. The effectiveness of this chemical is based on the concept of conditioned food avoidance, as the chemical may cause vomiting and gastrointestinal discomfort in birds.

Alpha-chloralose (AC) is delivered as bait to targeted birds and is selective and effective in immobilizing targeted individuals. Some unintentional mortality may occur due to differences in target bird weight, aggressiveness in feeding, or post baiting behavior.

Lure Crops can sometimes be used to reduce damage by providing an alternate food source in the form of bait or crops. Lure crops are typically grains that are cultivated for the sole purpose of attracting and holding the target species, thereby protecting other crop fields from damage. This method can be difficult to utilize because crop growers often have their entire cultivated properties dedicated to commercial agriculture and if lure crop areas are not of sufficient size the risk is high that non-lure crop fields will be damaged.

Lasers are selective and an effective non-lethal method to disperse some bird species under the correct lighting conditions and present virtually no health hazards to the birds (APHIS 2001).

Live traps are used in locations where a targeted population is causing damage or where other techniques cannot be safely used. Live traps, as applied and used by WS, are highly selective for target species. If a non-target animal is accidentally captured it can easily be released unharmed.

Nest box traps are effective and selective in capturing secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Snap traps are used to remove individual birds, primarily northern flickers and other woodpeckers, that are causing damage. Effectiveness can be increased by placing the traps near the location of damage and by baiting the trap with food items which are highly attractive to the targeted species and less attractive to non-target birds.

Nest destruction is selective for targeted species/individuals because nests would be identified by species-specific characteristics and nesting material. Heusmann and Bellville (1978) reported this method effective, but time-consuming.

Egg addling/destruction is highly selective because the eggs of specific birds are targeted for destruction; consequently, there are no adverse effects to other species. This method is considered highly selective, but time-consuming.

DRC-1339 – More than 35 years of studies have demonstrated the safety and efficacy of this compound. Prebaiting is conducted to monitor for the presence of non-target species and target species bait consumption to increase efficacy.

Avitrol - Prebaiting is usually conducted to increase baiting efficacy and selectivity. Any granivorous birds associated with the target birds could be affected by Avitrol if they consume treated bait. However, Avitrol only affects a very small number of birds in a baited area.

Shooting is selective for target species (USDA 1997). It would also be effective as a dispersal technique or to reinforce dispersal techniques.

There are several other bird damage management methods used by WS under the current program. Appendix C provides a description of each.

4.3.4.2 Alternative 2 - Technical Assistance Only Program

Under this alternative, WS would not have an operational bird damage management program to assist requesters to reduce bird damage. Efficacy of the WS program would not be a

consideration. Assistance would be limited to providing technical assistance and instructional demonstrations on legally available methods and self-help advice.

4.3.4.3 Alternative 3 - No WS Bird Damage Management Program

Under this alternative, WS bird damage management would not be a consideration because the Wyoming WS program would not conduct operational activities nor provide technical assistance to entities experiencing bird damage. Private efforts to reduce or prevent damage would probably increase, which could reduce efficacy of bird damage management methods. It is reasonable to assume that frustration caused by the inability to reduce losses through legal means in a timely manner could lead to the use of illegal techniques, which could result in unwanted impacts to bird populations and the environment.

4.4 CUMULATIVE IMPACTS

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

Under Alternatives 1 and 2, WS would address damage associated with birds in situations throughout the state. The Wyoming WS bird damage management program would be the primary federal program with bird damage management responsibilities; however, some state and local government agencies may conduct bird damage management activities in Wyoming as well. Through ongoing coordination and cooperation with the USFWS, FAA, WGFD, and WDH, WS is aware of other bird damage management activities and may provide technical assistance in such efforts. WS does not normally conduct operational damage management activities concurrent with other agencies in the same area, but may conduct bird damage management activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct bird damage management activities in the same area. The potential cumulative impacts analyzed in this EA could occur either as a result of WS bird damage management, or as a result of the effects of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

Bird damage management methods used or recommended by the WS program in Wyoming will have no cumulative adverse effects on target and non-target wildlife populations. Population trend data indicate that target bird populations have remained relatively stable or are increasing in Wyoming, USFWS Region 6 and the BBS Western Region. When damage management actions are implemented by WS, the potential lethal take of non-target species is expected to be minimal or non-existent.

Cumulative Impact Potential from Avicides

Bird damage management programs which include the use of pesticides as a lethal means to reduce damage may have the greatest potential for cumulative impacts, as such impacts relate to deposit of pesticide residues in the environment. DRC-1339 is the primary pesticide currently used by the Wyoming WS bird damage management program for the purpose of reducing damage or health threats to people or livestock. In Wyoming, it has historically been used only in buildings for feral pigeon control and in egg baits to control livestock depredation by ravens. This chemical has been evaluated for possible residual effects which might occur from buildup of the chemical in soil, water, or other environmental sites.

DRC-1339 exhibits a low persistence in soil or water, and bioaccumulation of the chemical is unlikely (USDA 1997). Additionally, the relatively small quantities of DRC-1339 used in the bird damage management program in Wyoming, the chemical's instability, which results in speedy degradation of the product, and application protocol used in WS programs further reduce the likelihood of any environmental accumulation.

Avitrol has a high persistence in soil and water but, according to the literature, does not bioaccumulate (USDA 1997, Extoxnet 2000). Because of the characteristic of Avitrol to bind to soils, it is not expected to be present in surface or ground water as a result of its use. A combination of chemical characteristics and baiting procedures is used by WS to reduce the likelihood of environmental accumulation of Avitrol. The EPA has not required studies on the fate of Avitrol in the soil because, based on use patterns of the avicide, soil residues are expected to be low.

Based on the chemical and physical characteristics and potential use patterns of DRC-1339 and Avitrol and factors related to the environmental fate of these pesticides, no cumulative impacts are expected from the lethal chemical components used or recommended by the WS bird damage management program in Wyoming. Avitrol may be used or recommended by the Wyoming WS program. Most applications will preclude direct contact with the soil or surface/ground water, and uneaten baits will be recovered and disposed of according to EPA label specifications.

