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

FINAL ENVIRONMENTAL ASSESSMENT

BIRD DAMAGE MANAGEMENT IN WISCONSIN

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Prepared by:

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

In Consultation With:

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

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

WISCONSIN DEPARTMENT OF AGRICULTURE TRADE AND CONSUMER PROTECTION

FEDERAL AVIATION ADMINISTRATION

WISCONSIN DEPARTMENT OF TRANSPORTATION – BUREAU OF AERONAUTICS

WISCONSIN DEPARTMENT OF HEALTH SERVICES

BAD RIVER BAND OF LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS

FOREST COUNTY POTAWATOMI COMMUNITY

RED CLIFF BAND OF LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS

GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION

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ACRONYMS USED IN THE EA

AC	Alpha-Chloralose
AD	Aleutian Disease
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BBS	Breeding Bird Surveys
BDM	Bird Damage Management
BGEPA	Bald and Golden Eagle Protection Act
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CY	Calendar Year
DP	Depredation Permit
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
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
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
HP	Highly Pathogenic
IWDM	Integrated Wildlife Damage Management
LD	Lethal Dose
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MMWR	Morbidity and Mortality Weekly Report
MOU	Memoranda or Memorandum of Understanding
NEP	Nonessential Experimental Population
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
NWHC	National Wildlife Health Center
NWR	National Wildlife Refuge
NWRC	National Wildlife Research Center
NWSD	National Wildlife Strike Database
PIF	Partners In Flight
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedure
T/E	Threatened and Endangered Species
TGE	Transmissible Gastroenteritis
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U. S. Geological Survey
WAC	Wisconsin Administrative Code
WDACP	Wildlife Damage Abatement and Claims Program
WDATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection
WDM	Wildlife Damage Management
WDNR	Wisconsin Department of Natural Resources
WS	Wildlife Services
WNV	West Nile Virus

EXECUTIVE SUMMARY

Wisconsin wildlife has many positive values and is an important part of life in the state. However, as human populations expand, and land is used for human needs, there is increasing potential for conflicting human/wildlife interactions. This Environmental Assessment (EA) analyzes the potential environmental impacts of alternatives for United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) involvement in the reduction of conflicts by birds in Wisconsin, including damage to property, agricultural and natural resources and risks to human and livestock health and safety. The proposed wildlife damage management activities could be conducted on public and private property in Wisconsin when the property owner or manager requests assistance and/or when assistance is requested by an appropriate state, federal, tribal or local government agency. Wildlife Services has prepared this EA in consultation with the U.S. Fish and Wildlife Service (USFWS), the U.S. Department of Transportation Federal Aviation Administration, Wisconsin Department of Natural Resources (WDNR), Wisconsin Department of Agriculture, Trade and Consumer Protection, Wisconsin Department of Health Services, and Wisconsin Department of Transportation-Bureau of Aeronautics.

Wisconsin WS's bird damage management (BDM) program would primarily consists of: 1) Projects at livestock facilities to reduce European Starling (*Sturnus vulgaris*) feed consumption, fecal contamination of feed, and to reduce potential risk of disease transmission to livestock; 2) to reduce damage caused by resident and migratory Canada Geese. Resources protected would include property (including agricultural crops) and quality of life, human health, and human safety; and 3) to reduce potential aircraft/bird strikes in Wisconsin thereby minimizing human health and safety risks.

The preferred alternative considered in the EA, would be to continue and expand the current Integrated Wildlife Damage Management (IWDM) program in Wisconsin. The IWDM strategy encompasses the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS would provide technical assistance and direct operational assistance including non-lethal and lethal management methods, as described in the WS Decision Model (Slate et al. 1992). When appropriate, non-lethal methods like physical exclusion, cultural practices, habitat modification, repellents or harassment would be recommended and utilized to reduce damage. In other situations, birds would be removed as humanely as possible using shooting, trapping, registered pesticides and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy. Other alternatives examined in the EA include an alternative in which WS does not become involved in BDM; an alternative in which WS is restricted to the use and recommendation of only non-lethal BDM methods; and an alternative in which WS provides technical assistance (advice) but does not provide operational assistance with implementing the recommendations (Chapter 3).

WS involvement in BDM in Wisconsin is conducted in accordance with applicable permits from the USFWS and also closely coordinated with the WDNR. All WS activities are also conducted in accordance with all other applicable Federal, State, Tribal, and local laws, and regulations.

The EA provides a detailed analysis of the impacts of each alternative on target bird populations; non-target species including state and federally-listed threatened and endangered species; human health and safety; humaneness of the alternatives used; impacts on stakeholders, including impacts on aesthetic values, and impacts on regulated harvest of birds.

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 used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human-wildlife interactions. This Environmental Assessment (EA) evaluates the potential environmental effects of alternatives for Wildlife Services (WS) involvement in bird damage management (BDM) to protect agricultural and natural resources, property and human health and safety in Wisconsin.

Wildlife damage management (WDM) is the science of reducing damage or other problems associated with wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 2010). The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), WS program is the federal agency authorized to protect American resources from damage associated with wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)). Wildlife Services recognizes that wildlife is an important public resource greatly valued by the American people. By its very nature, however, wildlife is a highly dynamic and mobile resource that can cause damage to agriculture and property, pose risks to human health and safety and sometimes adversely affect other natural resources. Human-wildlife conflict issues are complicated by the wide range of public responses to wildlife and wildlife damage. What may be unacceptable damage to one person may be a normal cost of living with nature to someone else. 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.

WS uses an Integrated Wildlife Damage Management (IWDM) approach (WS Directive 2.105[1]), commonly known as Integrated Pest Management where a combination of methods may be used or recommended to reduce wildlife damage. Integrated Wildlife Damage Management is the application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgment of trained personnel. The methods used may include non-lethal techniques like alteration of cultural practices, habitat management, repellents, frightening devices, and physical exclusion to prevent or reduce damage. The reduction of wildlife damage may also require removal of individual animals or reducing the local animal populations through lethal means. In some instances, the goal may be to eradicate an invasive species. Program activities are not based on punishing offending animals but are conducted to reduce damage and risks to human and livestock health and safety, and are used as part of the WS Decision Model (Slate et al. 1992).

Wildlife Services is a cooperatively funded, service-oriented program that receives requests for assistance with wildlife damage management from private and public entities, including tribes and other governmental agencies. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently in accordance with applicable Federal, State, Tribal, and local laws and Memoranda of Understanding (MOUs) between WS, other agencies and various Wisconsin Native American Tribes.

[1] The WS Policy Manual provides WS personnel guidance in the form of program directives. Information contained in the WS Policy Manual may be obtained on the WS website at http://www.aphis.usda.gov/wildlifedamage.

Normally, individual wildlife damage management actions could be categorically excluded (CE) from further National Environmental Policy Act (NEPA) analysis, in accordance with APHIS (7 CFR 372.5(c), 60 Fed. Reg. 6,000, 6,003, (1995)) implementing regulations for NEPA. Wildlife Services and the U.S. Department of the Interior (USDI) Fish and Wildlife Service (USFWS are preparing this (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. All wildlife damage management conducted in Wisconsin would be undertaken in compliance with applicable Federal, State, Tribal, and local laws and regulations.

1.2 USFWS AND WDNR REGULATORY AUTHORITY FOR BIRD DAMAGE MANAGEMENT

The USFWS is the primary Federal agency responsible for conserving, protecting, and enhancing the Nation's fish and wildlife resources and their habitats. 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 manages migratory birds listed in four bilateral migratory bird treaties the United States entered into with Great Britain (for Canada), Mexico, Japan, and Russia in accordance with 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.

Under the authority of the MBTA, the USFWS uses Depredation Permits (DP) (50 CFR 21.41) to authorize and monitor the take of migratory birds. The USFWS may issue DPs to persons who clearly show evidence of migratory birds causing or about to cause damage. Wildlife Services provides expertise to help resolve wildlife conflicts and can assess a particular situation and provide recommendations of short-term measures to provide relief from bird damage and long-term measures to help eliminate or significantly reduce the problem. WS also provides a "Form 37 Permit Review Form" to the USFWS and the WDNR (WS Directive 2.301). This form is required as part of the DP application. In Wisconsin, DPs applications are first forwarded to the Wisconsin Department of Natural Resources (WDNR) along with the form 37 for review. If the WDNR concurs with the recommendations the WDNR co-signs and forwards the application to the USFWS. If the USFWS approves the application, the permit is sent to the permitee, with copies sent to WS, and the WDNR. The number of DPs WI WS recommended and forwarded to the USFWS in calendar years (CY) 11, 12 and 13 for BDM was 248, 299, and 339 respectively. In addition to permits required under the MBTA for migratory birds, additional authorization is needed under the Bald and Golden Eagle Protection Act (BGEPA) for damage management actions involving eagles. Depredation Permits are not necessary for non-lethal harassment of species protected only under MBTA, but are required for species protected under the BGEPA and ESA (such as Whooping Cranes *Grus americana*). Bird species not specifically addressed in the MBTA, BGEPA, or the ESA fall under the jurisdiction of the states. In Wisconsin, the WDNR has authority to manage bird species as a public trust for the citizens of the state. The Eastern Wild Turkey (*Meleagris gallopavo*) and other non-migratory grouse species make up the majority of these species. The WDNR may issue DPs to persons who clearly show evidence of state managed birds causing or about to cause damage. The WDNR also requires a permit to use avicides on blackbirds and starlings that are either not protected by Federal regulation or are under the depredation order for blackbirds, cowbirds, grackles, and

crows (50 CFR 21.43). The WDNR also issues depredation permits to shoot and oil eggs of Canada Geese (Branta canadensis) under the authority of a Canada Goose Depredation order (50 CFR 21.50-51)

1.3 PURPOSE OF THE EA

This EA analyzes the potential effects of alternatives for BDM, as coordinated with the WDNR, USFWS, Federal Aviation Administration (FAA), Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP), Tribes and other State and Federal agencies, and private entities. The analysis aids in coordination of agency BDM efforts, informs the public of the issues relevant to BDM in Wisconsin, provides an opportunity for the public to participate in the decision-making process, and enables the lead and cooperating agencies to determine if the proposed action could have significant impacts on the quality of the human environment. Depending upon the alternative selected, BDM could be conducted on private, Federal, State, Tribal, County, and municipal lands in Wisconsin upon request for WS assistance of the landowner/manager under cooperative agreements, Memorandum of Understanding (MOU) or other comparable documents.

Wildlife Services and the cooperating agencies have identified 30 bird species for which they have routinely received requests for assistance or information with BDM (Table 1-1). Additional species that the WI WS program works with on a less frequent basis will also be discussed in this EA. The species analyzed in this EA include:

Waterbirds: American White Pelican (*Pelecanus erythrorhynchos*), Mute Swan (*Cygnus olor*), Canada Goose, Snow Goose (*Chen caerulescens*), Mallard (*Anas platyrhynchos*), Blue-winged Teal (*Anas discors*), Green-winged Teal (*Anas crecca*).

Raptors: Turkey Vulture (*Cathartes aura*), Red-tailed Hawk (*Buteo jamaicensis*), Cooper's Hawk (*Accipiter cooperii*), Great Horned Owl (*Bubo virginianus*), Rough-legged Hawk (*Buteo lagopus*), American Kestrel (*Falco sparverius*), Snowy Owl (*Bubo scandiacus*), Bald Eagle (*Haliaeetus leucocephalus*), Osprey (*Pandion haliaetus*).

Wading/Shorebirds: Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides virescens*), Sandhill Crane (*Grus canadensis*), Killdeer (*Charadrius vociferous*), Whooping Crane

Gulls: Herring Gull (*Larus argentatus*), Ring-billed Gull (*Larus delawarensis*).

Pigeons/Doves: Rock Pigeon (*Columba livia*), Mourning Dove (*Zenaida macroura*).

Swallows/Swifts: Barn Swallow (*Hirundo rustica*), Cliff Swallow (*Hirundo pyrrhonota*), Tree Swallow (*Tachycineta bicolor*), Bank Swallow (*Riparia riparia*), Chimney Swift (*Chaetura pelagica*).

Woodpeckers: Northern Flicker (*Colaptes auratus*), Pileated Woodpecker (*Dryocopus pileatus*).

Starlings/Blackbirds/Crows: European Starling, Red-winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*), Brown-headed Cowbird (*Molothrus ater*), American Crow (*Corvus brachyrhynchos*).

Other Birds: Wild Turkey, American Robin (*Turdus migratorius*), House Sparrow (*Passer domesticus*), and miscellaneous feral, domestic and exotic birds.

Additionally, in rare situations involving the protection of human health and safety at airports, WS may act to manage individuals of additional non-threatened and non-endangered species not listed in Table 1-1 (see Appendix D for species list).

Table 1-1. Identified species and resources that WS routinely receives requests for assistance.

SPECIES	PROTECTED RESOURCES				
	Human Health & Safety (Aviation)	Agriculture (aquaculture)	Agriculture (Field Crops)	Livestock (Feed or Animal Health)	Property (Buildings, Boats, Structures)
American Crow	X		X	X	X
Red-winged Blackbird	X		X	X	
Brown-headed Cowbird	X		X	X	
Common Grackle	X		X	X	
European Starling	X		X	X	X
House Sparrow	X			X	X
Rock Pigeon (Pigeon)	X			X	X
Wild Turkey	X		X	X	X
Bald Eagle[1]	X			X	X
Herring Gull	X	X		X	X
Ring-billed Gull	X	X		X	X
Killdeer	X				
Mallard	X				X
Blue-winged Teal	X				X
Sandhill Crane	X		X		X
Mourning Dove	X				
Mute Swan	HHS/general				
Barn Swallow	X				X
Cliff Swallow	X				X
Belted Kingfisher		X			
Great Blue Heron	X	X			
Great Horned Owl	X			X	X
Red-tailed Hawk	X			X	
American Kestrel	X				
Cooper's Hawk	X			X	X
Turkey Vulture	X			X	X
Northern Flicker					X
Downy Woodpecker					X
Hairy Woodpecker					X
Pileated Woodpecker					X

[1] Non-lethal management options only for this species.

1.4 NEED FOR ACTION

The need for action of this EA is based on requests for BDM assistance received by the Wisconsin WS program, and potential future needs identified by the lead and cooperating agencies. Bird damage management would be conducted to minimize bird damage to agriculture (e.g., crops, domestic animals), aquaculture, property (e.g., structures), natural resources (e.g., vegetation, wildlife), and animal and human health and safety (e.g., disease transmission, aircraft collisions). During CY 11, 12, and 13, the

current Wisconsin WS program received requests for technical and/or operational assistance on 1,843 occasions when birds were damaging agricultural resources and on 4,167 occasions when birds were damaging property or natural resources and/or threatening human health/safety (WS Management Information System (MIS)). Based on historical data, Wisconsin WS' BDM program would primarily be conducted for the following areas:

1) At livestock facilities to reduce European Starling feed consumption and contamination with feces, and reduce potential risk of disease transmission to livestock.
2) Throughout the state to reduce damage caused by resident and migratory Canada Geese including damage to property and agricultural crops., adverse impacts on aesthetics and recreation, and risks to human health, and human safety.
3) At airports to reduce potential aircraft/bird strikes and associated risks to human health and safety risks.

The threshold triggering a request for assistance is often unique to the individual person requesting assistance and can be based on many factors (e.g., economic, social, aesthetics). Therefore, how damage is defined can often be unique to an individual person and damage occurring to one individual may not be considered damage by another individual. However, the use of the term "damage" is consistently used to describe situations where an individual person has determined the losses associated with wildlife is actual damage requiring assistance (i.e., has reached an individual threshold). The term "damage" is most often defined as economic losses to resources or threats to human safety. However, damage could also include a loss in aesthetic value and other situations where the actions of wildlife are no longer tolerable to an individual person. The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for BDM is derived from the specific threats to resources.

Given the impact of personal perceptions and values on public response to bird damage, agencies need to consider both sociological and biological carrying capacities when seeking to resolve 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. The biological carrying capacity is the ability of the land or habitat to support healthy populations of wildlife without degradation to the species' health or their environment during an extended period of time (Decker and Purdy 1988). Those phenomena are especially important because they define the sensitivity of a person or community to a wildlife species. For any given damage situation, there are varying thresholds of tolerance exhibited by those people directly and indirectly affected by the species and any associated damage. This damage threshold determines the wildlife acceptance capacity. The available habitat may have a biological carrying capacity to support higher populations of wildlife; however, 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 management to alleviate damage or address threats to human health and safety.

1.4.1 Need for Bird Damage Management to Protect Agricultural Resources.

Wisconsin is an agricultural state with 15 million acres in agricultural production (NASS 2012). Wisconsin cash receipts from farm marketing's totaled $11.74 billion in 2011. Livestock and dairy production in Wisconsin contribute substantially to the State's economy. As of January 1st, 2012 there were an estimated 3.4 million head of beef and dairy cattle on Wisconsin farms. In 2011, Wisconsin's milk cows produced 26.1 billion pounds of milk. Additionally, in 2011 an estimated 6.03 million laying hens produced 1.28 billion eggs, and 340,000 hogs, 84,000 sheep and lambs were on Wisconsin farms (NASS 2012). The state produces many agricultural commodities that are in the top ten ranking for production in the nation such as ginseng, cranberries, and oats (NASS 2012).

1.4.1.1 Livestock Feeds. The interaction between bird species and livestock feed have been implicated in causing economic loss and health hazards to livestock. 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, because of the high quality feeds provided 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, and other grains which may be incorporated as whole, crushed or ground grains. Additional high protein additives in the form of protein nuggets are often added to supplement feed. 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, the high protein nuggets, or other items, thereby altering the composition and energy value of the feed.

Livestock feed losses to birds can be significant. Dairies in Pennsylvania, New York and Wisconsin showed increased input cost relative to bird abundance and model estimates indicated a $10 million annual loss to livestock feeds on dairies alone in just Pennsylvania (Schwiff et al. 2012). 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 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).

Wisconsin WS provides technical assistance and operational starling damage management services to livestock producers experiencing disease threats and losses due to starlings consuming livestock feed. Technical assistance involves advice and recommendations regarding the reduction of starlings in and around livestock. The program responded to an average of 26.4 requests per year over the period of 2008-2012, but number of requests for assistance varies annually based on a variety of factors, including temperature and snow cover (range of 11 in 2009 to 42 in 2008; MIS data). For the period of 2008-2012, producers reported losing $53,950 in livestock feed to consumption or contamination by starlings.

1.4.1.2 Aquaculture Resources. Some birds including wading birds, such as herons, can cause significant economic losses to aquaculture production facilities through consumption or injury of fish. The average cost of bird harassment at Arkansas baitfish farms ranged from $11,580 annually for small producers up to $104,560 for larger producers (Werner et al. 2005). Additionally, direct consumption losses at these farms exceeded the cost of harassment (Werner et al. 2005). In the northeastern US, 21% of surveyed trout-rearing facilities had damage that was estimated to exceed $10,000 (Glahn et al. 1999). Hoy et al. (1989) estimated that wading birds feeding at a minnow facility may consume $0.10 to $1.12 per bird which could translate into a loss in excess of $10,000 for a three month period. In a survey of fish hatcheries in the eastern United States, Parkhurst et al. (1987) estimated that most hatcheries lost in excess of $7,600 worth of fish production to bird predation annually.

In addition to direct losses through consumption, disease transmission from wild fish populations to aquaculture facilities or between aquaculture facilities may pose a substantial economic risk to fish hatcheries. Given the high densities of animals at aquaculture facilities, the introduction of a disease could result in substantial economic losses. Although the actual transmission of diseases through transport by birds is difficult to document, birds have been documented as having the ability to spread diseases through fecal droppings and possibly through other mechanical means such as on feathers, feet, and regurgitation. Whirling disease is caused by the parasite *Myxobolus cerebralis* and is responsible for reductions in wild trout populations and losses at trout hatcheries (Koel et al. 2010). Great blue heron fed trout infected with *M. cerbralis* were able to concentrate and excrete viable *M. cerbralis* microspores into shallow water habitats and may increase the

possibility of disease transmission over large areas (Koel et al. 2010). American White Pelicans perpetuate the horn snail in ponds in the south. The snail is the intermediate host for trematodes that infects farm raised channel catfish in Arkansas, Louisiana, and Mississippi and cause decreased production in fish (Overstreet et al. 2002).

Wisconsin WS routinely responds to requests for advice and assistance from private and government aquaculture facilities to address depredations from fish eating birds, including Great Blue Herons, Belted Kingfishers, Osprey, Ring-billed and Herring Gulls, and others. Pursuant to an MOU with USFWS, WS is involved in the process for Federal migratory bird DPs for aquaculture facilities. During CY 13, WS reviewed depredation permits for 61 different aquaculture facilities which reported $54,400 of damage from fish eating birds.

1.4.1.3 Field Crops. Bird damage to agricultural crops can pose significant economic threats to agricultural producers (Besser et al. 1968, Dolbeer et al. 1978, Feare 1984). Five percent of producers reported damage to field crops from Canada Geese and six percent from turkeys (NASS 2002). European Starling damage to agriculture is estimated to exceed $800 million annually in the United States (Pimentel et al. 2000). Birds also cause significant damage to fruit crops in the United States. Bird damage cost per hectare ranged from $104 in Oregon to tart cherries to $7,267 in Washington to Honeycrisp apples. Wisconsin has 2000 acres of tart cherries and 3,100 acres of apples (NASS 2013). Cleary et al. (1994) in "The Prevention and Control of Wildlife Damage" reported that waterfowl caused an estimated $12.6 million of damage in 1960 to small grains in the Canadian Prairie Provinces. In 1980 waterfowl were implicated in damaging $454,000 worth of small grains in North Dakota. Blackbirds routinely damage seeded and headed rice in Louisiana (Glahn and Wilson 1992) and headed sunflowers in the Dakotas (Linz et al. 1984, Homan et al. 1994, Linz and Hanzel 1997). Sandhill Crane damage to corn, potatoes, and a variety of other crops has recently been identified as a loss of revenue to farmers in Wisconsin (Lovell 2012). Gull damage to agriculture and horticulture includes eating, pecking, trampling, and defecating on crops such as tomatoes, corn, soybeans, wheat, strawberries and fish (Blokloel and Tessier 1986). Blackbirds, crows, and Blue Jays (*Cyancitta cristata*) routinely damage ripening sweet and field corn. Even a small amount of damage on an ear of sweet corn will render the ear worthless because most people will not purchase a damaged ear of corn (Conover 2002).

In Wisconsin, waterfowl, Sandhill Cranes, Wild Turkeys, and blackbirds are among the primary species that cause damage to field crops (MIS data). The amount of damage and subsequent monetary losses vary each year due to seasonal variations in migration, spatial differences in crop placement, and weather conditions affecting planting and harvesting dates. Under a cooperative agreement with the WDNR and Wisconsin counties, WS administers the Wildlife Damage Abatement and Claims Program (WDACP). This program was designed to provide abatement assistance and damage compensation payments to eligible farmers who suffer excessive damage to agricultural resources, including field crops, caused by game animals such as Canada Geese, Eastern Wild Turkeys, black bear (*Ursus americanus*) and white-tailed deer (*Odocoileus virginianus*). The population size and distribution of turkeys has increased greatly since initial reintroduction in 1976 (WDNR website). Consequently, conflict between agricultural producers and turkeys has also increased. In CY 2012, 95 producers were enrolled in the WDACP for turkey damage assessed at $30,088 (USDA 2013). Documented turkey damage includes damage to ginseng, alfalfa, corn and small grains.

Sandhill Crane numbers have also been increasing in Wisconsin during the past 20 years. Cranes cause damage in the spring by probing in the ground for newly planted corn seeds. They also

feed on winter wheat (Lovell 2012). WS received 265 complaints regarding crane damage to field crops, with reported damage of $1,996,390 in CY 2013 (MIS 2013).

Crows, starlings and blackbirds also cause damage to field crops in Wisconsin. During CY 2013 WS received or verified 142 complaints regarding crow, blackbird species, or starlings damaging field crops with an estimated damage value exceeding $15,700 (MIS 2013).

1.4.1.4 Livestock Health. Rock Pigeons, starlings, sparrows, and blackbirds have been implicated in the transmission of diseases which may negatively impact livestock production (Table 1-2). Rock Pigeons and starlings have been shown to be vectors of transmissible gastroenteritis (TGE) virus of swine. This disease is usually fatal to young pigs and may result in weight loss for adults. Starlings are probably an important carrier of TGE. The virus can remain alive on their feet and feathers for up to 30 hours resulting in the spread of TGE between livestock facilities (Cleary et al. 1994). Starlings were believed to be the cause of a 1978-79 outbreak of TGE in Nebraska that caused the loss of 10,000 swine in one month with a 2007 market value of nearly $1 million (Linz et al. 2007). Starlings also may be involved in the transmission of hog cholera. Cryptococcosis is a fungal disease spread by Rock Pigeons and starlings to livestock that may result in chronic, usually fatal, meningitis. Mites and lice are the most destructive external parasites of poultry with the northern fowl mite being regarded as the primary and most serious ectoparasite of poultry (Axtell and Arends 1990, Goddard and Edwards, 2010). Wild birds can readily introduce the mite into commercial production facilities in the absence of sound biosecurity protocols (The Poultry Site 2013).

Table 1-2. Diseases transmissible to humans and livestock associated with feral domestic Rock pigeons, starlings, and sparrows (Weber 1979).

Disease	Human Symptoms	Potential for Human Fatality	Effects on Domestic Animals
Bacterial:			
Erysipeloid	skin eruption with pain, itching; headaches, chills, joint pain, prostration, fever, vomiting	sometimes - particularly to young children, old or infirm people	serious hazard for the swine industry
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 other 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:			
Meningitis	inflammation of membranes covering the brain , dizziness, and nervous movements	possible — can also result as a secondary infection with listeriosis, salmonellosis, cryptococcosis	causes middle ear infection in swine, dogs, and cats
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 and paralysis
Mycotic (fungal):			
Aspergillosis	affects lungs and broken skin, toxins poison blood, nerves, and body cells	not usually	causes abortions in cattle

Blastomycosis	weight loss, fever, cough, bloody sputum and chest pains.	rarely	affects horses, dogs and cats
Candidiasis	infection of skin, fingernails, mouth, respiratory system, intestines, and urogenital tract	rarely	causes mastitis, diarrhea, vaginal discharge and aborted fetuses 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 flow 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 departed
Protozoal:			
American Trypanosomiasis	infection of mucous membranes of eyes or nose, swelling	possible death in 2-4 weeks	caused by the conenose bug found on pigeons
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/ Chlamydial:			
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
Q Fever	sudden pneumonitis, chills, fever, weakness, severe sweating, chest pain, severe headaches and sore eyes	possible	may cause abortions in sheep and goats

As noted in Section 1.4.1.1, Wisconsin WS conducts an average of 26 starling damage management projects at Wisconsin dairies per year to reduce consumption and contamination of feed. These projects also reduce the risk of disease transmission from birds. Aleutian Disease (AD) is a concern of mink farmers. In adult mink, AD is a persistent slowly progressive infection that often leads to death. The virus is present in the blood, bone marrow, spleen, feces, urine and saliva of infected mink. The disease can be transmitted to healthy mink directly by contact with infected mink or indirectly by contamination of feed, water, equipment or clothing with the feces, urine or saliva of infected mink (Tapscott 2010). In Wisconsin, starlings sometimes feed heavily in mink cages and potentially could increase AD transmission.

International trade and travel and the popularity of exotic pets have resulted in an ongoing risk of foreign animal disease introduction. Introduction of a disease such as Avian Influenza, or other foreign animal disease could have tremendous adverse impacts on the American livestock industry. State and federal agriculture and animal health agencies, and state wildlife agencies would have primary responsibility. However, these agencies may request WS assistance in conducting surveillance for the disease in wildlife populations, and/or capture and removal of animals in order to aid in management of the disease outbreak.

1.4.1.5 Predation. Certain bird species are also known to prey upon livestock, resulting in economic losses to livestock producers. Raptors, particularly Red-tailed Hawks, Cooper's Hawks, and Great Horned Owls prey on domestic fowl such as chickens and waterfowl (Hygnstrom and Craven 1994). Free-ranging fowl and fowl allowed to range outside of confinement for brief periods are particularly vulnerable to predation by raptors. Wisconsin WS received 6, 13, and 20 requests during CY 11, 12, and 13 respectively, to prevent predation of domestic fowl (MIS). In

CY 12 Great Horned Owls reportedly killed 20 show pigeons valued at $500 each in Manitowoc County (MIS 2013).

1.4.2 Need for Bird Damage Management to Protect Human Health and Safety

1.4.2.1 Risks from Zoonotic Diseases. Certain bird species are known vectors of diseases (zoonosis) that are transmittable to humans or they act as reservoirs that infect a host that spreads the disease to humans (Table 1-2) (Weber 1979, Conover 2002). Starlings, Rock Pigeons, House Sparrows, and waterfowl are a few species that are carriers of different zoonotic diseases that have been contracted by humans. In addition, soils that are enriched by bird droppings, usually blackbirds, gulls and Rock Pigeons, have a tendency to promote the growth of the fungus, *Histoplasmosis capsulatum,* which is endemic to the U.S. (Southern 1986, Cleary et al. 1994). When disturbed, fungal spores become airborne and if inhaled may cause the respiratory disease *Histoplasmosis*. Ninety-five percent of people in the Ohio Valley test positive for *Histoplasmosis* exposure. However, infected people are usually asymptomatic. Ornithosis (*Chlamydia psittaci*) is another respiratory disease that can be contracted by humans, livestock, and pets. Rock Pigeons are most commonly associated with the spread of Ornithosis to humans. Ornithosis is a virus that is spread through infected bird droppings when viral particles become airborne after infected bird droppings are disturbed. Various bird species are known reservoirs for the *Flavivirus* spp. that is responsible for the recent outbreaks of West Nile Virus (WNV) in the U.S.

Detecting contamination is relatively simple compared to the challenge of identifying where such contamination may originate. Fecal coliforms and *E. coli* are bacteria commonly used in water quality testing to detect fecal pollution. These organisms are present in high numbers in the gastrointestinal tract of almost all warm-blooded animals, and are therefore easy to detect in feces-contaminated water. Fecal coliforms and *E. coli* generally do not pose the actual health risk, but rather demonstrate the presence of fecal matter, which may carry numerous pathogenic (disease causing) organisms. The U.S. Environmental Protection Agency (EPA) has determined that if levels of *E. coli* exceed 235 organisms (Colony Forming Unit or CFU) per 100 mL of water, a health risk to humans may exist and recreational waters should be closed to the public.

Localized inputs of fecal bacteria from wildlife, such as waterfowl roosting on shorelines, can negatively impact water quality. Increased levels of *E. coli* in recreational water samples have been positively associated with the presence of gulls on beaches (Levesque et al. 1993). Canada Geese and Ring-billed Gulls were shown to be linked to beach closures in Madison, WI (Hefty 2011). Additionally, the removal of gulls at beaches through harassment, and population reduction has shown positive increases in water quality at recreational beaches and reduced closures (Converse et al. 2012, Hartmann et al. 2013a, Hartmann et al. 2013b).

WS received 1,228 and 1,136 requests for information or assistance during CY2012 and CY2013 respectively, concerning potential effects of zoonotic disease transmission by birds or direct threats to humans from birds (MIS data).

While transmission of diseases or parasites from birds to humans has not been well documented, the potential exists (Luechtefeld et al. 1980, Wobeser and Brand 1982, Hill and Grimes 1984, Pacha et al. 1988, Blankespoor and Reimink 1991, Hatch 1996, Graczyk et al. 1997, Saltoun et al. 2000, Kassa et al. 2001). In some cases, infections may even be life threatening for immunocompromised and immunosuppressed people (Roffe 1987, Graczyk et al. 1998). Even though many people are concerned about disease transmission from feces, the probability of contracting a disease from feces is believed to be small. Financial costs related to human health threats involving birds include testing of water for coliform bacteria, cleaning and sanitizing

public-use areas, contacting and obtaining assistance from public health officials, and implementing wildlife damage management to reduce risks of disease transmission. Wildlife Services recognizes and defers to the authority and expertise of local and state health officials in determining what does or does not constitute a threat to public health.

1.4.2.2 Bird/Aircraft Collisions. Bird hazards to aircraft and subsequent risks to public safety represent a serious concern about how wildlife can affect human health and safety. 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. The number of wildlife strikes annually reported nationally has increased 5.8-fold from 1,851 in 1990 to a record 10,726 in 2012 (Dolbeer et al. 2013). Birds were reported in 97.0 percent of the reported strikes (Dolbeer et al. 2013). The number of USA airports with strikes reported increased from 332 in 1990 to a record 643 in 2012. The 643 airports with strikes reported in 2012 were comprised of 387 airports certificated for passenger service under 14 CFR Part 139 and 256 general aviation airports. From 1990 - 2012, strikes have been reported from 1,771 USA airports (Dolbeer et al. 2013). For the 23-year period, reports were received of 10 wildlife strikes that resulted in 24 human fatalities and 276 human injuries. Sixty strikes have resulted in a destroyed aircraft; forty (60 percent) of these occurred at general aviation airports. The annual cost of wildlife strikes to the USA civil aviation industry is projected to be 583,175 hours of aircraft downtime and $957 million in direct and other monetary losses (Dolbeer et al. 2013). From 2008-2012 a total of 566 wildlife strikes were reported in Wisconsin with 548 of these involving birds. Reported cost of repairs from these bird strikes totaled $358,940. Canada Geese are one of the more dangerous bird species for aircraft to strike because of their large size (up to 15 pounds) and because they travel in flocks of up to several hundred birds. The presence of Canada Geese on and near airports creates a threat to aviation and human safety. Strikes involving Canada Geese accounted for $115,900 (32% of total) of reported cost of repairs (NWSD 2013).

WIWS has one full time wildlife biologist and one full time wildlife specialist stationed at General Mitchell International Airport in Milwaukee for the purpose of managing wildlife hazards.

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: (1) An air carrier aircraft experiences multiple wildlife strikes; (2) An air carrier aircraft experiences substantial damage from striking wildlife. As used in this paragraph, substantial damage means damage or structural failure incurred by an aircraft that adversely affects the structural strength, performance, or flight characteristics of the aircraft and that would normally require major repair or replacement of the affected component; (3) An air carrier aircraft experiences an engine ingestion of wildlife; or (4) Wildlife of a size, or in numbers, capable of causing an event described in (1), (2), or (3) of this section is observed to have access to any airport flight pattern or aircraft movement area. Airports involved in wildlife hazard management usually refer to "Wildlife Hazard Management at Airports" guidebook for conducting surveys or assessing potential wildlife risks at airports (Cleary and Dolbeer 2005). WS works with the FAA under a MOU to provide wildlife damage management information or services, upon request, to airport operators. Sometimes WS evaluates wildlife hazards at airports and then provides Wildlife Hazard Assessments which outline the detected wildlife hazards, and assist airports in developing Wildlife Hazard Management Plans to address wildlife threats. These plans may include specific recommendations to reduce threats associated with a particular wildlife species, including birds.

WS also sometimes assists airport managers in obtaining USFWS DPs for the purpose of reducing hazard threats posed by migratory birds, or may provide operational assistance with conducting wildlife hazard management activities.

Additional Human Safety Concerns Associated with Birds

As people are increasingly living with wildlife, the lack of harassing and threatening behavior by people toward many species of wildlife, especially around urban areas, has led to a decline in the fear wildlife have toward humans. When wildlife species begin to habituate to the presence of people and human activity, a loss of apprehension occurs that can lead those species to exhibit threatening behavior toward people. This threatening behavior continues to increase as human populations expand and the populations of those species that adapt to human activity increase. Geese can also threaten human health and safety by aggressively defending their nests or goslings by attacking or threatening pets, children, and adults (Smith et al. 1999). Threatening behavior can be in the form of aggressive posturing, a general lack of apprehension toward people, or abnormal behavior. Although birds attacking people occurs rarely, aggressive behavior by birds does occur, especially during nest building and the rearing of eggs and chicks. Raptors can aggressively defend their nests, nesting areas, and young, and may swoop and strike at pets, children, and adults. Additionally, slipping hazards can be created by the buildup of feces from birds on docks, walkways, and other foot traffic areas. Injuries resulting from these types of hazards have resulted in litigation (Illinois WS, unpub. data). An example of this occurred in Illinois where a man trying to enter his place of employment was confronted by three Canada Geese. While trying to run away he tripped and broke his wrist. He sued his employer and settled for $17,000. During his case, his lawyer successfully argued that the building was in close proximity to lush lawns and a pond, and stated it was a "high-goose area" comparing it to a high crime area (Field and Stream 2001). Elderly people are especially vulnerable to broken bones if they slip and fall or are knocked down by geese. They are also more vulnerable to medical complications from such injuries. To avoid those conditions, regular cleanup is often required to alleviate threats of slipping on fecal matter, which can be economically burdensome. In Chicago, IL, a man was killed by a mute swan when it knocked him out of his kayak and continued to attack and hold him under water until the man finally drowned (Love 2012). The man worked for a company that used Mute Swans and dogs to manage Canada Geese at the condominium property where the incidence occurred. Later the man's wife sued the company he worked for and the condominium complex stating that they should have known that Mute Swans were dangerous (Rodriquez 2014).