Non-lethal chemicals (such as alpha-chloralose) may also be used or recommended by the WS bird damage management program in Wyoming. Characteristics of these chemicals and potential use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use.

Cumulative Impact Potential from Non-Chemical Components

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

Because shooting may be considered a component of the non-chemical cumulative impact, the deposition of lead shot in the environment is a factor considered in this EA.

Threats of lead toxicosis to waterfowl from the deposition of lead shot in waters where such species feed were observed more than one hundred years ago (Sanderson and Belrose 1986). As a result of discoveries made regarding impacts to several species of ducks and geese, federal restrictions were placed on the use of lead shot for waterfowl hunting in 1991. "Beginning September 1, 1991, the contiguous 48 United States, and the states of Alaska and Hawaii, the Territories of Puerto Rico and the Virgin Islands, and the territorial waters of the United States, are designated for the purpose of Sec. 20.21 (j) as nontoxic shot zones for hunting waterfowl, coots, and certain other species. "Certain other species" refers to those species, other than waterfowl or coots, affected by reason of being included in aggregate bags and concurrent seasons."

All Wyoming WS bird damage management shooting activities involving waterfowl, coots and "certain other species" conform to federal, state and local laws. Consequently, no deposition of lead in nontoxic shot zones is likely to occur as a result of Wyoming WS' bird damage management actions. Therefore, cumulative impacts are not likely to occur if lead shot is used.

Roost Harassment/Relocation. Some potential exists for cumulative impacts to human health and safety related to the harassment of flocks of birds in urban environments. If birds are dispersed from one site and relocate to another where human exposure to concentrations of bird feces occurs over time, human health and safety could be threatened. If WS is providing operational assistance in relocating such birds, coordination with local authorities will be conducted to assure that the birds do not re-establish in other undesirable locations.

SUMMARY

No significant cumulative environmental impacts are expected from any of the alternatives analyzed in this EA (Table 4-3). Under the Current/Proposed Action, the lethal removal of birds by WS would not have a significant impact on overall bird populations in Wyoming, USFWS Region 6 or in the BBS Western Region, but some local reductions may occur. No risk to public safety is expected when WS' services are provided and accepted by requesting individuals under Alternative 1, since only trained and experienced wildlife biologists/specialists would conduct and recommend bird damage management activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations under Alternative 1 conduct their own bird damage management, and when no WS assistance is provided (Alternative 3). In all three alternatives, however, it would not be to the point that the impacts would be significant. Although some persons will likely be opposed to WS' participation in bird damage management activities on public and private lands in Wyoming, the analysis in this EA indicates that a WS adaptive integrated bird damage management program would not result in significant cumulative adverse impacts on the quality of the human environment.

Table 4.3 Comparisons of Issues/Impacts and Alternatives.							
Issues/Impacts	Alternative 1	Alternative 2	Alternative 3				
Effects of WS Bird Damage Management on Target Species Populations	WS would have no effect on local or regional bird populations. If resource owners conduct bird damage management, effects would be more or less than Alternative 2 or 3 dependent on the efforts and methods used.	Effects similar to Alternative 1; however, could be more adverse depending on the level of control by others.	Effects similar to Alternative 1; however, could be more adverse depending on the level of control by others.				
Effects on non-target species, including T/E species	No adverse affects from WS activities. Potential positive effects to those species that are being negatively impacted by invasive target species.	No adverse effects from WS activities. Potential adverse affects from others if toxicants or other methods are misused.	No adverse affects from WS activities. Potential adverse effects from others if toxicants or other methods are misused.				
Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets	No adverse affects from WS activities. Potential positive effect from reduced risks from bird disease transmissions or bird aircraft strikes.	Potential negative effect from the misuse of methods or toxicants or increased disease transmission or bird strike risks.	Potential negative effect from the misuse of methods or toxicants or increased disease transmission or bird strike risks.				
Efficacy of WS Bird Damage Management Methods	Provides most effective means to reduce bird damage or potential bird damage.	Moderate level of effectiveness if WS technical assistance recommendations are followed.	Least effective because no professional assistance would be available to requesters.				

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APPENDIX A

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APPENDIX B

AUTHORITY AND COMPLIANCE

USDA-APHIS-Wildlife Services

USDA is authorized and directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for USDA is the *Act of March 2, 1931* and the *Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (7 USC 426-426c; 46 Stat. 1468)*, as amended in the Fiscal Year 2001 Agriculture Appropriations Bill, which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

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

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

Under the Act of March 2, 1931, and 7 U.S.C. §§426c, APHIS may carry out these wildlife damage management programs itself, or it may enter into cooperative agreements with states, local jurisdictions, individuals and public and private agencies whereby they may fund and assist in carrying out such programs. <u>Id</u>. These laws do not grant any regulatory authority. Therefore, there are no regulations promulgated under these statutes for wildlife services or animal damage management activities.

U.S. 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 T/E species, migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters that the USFWS administers 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 to carry out the purposes of, the four migratory bird treaties.

The 1916 treaty with Great Britain was amended in 1999 by the governments of Canada and the United States. Article II of the amended United States-Canada migratory bird treaty (Treaty) states that to ensure the long-term conservation of migratory birds, migratory bird populations shall be managed in accordance with conservation principles that include (among others) to: 1) manage migratory birds internationally, 2) sustain healthy migratory bird populations for harvesting needs, and 3) provide for and protect habitat necessary for the conservation of migratory birds.

Article III of the Treaty states that the governments should meet regularly to review progress in implementing the Treaty. The review shall address issues important to the conservation of migratory birds, including the status of migratory bird populations, the status of important migratory bird habitats, and the effectiveness of management and regulatory systems. The governments agree to work cooperatively to resolve identified problems in a manner consistent with the principles of the Treaty and, if the need arises, to conclude special arrangements to conserve and protect species of concern.