1.4.3 Property damage.

Property damage caused by birds can entail numerous resources and may be significant on a local or regional basis. For example, woodpecker damage to residential dwellings from a national perspective is insignificant but to local home owners it can be very significant, resulting in thousands of dollars in related damages. House Sparrows and starlings may damage buildings by pecking foam insulation and create hazards with their droppings and nesting materials. They may also create fire hazards by placing nesting material near electrical wiring and light fixtures.

Accumulations of Rock Pigeon droppings may accelerate deterioration of buildings and increase maintenance costs. Bird feces are highly acidic and can be corrosive to paint and metal surfaces. Potential for damage is greatest in situations where large numbers of birds congregate in one area to roost or loaf. Bird feces can also have corrosive effects on monuments and decorative stonework on buildings. Gómez-Heras et al. (2004) evaluated the impact of extracts from Rock Pigeon feces on limestone. Results from the study indicated that accumulations of Rock Pigeon droppings generate solutions with low pH and high salinity when they are leached by water. The

derived solutions contain high concentrations of salts which had been identified as possible decay agents on stone monuments and historical buildings in other studies. Gómez-Heras et al. (2004) concluded that Rock Pigeon excrement should be considered as a potentially important factor in the long-term decay of stone. Rock Pigeon droppings can also deface signs and cause significant losses to sign companies attempting to maintain billboards. Rock Pigeon manure deposited on park benches, cars, statues, and unwary pedestrians may be aesthetically displeasing.

Gulls create nuisances when they nest on roof tops and attempt to gain food from people eating outdoors (Dolbeer et al. 1990). Roof-nesting gulls are undesirable because they may cause damage to structures, plug drains with nesting material and food remains, defecate on vehicles, and harass maintenance personnel (Belant 1993). In CY 12 $19,000 of damage from gulls to a parking garage was reported in Milwaukee (MIS data).

Instances of property damage from birds may consist of Barn Swallow nests under eaves and bridges or bird droppings defacing property. Cliff Swallows for instance may cause damage with their nests and droppings when they nest in large numbers on buildings or homes. Their nests may foul machinery and create safety hazards when they fall to the ground. In one example, the City of Madison reported that Barn Swallows cost the City $500,000 by delaying major reconstruction of a bridge (MIS 2002). During CY 13 WS received 163 complaints about damage or damage threats to residential and non-residential buildings caused by a variety of bird species, including gulls, starlings, Sandhill Cranes, Rock Pigeons, House Sparrows and woodpeckers (MIS 2013). WS recorded 38 incidents of woodpecker damage to residential buildings in CY 13 with reported damage totaling $91,200 (MIS 2013).

1.4.4 Natural Resources

Encroachment by some bird species is a concern of some resource management agencies. Starlings usurp nest sites from Wood Ducks (*Aix sponsa*), bluebirds (*Sialia* spp.), woodpeckers, and many other secondary cavity nesters (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, such parasitism can cause enough nest failures to jeopardize the host species. Cowbirds have parasitized 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*). Cowbird management is a major component of the endangered Kirtland's Warbler (*Setophaga kirtlandii)* recovery efforts in Wisconsin and Michigan. WS has used decoy traps in Kirtland's Warbler habitat to successfully remove cowbirds and promote nest success in Wisconsin. In CY 13 WS trapped 207 cowbirds for the protection of Kirtland's Warbler (Benson and Lovell 2013). Starlings may also parasitize the nests of other species by destroying eggs or hatchlings (Grabill 1977, Peterson and Gauthier 1985).

Ring-billed and Herring Gulls encroaching on the nesting habitat of other migratory bird species is also a concern. This is especially true for the Common Tern (*Sterna hirundo*) which is a species of management concern. Gulls arrive at colony sites well in advance of many species and simply take over traditional nesting sites and thus force the other species to nest in less suitable habitat or to abandon the site (Courtney and Blokpoel 1983). The potential for gull predation on Piping Plover (*Charadrius melodus*) chicks is also a concern to management agencies (USFWS 2000). The Piping Plover is listed as an endangered species. WS has worked with partners to test effectiveness of overhead grid systems to reduce gull access to beach sites in order to encourage Piping Plover nesting on Lake Superior. Because of the predatory or invasive nature of some bird

species, WS could be requested to help reduce conflicts for the overall protection and conservation of some bird species.

1.5 RELATIONSHIP OF THIS EA TO OTHER MANAGEMENT AND ENVIRONMENTAL DOCUMENTS

1.5.1 Bird Damage Management in Wisconsin EA. WS completed an EA that covered BDM in the state of Wisconsin in 2004. Once completed, this Bird Damage Management EA will replace the Bird Damage Management EA from 2004.

1.5.2 Management of Conflicts Associated with Resident Canada Geese in Wisconsin EA. WS completed a state-wide EA for resident Canada Goose management in Wisconsin in 2000. Management of damage by and conflicts with Canada Geese will be addressed in this Bird Damage Management EA and will replace the 2000 Canada Goose EA.

1.5.3 Reducing Double-crested Cormorant Damage in Wisconsin EA. WS completed an EA that covered Double-crested Cormorant damage management in the state of Wisconsin in 2009. Due to the scope and nature of the issues involved in Double-crested Cormorant damage management, WS has chosen to continue to consider Double-crested Cormorant damage management in a separate analysis and cormorants will not be addressed in this EA.

1.5.4 Final Environmental Assessment Depredation Permits for the Control and Management of Gulls in the Great Lakes Region. The USFWS Region 3 prepared an EA and signed a FONSI (12/2000) for the management of Ring-billed and Herring Gull damage to protect human health and safety, property and the productivity of other colonial water birds. The USFWS selected the No Action Alternative which supports the current program whereby the USFWS would continue to issue DP.

1.5.5 Executive Order (EO) 13186 and MOU between USFWS and APHIS. 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 APHIS was completed 2 August 2012 to facilitate the implementation of Executive Order 13186.

1.5.6 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, 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.

1.5.7 Proposal to Permit Take as provided under the Bald and Golden Eagle Protection Act Final Environmental Assessment. Developed by the USFWS, this EA evaluated the issues and alternatives associated with the promulgation of new regulations to authorize the "*take*" of Bald Eagles and Golden Eagles as defined under the Bald and Golden Eagle Protection Act. The preferred alternative in the EA evaluated the authorization of disturbance take of eagles, the

removal of eagle nests where necessary to reduce threats to human safety, and the issuance of permits authorizing the lethal take of eagles in limited circumstances, including authorizing take that is associated with, but is not the purpose of, an action (USFWS 2009). A Decision and Finding of No Significant Impact (FONSI) was made for the preferred alternative in the EA. The selected alternative in the EA established new permit regulations for the "*take*" of eagles (see 50 CFR 22.26) and a provision to authorize the removal of eagle nests (see 50 CFR 22.27). The USFWS published a Final Rule on September 11, 2009 (74 FR 46836-46879).

1.6 DECISION TO BE MADE

Based on agency relationships, MOUs and legislative mandates, WS is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. The WDNR, USFWS, FAA, Wisconsin Tribes, Great Lakes Indian Fish and Wildlife Commission (GLIFWC), Wisconsin Department of Health, Wisconsin Department of Transportation, and WDATCP had input during preparation of the EA to ensure an interdisciplinary approach in compliance with NEPA and agency mandates, policies and regulations. As a cooperating agency, the USFWS may adopt this EA and make and document their own decision.

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

- Should BDM as currently implemented by the WS program be continued in Wisconsin?
- If not, how can WS best respond to the need to reduce bird damage in Wisconsin?
- What are the potential impacts of the alternatives for addressing bird damage?
- Do the alternatives have significant impacts meriting an Environmental Impact Statement (EIS)?

1.7 SCOPE OF THIS ANALYSIS

1.7.1 Actions Analyzed. This EA evaluates BDM to protect agriculture, aquaculture, property, natural resources, and human and animal health and safety wherever such management is requested from the WS program. Program activities would be coordinated with the WDNR, USFWS, FAA, Wisconsin Department of Transportation and/or WDATCP.

1.7.2 American Indian Lands and Tribes. Currently WS has MOUs signed with three American Indian tribes in Wisconsin; Red Cliff and Lac du Flambeau Bands of Lake Superior Chippewa and the Forest County Potawatomi. 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 BDM, this EA would be reviewed and supplemented, if appropriate, to ensure NEPA compliance. Requests for operational assistance to resolve bird damage complaints on private properties within the boundaries of Indian reservations would be conducted with consultation of tribal governments.

WS recognizes that wildlife is a key component of Native American culture and beliefs. The exact nature of this relationship and role varies among Tribes and individuals within Tribes.

1.7.3 Period for which this EA is Valid. If it is determined that an EIS is not needed, this EA will remain valid until Wisconsin 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. Impacts of WS actions taken under the provisions of this EA would be monitored to ensure that the EA analysis sufficiently addresses current activities and their impacts.

1.7.4 Site Specificity. As mentioned previously, WS would only conduct damage management activities when requested by the appropriate resource owner or manager. WS' activities that could involve the take of birds would only occur when authorized by the USFWS, WDNR, and/or the Tribes as appropriate.

This EA analyzes the potential impacts of BDM based on previous activities conducted on private, public, and Tribal lands in Wisconsin, where WS and the appropriate entities have entered into a MOU, cooperative service agreement, or other comparable document. Because the need for action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional BDM efforts could occur. Thus, this EA anticipates the potential expansion and analyzes the impacts of such efforts as part of the alternatives.

Many of the bird species addressed in this EA can be found statewide and damage or threats of damage can occur wherever those species occur. Planning for the management of bird damage must be viewed as being conceptually similar to other federal or agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they would occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, and insurance companies. Although some of the sites where bird damage could occur can be predicted, all specific locations or times where such damage would occur in any given year cannot be predicted. The threshold triggering an entity to request assistance from WS to manage damage associated with birds is often unique to the individual; therefore, predicting where and when such a request for assistance would be received by WS is difficult. This EA emphasizes major issues as those issues relate to specific areas whenever possible; however, many issues apply wherever bird damage and the resulting management actions occurs and are treated as such.

Chapter 2 of this EA identifies and discusses issues relating to BDM in Wisconsin. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in the State (see Chapter 3 for a description of the Decision Model and its application). Decisions made using the model would be in accordance with WS' directives and Standard Operating Procedures (SOPs) described in this EA as well as relevant laws and regulations.

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

1.7.5 Public Involvement/Notification. Issues related to BDM as conducted by Wisconsin WS were initially developed by WS with assistance from the cooperating and consulting agencies and tribes. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS' NEPA implementing regulations, this document is being made available for public review and input through a legal notice published in the Wisconsin State Journal, through direct mailings to parties that have requested to be notified or have been identified to have an interest in

the reduction of threats and damage associated with birds in the State, and by posting the EA on the APHIS website at http://www.aphis.usda.gov/wildlifedamage/nepa

WS will provide for a minimum of a 30-day comment period for the public and interested parties to review and provide comments on the analysis. New issues or alternatives raised after publication of public notices would be fully considered to determine whether the EA should be revisited and, if appropriate, revised prior to issuance of a final Decision or publication of a notice of intent to prepare an EIS.

1.8 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of five Chapters and four Appendices. Chapter 2 discusses the issues, issues not analyzed in detail, and affected environment. Chapter 3 describes each alternative, alternatives not considered in detail, mitigation and SOPs. Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail. Chapter 5 is a list of preparers, consultants and reviewers. Appendix A is the literature cited, Appendix B discusses the legal authorities of Federal and State agencies in Wisconsin, Appendix C describes BDM methods which could be used or recommended by WS in Wisconsin, and Appendix D lists birds not threatened or endangered and not covered in detail in this EA that could be encountered in Wisconsin.

CHAPTER 2: AFFECTED ENVIRONMENT AND ISSUES

2.1 INTRODUCTION

Chapter 2 discusses the issues relevant to BDM, including issues that will receive detailed analysis in Chapter 4 (Environmental Consequences) and issues that will not be considered in detail. Pertinent portions of the affected environment will be addressed in this chapter in the discussion of issues used to develop mitigation measures. Additional affected information on the affected environment will be incorporated into the discussion of environmental impacts in Chapter 4.

2.2 AFFECTED ENVIRONMENTS

Wisconsin encompasses 65,496 mi^2, not including those parts of the Mississippi River and Great Lakes located within the boundaries of the state. Its inland lakes, covering more than 982,000 acres, make up almost 3% of the state's total surface area. Most of Wisconsin's largest lakes are concentrated in the northern two-thirds of the state, and they include artificial bodies of water created by dams.

Although the range and habitat used by individual species varies, at least some of the birds discussed in this analysis can be found in any location in the state where suitable habitat exists for foraging and shelter. Consequently, damage or threats of damage caused by the birds addressed in this EA can occur statewide in Wisconsin wherever those species occur. However, BDM would only be conducted by WS when requested by a landowner or manager and only on properties where a cooperative service agreement or other comparable document has been signed between WS and a cooperating entity.

Upon receiving a request for assistance, BDM activities could be conducted on federal, state, tribal, municipal, and private properties in Wisconsin. Areas where damage or threats of damage could occur include but are not limited to agricultural fields, vineyards, orchards, farmyards, dairies, livestock operations, aquaculture facilities, railroad yards, waste handling facilities, industrial sites, natural resource areas, park lands, and historic sites; property in or adjacent to subdivisions, businesses, and industrial parks; timberlands and croplands; areas in and around airports: public and private properties in rural/urban/suburban areas where birds cause damage to property and natural resources, and pose risks to human safety. Project areas may also include anywhere where birds are a threat to human safety and to property.

Environmental Status Quo

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

The USFWS has primary authority for management of species protected under the Migratory Bird Treaty Act (MBTA). In accordance with a MOU between the USFWS and APHIS, WS assists the USFWS/WDNR in issuance of depredation permits by providing recommendations through completion of WS Permit Review Form 37. The form is used to report the basic information required by the regulatory language for the MBTA (50 CFR 21.41) including the resource being impacted and its damage

estimate, the species doing the damage, previous actions and the results of those actions, and recommendations for abatement. However, the regulations implementing the MBTA do not require involvement by WS. Conflicts with migratory birds would not cease in the absence of WS involvement in the permitting process, and the USFWS and WDNR would find alternative mechanisms to meet permitting requirements. WS involvement is not required for the issuance of permits to take resident bird species protected by the state or species, such as most non-native invasive species that are not protected under state or federal law. Consequently, entities other than WS (e.g., agricultural producers, municipalities, counties, private companies, individuals) may conduct BDM on their own provided that they receive the applicable authorization from the USFWS and/or WDNR. Under such circumstances, the environmental baseline or status quo must be viewed as an environment that includes those resources as they are managed or impacted in the absence of the proposed federal action. In situations in which an entity has decided that a BDM action will occur and has received applicable authorization for the action, WS' involvement in the action would not affect the environmental status quo because the requestor would conduct the action in the absence of WS' involvement. Given that non-federal entities can receive authorization to conduct BDM methods from the WDNR and USFWS, and that most methods for resolving damage are available to both WS and to non-federal entities[2], WS' decision-making ability is restricted to one of three alternatives: 1) WS can either take the action using the specific methods discussed in this EA upon request; 2) WS can provide technical assistance only; 3) Or WS can take no action, at which point the non-federal entity could take the action anyway, either without a permit, during the hunting or trapping season, or through the issuance of a permit by the USFWS and/or WDNR. Under those circumstances, WS would have virtually no ability to affect the environmental status quo because the action would likely occur in the absence of WS' direct involvement. However, in some situations certain aspects of the human environment may actually benefit more from WS' involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove a target species than a non-WS entity; WS' management activities may have less of an impact on non-target species and human safety than if the non-federal entity conducted the action alone. Thus, in those situations, WS' involvement may provide some benefit to the human environment when compared to the environmental status quo in the absence of such involvement.

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
- Impacts to stakeholders, including aesthetics
- Humaneness and Animal Welfare Concerns

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 BDM 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 conducts

[2] Alpha-Chloralose and DRC-1339 are only available to Wildlife Services. Starlicide Complete©, an avicide with the same active ingredient as DRC-1339, is available to properly certified applicators.

activities are considered "*anthropogenic abundant*" (Conover 2002). Quantitative population data for most species is not available however population trend data *(*i.e., qualitative) exists from the breeding bird survey (BBS) data base (Sauer et al. 2014) for most species. The anticipated take of most species in a year would be less than 50 individuals. However, the take for certain species, such as invasive European Starlings, could be considerably more. Take of migratory birds is reported to and reviewed by the USFWS annually, and similar reports are submitted to the WDNR. Additionally, WS would monitor the impact of actions taken under this EA to ensure that take and resulting impacts remain within the parameters analyzed and expected in this EA. A detailed analysis concerning WS' effect to 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. A common concern among members of the public and wildlife professionals, including WS personnel, is the effect of BDM on non-target species, particularly T/E species. WS' uses an IWDM approach and the WS Decision Model to reduce risk of adverse effects on non-target species' populations. The IWDM approach, Decision Model and SOPs for the protection of non-target species are described in Chapter 3.

To reduce the risks of adverse effects to non-target species, WS would select methods that are as target-selective as possible or apply such methods in ways to reduce the likelihood of adversely affecting non-target species populations. 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 would be postponed or not applied. For trapping activities, WS would select trapping locations that are used by the target species, traps that are species specific or set to target a particular species, and use baits that are preferred by the target species.