Article IV of the Treaty states that each government shall use its authority to take appropriate measures to preserve and enhance the environment of migratory birds. In particular, the governments shall, within their constitutional authority, seek means to prevent damage to such birds and their environments and pursue cooperative arrangements to conserve habitats essential to migratory bird populations.

Article VII of the Treaty authorizes permitting the take and kill of migratory birds that, under extraordinary conditions, become seriously injurious to agricultural or other interests.

The USFWS regulates take of bird species that are listed as migratory under the MBTA and those that are listed as T/E under the ESA. The USFWS cooperates with the WGFD and WS by recommending measures to avoid or minimize take of T/E species. The term "take" is defined by the ESA (section 3(19)) to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The terms "harass" and "harm" have been further defined by USFWS regulations (50 CFR section 17.3), as follows: 1) harass means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering; 2) harm means an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation when it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding or sheltering.

The USFWS authority for action is based on the MBTA of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

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

governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

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

Federal Aviation Administration

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. The FAA is responsible for setting and enforcing the federal aviation regulations 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. An MOU was developed in 1998 and revised in 2005 between the FAA and WS, which established a cooperative relationship between the two agencies to resolve wildlife hazards to aviation.

Wyoming Game and Fish Department

The WGFD has the responsibility to manage all protected and classified wildlife in Wyoming, except federally listed T/E species, regardless of the land class on which the animals are found (WSS §§23-1-103, 302). By Wyoming statute and policy, the state provides for the conservation of lands, protection of natural resources, wildlife and public lands (WSS §§11-16-103). WGFD is also authorized to cooperate with WS and the WDA for controlling predatory animals (WSS §§11-6-104, 107, 108).

The Chapter 56 permit process authorizes the Chief Game Warden or his designee to take (kill) any wildlife in Wyoming when, in his judgment, the taking is necessary due to substantial damage to property or the creation of a human health and safety hazard. This regulation is promulgated by authority of WSS §\$23-1-302(a)(viii)and(xxii).

Wyoming Department of Agriculture

The WDA is authorized to enter into Cooperative Agreements with WS and local entities for reducing damage caused by predatory animals or to administer such programs (WSS §§11-6-104). The WDA currently has an MOU, Cooperative Agreement, and work plan with WS. These documents establish a cooperative relationship between WS and WDA, outline responsibilities, and set forth annual objectives and goals of each agency for resolving wildlife damage in Wyoming.

Wyoming Indian Tribes

Currently WS has an MOU with the Northern Arapahoe and Eastern Shoshone tribes on the Wind River Reservation. Any WS activities conducted on tribal lands would only be conducted at the request of the tribe and after appropriate authorizing documents were signed. If WS enters into an agreement with a tribe for bird damage management, this EA would be reviewed and supplemented, if appropriate, to ensure compliance with NEPA. Agreements would be signed and NEPA documentation addressed as appropriate before implementing bird damage management on reservation lands. Requests for operational assistance to resolve bird damage complaints on private properties within the boundaries of Indian reservations would be coordinated with the tribal government.

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 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 impact resulting from federal actions, 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 (B. Kelly, USFWS Ecological Services letter to R. Krischke, WS, December 19, 2005 and USFWS Intraagency Consultation).

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 onsite 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 technical assistance 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 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).

<u>Federal Insecticide, Fungicide, and Rodenticide Act:</u> FIFRA requires the registration, classification and regulation of all pesticides used in the United States. The EPA is responsible for implementing and

enforcing FIFRA. All pesticides used or recommended by the WS program in Wyoming are registered with, and regulated by, the EPA and the WDA. Wyoming WS uses all chemicals according to label directions as required by the EPA and WDA.

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. None of the bird damage management methods described in this EA that might be used operationally by WS causes major ground disturbance, any physical destruction or damage to property, any alterations of property, wildlife habitat, or landscapes, nor involves 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 predators 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 the benefit of 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.

Environmental Justice - 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 wildlife damage management methods in as selective and environmentally conscious a manner as possible. All chemicals used by WS are

regulated by the EPA through FIFRA, CDA, by MOUs with federal land management agencies, and by WS Directives. Based on a thorough Risk Assessment, USDA (1997, Appendix P) concluded that when WS program chemicals are used following label directions, they are highly selective for the target species or populations, and such use has negligible impacts on the environment. The WS operational program properly disposes of any excess solid or hazardous waste. 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' bird damage management 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.

Protection of Children from Environmental Health and Safety Risks - Executive Order 13045: 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 predator damage management 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. The Risk Assessment (USDA 1997, Appendix P) concluded that when WS program chemicals and non-chemical methods are used following label directions and in compliance with normally accepted safety practices and WS standard operating procedures, such use has negligible impacts on the environment or on human health and safety, including the health and safety of children.

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.

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.

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 EPA. 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 regarding 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.

APPENDIX C

BIRD DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE IN WYOMING

The most effective approach to resolving wildlife damage problems is to integrate the use of several methods, either simultaneously or sequentially. IWDM would integrate and apply practical methods of prevention and reduce damage by wildlife while minimizing harmful effects of damage reduction measures on humans, other species, and the environment. IWDM may incorporate resource management, physical exclusion and deterrents, and population management, or any combination of these, depending on the characteristics of specific damage problems.

In selecting damage management techniques for specific damage situations and the methods under each alternative, consideration is given to the responsible species and the magnitude, geographic extent, duration and frequency, and likelihood of wildlife damage. Consideration is also given to the status of target and potential non-target species, local environmental conditions and effects, social and legal aspects, and relative costs of damage reduction options. The cost of damage reduction may sometimes be a secondary concern because of overriding environmental, legal, and animal welfare considerations. These factors are evaluated in formulating damage management strategies that incorporate the application of one or more techniques.

A variety of methods (Table C-1) is potentially available to the WS program in Wyoming concerning the management or reduction of bird damage. WS develops and recommends or implements IWDM strategies rooted in sound resource management and wildlife management philosophies. Within each approach there may be a number of specific methods or tactics available.

Various federal, state, and local statutes and regulations and WS Directives govern WS use of damage management tools and substances. The following methods and materials are recommended or used in technical assistance and

Table C-1. Bird Damage Management Methods which would be Recommended or Used by WS under each Alternative.

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Management Method	Alternative 1 Current Program	Alternative 2 Technical Assistance	Alternative 3 No Program
Habitat Management	Yes	Yes	No
Lure Crops/Cultural Methods	Yes	Yes	No
Exclusion	Yes	Yes	No
Frightening Devices	Yes	Yes	No
Avitrol	Yes	Yes	No
Repellents ¹	Yes	Yes	No
Live Traps	Yes	Yes	No
Shooting	Yes	Yes	No
DRC-1339 ^{2, 3}	Yes	No	No
Alpha-chloralose ^{2, 3}	Yes	No	No
Euthanasia	Yes	Yes	No

- 1 Mesurol is currently not registered for use in Wyoming.
- 2 Only certified applicators can use these chemicals.
- 3 Only registered for USDA/APHIS/WS use.

operational damage management efforts of the WS program in Wyoming. The effectiveness of the program can be defined in terms of reduced economic losses, decreased health hazards, reductions in property damage and overall improved quality of life.

NON-LETHAL METHODS

On rare occasions, a bird may inadvertently die from the management methods that are implemented. These birds may be killed or injured from capturing/handling procedures or unknown causes. For example, individual bird weight, stomach contents, or physiology may make it 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 inadvertent mortality during implementation of some non-lethal damage management techniques.

Resource Management. Resource management includes a variety of practices that may be used by resource owners to reduce the potential for wildlife damage. Implementation of these practices is appropriate when the potential for damage can be reduced without significantly increasing a resource owner's costs or diminishing his/her ability to manage resources pursuant to goals. Resource management recommendations are made through WS technical assistance efforts.

Alter Aircraft Flight Patterns. In cases where the presence of birds at airports results in threats to air traveler safety and when such problems cannot be resolved by other means, the alteration of aircraft flight patterns or schedules may be recommended. However, altering operations at airports to decrease the potential for hazards is not feasible unless an emergency situation exists. Otherwise, the expense of interrupted flights and the limitations of existing facilities make this practice prohibitive.

Relocation of damaging birds to other areas following live capture generally is not cost-effective. Since starlings, blackbirds, pigeons, and most other damaging species are common and numerous throughout Wyoming, they are rarely, if ever, relocated because habitats in other areas are generally already occupied and/or the birds would cause similar problems at a new location. Relocation of wildlife often involves stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats, or translocated individuals simply leave the area.

However, there are exceptions to the rule for relocating birds. 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 would consult with the USFWS and WGFD 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. 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 for home and business owners. Heusmann and Bellville (1978) reported that nest removal was an effective but time-consuming method because problem bird species are highly mobile and can easily return to damage sites from long distances, or because of high population densities. This method poses no imminent danger to pets or the public.

Cultural Methods. These generally involve modifications to the level of care or attention given to the resource, which may vary depending on the age, size, and location of the resource. Such husbandry practices include, but are not limited to, techniques such as night feeding, indoor feeding, closing barns or corrals, removing spilled grain or standing water, and use of bird proof feeders (Johnson and Glahn 1994).

Agricultural Producer/Property Owner Practices. These consist primarily of non-lethal preventive methods and localized habitat modification. Such management techniques are implemented by the agricultural producer and property owners. Producers and property owners are encouraged to use these methods, basing their decisions on the level of risk, need, and professional judgment. Producer and property owner practices recommended by WS include:

Lure crops/alternate foods. When depredations cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate potential losses. Lure crops are planted or left for consumption by wildlife as an alternative food source. This approach

provides relief for critical crops by sacrificing less important or specifically planted fields. Establishing lure crops is sometimes expensive, requires considerable time and planning to implement, and may attract other unwanted species to the area.

For lure crops to be effective, the ability to keep birds from surrounding fields is necessary, and the number of alternative feeding sites must be minimal (Fairaizl and Pfeifer 1988). Additionally, lure crops reduce damage for only a short time (Fairaizl and Pfeifer 1988). The resource owner is limited in implementing this method contingent upon ownership of, or ability to, manage the property. Unless the original bird-human conflict is resolved, creation of additional habitat or feeding sites could increase future conflicts.

Lure crops would likely be planted on some land held in private ownership, such as conservation clubs, throughout Wyoming. These plantings may provide some additional food or act as an attractant for birds. However, it is highly unlikely they contribute to conflicts with birds or act as significant attractants when one considers that 13,817,000 acres of the state are in corn, wheat, hay and soybean production (Battaglia et al. 1999), providing high quality foods for much of the year.

Environmental/habitat modification is an integral part of bird damage management. The type, quality, and quantity of habitat are directly related to the wildlife that is produced. Therefore, habitat can be managed to not attract certain bird species or to repel certain birds. Most habitat management revolves around airports and bird aircraft strike problems in Wyoming. Habitat management around airports is aimed at eliminating bird nesting, roosting, loafing, or feeding sites. Generally, many bird problems on airport properties can be minimized through management of vegetation and water in runway areas. Habitat management is often necessary to minimize damage caused by blackbirds and starlings that form large roosts during late autumn and winter. Bird activity can be greatly reduced at roost sites by removing all of the trees or selectively thinning the stand. Roosts often will re-form at traditional sites, and substantial habitat alteration is the only way to permanently stop such activity (USDA 1997).