There may also be concerns that WS' activities could result in the take or disturbance of eagles that may be near or within the vicinity of WS' activities. Under 50 CFR 22.3, the term "*disturb"*, as it relates to take under the Bald and Golden Eagle Act, has been defined as "*to agitate or bother a Bald and Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."* The environmental consequences evaluation conducted in Chapter 4 of this EA discusses the potential for WS' activities to take or disturb eagles as defined by the Act.

WS has consulted with the USFWS and WDNR regarding potential risks to federal and state listed threatened and endangered species from the proposed action. These consultations include a description of the types of methods which will be used, assessment of the potential for the proposed methods to impact federal or state listed species, proposals for preventing or reducing any risks, and an evaluation of the magnitude of impact on listed species with the protective measures in place. A summary of the conclusions of these consultations is provided in Chapter 4.

2.3.3 Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets. Review of the potential impacts on human health and safety from BDM actions has two primary components: 1) the potential risk to human health and safety from BDM methods; and 2) the potential benefits to human health and safety when BDM actions are conducted to reduce risks caused by birds. Wildlife Services' employees use and recommend only those methods which are legally available and are effective at resolving the damage associated with wildlife. Still, some concerns exist regarding the safety of WS' methods despite their legality. In addition to the potential risks to the public associated with WS' methods, risks to employees are also of

concern. Selection of methods, as part of an integrated approach, includes consideration of public and employee safety.

Safety of Proposed Chemical Methods

Safety concerns pertaining to the use of chemical BDM methods include the potential for human exposure either through direct contact with the chemical or exposure to the chemical from wildlife that have been exposed (e.g., animals used for food). Under the alternatives identified, the use of chemical methods would include the sedative alpha-chloralose (AC), carbon dioxide for euthanasia, repellents, and the toxicant DRC-1339 (Appendix C). Chemicals proposed for use under the relevant alternatives are regulated by the EPA through FIFRA, by WDATCP through Chapter ATCP 29, Wis. Adm. Code (Pesticide Use and Control), Food and Drug Administration (FDA), and by WS' Directives.

Safety of Proposed Non-Chemical Methods

Non-chemical methods employed to reduce damage and threats to safety caused by birds, could potentially be hazardous to human safety through misuse or accident. Non-chemical methods may include but are not limited to firearms, live-traps, kill-traps, exclusion, pyrotechnics, and other scaring devices (Appendix C). Some people may be concerned that WS' use of firearms, traps, and pyrotechnic scaring devices could cause injuries to people. There are also concerns regarding potential fire hazard to agricultural sites and private property from pyrotechnic use.

Firearm use is a very sensitive issue and a concern because of public fears regarding the risks associated with unsafe firearm use and the potential for misuse of firearms. WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program prior to using firearms and annual refresher training thereafter (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are also 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.

WS works with cooperators to develop management strategies suited to the specific needs of each site. WS communicates the potential risks from the proposed methods to the cooperator during the development of the management strategy. The cooperator also has opportunities to communicate their concerns to WS to ensure that WS can then create a management strategy in which both parties are in agreement. The methods to be used are listed in a MOU, cooperative service agreement, or a similar document approved by the cooperator, property owner or managed by the cooperator.

Impacts on human health and safety from birds

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

2.3.4 Impacts on Stakeholders, Including Impacts on Aesthetics. 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. Some people may also consider individual wild animals and birds as

"pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Conversely, others may see the same species as a detriment to aesthetic values (i.e., droppings from large roosting flocks of starlings, blackbirds, or Canada Geese). Therefore, the public reaction to wildlife damage management is variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the aesthetic values of wildlife and the best ways to reduce conflicts/problems between humans and wildlife.

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

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

Many people, directly affected by problems and threats to public health or safety caused by birds, insist upon their removal from the property or public location when they cause damage. Other people directly impacted by the problem may want to exhaust all non-lethal alternatives before attempts are made to remove the animals. Others may decide they can learn to live with the problem. Similarly, individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Those totally opposed to BDM want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed, and would strongly oppose removal of birds regardless of the amount of damage. Other members of the public oppose removal of wildlife because of human-affectionate bonds with individual animals. Other members of the public believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety.

The WS program in Wisconsin only conducts wildlife damage management at the request of the affected property owner or resource manager. If WS received requests from an individual or official for BDM, WS would advise the landowner/manager of the sociological issues/concerns and consideration would be made to explain these issues relative to the proposed individual damage management methods. Management actions would be carried out in a caring, humane, and professional manner.

2.3.5 Humaneness and Animal Welfare Concerns. Humaneness, in part, is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an

action differently. The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife, is an important and very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if " . . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process." 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 . . . " (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 . . . "(CDFG 2000), such as shooting.

Pain obviously occurs in animals, but assessing pain experienced by animals can be challenging (AVMA 2007, CDFG 2000). The AVMA defines pain as being, "that sensation (perception) that results from nerve impulses reaching the cerebral cortex via ascending neural pathways" (AVMA 2007). The key component of this definition is the perception of pain. The AVMA (2007) notes that "pain" should not be used for stimuli, receptors, reflexes, or pathways because these factors may be active without pain perception. For pain to be experienced, the cerebral cortex and subcortical structures must be functional. If the cerebral cortex is nonfunctional because of hypoxia, depression by drugs, electric shock, or concussion, pain is not experienced.

Stress has been defined as the effect of physical, physiologic, or emotional factors (stressors) that induce an alteration in an animal's base or adaptive state. Responses to stimuli vary among animals based on the animals' experiences, age, species and current condition. Not all forms of stress result in adverse consequences for the animal and some forms of stress serve a positive, adaptive function for the animal. Eustress describes the response of animals to harmless stimuli which initiate responses that are beneficial to the animal. Neutral stress is the term for response to stimuli which have neither harmful nor beneficial effects to the animal. Distress results when an animal's response to stimuli interferes with its well-being and comfort (AVMA 2007).

The AVMA states "... euthanasia is the act of inducing humane death in an animal" and that "...that if an animal's life is to be taken, it is done with the highest degree of respect, and with an emphasis on making the death as painless and distress free as possible" (AVMA 2013). Additionally, euthanasia methods should minimize any stress and anxiety experienced by the animal prior to unconsciousness." Although use of euthanasia methods to end an animal's life is desirable, as noted by the AVMA, "For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. AVMA (2013) recognizes that there is "an inherent lack of control over free-ranging wildlife, accepting that firearms may be the most appropriate approach to their euthanasia, and acknowledging that the quickest and most humane means of terminating the life of free-ranging wildlife in a given situation may not always meet all criteria established for euthanasia. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress- free death may not be possible." (AVMA 2001). Because of the variety of situations that may be encountered, it is difficult to strictly classify methods for termination of free-ranging wildlife as acceptable, acceptable with conditions, or unacceptable. Furthermore, classification of a given method as a means of euthanasia or humane killing may vary by circumstances. These acknowledgments are not intended to condone a lower standard for the humane termination of wildlife. The best methods possible under the circumstances must be applied, and new technology and methods demonstrated to be superior to previously used methods must be embraced.

AVMA (2013) notes, "While recommendations are made, it is important for those utilizing these recommendations to understand that, in some instances, agents and methods of euthanasia identified as appropriate for a particular species may not be available or may become less than an ideal choice due to differences in circumstances. Conversely, when settings are atypical, methods normally not considered appropriate may become the method of choice. Under such conditions, the humaneness (or perceived lack thereof) of the method used to bring about the death of an animal may be distinguished from the intent or outcome associated with an act of killing. Following this reasoning, it may still be an act of euthanasia to kill an animal in a manner that is not perfectly humane or that would not be considered appropriate in other contexts. For example, due to lack of control over free-ranging wildlife and the stress associated with close human contact, use of a firearm may be the most appropriate means of euthanasia. Also, shooting a suffering animal that is in extremis, instead of catching and transporting it to a clinic to euthanize it using a method normally considered to be appropriate (e.g., barbiturates), is consistent with one interpretation of a good death. The former method promotes the animal's overall interests by ending its misery quickly, even though the latter technique may be considered to be more acceptable under normal conditions (Yeates 2010). Neither of these examples, however, absolves the individual from her or his responsibility to ensure that recommended methods and agents of euthanasia are preferentially used."

Multiple federal, state, and local regulations apply to the euthanasia of wildlife. In the United States, management of wildlife is primarily under state jurisdiction. However, some species (e.g., migratory birds, endangered species, and marine mammals) are protected and managed by federal agencies or through collaboration between state and federal agencies. Within the context of wildlife management, personnel associated with state and federal agencies and Native American tribes may handle or capture individual animals or groups of animals for various purposes, including research. During the course of these management actions, individual animals may become injured or debilitated and may require euthanasia; in other cases, research or collection protocols dictate that some of them be killed. Sometimes population management requires the lethal management of wildlife species, and, the public may identify and/or present individual animals to state or federal personnel because they are orphaned, sick, injured, diseased (e.g., rabid), or becoming a nuisance."

Analysis of this issue must consider not only the welfare of the animals captured, but also the welfare of humans, livestock and some T&E species if damage management methods are not used. For example, some individuals may perceive techniques used to remove a predator that is killing or injuring pets or livestock as inhumane, while others may believe it is equally or more inhumane to permit pets and livestock that depend upon humans for protection to be injured or killed by predators.

The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology. Wildlife Services personnel are concerned about animal welfare. WS is aware that techniques like snares and traps are controversial, but also believes that these activities are being conducted as humanely and responsibly as practical. Wildlife Services and the National Wildlife Research Center are striving to bring additional non-lethal damage management alternatives into practical use and to improve the selectivity and humaneness of management devices. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in situations when non-lethal damage management methods are not practical or effective. Wildlife Services supports the most humane, selective, and effective damage management techniques, and would continue to incorporate advances into program activities.

Wisconsin WS personnel are experienced and professional in use of management methods to increase humaneness as much as possible under the constraints of current technology, workforce, and funding. SOPs used to maximize humaneness are listed in Chapter 3.

2.4 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.4.1 WS' Impact on Biodiversity. No WS BDM in Wisconsin is conducted to eradicate a native wildlife species. WS operates according to international, Federal, State, and Tribal laws and regulations (and any related management plans, guidelines or policies) enacted to ensure species viability. In addition, any reduction of a local population or group is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed. Further, WS operates on an extremely small percentage of the land area of the State and WS' take of any native wildlife species analyzed in this EA is a small proportion of the total population and insignificant to the viability and health of the total population. Based on the analysis in Chapter 4, the cumulative impacts of the alternatives analyzed in this EA would not jeopardize the ongoing viability of any native species in the state, region or nation. In the absence of significant cumulative impacts on target or non-target species, the proposed action would not have a substantive negative impact on biodiversity.

2.4.2 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 federal BDM 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, although some losses can be expected and tolerated by agriculture producers and property owners, WS has the legal responsibility and direction to respond to requests for BDM, 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).

2.4.3 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 assistance to the people of the United States. Federal, state and local officials have decided that wildlife damage management 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, Wisconsin WS provides free technical assistance on BDM 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 when *Work Initiation Document for Wildlife Damage Management* or other comparable instruments provide for WS operational damage management, and when the necessary funds are made available. Thus, the primary focus of WS operational BDM in Wisconsin is fee based.

2.4.4 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. 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. WNV has spread across the United States since 1999 and in 2013 WNV human cases occurred in 47 states (CDC 2014). Wisconsin accounted for 22 cases and two human deaths in 2013 (CDC 2014).

In an early look at potential impacts to bird populations from WNV, McLean (2004) suggested that American crows and other highly susceptible bird species that have a high fatality rate from WNV infection could be suffering enough mortality to impact populations, particularly on a local basis. Studying American Crows, Koenig et al. (2010) found that WNV declined in virulence during its sweep across the United States after first detection in 1999 and suggested that a diverse host community dampens transmission of a pathogen (a dilution effect). Caffrey and Peterson (2003) examined Christmas Bird Count trends for 10 species in a region surrounding the epicenter of the original WNV outbreak in 1999 and concluded that "despite some suggestive hints" Christmas Bird Count data suggest WNV may not be a conservation issue in the northeastern United States. Foppa et al (2011) analyzed North American Breeding Bird Survey data, 1994-2010 for five bird species in ten states and concluded that American Crows appeared to be severely impacted by WNV and American Robins and House Sparrows suffered regional losses. However, in most states where a substantial impact on American Crows was observed that impact seemed to stabilize (Foppa et al. 2010). House sparrows are an invasive species. WS killed six crows in CY 13 (MIS data) and no crows taken for three years prior. Two American Robins were killed and one nest containing three eggs was removed as a result of WS BDM during this same time period (see Chapter 4). The impact of WNV on Wisconsin bird populations is difficult to assess but bird take from WS BDM activities is not large enough to have a substantive additional cumulative impact.

2.4.5 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 Wisconsin would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire state may provide a better analysis than multiple EA's covering smaller zones. In addition, Wisconsin WS only conducts BDM on a very small percentage of land area in the state where damage is occurring or likely to occur (see Section 1.5.1).

2.4.6 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 use the services of 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. Wildlife Service employees undergo extensive documented training and certification. This, along with employee and agency experience can fulfill the needs of these entities. The relationship between WS and private industry is addressed in WS directive 3.101 (http://www.aphis.usda.gov/wildlife_damage/directives/3101.pdf).

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) BDM strategies and methods which may be used or recommended by WS in Wisconsin, 4) alternatives considered but not analyzed in detail with the rationale, and 5) minimization measures and SOPs for BDM. Four alternatives were recognized, developed, analyzed in detail by WS, the USFWS, WDNR, FAA and WDATCP. Three 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, as defined here, is consistent with the CEQ's (1981) definition which states that "No Action" may be interpreted as being the continuation of current management practices. 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 current and proposed program is an adaptive integrated Wisconsin WS BDM program for the protection of human health and safety (e.g., disease transmission, aircraft collisions), agriculture (e.g., crops, domestic animals, aquaculture), property (e.g., structures) and natural resources (e.g., vegetation, wildlife).

To meet the goals of the program, WS would continue to respond to requests for assistance with, at a minimum, technical assistance. If appropriate, when permitted by the landowner/manager, USFWS and WDNR and when cooperative funding is available, WS may also provide operational damage management assistance whereby WS personnel conduct BDM actions. An IWDM approach and the WS Decision Model would be used to select and apply legally available methods, either singly or in combination, to meet requester needs for reducing bird damage. Agricultural producers, airport managers, property owners and others requesting assistance would be provided information regarding the use of effective non-lethal and lethal techniques to prevent or reduce damage as appropriate. Non-lethal methods include, but are not limited to lure crops, habitat modification, frightening devices, human behavior modification (e.g., trash management and policies to prohibit feeding birds), exclusionary devices, nest destruction, and chemical repellents. Decoy traps and other live traps and the sedative alpha-chloralose may be used as part of non-lethal or lethal management strategies depending upon the fate of the animal (relocation or euthanasia). Lethal methods considered by WS include: shooting, egg oiling/addling/destruction, snap traps, DRC-1339, and American Veterinary Medical Association approved euthanasia techniques, such as CO_2. WS may recommend hunting or DPs to resource owners when these methods are deemed applicable to certain BDM situations.

WS BDM actions could be implemented on private or public property when requested, a need for management has been documented, and a *Work Initiation Document for Wildlife Damage Management* or other comparable document has been completed. All management actions would comply with appropriate laws, orders, policies, and regulations. Although, WS would be able to

provide operational assistance with BDM under this alternative, landowners/managers are not obligated to work with WS or implement WS recommendations. They may choose to implement WS recommendations on their own, obtain the services of a contractor or other organizations, implement strategies for BDM other than those recommended by WS or choose not to implement any BDM. Similarly, although WS provides recommendations to the USFWS/WDNR regarding migratory bird depredation permits, the USFWS/WDNR is not obliged to implement WS recommendations and may choose to deny the request for a permit or issue a modified version of WS recommendations.

3.2.2 Alternative 2 – Technical Assistance Only Program

This alternative would not allow for WS operational BDM in Wisconsin. WS would only provide technical assistance and make recommendations when requested. Implementation of damage management strategies would be the responsibility of the landowner/manager, who could use any of the non-lethal or lethal BDM methods legally available. Currently, DRC-1339 and AC are only available for use by WS employees and would not be available under this alternative. However, most use of DRC-1339 in Wisconsin is to reduce bird damage at feedlots and dairies. Starlicide Complete™, a similar product using the same active ingredient, is available to certified pesticide applicators for this type of application. Under this alternative, WS would still be available to assist with WS Form 37 evaluations and recommendations for migratory bird depredation permits from the USFWS/WDNR.

Individuals experiencing bird damage would, independently or with WS recommendations, carry out and fund damage management activities. Individual producers could work with a private entity or organization to address their problems, and/or local, state or other federal agencies could assume a more active role in providing operational damage management assistance. The probability that BDM methods and devices could be applied by people with little or no training and experience, and with no professional oversight or monitoring for effectiveness is higher for this alternative than Alternative 1, but may be lower than for Alternative 4, wherein no WS advice on use of BDM methods would be available. Use of BDM methods by individuals with less training and experience could require more effort and cost to achieve the same level of problem resolution as Alternative 1, and could result in greater risk to the environment, including a higher take of non-target animals and illegal use of pesticides.

3.2.3 Alternative 3 - Bird Damage Management by WS Using Only Non-lethal Methods

Under this alternative, WS would be restricted to only using or recommending non-lethal methods to resolve damage caused by birds (Appendix C). Lethal methods could continue to be used under this alternative by those persons experiencing damage without involvement by WS. In situations where non-lethal methods were impractical or ineffective to alleviate damage, WS could refer requests for information regarding lethal methods to the state, local animal control agencies, or private businesses or organizations. Property owners or managers may choose to implement WS' non-lethal recommendations on their own or with the assistance of WS, implement lethal methods on their own, or request assistance (non-lethal or lethal) from a private or public entity other than WS.

Wildlife Services could not provide recommendations for lethal removal of birds in WS Form 37 consultations that the USFWS/WDNR currently uses when evaluating applications for migratory bird depredation permits. However, WS involvement is not required by the MBTA, and given the expected ongoing conflicts with birds, the USFWS and WDNR are expected to find an alternative mechanism to meet permitting requirements. As noted under Alternative 2, the toxicant DRC-

1339 would not be available under this alternative, but a similar product, Starlicide Complete™, would be available for the most common types of DRC-1339 applications conducted by WS.

Risks associated with application of lethal BDM methods would vary depending upon the experience and training of the individual conducting the actions. The probability that BDM methods and devices could be applied by people with little or no training and experience, and with no professional oversight or monitoring for effectiveness and associated environmental risks is higher for this alternative than Alternative 1. Use of BDM methods by individuals with less training and experience could require more effort and cost to achieve the same level of problem resolution as Alternative 1, and could result in greater risk to the environment, including a higher take of non-target animals and illegal use of pesticides.

3.2.4 Alternative 4 - No WS Bird Damage Management Program

This alternative would terminate the WS program for BDM (operational and technical assistance) on all land classes in Wisconsin. However, local, state and other federal agencies, and private individuals may provide BDM assistance. As with Alternative 3, the USFWS and WDNR are expected to find an alternative mechanism to meet migratory permitting requirements in the absence of WS involvement. In addition, DRC-1339 and AC are only available for use by WS employees and would not be available under this alternative. However, Starlicide Complete™ (similar to DRC-1339) could be used by certified restricted-use pesticide applicators.

The probability that BDM methods and devices could be applied by people with little or no training and experience, and with no professional oversight or monitoring for effectiveness and associated environmental risks is higher for this alternative than Alternative 1. Risks may be similar to or higher than Alternative 2 depending on the alternative mechanisms for technical advice established by agencies, university extension and private entities. Use of BDM methods by individuals with less training and experience could require more effort and cost to achieve the same level of problem resolution as Alternative 1, and could result in greater risk to the environment, including a higher take of non-target animals and illegal use of pesticides.

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

The strategies and methodologies described below are common to Alternatives 1, 2, and 3. Under Alternative 2, WS personnel would only provide technical assistance recommendations and conduct demonstrations. Alternative 3 would allow WS to only use those methods that are generally considered non-lethal. Alternative 4 would terminate both WS technical assistance and operational BDM in Wisconsin. 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. The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement effective management methods in a cost-effective[3] 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

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

methods for the specific circumstances. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification (i.e., exclusion), animal behavior (i.e., scaring), local population reduction, or any combination of these, depending on the characteristics of the specific damage problem. In selecting management techniques for specific damage situations consideration is given to:

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

3.3.2 The IWDM Strategies Used by WS

3.3.2.1 Technical Assistance Recommendations. Technical assistance consists of information, demonstrations, and advice on available and appropriate wildlife damage management methods. Technical assistance may include demonstrations on the proper use of management devices (i.e., propane exploders, exclusionary devices, decoy traps, 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.

3.3.2.2 Education. 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. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage (technical assistance), lectures, instructional courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. Wildlife Services 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.

3.3.2.3 Operational Damage Management Assistance. Operational Assistance involves conducting or supervising BDM. Operational damage management assistance is initiated when the problem cannot effectively be resolved through technical assistance, and when *Work Initiation Document for Wildlife Damage Management* 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 a wildlife professional.

3.3.2.4 Research and Development. The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC research was instrumental in the development of methyl anthranilate and is currently testing new experimental drugs that inhibit

bird reproduction. In addition, NWRC scientists have authored thousands of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

3.3.3 WS Decision Making

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

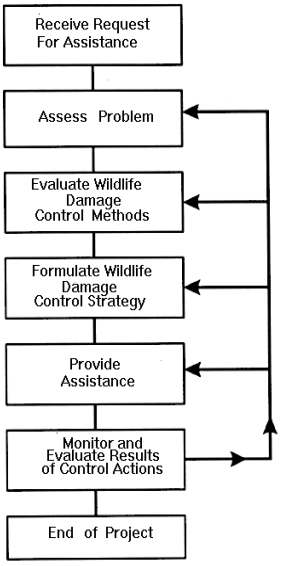

Figure 3-1. WS Decision Model as presented by Slate et al. (1992) for developing a strategy to respond to a request for assistance with human-wildlife conflicts.

Community-based Decision Making. The WS program in Wisconsin follows the "co-managerial approach" to solve wildlife damage or conflicts as described by Decker and Chase (1997). Within this management model, WS could provide technical assistance regarding the biology and ecology of birds and effective, practical, and reasonable methods available to the local decision-maker(s) to reduce damage or threats. This could include non-lethal and lethal methods depending on the alternative selected. Wildlife Services and other state, tribal and federal wildlife management agencies may facilitate discussions at local community meetings when resources are available.

Requests for assistance to manage damage caused by birds often originate from the decision-maker(s) based on community feedback or from concerns about damage or threats to human safety. As representatives of the community, the decision-maker(s) are able to provide the information to local interests either through technical assistance provided by WS or through demonstrations and presentations by WS on BDM activities. This process allows decisions on BDM activities to be made based on local input. They may implement management recommendations provided by WS or others on their own, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Community Decision-Makers. The decision-maker for the local community would be elected officials or representatives of the community. The elected officials or representatives are popularly elected residents of the local community or appointees who oversee the interests and business of the local community. This person or persons would represent the local community's

interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision-making. Identifying the decision-maker for local business communities is more complex because building owners may not indicate whether the business must manage wildlife damage themselves, or seek approval to manage wildlife from the property owner or manager, or from a governing entity. Wildlife Services could provide technical assistance and make recommendations for damage reduction to the local community or local business community decision-maker(s). Direct control could be provided by WS only if requested by the local community decision-maker, funding is provided, and if the requested direct control was compatible with WS' recommendations.

Private Property Decision-Makers. In the case of private property owners, the decision-maker is the individual that owns or manages the affected property. The decision-maker has the discretion to involve others as to what occurs or does not occur on property they own or manage. Due to privacy issues, WS cannot disclose cooperator information to others. Therefore, individual property owner or managers make the determinations regarding involvement of others in the decision-making process for the site. Direct control could be provided by WS if requested, funding is provided, and the requested management is in accordance with WS' recommendations.

Public Property Decision-Makers. The decision-maker for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals, and legal mandates for the property. Wildlife Services could provide technical assistance to this person and recommendations to reduce damage. Direct control could be provided by WS if requested, funding is provided, and the requested actions were within the recommendations made by WS. Public involvement would be the responsibility of the agency responsible for managing the site in accordance with agency procedures.

Tribal Decision-Makers. The decision-makers for Tribal property and ceded territories would be the officials responsible for or authorized to manage the Tribal lands and the lands/and or resources identified under treaty rights, to meet interests, goals, and legal mandates for the property. Wildlife Services could provide technical assistance and recommendations to reduce damage. Direct control could be provided by WS if requested, funding is provided, and the requested actions were within the recommendations made by WS. Involvement of tribal members or members of the surrounding community would be conducted in accordance with the established regulations and procedures for the affected tribe(s).

3.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.4.1 Compensation for Bird Damage Losses

The Compensation Alternative would require the establishment of a system to reimburse persons 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, except for Canada Geese and Wild Turkey damage to agricultural crops associated with the states Wildlife Damage Abatement and Claims Program or from avian predators (and associated livestock) covered under the 2014 Farm Bills Livestock Indemnity Program. Under this alternative, WS would not provide any technical assistance or operational BDM to requesters. Aside from the lack of legal authority, this alternative has many drawbacks, some of these 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.

Although compensation is not appropriate as a programmatic solution to all bird damage, it can be a successful strategy for select situations. In Wisconsin, farmers who sustain damage to their agricultural crops caused by Canada Geese and Wild Turkeys are eligible for assistance in preventing/reducing losses and for financial compensation for the losses through the Wisconsin WDACP. To determine goose and turkey damage to crops for this program, each crop field sustaining damage is examined and a thorough on-site damage appraisal is conducted (ss. §§29.889 (7a), Wis. Stats.). This statute was enacted by a legislative act and funded by a surcharge placed on hunting licenses sold in Wisconsin. Because Canada Geese and Wild Turkeys have legal hunting seasons in Wisconsin their damage is covered by the WDACP. Consequently, species without hunting seasons are not covered by the WDACP. Much of WS bird damage work in Wisconsin is preventing damage that may jeopardize human health and safety at airports or livestock health. Compensating dairy farmers for losses due to reduced milk yields or animal weight gain would be impossible to accurately determine.

3.4.2 Exhaust All Feasible Non-lethal Methods Before Using Lethal Methods

This alternative would require that all non-lethal methods or techniques described in Appendix C be applied to all requests for assistance to reduce damage and threats to safety from birds in Wisconsin. If the use of all non-lethal methods fails to resolve the damage situation or reduce threats to human safety at each damage situation, lethal methods would be employed to resolve the request. Non-lethal methods would be applied to every request for assistance regardless of severity or intensity of the damage or threat until deemed inadequate to resolve the request. This alternative would not prevent the use of lethal methods by those persons experiencing bird damage but would only prevent the use of those methods by WS until all feasible non-lethal methods had been employed.

People experiencing damage often employ non-lethal methods to reduce damage or threats prior to contacting WS. Verification of the methods used would be the responsibility of WS. No standard exists to determine requester diligence in applying those methods, nor are there any standards to determine how many non-lethal applications are necessary before the initiation of lethal methods. Thus, only the presence or absence of non-lethal methods can be evaluated. The proposed action (Alternative 1) is similar to a non-lethal before lethal alternative because the use of non-lethal methods is considered and given preference where practical and effective (WS Directive 2.101). Alternative 3 evaluates the impacts of an alternative in which WS would be restricted to only using non-lethal methods. A non-lethal before lethal alternative would have impacts similar or intermediate to alternatives already analyzed. Consequently analyzing this alternative in detail, would not add substantive new information to the analyses in the EA.

3.4.3 Trap and Translocate Birds Only

Under this alternative, all requests for assistance would be addressed using live-capture methods or the recommendation of live-capture methods. Birds would be live-captured using AC, live-traps, cannon nets, rocket nets, bow nets, mist nets, or some other type of live capture method. All birds live-captured through direct operational assistance by WS would be translocated. Translocation sites would be identified and have to be approved by the USFWS, the WDNR, and the landowner/manager where the translocated birds would be placed prior to live-capture and translocation.

The translocation of birds, that have caused damage to other areas following live-capture, generally would not be effective or cost-effective. Translocation is often ineffective because problem bird species are highly mobile and can easily return to damage sites from long distances, habitats in other areas are generally already occupied, and translocation can result in a repeat of the problem bird behavior at the new location. In addition, hundreds or thousands of birds would need to be captured and translocated to solve some damage problems (e.g., urban blackbird roosts) and translocation would not be logistically viable in these situations. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of the stress to the translocated animal, poor survival rates, and the difficulties that translocated wildlife have with adapting to new locations or habitats (Nielsen 1988).

Live-capture and translocation could be conducted for select species and situations as part of Alternatives 1 and 3 when requested by the USFWS and/or the WDNR. For example, raptors have been successfully relocated from the airfields at Dane County Regional Airport in Madison and General Mitchel International Airport in Milwaukee. These birds are banded and re-sightings tracked for an ongoing national study looking to develop protocols for relocating raptors.

3.5 MINIMIZATION MEASURES AND STANDARD OPERATING PROCEDURES FOR BIRD DAMAGE MANAGEMENT TECHNIQUES

Standard Operating Procedures (SOPs) improve the safety, selectivity and efficacy of wildlife damage management techniques. The following SOPs apply to some or all of the alternatives, as indicated in the columns.

- Alternative 1. Integrated Bird Damage Management
- Alternative 2. Technical Assistance Only
- Alternative 3. Only Non-lethal Bird Damage Management
- Alternative 4. No Federal WS WDM in Wisconsin

Standard Operating Procedure	Alternatives			
	Current Program	Technical Assistance Only	Non-Lethal Only	No WS Program
Animal Welfare and Humaneness of Methods Used by WS				
Research on selectivity and humaneness of management practices would be adopted as appropriate.	X	X	X	
The WS Decision Model (Slate et al. 1992) would be used to identify effective biological and ecologically sound BDM strategies and their impacts.	X	X	X	
Euthanasia procedures approved by the AVMA would be used as appropriate.	X			
The use of newly developed, proven non-lethal methods would be encouraged when appropriate.	X	X	X	
WS would continue to improve the selectivity and humaneness of management devices.	X	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.	X		X	
Safety Concerns Regarding WS Damage Management Methods				
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 BDM strategies.	X	X	X	
All pesticides used by WS are registered with the EPA and WDATCP.	X		X	
Pesticides would be stored, used and disposed of in accordance with EPA-approved label directions and other applicable laws and regulations, and Executive Orders 12898 and 13045.	X		X	
Avicides and live traps would primarily be used on private lands.	X		X	
Pesticides would only be used by trained and certified personnel.	X		X	
WS employees, who use pesticides, participate in WDATCP approved continuing education to keep abreast of developments and maintain their certifications.	X		X	
Live traps would be placed so that captured animals would not be readily visible from any road or public area.	X		X	
Safety Data Sheets for avicides are provided to all WS personnel involved with specific BDM activities.	X		X	
Research is being conducted to: 1) improve BDM 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	X	

Standard Operating Procedure	Alternatives			
	Current Program	Technical Assistance Only	Non-Lethal Only	No WS Program
Concerns about Impacts of Damage Management on Target Species, T/E Species, Species of Special Concern, and Non-target Species				
WS will adhere to all applicable USFWS and WDNR measures to ensure protection of state and federal T/E species.	X		X	
Management actions would be directed toward localized populations or groups and/or individual offending birds.	X		X	
WS personnel are trained and experienced in selecting the most appropriate methods for removing targeted birds and excluding non-target species.	X		X	
WS would initiate consultation with the USFWS following any incidental take of T/E species.	X		X	
WS take of birds would be provided to the USFWS and WDNR as appropriate 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 native 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	X	
The presence of non-target species are 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 at feedlots or dairies where avicides are being applied, then WS would remain on site to discourage non-target visitation.	X			
WS personnel would contact cooperating agencies to determine Peregrine Falcon nesting and roosting locations in areas where pigeon damage management is proposed.	X		X	
If a Peregrine Falcon is encountered during damage management operations, activities that could adversely affect the falcon would cease until the bird(s) is gone.	X		X	

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 provides information needed for making informed decisions when selecting a management alternative to meet the need for action described in Chapter 1. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2 in comparison with the proposed action/no action alternative to determine if the potential impacts are greater, lesser, or similar. Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

4.2 ENVIRONMENTAL CONSEQUENCES

The following resource values in Wisconsin 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 BDM that are inconsistent with Executive Orders 12898, 13045, 13112, or 13186 (Appendix B).

4.2.1 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 Wisconsin WS program.

4.2.2 Cumulative and Unavoidable Impacts.

Cumulative and unavoidable impacts of each alternative to bird 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 removal[4] of birds by all causes is the cumulative mortality. Cumulative impacts would be mortality caused by Wisconsin WS BDM and other known causes of mortality.

4.2.3 Evaluation of Significance.

All major issues are evaluated for each alternative including direct, indirect and cumulative impacts. 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. Wildlife Services considers the following factors when reviewing the context and intensity of the proposed actions:

4 It is recognized that the other mortality of wildlife (i.e., road kills, disease, natural mortality, etc.) occurs throughout Wisconsin but no reliable system exists for recording this information.

Magnitude of the Impact (size, number, or relative amount of impact) (intensity). For purposes of this analysis, magnitude is defined as *a measure of the number of animals killed in relation to their abundance.* Magnitude may be determined either quantitatively or qualitatively. Quantitative analysis uses available population estimates and known mortality. Qualitative analysis is based on population trends and harvest data or trends and modeling.

Duration and Frequency of the Action. Duration and frequency of BDM in Wisconsin is highly variable. Abiotic and biotic factors affecting bird behavior will affect the duration and frequency of BDM activities conducted by WS in Wisconsin. Bird damage management at airports may be long duration programs but the frequency of individual operational BDM actions within the program may be highly variable depending upon spatial, temporal, and biotic factors affecting the behavior of the birds that are causing damage. For instance, the lethal 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 starling damage management at individual diaries will generally be short in duration but may happen frequently at different sites.

Likelihood of the Impact. This factor can relate to the likelihood that a particular damage management action will be needed, and also to the likelihood that an impact may occur as a result of a damage management action. For example, the likelihood that an abundant resident bird such as a Canada Goose may be managed (harassment or lethal removal) to reduce hazards at an airport may be relatively high, but the need to harass or remove other less abundant birds which migrate through the area will be much lower. Likewise, although some impacts on non-target species may be theoretically possible, the likelihood that the impact would occur may be negligible or nonexistent because of Standard Operating Procedures used by WS.

Geographic Extent. Bird damage management could occur anywhere in Wisconsin where damage management assistance has been requested, agreements for such actions are in place, and action is warranted, as determined by the WS Decision Model (Slate et al. 1992). Wisconsin encompasses about 65,496 mi^2, not including those parts of the Mississippi River and Great Lakes located within the boundaries of the State. However, WS only has agreements to conduct BDM on a small portion of land in the state and not all properties under Agreement may need BDM assistance in any given year. Additionally, BDM may only be conducted on a small portion of the property under agreement.

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 4-1). Six key issues have been identified as being important for informed decision-making. The six issues are:

- 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.
- Impacts on stakeholders, including aesthetics
- Humaneness and Animal Welfare Concerns

Table 4-1. Comparisons of Issues/Impacts and Alternatives.

Issues/Impacts	*Alternative 1* **Integrated BDM Program (Proposed Action/No Action)**	*Alternative 2* **Technical Assistance Only**	*Alternative 3* **Nonlethal Only**	*Alternative 4* **No WS BDM Program**
Effects of WS Bird Damage Management on Target Species Populations	WS would have no affect on local bird populations. If resource owners conduct bird damage management, effects would be more or less than Alternative 2 or 4.	Affects similar to Alternative 1, however could be more adverse depending on the level of control by others.	Affects similar to Alternative 1, however could be more adverse depending on the level of control by others.	Affects 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.	Affects similar to Alternative 1, however could be more adverse depending if WS technical assistance recommendations are followed.	Minimal adverse affects from WS activities. Potential adverse affects from others if toxicants or other methods are misused.	No adverse affects from WS activities. Potential adverse affects 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.	Affects similar to Alternative 1, however could be more adverse depending if WS technical assistance recommendations are followed.	Increased risks of potential negative affect from the misuse of methods including toxicants and possible increase in risks to human health and safety if alternative sources of BDM are less effective than WS in Alternative 1.	Potential negative affect from the misuse of methods or toxicants or increase disease transmission or bird strike risks.
Efficacy of WS Bird Damage Management Methods	Alternative provides most effective means to reduce bird damage or potential bird damage.	Moderate effectiveness if WS technical assistance recommendations are followed.	WS less effective than Alternative 1. Overall efficacy depends on access to and effectiveness of non-WS entities when using lethal methods.	Least effectiveness because no professional assistance would be available to requesters.
Impacts on Stakeholders, including Aesthetics	Low to moderate effect at local levels; Some local bird populations may be temporarily reduced; WS bird damage management activities do not adversely affect overall regional, state or national bird populations.	Affects similar to Alternative 1, however could be more adverse depending if WS technical assistance recommendations are followed.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on overall regional, state and national bird population.	No impact by WS. Overall efficacy depends on access to and effectiveness of non-WS entities when using lethal methods.
Humaneness and Animal Welfare Concerns of Methods	Impact by WS low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Affects similar to Alternative 1, however could be more adverse depending if WS technical assistance recommendations are followed.	Impact by WS Lower effect than Alternative 1 since only non-lethal methods would be used by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.