Animal Behavior Modification. This refers to tactics that alter the behavior of wildlife and consequently reduce damage. Animal behavior modification may employ scare tactics or exclusion to deter or repel birds that cause loss or damage (Twedt and Glahn 1982). Some devices used to accomplish this are:

- bird proof exclusions
- auditory scaring devices (*i.e.*, electronic guards, propane exploders, pyrotechnics, distress calls and sound producing devices
- chemical frightening agents (*i.e.*, Mesurol, anthraquinone)
- repellents (i.e., tactile repellents, surface coverings)
- visual scare devices (*i.e.*, scarecrows, dogs, lasers, spotlights, remote control devices)
- falconry

Bird proof exclusions can be effective but are often cost-prohibitive, particularly because of the mobility of birds, which requires the use of overhead barriers as well as conventional netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993). Heavy plastic strips hung vertically in open doorways have been successful in some situations for excluding birds (Johnson and Glahn 1994). Plastic strips, however, can prevent filling of feed troughs at livestock feeding facilities or can be covered up when the feed is poured into the trough by the feed truck. Such strips are not practical

for open-air feedlot operations that are not housed in buildings. Porcupine wire can be placed on ledges to exclude birds from perching or nesting on the ledges. This material can be expensive and debris often collects in the porcupine wire making it ineffective and unsightly.

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scarecrows, and audio distress/predator vocalizations, are often not practical in suburban, urban or rural areas if they disturb people or pets. In addition, under large feedlot situations they may not be appropriate because of the disturbance to livestock, although livestock would eventually habituate to the noise. Birds, too, quickly learn to ignore scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics (Bomford and O'Brien 1990).

Tactile Repellents (*i.e.*, sticky or tacky bird repellents such as Tanglefoot®, 4-The-Birds®, and Roost-No-More®) smeared or placed in wavy bands with a caulking gun will often discourage the birds from perching on or in structures, or in orchard, ornamental, and shade trees. The birds are not entrapped by the sticky substances, but rather dislike the tacky footing. A word of caution: some of the sticky bird repellents will discolor painted, stained, or natural wood siding. Others may run in warm weather, leaving unsightly streaks. It is best to try out the material on a small out-of-sight area first before applying it extensively. The tacky repellents can be applied to a thin piece of pressed board, ridged clear plastic sheets, or other suitable material, which is then fastened to the area where damage is occurring.

Surface Coverings: Some birds may be excluded from ponds or other areas using overhead wire grids (Fairaizl 1992, Lowney 1993). These 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 feeding activities and not cause bird injury or death. Overhead wire networks generally require little maintenance other than ensuring proper wire tension and replacing broken wires; the spacing varies with the species being excluded. Overhead wires have been demonstrated to be most effective on sites ≤ two acres in size, 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. The expense of maintaining wire grids may be burdensome for some people.

Balls approximately five inches in diameter can be used to cover the surface of a pond. A "ball blanket" renders a pond unusable for boating, swimming, fishing, and other recreational activities. This method is very expensive, costing about \$131,000 per surface acre of water.

Scarecrows: The use of scarecrows has met with mixed results. These techniques are generally only practical for small areas. Scaring devices such as distress calls, helium-filled eye spot balloons, raptor effigies and silhouettes, mirrors, and moving disks can be effective but usually for only a short time before birds become accustomed to, and learn to, ignore them (Schmidt and Johnson 1984, Bomford 1990, Rossbach 1975, Mott 1985, Shirota et al. 1983, Conover 1982, Arhart 1972, Bomford and O'Brien 1990). Mylar tape has produced mixed results for effectively frightening birds (Dolbeer et al. 1986, Tobin et al. 1988). In general, scarecrows are most effective when they are moved frequently, alternated with other methods, and are well maintained.

Dogs: Dogs can be an effective tool for harassing birds and keeping them off turf and beaches (Conover and Chasko 1985, Woodruff and Green 1995). Around water, this technique appears most effective when the body of water to be patrolled is ≤ 2 acres in size (Swift 1998). Although dogs can be effective in keeping birds off individual properties, they do not contribute to a solution for the larger problem of overabundant/anthropogenically abundant bird populations (Castelli and Sleggs 1998). Swift (1998) reported that when harassment with dogs ceases, the number of birds usually

eventually returns to pre-treatment numbers. WS has recommended and encouraged the use of dogs where appropriate.

Lasers are a relatively new technique used to frighten and disperse birds from their roosts or loafing areas. Although the use of a laser (the term "laser" is an acronym for Light Amplification by Simulated Emission of Radiation) to alter bird behavior was first introduced nearly 30 years ago (Lustick 1973), it received very little attention until recently, when it was tested by the NWRC. Results have shown that several bird species, such as double-crested cormorants, Canada geese, other waterfowl, gulls, vultures (*Cathartes aura* and *Coragyps atratus*), and American crows all exhibited avoidance of laser beams during field trails (Glahn et al. 2001, Blackwell et al. 2002). The repellent or dispersal effect of a laser is due to the intense and coherent mono-wavelength light that, when directed at birds, can have substantial effects on behavior and may elicit changes in physiological processes (APHIS 2001). Best results are achieved under low-light conditions (*i.e.*, from sunset through dawn) by targeting structures or trees proximal to roosting birds, which reflects the beam. In field situations, habituation to lasers has not been observed (APHIS 2001).

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. Lasers used by WS include the Class-III B, 5-mW, He-Ne, 633-nm Desman laser, and the Class II, battery-powered, 68-mW, 650-nm, diode Laser Dissuader. Because of the risk of eye damage, safety guidelines and specifications have been developed and are strictly followed by the user (Occupational Safety and Health Administration 1991, Glahn and Blackwell 2000).

Spotlights. The use of light to disturb or move loafing and or roosting birds can be an effective technique. This method is similar to the laser, but with a much reduced price tag. The sacrifice in reduced pricing also limits the range and effectiveness of this method when compared to the laser.

Remote Control Devices. The use of remote control devices for the purpose of disturbing the activity or behavior of birds is a relatively new concept. These devices have been in existence for many years, but their durability, range, strength and cost have improved dramatically. Remote control devices are available in numerous forms such as: speed boats, helicopters, airplanes, sail boats, race cars, etc.

Falconry is the use of falcons and hawks, which chase/hunt other wildlife species, then return to the handler. This practice is regulated by both federal and state laws and all raptors in the United States are protected under various statutes; any "take" of a raptor must be conducted under the appropriate permit to be legal. The care and housing of falcons can be expensive (Chamorro and Clavero 1994) and there are drawbacks to using falcons to disperse birds from damage or potential damage sites (Hahn 1996) (*i.e.*, falcons are generally only flown when weather and lighting conditions are conducive).

Live traps include:

Clover, funnel, and common pigeon traps are enclosure traps made of nylon netting or hardware cloth and come in many different sizes and designs, depending on the species of birds being captured. The entrances of the traps also vary greatly from swinging-door, one-way door, funnel entrance, to tip-top sliding doors. Traps are baited with grains or other food material, which attract the target birds. 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.

Decoy traps are used by WS for preventive and corrective damage management. Decoy traps are similar in design to the Australian Crow Trap as reported by Johnson and Glahn (1994) and McCracken (1972). Live decoy birds of the same species that are being targeted are usually placed in the trap with sufficient food and water to assure their survival. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds, which enter and become trapped themselves. Active decoy traps are monitored daily, every other day, or as appropriate, to remove and euthanize excess birds and to replenish bait and water. Decoy traps and other 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 by WS for corrective damage management and are effective in capturing local breeding and post-breeding starlings and other targeted secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Mist nets are more commonly used for capturing small-sized birds such as house sparrows, finches, etc. but can be used to capture larger birds such as ducks and ring-neck pheasants (*Phasianus colchicus*). The mist net was introduced to the United States in the 1950's from Asia and the Mediterranean, where it was used to capture birds for the market (Day et al. 1980). 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.

Cannon nets/rocket nets are normally used for larger birds such as pigeons, feral ducks, 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.

Pole traps are generally set for raptors which perch on poles prior to making an attack. Problem hawks and owls can be safely trapped using a well padded (*i.e.*, with foam rubber wrapped in electricians tape, surgical tubing) steel leg-hold trap (No. 1½ or other appropriate size), snare or tangle snares set on the top of poles. Erect poles that are 5 to 10 feet high near the threatened area where they can be easily seen and place one padded trap on top of each pole. The wire is run through the trap ring and the wire is secured to the pole and ground so that trapped birds may slide to the ground where they can rest.

Bal-chatri traps are small traps used for capturing birds of prey such as hawks and eagles. Live bait, such as pigeons, starlings, rodents, etc. is used to lure raptors into landing on the trap (Hygnstrom and Craven 1994) where nylon nooses entangle their feet and hold the bird. 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. The outside top and sides are covered with many nooses consisting of strong monofilament line or stiff nylon string.

Chemical Agents

Methyl anthranilate (MA) (artificial grape flavoring used in foods and soft drinks for human consumption) could be used or recommended by WS as a bird repellent. MA is currently registered

as a repellent to protect turf from bird grazing and as a spray for airport runways to reduce bird activity/risk on or near airports. It is also being investigated as a livestock feed additive to reduce or prevent feed consumption by birds. Such chemicals undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they can be registered by EPA or the FDA.

Mesurol is a chemical repellent used for non-lethal taste aversion. It is registered by the EPA as an aversive conditioning egg treatment to reduce predation by common ravens, white-necked ravens (C. cryptoleucas), and American crows on the eggs of protected T/E species or eggs of other species designated for special protection (EPA Reg. No. 56228-33). Mesurol is registered for WS use only. The active ingredient is methiocarb, a carbamate pesticide which acts as a cholinesterase inhibitor. Species which feed upon treated eggs may show signs of toxicity (e.g., regurgitation, lethargy, temporary immobilization). Occasionally, birds may die after feeding upon treated eggs, but most birds exposed to treated eggs survive. Avery et al. (1995) examined the potential of using eggs injected with 30 mg of Mesurol to condition ravens from preying on eggs of endangered California least terns (Sterna antillarum). They concluded that proper deployment of treated eggs can be a useful, nonlethal method of reducing raven predation at least tern colonies. Avery and Decker (1994) evaluated whether predation might be reduced through food avoidance learning. They used captive fish crows (Corvus caurinus) to examine avoidance responses from Mesurol (18 mg/egg) and MA (100 mg/egg). They concluded that some crows displayed persistence to the 5-day exposure and that successful application may require extended periods of training for target predators to acquire an avoidance response. During the spring of 2001, WS conducted a field test on the Sterling Wildlife Management Area in Bingham County, Idaho, where Mesurol-treated eggs were exposed to blackbilled magpies to evaluate aversive conditioning to eggs of waterfowl and upland game birds. Feeding on treated eggs decreased after a short period of time; however, the feeding behavior of magpies switched to pecking holes in eggs, possibly trying to detect treated eggs before consuming them. This behavior may suggest that at least some birds experienced the ill effects of Mesurol, but the "tasting" of eggs may result in increased predation (Maycock and Graves 2001).

Anthraquinone (Flight ControlTM), a non-lethal repellent not currently registered for use on gulls or cormorants in some states could be considered for use in Wyoming if it becomes registered in the state in the future. As part of the planning process, analyses of potential effects of this repellent are being addressed in this EA to determine potential effects if and when anthraquinone becomes registered for use in Wyoming on species other than Canada geese. Similar to MA, this chemical could be used to induce a negative response to feeding in treated areas.

In the United States, the use of anthraquinione as a bird repellent date at least from the 1940's when the first patent for its use was issued (Avery 2003). Subsequent development and testing of the chemical centered on seed treatments, particularly pine seeds and rice. It is registered as a treatment to repel birds from turf and grass and as a repellent for roosting birds. Additional bird-repellent applications are being developed for rice and corn seed treatments and aerial application to ripening rice (Avery 2003).

Anthraquinone is a secondary repellent and affects birds by causing post-intestinal distress. Sometimes ingestion of anthraquinone-treated food produces vomiting, but often vomiting does not occur and the bird just sits quietly until the discomfort passes. Anthraquinone is not a taste repellent or contact irritant as the birds do not hesitate to eat treated food, and they exhibit no sign that treated food is unpalatable to them. However, once the birds experience the adverse consequences they learn to avoid the protected food.