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

This section primarily focuses on those species most commonly involved in requests for BDM assistance. The target species discussed below were selected for detailed analysis because Wisconsin WS has received requests for assistance with these species and they could be targeted by WS (non-lethal and lethal methods) to protect agricultural and natural resources, property and people from injury or damage (i.e., BDM at airports to reduce or prevent risks to the traveling public from bird strikes to aircraft). Generally, WS conducts damage management on species whose population densities are high (e.g., overabundant or anthropogenic abundant (Conover 2002)) and/or invasive species and only after they have caused damage or an identified potential damage risk exists. In addition, to species commonly involved in BDM in WI, WS' permit from the USFWS and WDNR (MB042886-0-0) allows WS to take, capture/relocate or remove nests and eggs of birds posing an immediate threat to human health and safety or where the health of the bird is jeopardized.

Many bird species involved in damage problems are protected by the USFWS under the MBTA and/or the WDNR. All WS bird take is conducted in accordance with applicable state and federal laws and regulations authorizing take of birds, and their nests and eggs, including the USFWS and the WDNR permitting processes. The USFWS and WDNR are responsible for maintaining sustainable populations of these species, and can impose restrictions on depredation or other take (e.g., hunter harvest) as needed to assure cumulative take does not adversely affect the continued viability of specific bird populations. Close coordination with the USFWS and WDNR helps to ensure that cumulative impacts on bird species would have no significant adverse impact on the quality of the human environment and long-term viability of bird populations.

Non-lethal Damage Management Activities.

Preference is given to non-lethal damage management when practical and effective (WS Directive 2.101). WS commonly makes recommendations to landowners/managers on non-lethal methods that they can implement on their own (e.g., exclusion, habitat modification, human behavior management, crop selection, repellents, etc.). The primary non-lethal BDM techniques used operationally by WS staff is the use of frightening devices. In 2004, Wisconsin WS dispersed approximately 1,738[5], birds of at least 8 species (i.e., American Crows, Mourning Doves, Ring-billed Gulls, Red-tailed Hawks, American Kestrels, Killdeer, Mallards, and European Starlings) using non-chemical harassment methods such as propane exploders and pyrotechnics. WS use of non-lethal harassment techniques increased to approximately 281,351[5] birds of at least 32 species in 2013 (Table 4-2). In general, scaring and harassment devices may cause non-target migratory birds and other affected wildlife to temporarily leave the immediate vicinity of scaring, but it is possible that they return to the area after conclusion of the action.

Relocation is another option that may be implemented by WS staff, but, because of the mobility of birds, has limited applicability. Live-capture and translocation could be conducted for select species and situations when requested by the USFWS and/or the WDNR. For example, raptors have been successfully relocated from the airfields at Dane County Regional Airport in Madison and General Mitchel International Airport in Milwaukee. These birds are banded and re-sightings tracked for an ongoing national study looking to develop protocols for relocating raptors. Live capture and relocation is not practical for smaller birds

[5] This count may include multiple incidents involving the same bird or group of birds.

such as Red-winged Blackbirds, swallows, etc. because of: 1) the number of birds involved, 2) problems with birds returning from relocation sites (especially if birds are relocated to reduce health and safety risks at places like airports), 3) relocated birds compete for food resources and other limiting factors with other birds and wildlife already at the relocation site, 4) the difficulty in finding acceptable release sites, 5) costs of relocation, 6) relocated birds could create the same disease transmission potential to people or livestock in the relocation area, and 7) the relocation of invasive species would not be consistent with reduction/elimination goals.

Table 4-2. Birds Relocated or Dispersed By WS during CY 11, 12, and 13.

Species	CY11 Dispersed (Relocated)	CY12 Dispersed (Relocated)	CY13 Dispersed (Relocated)
American Bittern			1
Red-Winged Blackbirds	235	118	53
Snow Buntings	130	375	60
Brown-headed Cowbirds	4		
American Crows	52	78	8
Sandhill Cranes			11
Mourning Doves	646	1,764	1,171
Long-billed Dowitchers			6
Mallards	689	634	468
Rudy Duck		1	
Hooded Merganser	2		
Blue-Winged Teal	17	2	36
Wood Ducks	11	2	3
American Kestrels	45	25	13
Peregrine Falcon		1	2
Canada Geese	1,027	774	463
Snow Geese		1	
Common Grackles	312	85	19
Pied-Billed Grebes	1		
Herring Gulls	50,022	106,437	91,847
Ring-Billed Gulls	113,290	200,785	181,324
Cooper`s Hawks	1	6 (1)	
Red-Tailed Hawks	161 (13)	83 (9)	43
Northern Harrier		7	1
Rough-legged Hawk		8	
Great Blue Herons	12	2	5
Green Herons	1		1
Killdeers	147	982	537
Horned Larks	30	28	50
Eastern Meadowlarks	15	5	10
Nighthawks	2		
Great Horned Owls		1 (1)	
Short-Eared Owls	1		1
Snowy Owls	4	4	5
American Golden Plover		10	
Black-bellied Plovers			6
American Robins	12	100	141
Least Sandpipers		20	
Wilson's Snipe			6
European Starlings	16,420	18,935	4,996
Mute Swans	2		
Barn Swallows			15
Cliff Swallows			40
Turkey Vultures	6	54	2

Lethal Damage Management Activities.

Lethal damage management activities that include shooting, toxicants, capture and euthanasia, and egg oiling/addling/destruction (Appendix C) are the primary WS actions proposed in this EA with the potential for adverse impacts on the environment. Lethal damage management is implemented when a BDM problem cannot be practically or effectively resolved through non-lethal damage management and where a *Work Initiation Document for Wildlife Damage Management* or other comparable documents provide for operational damage management. Table 4-3 provides information on the number of birds Wisconsin WS killed by lethal methods during CY 11, 12 and 13.

Table 4-3. Target Birds Killed By WS during CY 11, 12, and 13.

CY	Species	Damage Management Method				
		Trap	Shot	DCR-1339	Non-chemical Other [6]	Nest/Egg Removal
11	American Kestrel	3	7			
	American Robins				2	1 / 1
	Barn Swallow					1 / 3
	Blue-winged Teal Ducks		3			
	Brown-headed Cowbirds	244				
	Canada Geese	1,950	35			62 / 286
	Common Grackles	3	4			
	European Starlings	2	70	13,934		
	Rock Pigeons		67			
	Great Blue Herons		3			
	Herring Gulls		112		48	749 / 1,394
	Killdeers		1			
	Mallard Ducks		31			
	Mourning Doves				1	5 / 6
	Mute Swans		241			1 / 1
	Red-tailed Hawks		22			
	Red-winged Blackbirds	124				
	Ring-billed Gulls		157		1	109 / 267
	Sandhill Cranes		1			
	Snowy Owl		1			
	Turkey Vultures		2			
12	American Kestrel		2			
	Brown-headed Cowbirds	330	1	61		
	Canada Geese	2,268	46			118 / 646
	Common Grackles		28			
	European Starlings		70	11,510		
	Rock Pigeons		90		5	1 / 1
	Great Blue Herons		4			
	Herring Gulls		139		150	835 / 1,779
	Killdeers		44			

[6] Alternative lethal methods may include hand catching birds and euthanasia using CO^2.

	Mallard Ducks		9			1 / 9
	Mute Swans	1	132		2	4 / 22
	Red-tailed Hawks		7			
	Red-Winged Blackbirds		174			
	Ring-billed Gulls		343			
	Rough-legged Hawks		1			
	Sandhill Cranes		4			
	Snowy Owls		3			
	Wild Turkeys		2		10	
13	American Crow		6			
	American Kestrel		1			
	American Robin					1 / 3
	Brown-headed Cowbird	218				
	Canada Geese	1,469	43		2	108 / 582
	Cliff Swallow					1 / 3
	Common Grackles		2			
	European Starling			9,786		
	Rock Pigeons		65			
	Great Blue Herons		2			
	Herring Gulls		152		148	680 / 1,799
	Killdeers		17			
	Mallard Ducks		20			
	Mourning Doves		1			
	Mute Swan		71			2 / 10
	Red-tailed Hawks		7			
	Red-winged Blackbirds		40			
	Ring-billed Gulls		271			6,597 / 14,595
	Sandhill Cranes		4			
	Snowy Owls		1			
	Wild Turkey		4			

Bird Population Information

This Section discusses the primary sources of information used by the WS program when evaluating the impacts of program actions on bird populations. Additional sources of information are incorporated for individual species and species groups when available (e.g., USFWS Mourning Dove population status report, waterfowl population status reports).

Breeding Bird Survey. The Breeding Bird Surveys (BBS) is one of the primary methods used to track trends in bird abundance. The BBS is a large-scale inventory of North American birds coordinated by the U.S. Geological Survey, Patuxent Wildlife Research Center (Sauer et al. 2014). The BBS is a combined set of over 5,000 roadside survey routes primarily covering the continental United States and southern Canada. The BBS was started in 1966, and routes are surveyed in June by experienced birders. The stated primary objective of the BBS has been to generate an estimate of population change for all breeding birds. The BBS analyzes bird population trends at the national, regional, state levels and for

Bird Conservation Areas (based on physiographic characteristics). Populations of birds tend to fluctuate, especially locally, as a result of variable annual local habitat and climatic conditions. Trends can be determined using different population equations, and statistically tested to determine if a trend is significant. The breeding bird survey uses a 95% confidence interval as the credible interval for trend estimates.

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

- All birds within a ¼ mile of the observer are seen at all stops on a BBS route; this assumption is faulty because observers often cannot see a ¼ mile in radius at all stops due to obstructions such as hills, trees, and brush and because some bird species are elusive. Therefore, the birds seen per route would provide a conservative estimate of the population.

- The chosen survey routes are fully representative of habitats in the survey area. Routes are randomly picked throughout the survey areas, survey rules allow the observers to make stops for surveys based on better quality habitat or convenient parking areas, even though the survey sites are supposed to be spaced a ½ mile apart. Therefore, if survey areas had stops with excellent food availability, such as a landfill site or waterfowl nesting habitat where birds may congregate, the count survey could be biased. This would tend to overestimate the population. However, if these sites were not on a route at all, the population could be underestimated.

- Routes are randomly selected. Routes are randomly picked throughout the survey areas, but are placed on the nearest available road. Some birds tend to congregate along roadsides and others avoid roadside areas. Additionally, most BBS routes are selected because they are "off the beaten path" to enable the observer to hear birds without interruption from vehicular noise, so they may under-represent birds that have adapted to urban areas.

- Birds are equally distributed throughout the survey area. Each bird species has its own specific habitat requirements. This assumption is likely to be less of a problem for habitat generalists and birds which use relatively abundant habitat types than for birds such as shorebirds and waders. The assumption that birds are equally distributed throughout the survey area is especially problematical for colonial waterbirds (e.g., gulls and herons). Even when routes are randomly located, only a limited number of routes are likely to include areas that might be used by colonial waterbirds. BBS data on the species may under or over-represent a species depending on whether a colony area is included in the survey area. Additionally, it is not unheard of for colonial waterbirds to abandon a site in response to disturbance, habitat alteration, or other factors. This can result in a sudden decrease or increase in BBS survey numbers if the original or new site is not included in a BBS survey route.

WS recognizes the statistical variability of the data and believes that the BBS represents the best available commercial and scientific data available to evaluate bird populations and population trends. WS also recognizes that the BBS may under-sample birds not readily found along survey routes, are more active at other times of the year or active at night. Population trend and distribution information obtained from the BBS and similar surveys such as the Christmas Bird Count (CBC) can be particularly valuable in impact analyses because it can serve as a measure of the cumulative impact of all environmental factors on the species in question.

Christmas Bird Count. The National Audubon Society (NAS) conducts nationwide bird surveys in December to early January (the NAS Christmas Counts). The CBC provides information on

the number of birds frequenting the state during the winter months. Like the BBS data, CBC data do not provide a population estimate, but can be used as an indicator of trends in the population. Researchers have found that population trends reflected in CBC data tend to correlate well with those from censuses taken by more stringent means (National Audubon Society 2002).

Partners in Flight Landbird Population Estimates Database. Partners in Flight (PIF) compiles a database of bird populations in North America. Initially focusing on Neotropical migrants that breed in North America and winter in Central and South America, the database has expanded to all landbird species. The PIF database uses the Breeding Bird Survey as the base of its data set. The population estimates are determined using the BBS average observations per route multiplied by the area of the region that is sampled (Blancher et al. 2013). This estimate is further refined with parameters that include detection distances, pair adjustments, and time of day adjustment to come up with an estimate of the population (Blancher et al. 2013).

The analyses below provide information on state, regional and national bird population trends in order to evaluate the cumulative impacts of the population on a local (state) and large scale (BBS Eastern Region and National). This is especially important for migratory species which range from northern to southern latitudes during the year.

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 Wisconsin WS BDM program which, based on historical data, would primarily be conducted for the following areas:

1) At livestock facilities to reduce European Starling feed consumption and contamination with feces, and reduce potential risk of disease transmission to livestock.
2) Throughout the state to reduce damage caused by resident and migratory Canada Geese. Resources protected would include property (including agricultural crops) and quality of life, human health, and human safety.
3) At airports to reduce potential aircraft/bird strikes in Wisconsin thereby minimizing human health and safety risks.

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 the adverse effects to bird species populations. Annual variations in need to use lethal methods are incorporated in the estimates of maximum annual lethal take analyzed below. The majority of bird species targeted by WS are migratory and range from northern to southern latitudes during the year. Consequently, this analysis includes review of regional population trend data in addition to data from Wisconsin.

Waterbirds

American White Pelican Biology and Impacts.

American White Pelicans are large bodied colony nesting waterbirds that occur mainly in western and southern portions of the United States (Kopf and Evans 2004). Pelicans migrate to the colony nesting ground early in the spring, often before ice has completely left surrounding waters. Following courtship for newly paired birds, pelicans form synchronized nesting in dense clusters in the colony (Kopf and Evans 2004). Foraging sites are associated with wetland habitats that

include shallow rivers, marshes and lake edges. Pelicans use their large pouched bills to dip prey from the water (Kopf and Evans 2004). Two eggs are laid in the nest with only one of the two siblings surviving, often due to the smaller one being harassed or killed by the larger (Kopf and Evans 2004).

The population of American White Pelicans was considered threatened until the early 1960's, but have since recovered and is estimated at over 130,000 breeding birds in North America (King and Anderson 2005). In Wisconsin, pelicans nest on islands in Green Bay, along the Mississippi River, and on larger lakes within the interior of the state. Population totals for Wisconsin are estimated at over 4,100 nesting pairs at 8 colony sites (Matteson et al. 2014). The population trend for pelicans show a robust increase at greater than 3% per year (Kopf and Evans 2004). Matteson et al (2014) estimated a 17% increase in the number of nesting American White Pelicans in Wisconsin from 2003-2013. The BBS shows a similar increasing trend for Wisconsin, the Eastern BBS Region, and Nationwide over the period of 2002-2012 (Sauer et al. 2014).

American White Pelican numbers are expanding steadily and are starting to create conflicts with the aquaculture industry in the Southeastern United States (Kopf and Evans 2004). Although Wisconsin has had limited conflicts with pelicans, the increasing population could necessitate limited management. Wisconsin oiled 64 pelican nests on Terrell's Island in Winnebago County in CY 2014 for habitat and water quality restoration. Should the need arise, WI WS would only take nests, eggs or birds in a localized area and in conjunction with a permit authorized by the USFWS/WDNR. Wisconsin WS does not anticipate removing more than 30 birds per year and 200 nests, and would have a low magnitude of impact on the state population.

Mute Swan Biology and Population Impacts

Mute Swans are native to Eurasia, and were introduced from Europe into the United States in the late 19th and early 20th centuries for use in ornamental ponds and lakes, zoos, and aviculture collections (Maryland Mute Swan Task Force 2001; Ciaranca et al. 1997). Feral breeding is believed to have first started among escaped birds in the lower Hudson Valley in 1910 and on Long Island in 1912 (Atlantic Flyway Council 2003). Since that time Mute Swans have expanded their range to many Eastern states, several Midwestern states, and portions of the western U.S. and Canada. In Wisconsin, conflicts with Mute Swans primarily involve aggressive behavior by birds defending nesting territories and cygnets, and by food conditioned birds. Some Mute Swans also behave aggressively toward other bird species and may exclude native birds from feeding and nesting habitat including Trumpeter Swans (*Cygnus buccinators*) that the WDNR has been working to restore in the state (WDNR 2014b). Mute Swans forage primarily on submerged aquatic vegetation and adult birds may consume approximately 4-8 pounds of vegetation per day (Allin 1981, Fenwick 1983). There is evidence that foraging by high densities of Mute Swans can cause damage to wetland ecosystems although there is variation among plant species and communities in ability to sustain Mute Swan foraging (Guillaume et al. 2014).

Mute Swan populations in the U.S. have demonstrated a remarkable capacity for population growth. The Atlantic Flyway population of feral Mute Swans grew from 6,309 birds in 1986 to over 10,500 swans in 2008 (Atlantic Flyway Council 2009). This same trend is seen in the Mississippi Flyway. For example, in Michigan, the Mute Swan population increased from approximately 5,700 birds in 2000 to 15,420 by 2011 (USDA 2012). BBS trend data from 2002-2012 indicate that Mute Swan populations are stable or increasing in Wisconsin, the Eastern BBS Region, and Nationwide (Sauer et al. 2014), although some local and state-level reductions may

occur as some state natural resource agencies work to reduce Mute Swan populations in their area (Atlantic Flyway Council 2003, Mississippi Flyway Council 2012).