Anthraquinone is a stable compound virtually insoluble in water with no known hazards to non-target species. It is not phytotoxic and does not inhibit germination of rice seeds or growth of

sprouts. It also has a very low toxicity to birds and mammals, and it appears to be innocuous to insects (Avery 2003).

Avitrol is a chemical frightening agent (repellent) that can be effective in a single dose when mixed with untreated baits, normally in a 1:9 ratio. Avitrol, however, is not completely non-lethal in that a small portion of the birds could be killed (Johnson and Glahn 1994). Prebaiting is usually necessary to achieve adequate bait acceptance by the target species. Avitrol-treated bait is placed in an area where the targeted birds are feeding and a few birds consume treated bait and become affected by the chemical. The affected birds then broadcast distress vocalizations and display abnormal flying behavior, in the process frightening the remaining flock. Avitrol is a restricted use pesticide that can only be sold to certified applicators and is available in several bait formulations where only a small portion of the individual grains carry the chemical. It can be used during any time of the year, but is used most often during winter and spring in Wyoming. Any granivorous bird associated with the target species could be affected by Avitrol. Avitrol is water soluble, but laboratory studies demonstrated that Avitrol is strongly absorbed onto soil colloids and has moderately low mobility. Biodegradation is expected to be slow in soil and water, with a half-life ranging from three to 22 months. However, Avitrol may form covalent bonds with humic materials, which may serve to reduce its bioavailability in aqueous media, is non-accumulative in tissues and rapidly metabolized by many species (Schafer 1991). Laboratory studies with predator and scavenger species have shown minimal potential for secondary poisoning, and during field use only magpies and crows appear to have been affected (Schafer 1991). However, a laboratory study by Schafer et al. (1974) showed that magpies exposed to two to 3.2 times the published Lethal Dose (LD₅₀) in contaminated prey for 20 days were not adversely affected and three American kestrels fed contaminated blackbirds for seven to 45 days were not adversely affected. Therefore, no probable risk is expected, based on low concentrations and a low hazards quotient value for nontarget indicator species tested on this compound. No probable risk is expected for pets and the public, based on low concentrations and a low hazards quotient value for nontarget indicator species tested on this compound.

Alpha-chloralose (AC) is a chloral derivative of glucose and a central nervous system depressant (*i.e.*, it depresses cortical centers in the brain). It is used as an immobilizing agent to capture and remove nuisance waterfowl and other birds, and for capture of birds for research purposes¹⁷. It is labor intensive to use and in some cases, may not be cost effective, depending on the application and purpose (Wright 1973, Feare et al. 1981), but is typically used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts and for the capture of birds for research. AC is typically delivered as a well-contained bait in small quantities with minimal hazards to pets and humans and the target birds; single bread or corn baits are fed directly to the target birds. WS personnel or other authorized personnel are present at the site of application during baiting to retrieve the immobilized birds. Unconsumed baits are removed from the site following each treatment.

AC was eliminated from more detailed analysis in USDA (1997) based on critical element screening; therefore, environmental fate properties of this compound were not rigorously assessed. However, the solubility and mobility are believed to be moderate and environmental persistence is believed to be low. Bioaccumulation in plants and animal tissue is believed to be low. AC is used in other countries as an avian and mammalian toxicant. The compound is slowly metabolized, with recovery occurring a few hours after administration (Schafer 1991). The dose used for immobilization is designed to be about 2 to 30 times lower than the LD_{50} . Mammalian data indicate higher LD_{50} values than birds. Toxicity to aquatic organisms is unknown (Wornecki et al. 1990) but the compound is not generally soluble in water and therefore should remain unavailable to aquatic

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¹⁷ With proper use and follow-up, AC reduces the potential for stress, injury and death in many situations compared to other capture techniques.

organisms. Factors supporting the determination of this low potential included the lack of exposure to pets, nontarget species and the public, and the low toxicity of the active ingredient. Supporting rationale for this determination included relatively low total annual use and a limited number of potential exposure pathways.

Nicarbazin (e.g., OvoControl^{TM,})

Nicarbazin is an avian reproductive inhibitor¹⁸ recently registered by the EPA to help reduce the hatchability of eggs; the product is non-lethal and a humane wildlife damage management tool¹⁹. Nicarbazin was approved more than 50 years ago to treat an enteric disease in poultry and has now been developed to reduce the hatchability of eggs of nuisance bird species. The effects of nicarbazin are fully reversible; furthermore, care has been taken to develop feeding systems that limit exposure to non-target species²⁰ (http://www.aphis.usda.gov/ws/nwrc).

Nicarbazin is believed to induce infertility in birds by two main mechanisms. The first of these is disruption of the membrane surrounding the egg yolk, resulting in intermixing of the egg yolk and white (albumin). In the second method, cholesterol uptake is inhibited; because this is a necessary step for yolk formation, energy for the developing embryo is limited. If the yolk does not provide enough energy, the embryo will not completely form and the egg will not hatch. A third mechanism, which may only be observed at very high doses of nicarbazin, is a significant reduction in the size of the yolk. If an inadequate amount of yolk is deposited, the egg will not completely form inside the bird, the components of the egg will be resorbed, and no egg will be laid.

Nicarbazin is proposed for broad scale applications and/or where bird nests may be difficult to locate or access. The technology can be readily scaled to the community level without requiring large inputs of manpower or money.

LETHAL METHODS

Egg addling/destruction is the practice of destroying the embryo prior to hatching. Egg addling is conducted by vigorously shaking an egg numerous times, which causes detachment of the embryo from the egg sac. Egg destruction can be accomplished in several different ways, but the most commonly used methods are manually gathering eggs and breaking them, or oiling or spraying the eggs with a liquid, which covers the entire egg and prevents it from obtaining oxygen. Although WS does not commonly use egg addling or destruction, it is a valuable damage management tool with demonstrated effectiveness.