Mute Swans are not protected under United State Federal law and are considered an invasive species by the USFWS. The Mississippi Flyway Council policy includes removing pioneering Mute Swans and reducing existing Mute Swan populations with a long-term goal of reducing the flyway population to 4,000 birds or fewer by 2030 (Mississippi Flyway Council 2012). The majority of Mute Swans in the flyway are in Michigan and Ontario with 2011 estimates of more than 15,000 Mute Swans in Michigan and more than 3,000 Mute Swans in Ontario (Mississippi Flyway Council 2012). Status of Mute Swans in the Mississippi Flyway states varies. In Minnesota and Michigan, Mute Swans are classified as an invasive species and the states are working to reduce their population (Michigan; USDA 2012) or prevent Mute Swans from becoming established (Minnesota; C. Henderson, Minnesota Department of Natural Resources, pers. comm.). In contrast, Illinois gives non-native Mute Swans the same protections as native swan species. In Wisconsin, Mute Swans are classified as a non-native introduced species with control of the population through management (WDNR 2014a). WI WS conducts Mute Swan management in Wisconsin under the authority of Executive order 13112- Invasive Species. All WS Mute Swan damage management activities would continue to be coordinated with the WDNR.

Mute Swans were first observed in Wisconsin in the late 50's-early 60's and by 1970 they had established populations in northwestern and southeastern WI (Manthey 1999). Current populations are concentrated in small numbers in the southeast portion of the state and in Green Bay and northern Lake Michigan. The birds in the northern part of the state are believed to be immigrants from Michigan. In Wisconsin, the Mute Swan population is estimated to be 250 to 300 birds. During CY 11-13, WS removed 241, 133, and 71 Mute Swans through trapping and shooting. During this time, WS also oiled 33 eggs in seven nests in WI (Table 4-3). A Mute Swan population model by Ellis and Elphick (2007) indicated that at least 17% of the population must be removed per year to be reasonably certain of a reduction in the Mute Swan population. Based on the population status of Mute Swans in Wisconsin, and the immigration of swans from neighboring states, WS could take up to 400 birds per year. Any reduction, even to the extent of complete eradication from the natural environment, could be considered a beneficial impact to native bird species and ecosystems in Wisconsin and would be consistent with regional flyway management objectives and Executive Order 13112-Invasive Species. Eradication, however, would be unlikely due to local ordinances protecting Mute Swans in a limited area and immigration from neighboring states with high Mute Swan populations.

Canada Goose Biology and Population Impacts.

Canada Geese are among the most widely distributed species of bird in North America (Mowbray et al. 2002). Breeding populations now exist in every province and territory of Canada and in 49 of the 50 United States. Market hunting and poor stewardship led to record low numbers of geese in the early 1900's, but regulated seasons including closures, refuges, and law enforcement led to restoration of most populations. To facilitate management, Canada Geese are divided into populations based on physiological characteristics and movement patterns (migration, breeding areas). The majority of Canada Geese in Wisconsin come from two populations: 1) the Mississippi Valley Population (MVP) that breeds in Ontario along the Hudson Bay coast; and 2) the Temperate Breeding Population (TBP) of resident Giant Canada Geese [hereafter locally breeding Canada Geese] that breed in Wisconsin (Van Horn et al. 2013). A small portion (2%) of

the Canada Goose population in Wisconsin is made up of birds from the Eastern Prairie, Tall Grass Prairie, and Southern James Bay populations of Canada Geese (Van Horn et al. 2013).

Many people view Canada Geese as a charismatic and highly valued species, however, individual tolerance of goose behavior differs (Smith et al. 1999). Because of their prolific nature, site tenacity, longevity, size, and tolerance of human activity, Canada Geese can become problematic.

Mississippi Valley Population: During the 1950's the Canada Goose harvest in WI centered around the MVP with Horicon National Wildlife Refuge (NWR) being an important stopping point for migrating geese (Van Horn et al. 2013). The MVP of Canada Geese utilizing Horicon NWR and surrounding areas rose to 80% (250,000-300,000) of the total population of MVP in the 1970's. This increase in fall population led to agricultural concerns and steps were taken at Horicon NWR, and surrounding lands to redistribute geese over a broader area and out of WI (Van Horn et al. 2013).

Current adult breeding population estimates for the MVP of Canada Geese for 2013 are 319,700 birds, which is an increase from the 2012 population of 268,891 (Van Horn et al. 2013). This, however, is lower than the 1989-2012 long term average of 353,396 (Brook and Hughes 2013). The current population is well above the minimum MVP breeding population threshold of 255,000 set in the MVP management plan (Brook and Luukonen 2010). MVP geese make up approximately 60% of the annual regular season goose harvest in Wisconsin (Van Horn et al. 2013). Regular season hunter harvest in 2013 was 44,783 with an estimated 26,870 coming from the MVP.

Most of the impact that WI WS has on the MVP involves work at airports for the protection of property and human safety from bird-aircraft collisions. WS killed 35, 46, and 43 geese in CY 2011-2013 that were not associated with goose roundups during the summer. These birds were likely a mix of MVP Canada Geese and locally breeding Canada Geese. However, even if all birds were from the MVP, this level of take represents only 0.2% of the 2013 regular season geese killed by licensed hunters in Wisconsin and 0.04% of the total population of MVP geese. The low numbers of take by WI WS of the MVP Canada Geese would not have an adverse cumulative impact on the population.

Locally Breeding Canada Geese: In the 1950's, the giant race of Canada Geese was considered nearly extinct in Wisconsin (Van Horn et al. 2013). A few small remnant populations were found and restoration efforts began in the 1960's to restore this population (Van Horn et al. 2013). These restoration efforts included captive breeding efforts, translocations, and limited or closed seasons for Canada Geese in some areas. These efforts resulted in Giant Canada Geese being the most abundant subspecies in the flyway (Leafloor et al. 2003). The population expanded and went from less than 23,000 geese in 1990 to an estimated population of 138,925 in 2013.

The expanding population of locally breeding Canada geese led the USFWS to conduct an environmental impact statement on the management of locally breeding Canada Geese (USFWS 2005). The preferred alternative in this EIS created specific management and depredation orders for airports, landowners, agricultural producers and public health officials. It also allowed for the expansion of hunter harvest take and an expansion of the dates of the fall hunting season to target locally breeding Canada Geese (USFWS 2005). In 2007, USDA APHIS announced a record of decision that was based off of the final EIS prepared by the USFWS. Based on the EIS, components based on the integrated damage management and population management alternative (preferred alternative) which allows for both non-lethal and lethal management techniques where chosen.

The steady growth of locally breeding Canada Geese and the desire to maintain the MVP of Canada Goose numbers has led to a hunting season structure that takes advantage of the growing locally breeding goose population. An early season from September 1-15 is designed to target locally breeding geese prior to the fall migration. Average harvest of locally breeding Canada Geese in the Mississippi flyway is 16% of the flyway population and Wisconsin hunters take an average of 21% of the state locally breeding Canada Goose population. Despite this, the population of locally breeding Canada Geese has continued to increase in the state and flyway (Van Horn et al. 2013). Locally breeding Giant Canada Geese make up approximately 40% of the regular goose harvest and nearly all of the early season harvest (Van Horn et al. 2013). Early season and regular season harvest of Canada Geese in Wisconsin has been relatively stable the last few years (Van Horn et al. 2013).

Although this steady growth in locally breeding Canada Geese has provided for expanded hunting and viewing opportunities, it has also led to damage to agricultural crops and some birds have become a nuisance in urban settings. The WDNR and USFWS issue permits to take geese and to remove and destroy nests and eggs in areas where these conflicts are taking place. WI WS conducts some of these operational activities. Wildlife Services conducts a significant amount of the removals of Canada Geese in Wisconsin under the authority of individuals or entities who have received a depredation permit from the USFWS/WDNR (Table 4-4). From CY 2011-2013, the USFWS issued multiple permits to take Canada Geese and to remove and destroy their nests and eggs (L. Harrison, USFWS, Pers. Comm., 26 June 2014).

Table 4-4. Locally Breeding Canada Goose Harvest and Take in Wisconsin CY 2011-13.

	CY 2011	CY2012	CY2013
Hunter Harvest-Early	18,476	21,302	19,407
Hunter Harvest-Regular	16,459	15,559	17,913
Depredation Permits Issued	67	78	85
Geese Taken on Permits-WS	1,950	2,268	1,469
Geese Taken on Permits-Other	149	214	143
Nest and Egg Destruction Permits	128	121	136
Nests Taken/Oiled on Permits-WS	36	118	210
Nests Taken/Oiled on Permits-Other	611	618	621
WDACP depredation permits issued	52	63	76
Geese Taken on WDACP permits	292	413	307

The WDNR issued permits to reduce agricultural damage caused by Canada Geese through its Wildlife Damage Abatement and Claims Program during CY 2011-2013 (Table 4-4). In 2013, 136 nest and egg permits were issued with 616 nest and the associated eggs removed (Van Horn et al. 2013). Wisconsin WS conducts operational activities through a number of these permits throughout the state. Wisconsin WS removed 1,950 geese through goose roundups in 2011, 2,268 geese in 2012, and 1,469 geese in 2013. Wisconsin WS recommends a majority of the depredation and egg oiling permits through the WDACP in WI, as well as undertaking the operational activities of nest and egg oiling and removal for individual permitees throughout the state. In 2013, 1,469 geese were killed in round ups, 307 geese killed on WDNR depredation permits, and 1,128 eggs destroyed by WS personnel. This level of take accounts for less than 8% of total hunter harvest of locally breeding Canada Geese and 2.1% of the total population of locally breeding Canada Geese in Wisconsin.

Based on an anticipated increase in requests for services, WS anticipates maximum lethal removal of up to 3,500 Canada Geese, and 1,000 nests and all eggs associated with those nests in any one year for airport safety and protection of other resources. This level of take by WS would only be 7.5% of the 59,893 and 60,200 resident Canada Geese taken by licensed hunters in Wisconsin during 2011 and 2012 respectively (Raftovich and Wilkins 2013).

Given the increasing population trends for Canada Geese and that WS' proposed maximum annual goose removal would only be a small fraction of the birds taken by sport hunters, WS actions would result in a low magnitude of impact on the Canada Goose population and on goose hunting opportunities. The majority of the damage management efforts will occur on urban goose populations which are not as available to hunting activities.

Snow Goose Biology and Population Impacts.

Snow Geese are only an occasional visitor to Wisconsin. In North America, Snow Geese breed in the Arctic regions of Canada and winter south of Wisconsin. This medium sized goose is one of the most abundant species of waterfowl in the world and breed in large dense colonies (Mowbray et al. 2000). Snow geese feed by grubbing (i.e., the uprooting of subsurface plant rhizomes and vegetation) and have seen rapid population increases due to the availability to use new anthropogenic food sources, such as grain crops, on its wintering grounds and along its migration routes (Mowbray et al. 2000). The population estimate could be between 5-6 million birds, a number that may be environmentally unsustainable given there foraging strategy and dense breeding colonies (Mowbray et al. 2000).

The mid-winter survey of mid-continent light geese recorded a record high of over 4.6 million light geese, a 15% increase from 2012 populations and a third straight year of record numbers (Raftovich and Wilkins 2013). The term light geese is used to describe the combined populations of Snow Geese and Ross's Geese (*Chen rossii*). During the 2012 regulated waterfowl hunting season, Wisconsin hunters did not kill any Snow Geese and only killed 153 in 2011 (Raftovich and Wilkins 2013).

Wisconsin WS dispersed one Snow Goose during 2012 to protect human health and safety at an airport and did not kill any from 2011-2013 (Table 4-2 and 4-3). Because the Wisconsin WS program is anticipated to expand to protect human health and safety, up to 50 Snow Geese could be removed annually without adversely affecting populations. However, considering WS' history of not having killed any Snow Geese for damage management in the last three years, actual take in most years is likely to be far lower than this number. If WS received a request to conduct lethal damage management of Snow Geese and a need was established, WS would consult with USFWS and WDNR. Because of this consultation, and the large population size of mid-continent Snow Geese, WS activities would result in a low magnitude of impact and have low impacts to hunting opportunities.

Wild Mallard Biology and Population Impacts.

Mallards are the most widespread and abundant duck in North America (http://www.allaboutbirds.org/guide/mallard/lifehistory). Mallards are a common winter resident in south and central Wisconsin, an abundant migrant, and a common summer resident throughout the state (http://www.wisconsinbirds.org/plan/species/mall.htm).

The Waterfowl Breeding Population Survey report an increasing population trend for Mallards and is 42% above the long term average over the period of 1955-2014 (USFWS 2014). The BBS from 1966-2012 shows a similarly increasing population trend in Wisconsin (1.6% per year) and nationwide (1.8% per year; Sauer et al. 2014).

Duck production depends upon water conditions and when water is abundant, production is good and poor production is expected when water is scarce. Other factors that may influence Mallard population trends are predation and availability of nesting habitat. During the 2011 and 2012 regulated waterfowl hunting season, licensed hunters in Wisconsin killed an estimated 149,273 and 112,251 Mallards respectively (Raftovich and Wilkins 2013). Mallard conflicts in Wisconsin are typically related to health and human safety at airports and occasionally nuisance complaints related to nest construction by hens in the spring. A total of 119 Mallards were taken on all USFWS/WDNR permits during CY11-13, primarily on airports throughout the state for the protection of human health and safety at airports (Table 4-5). The Mallard population in the state and nationwide continues to grow despite hunter harvest and lethal take on USFWS/WDNR permits.

Table 4-5. All Depredation Permits issued by the USFWS/WDNR and total number of birds lethally removed under DPs in Wisconsin.

	CY11		CY12		CY13	
Species	**Issued**	**Take**	**Issued**	**Take**	**Issued**	**Take**
American Kestrel	1	10	3	3	4	4
American Robin	2	23	1	41	3	39
Barn Swallow	4	0	6	0	4	1
Blue-winged Teal	2	3	1	3	1	0
Canada Geese	58	1,577	78	2,380	85	1,601
Cliff Swallow	2	0	6	0	4	3
Great-blue Heron	22	195	27	165	26	176
Great-horned Owl	3	7	5	7	7	8
Gull spp.	84	1,090	49	539	72	1,354
Killdeer	1	0	5	44	6	23
Mallard	8	34	9	19	11	66
Mourning Dove	4	0	8	0	10	3
Red-tailed Hawk	6	51	10	37	15	25
Sandhill Crane	66	297	99	494	123	566

Wildlife Services lethally removed 60 of the total Mallards to protect human health and safety at airports during CY 2011-13. WS also used non-lethal methods to disperse 1,789 Mallards during this time period. Five Mallards were killed unintentionally during trapping activities. Based on an anticipated increase in requests for services, WS' lethal removal of up to 500 Mallards in any one year for airport safety and protection of other resources would not adversely affect Mallard populations. Mallard populations are healthy in Wisconsin and nationwide, WS potential lethal take of Mallards represents only 0.4% of the hunter harvest for 2012, and because of USFWS/WDNR oversight and monitoring of the Mallard population; WS actions would result in a low magnitude of impact on the Mallard population and have low impacts to hunting opportunities.

Blue-winged Teal Biology and Population Impacts

Blue-winged Teal breed from southeastern Alaska and western Canada to Canadian Maritimes and south to northeastern California, New Mexico, and New York. They winter from southern California, southern Texas, and Carolinas southward through tropical America. They arrive latest of all ducks at their breeding grounds and leave early in the fall. They are usually one of the first birds to migrate with many states opening an early hunting season for this duck.

During the 2012 regulated waterfowl hunting season, hunters killed an estimated 37,012 Blue-winged Teal in Wisconsin (Raftovich and Wilkins 2013). The BBS data from 2002-2012 shows a decreasing population trend in Wisconsin (-5.39%), but a stable population regionally and nationwide (Sauer et al. 2014). The USFWS breeding waterfowl data for Blue-winged Teal shows an increasing trend from the early 2000's to the present and is above the North American Waterfowl Management Plan population goals (USFWS 2014).

WS dispersed 54 and killed 3 Blue-winged Teal during CY 2011-13 to protect human health and safety at airports (MIS Data). Because the Wisconsin WS program is anticipated to expand to protect human health and safety, up to 50 Blue-winged Teal could be removed annually without adversely affecting populations. If WS received a request to conduct lethal damage management of Blue-winged Teal and a need was established, WS would consult with USFWS and WDNR. Because of this consultation, and that over 37,000 birds were harvested in 2012 in Wisconsin and 932,096 were harvested in the Mississippi Flyway by hunters (Raftovich and Wilkins 2013), WS activities would result in a low magnitude of impact and have low impacts to hunting opportunities.

Green-winged Teal Biology and Population Impacts

Green-winged Teal are the smallest dabbling duck in North America (Johnson 1995). They are very similar to Blue-winged Teal except smaller and without the pale blue wing patch on the forewings (Johnson 1995). The Green-winged Teal's breeding range spreads from western Alaska through northern Canada all the way to the northern reaches of Maine. These ducks are commonly one of the first ducks to migrate through Wisconsin in the month of September. These ducks can be seen foraging on vegetative materials in shallows, agricultural fields, and woodlots (Johnson 1995).

During the 2012 regulated waterfowl hunting season, hunters killed an estimated 31,625 Green-winged Teal in Wisconsin (Raftovich and Wilkins 2013). The BBS data from 2002-2012 shows stable population trends in Wisconsin, regionally, and nationwide (Sauer et al. 2014). The USFWS breeding waterfowl data show an increasing trend for Green-winged Teal going back to the early 1990's and they are above the North American Waterfowl Management Plan population goals (USFWS 2014).

Wisconsin WS did not disperse or kill any Green-winged Teal during the period of CY 11 through CY 13 (Table 4-2 and 4-3). Because the Wisconsin WS program is anticipated to expand to protect human health and safety at airports, up to 10 Green-winged Teal could be removed annually without adversely affecting populations. However, considering WS' history of not having killed any Green-winged Teal for damage management in the last three years, actual take in most years is likely to be low. If WS received a request to conduct lethal damage management of Green-winged Teal and a need was established, WS would consult with USFWS and WDNR. Because of this consultation, and that over 31,000 birds were harvested by hunters in 2012 in Wisconsin and 932,461 were harvested in the Mississippi Flyway (Raftovich and Wilkins 2013),

WS activities would result in a low magnitude of impact and have low impacts to hunting opportunities.