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when a large number of birds are present. Normally, shooting is conducted with shotguns or air rifles. Shooting is a very intensive method normally used to remove a single offending bird, or group of birds (numbering less than 50) at one location. However, at times, a few birds could be shot from a flock to make the remainder of the birds more wary and to help reinforce non-lethal methods. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997). It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and

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OvoControl interferes with the formation of the vitelline membrane that separates the yolk and white in the egg, so no embryo is ever formed.

Several organizations that are concerned with animal welfare (i.e., The Humane Society of the United States, Geese Peace, and the Coalition to Prevent Destruction to Canada Geese) advocate non-lethal means to control Canada geese such as infertility drugs and egg oiling or addling on their web sites. This evidence suggests that research in the arena of contraceptive or infertility drugs for Canada geese is supported and is being requested by the interested public.

Due to its unique chemistry, the product represents no secondary hazards or harmful to target species and non-target species, or people.

calling. Shooting with shotguns, air rifles, or rimfire and centerfire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are humanely killed. All firearms safety precautions are followed by WS when conducting bird damage management activities, and laws and regulations governing the lawful use of firearms are strictly complied with.

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

Hunting and DPs. WS sometimes recommends that resource owners consider legal hunting as an option for reducing game bird species damage. Although legal hunting is impractical and/or prohibited in many urban/suburban areas, it can be used to reduce some populations of game birds. 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 denying the permit application by submitting a Form 37 (Migratory Bird Damage Project Report).

DRC-1339 is the principal chemical method proposed for use for blackbird, starling, and pigeon damage management under the current program and for the proposed action (Table C-2). For more than 30 years, DRC-1339 has proven to be an effective method for starling, blackbird, gull, and pigeon damage management at feedlots, dairies, airports, and in urban areas (West et al. 1967, Besser et al. 1967, Decino et al. 1966). Studies continue to document the effectiveness of DRC-1339

in resolving blackbird and starling problems at feedlots (West and Besser 1976, Glahn 1982, Glahn et al. 1987); research studies and field observations suggest DRC-1339 treatments kill about 75% of the starlings at cattle feeding facilities (Besser et al. 1967). Blanton et al. (1992) reports that DRC-1339 appears to be a very effective, selective, and safe means of urban pigeon population reduction. Glahn and Wilson (1992) noted that baiting with DRC-1339 is a cost-effective method of reducing damage by blackbirds to sprouting rice.

DRC-1339 is a slow-acting avicide that is registered with the EPA for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 was developed as an avicide because of its differential toxicity to mammals. DRC-1339 is highly toxic to sensitive species, but only slightly toxic to nonsensitive birds, predatory birds, and mammals. For example, starlings, a highly sensitive species, require a dose of only 0.3 mg/bird to cause death (Royall

Table C-2. DRC-1339 Used by Wyoming WS by FY for Bird Species Addressed in this Document.

FY	Species	Quantity Used (Grams)
00	Pigeons	0
01	Pigeons	85
02	Pigeons	39
03	Pigeons	0
04	Pigeons	28
05	Pigeons	87

et al. 1967). Most bird species that are responsible for damage, including starlings, blackbirds, pigeons, crows, magpies, and ravens are highly sensitive to DRC-1339. Many other bird species, such as raptors, sparrows, and eagles, are classified as nonsensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to nontarget and T/E species (USDA 1997). Secondary poisoning has not been observed with DRC-1339-treated baits. During research studies,

carcasses of birds which died from DRC-1339 were fed to raptors and scavenger mammals for 30 to 200 days with no symptoms of secondary poisoning observed (Cunningham et al. 1981). This can be attributed to relatively low toxicity to species that might scavenge on blackbirds and European starlings killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds, leaving little residue to be ingested by scavengers. Secondary hazards of DRC-1339 are almost nonexistent. DRC-1339 acts in a humane manner, producing a quiet and apparently painless death. DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultraviolet radiation. DRC-1339 is highly soluble in water, but does not hydrolyze and degradation occurs rapidly in water. DRC-1339 tightly binds to soil and has low mobility. The half life is about 25 hours, which means it is nearly 100% broken down within a week, and identified metabolites (*i.e.*, degradation chemicals) have low toxicity. Aquatic and invertebrate toxicity is low (USDA 1997). Appendix P of USDA (1997) contains a thorough risk assessment of DRC-1339 and the reader is referred to that source for a more complete discussion. That assessment concluded that no adverse effects are expected from use of DRC-1339.

DRC 1339 has several EPA Registration Labels (56228-10, 56228-17, 56228-28, 56228-29, and 56228-30) depending on the application or species involved in the damage reduction project.

Snap traps. Rat snap traps with wooden bases can be effective in killing offending birds, usually woodpeckers. The trap is affixed to the building with the trigger pointed downward in the vicinity of the damage. The trap is baited with nut meats (walnuts, almonds, or pecans) or suet. If multiple areas are being damaged, several traps can be used.

Carbon dioxide (CO₂) or carbon monoxide (CO) gas are a colorless, odorless gases approved by the AVMA as a euthanasia agent (Beaver et al. 2001). These are commonly used for euthanasia because of its ease of use, wide safety margin, and efficacy (e.g., ability to euthanize many animals in a short time span). The advantages of using CO or CO₂ 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. CO and CO₂ have been used to euthanatize mice, rats, guinea pigs, chickens, and rabbits, and to render swine unconscious before humane slaughter. Studies of 1-day-old chickens have revealed that CO₂ is an effective euthanizing agent. Inhalation of CO₂ caused little distress to the birds, suppressed nervous activity, and induced death within 5 minutes. In addition, inhalation of CO₂ at a concentration of 7.5% increases the pain threshold, and higher concentrations of CO₂ have a rapid anesthetic effect.

WS sometimes uses CO or CO_2 to euthanize birds which have been captured in live traps, by hand, or by chemical immobilization when relocation is not feasible. Live birds are placed in a container or chamber and CO or CO_2 gas from a cylinder is released into the chamber. The birds quickly expire after inhaling the gas.