Raptors/Owls

Turkey Vulture Biology and Population Impacts.

Turkey Vultures breed from Canada to southern South America, adapting equally well to deserts, eastern deciduous forests, and tropical lowlands (Wilbur 1983). Turkey Vultures migrate to Wisconsin during April, nest, and return to their winter range in about September. Turkey Vultures are carrion feeders, eating fresh meat or carrion in advanced stages of decay.

The BBS population trend data from 2002-2012 indicates the Turkey Vulture breeding population has increased the United States (3.03% per year), in the BBS Eastern Region (4.85% per year), and in Wisconsin (9.54% per year; Sauer et al. 2014). PIF estimates a population of 17,000 Turkey Vultures in WI (Partners in Flight Science Committee 2013).

The WS program receives requests to assist with risks of Turkey Vulture collisions with aircraft and nuisance complaints associated with roosting groups of Turkey Vultures (e.g., fecal contamination). Nuisance complaints are generally resolved using non-lethal methods including vulture effigies and a combination of harassment and lethal methods are used to reduce hazards at airports. During CY 11 through 13, WS killed two Turkey Vultures for the protection of human health and safety at airports (Table 4-3). Turkey Vulture population trends are increasing in Wisconsin and in the BBS Eastern Region, consequently, WS anticipates that lethal removal of Turkey Vultures could increase to up to 10 Turkey Vultures per year (0.06% of the estimated population of Turkey Vultures in Wisconsin). Given the increasing trend for the Turkey Vulture population, current environmental factors (including the WS Program) are not having an adverse impact on state, regional or national Turkey Vulture populations. Given the low level of anticipate take relative to the current estimated state Turkey Vulture population and rate of population increase, WS proposed activities would have a low magnitude of cumulative impact on the Turkey Vulture population.

Red-tailed Hawk Biology and Population Impacts.

Red-tailed Hawks are probably one of the best-known and most common hawk species in North America. They range throughout North America to central Alaska and northern Canada, and south as far as Panama. Although not truly migratory, they do adjust seasonally to areas with abundant prey. In winter many of the northern birds move south. They nest in woodlands and feed on rodents and rabbits in open country. The Red-tailed Hawk is the largest hawk, usually weighing between 2 and 4 pounds.

BBS population trend data for 2002 – 2012 indicate that the Red-tailed Hawk population is stable in Wisconsin, and increasing in BBS Eastern Region (1.49% per year), and nationwide (2.28% per year; Sauer et al. 2014). Partners in Flight landbird population database estimates that there are 20,000 Red-tailed Hawks in Wisconsin (Partners in Flight Scientific Committee 2013). During CY 11 through 13, WS dispersed 572 Red-tailed Hawks using non-lethal management tools (Table 4-2). During the same period WS captured and relocated 22 Red-tailed Hawks as part of an ongoing raptor relocation program at two Wisconsin airports. WS also killed 36 Red-tailed Hawks to protect human health and safety at airports throughout the state of Wisconsin during CY 11 through CY 13 (Table 4-3). An additional 77 Red-tailed Hawks were taken by

entities other than WS under DPs issued by the USFWS/WDNR during 2011-2013 for a cumulative impact of 113 hawks lethally removed under all DP's (Table 4-5). WS removals of Red-tailed Hawks was less than a third of Red-tailed Hawk removals authorized by DP's and less than 0.2% of the estimated population of Red-tailed Hawks in Wisconsin. Based on increasing Red-tailed Hawk population trends for the region and nationwide and anticipated increases in requests for WS at airports, annual lethal removal of Red-tailed Hawks by WS could increase but is not expected to exceed 35 Red-tailed Hawks annually. Adding WS' maximum annual lethal take to an anticipated annual lethal take of approximately 30 Red-tailed Hawks per year by entities other than WS would result in maximum annual cumulative take of approximately 0.3% of the total Wisconsin Red-tailed Hawk population. Based on current population trends, the wide distribution of Red-tailed Hawks in the state and the localized nature of WS Red-tailed Hawk removals, this level of cumulative take should not adversely impact the state, regional, or national Red-tailed Hawk population.

Cooper's Hawk Biology and Population impacts.

The Cooper's Hawk is a strictly North American species. The Cooper's Hawk, is essentially a woodland species and although a true forest hawk, it has adapted remarkably well to life in and around the older suburbs, especially in areas where small woodlots and trees have been allowed to stand (Curtis et al. 2006). Home range of these hawks is relatively large. In Wisconsin, a breeding male was found to have a territory of 1,900 acres (Murphy et al. 1988).

BBS population trends for the period of 2002-2013 indicate that Cooper's Hawks population trends are stable to increasing in Wisconsin and increasing in the BBS Eastern Region (5.33 % per year), and nationwide (4.85% per year; Sauer et al. 2014). Partners In Flight Estimate the population of Cooper's Hawks in Wisconsin to be 30,000 (Partners in Flight Scientific Committee 2013).

During CY11 through 13, WS did not kill any Cooper's Hawks (Table 4-3). WI WS did disperse 7 and relocate 1 Cooper's Hawk during this time to address safety concerns at airports (Table 4-2). WS did not recommend the issuance of any DPs to the USFWS/WDNR from CY11 through CY13 (Table 4-5). Because Cooper's Hawk populations appear to be stable to increasing, WS could remove of up to 15 Cooper's Hawks causing damage or potentially causing damage annually (i.e., bird aircraft strikes and agriculture protection) under a DP issued by the USFWS/WDNR. This level of take represents 0.05% of the estimated population of Cooper's Hawks in the state. However, considering WS's history of not having killed any Cooper's Hawks in the last three years, actual take in most years is likely to be far lower than this number. Given the low level of impact and stable or increasing population trends for the state, region, and nationally, this level of lethal removal will not have a cumulative adverse impact on Cooper's Hawk populations.

Great Horned Owl Biology and Population Impacts.

The Great Horned Owl is common in Wisconsin and throughout the United States and the largest owl in North America. They are found in woods, mountain forests, desert canyons, marshes, city parks, and urban forests.

BBS population trends for 2002-2012 indicate that Great Horned Owl populations have remained relatively stable in Wisconsin, the eastern BBS Region, and nationwide (Sauer et al. 2014).

Partners in Flight estimate the state Great Horned Owl population at 30,000 (Partners in Flight Scientific Committee 2013).

During CY 11 through 13, WS did not kill any Great Horned Owls (Table 4-3). WS dispersed one and relocated one Great Horned Owl related to safety concerns at airports (Table 4-2). The USFWS/WDNR issued 15 DPs to resolve conflicts in Wisconsin from CY11 through CY13 with a total of 22 owls being lethally taken by entities other than WS (Table 4-5). Based on anticipated increases in requests for WS assistance, WS might kill up to 10 Great Horned Owls per year which represents 0.03% of the estimated population of Great Horned Owls in Wisconsin. However, considering WS' history of not having taken any Great Horned Owls for damage management in the last three years, actual take in most years is likely to be far lower than the predicted maximum level. Given the relatively stable state, regional, and national trends for this species with current levels of lethal removal by non-WS entities and the low level of maximum WS take; WS proposed action is not anticipated to have an adverse cumulative impact on Great Horned Owls.

Rough-legged Hawk Biology and Population Impacts.

Rough-legged Hawks are an arctic species that breed in arctic and subarctic Alaska and Canada and migrate to southern Canada and the northern United States in the winter. Winter habitat includes open spaces that resemble the tundra habitat they inhabit in the summer. This can include marshy areas, pastures, and in Wisconsin, airport property. Rough-legged Hawks summer diet includes small rodents. Winter diet is similar; however, carrion may be consumed when heavy snows limit small mammal abundance (Bechard and Swem 2002).

Limited data on the population status of Rough-legged Hawks exists, although the species is considered widespread and common in the Arctic tundra breeding range, and there is no evidence of change in breeding populations (Bechard and Swem 2002). Christmas bird counts from 2002-2012 indicate that the population of Rough-legged Hawks is relatively stable in Wisconsin and Nationwide (National Audubon Society 2014).

WS dispersed eight Rough-legged Hawks using non-lethal methods and killed one bird from 2011-2013 for the protection of aviation safety (Table 4-2 and 4-3). Because Rough-legged Hawk populations are stable in Wisconsin, removal of up to 5 Rough-legged Hawks causing damage or potentially causing damage (i.e., bird aircraft strikes) annually would result in a low magnitude of impact. Given available population information and the very low level of anticipated maximum annual WS lethal removal, the proposed action will not have an adverse cumulative impact on Rough-legged Hawk populations.

American Kestrel Biology and Population impacts.

American Kestrels are the smallest and most common falcon in open and semi-open country, which frequently use telephone poles or wires as hunting perches and are often mistaken for a songbird (Smallwood and Bird 2002). Their breeding range extends as far north as central and western Alaska across northern Canada to Nova Scotia, and extends south throughout North America, into central Mexico, the Baja, and the Caribbean (Smallwood and Bird 2002). Most of the birds breeding in Canada and the northern United States migrate south in the winter, although some males stay as year round residents (Smallwood and Bird 2002). Kestrels consume primarily insects in the summer; however, they will also eat small rodents and birds. Wintering birds feed primarily on rodents and birds (Smallwood and Bird 2002). It is possible that the use

of pesticides has had an effect on them in recent decades. An even greater problem may be a scarcity of nest sites. Being a secondary cavity nester, the kestrel requires an abandoned woodpecker hole or similar cavity to nest and may compete with European Starlings for nest sites.

BBS population trends for the period of 2002-2012 indicate that American Kestrel populations are relatively stable in Wisconsin, and stable to slightly decreasing in the BBS Eastern Region and nationwide (Saurer et al 2014). Estimates of up to 1.2 million breeding pairs have been made for the North American population (Cade et al. 1988), with an equal number thought to breed in the neotropics. Partners in Flight estimates there are approximately 29,000 American Kestrels in Wisconsin (Partners in Flight Scientific Committee 2013).

During the period of CY11 through CY 13, WS dispersed 83 American Kestrels and killed 13 for the reduction of bird hazards to aircraft (Table 4-2 and Table 4-3). During this same period an additional 4 birds were taken under USFWS DPs by entities other than WS (Table 4-5). WS anticipates that total WS lethal removal of American Kestrels will not exceed 25 kestrels per year. Based on historic patterns, lethal removal by non-WS entities is not likely to exceed 5 birds per year or a maximum annual take of 30 birds per year (0.1% of the estimated population of American Kestrels in Wisconsin). Given the wide distribution of American Kestrels and the low level of anticipated lethal removal and isolated nature of WS damage management actions, the proposed action would not have an adverse cumulative impact on American Kestrel populations and is not contributing substantively to current population trends.

Snowy Owl Biology and Population Impacts.

Snowy Owls are a highly charismatic large circumpolar owl that breeds on open ground from the near tree line north to the polar seas (Parmelee 1992). Although regular migrants to the northern great plains in the winter, Snowy Owl migrations will see occasional and irregular eruptions of large numbers of birds migrating south in parts of eastern and western North America (Parmelee 1992). For example, in 2013-14 large numbers of Snowy Owls migrated south into the U.S. in greater numbers than normally observed. These migrations can cause problems at airfields which resembles the open spaces that the birds inhabit in the Arctic. There have been 31 reported aircraft strikes of Snowy Owls in the Great Lakes region in the last two years with Wisconsin reporting two of those strikes.

Population status of Snowy Owls is not well known and there are few population estimates available. The number of Snowy Owls observed during the Christmas Bird Count across all areas surveyed in the United States and in Wisconsin has shown a variable trend over the past 20 years (National Audubon Society 2010). This is as expected given that Snowy Owls are only infrequent visitors to most locations in the U.S. Christmas bird counts are highly variable due to the irregular eruptions of migrating Snowy Owls from northern wintering grounds. Christmas bird counts do indicate a relatively stable population trend (National Audubon Society 2014). BBS results are not available for the breeding range of this species.

During CY11 through 13, WS dispersed between 4-5 Snowy Owls and killed 1-3 Snowy Owls per year for the protection of human health and safety at airports in Wisconsin (Tables 4-2 and 4-3). Given past experience and anticipated increases, removal of up to 5 Snowy Owls per year for the protection of human health and safety may occur. Given USFWS and WDNR oversight and monitoring, the low number of birds which may be taken and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would not have an adverse cumulative impact on Snowy Owl populations.

Bald Eagle Biology and Population Impacts

Bald Eagles are normally found in Wisconsin near large bodies of water, rivers and creeks, and marshes. Food habits of Bald Eagles are varied and they partake in scavenging more often than hunt for live prey. It is not uncommon to find Bald Eagles feeding on livestock carcasses or carcasses of deer and other large animals killed near highways. The largest breeding populations of Bald Eagles occur in Alaska and Canada; however, people have found eagle nests in all 48 contiguous States, except Rhode Island and Vermont (Buehler 2000). During the migration period, eagles occur throughout the United States and parts of Mexico (Buehler 2000). In addition to protection under the MBTA, Bald Eagles are also protected under the BGEPA which prohibits, except under certain specified conditions, the taking, possession, and commerce of such birds, and assesses penalties for violating the BGEPA.

Humans are the leading cause of mortality for Bald Eagles (Wood 1990). From February 2005 to August 2013, 380 Bald Eagles have been submitted by the WDNR for Necropsy. The majority of the causes of death were from vehicle collisions, trauma, and lead poisoning (L. Long, WDNR Wildlife Veterinarian, personal communication). Bald Eagles are routinely submitted to wildlife rehabilitators in WI. From December 2006 to January 2013, 598 eagles have been admitted to wildlife rehabilitators. In 292 of these cases, eagles were dead on arrival, died in care, or euthanized. Eagles were released back into the wild in 127 cases (A. J. Kamp, WDNR Wildlife Biologist, personal communication).

Wildlife Services does not anticipate using lethal methods to address conflicts with Bald Eagles in Wisconsin. Non-lethal methods (frightening devices and capture and relocation) may be used, if permitted by the USFWS/WDNR, to reduce hazards to aircraft. However, WS could unintentionally take Bald Eagles while conducting BDM activities. Wildlife Services non-purposeful take is very low with only 5 cases of non-purposeful take of Bald Eagles recorded in the last 25 years in WI and none of these were from the result of BDM activities. Three of the eagles were killed and 2 were released. Four of these were caught in foothold traps set for beaver (*Castor canadensis*) and one in a foothold trap set for wolf (*Canis lupis*).

Under the BGEPA (16 USC 668-668c), the take of Bald Eagles is prohibited without a permit from the USFWS. The definition of "*take*" includes actions that can "*molest"* or *"disturb"* eagles. For the purposes of the Act, under 40 CFR 22.3, the term "disturb" as it relates to take has been defined as "*to agitate or bother a Bald and Golden Eagles to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.*" Most all activities that WS conducts would not fall into the category that would require a permit for the non-purposeful take of Bald Eagles. The USFWS states that "*Eagles are unlikely to be disturbed by routine use of roads, homes, or other facilities where such use was present before an eagle pair nesting in a given area. For instance, if eagles build a nest near your existing home, cabin, or place of business you do not need a permit.*" (USFWS 2012). Therefore, activities that are species specific and are not of a duration and intensity that would result in disturbance as defined by the act would not result in non-purposeful take. Activities such as crop appraisals, egg oiling of various species (gull, goose, and cormorants), trap checks, and stream surveys are generally short term disturbances at sites where these take place.

WS will conduct its activities that are located near active eagle nests and Important Eagle Use Areas using the National Bald Eagle Management Guidelines (USFWS 2007). The categories

that would encompass most of these activities are Categories D (Off-road vehicle use), F (Non-motorized recreation and human entry), and H (Blasting and other loud, intermittent noises). These categories generally call for a buffer of 330-660 feet for category D and F, and a ½ mile buffer for category H. In addition, Wisconsin WS utilizes mostly lead free ammunition when conducting operational work with firearms. Based on the above information and protective measures, WS activities are not expected to agitate or bother a Bald Eagle to a degree that causes, or is likely to cause a decrease in its productivity or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

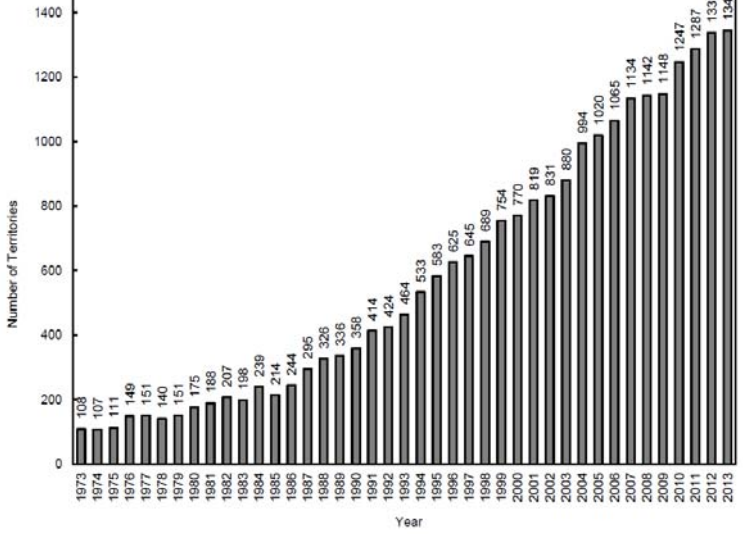

Figure 4-1. Occupied Bald Eagle nests in Wisconsin, 1973-

Despite all known and unknown sources of eagle mortality, including past non-purposeful take by WS, Bald Eagle nesting in WI has steadily increased from 108 nests in 1973 to 1,344 in 2013 (Figure 4-1)(WDNR 2013). Bald Eagles occupy nests in 67 of the state's 72 counties with the highest concentration of eagle nesting occurring in Villas (*n*=144) and Oneida (*n*=134) counties (WDNR 2013). A total of 1,057 young were fledged in 748 successful nests for a success rate of 63% (WDNR 2013). Four hundred and thirty-four Bald Eagles were observed during a 2013 over-winter survey. Although numbers recorded by the WDNR are variable due to ice conditions, this is 2.2 times the 20-year average of 196 eagles (WDNR 2013).

Non-purposeful take of Bald Eagles in Wisconsin (associated with other wildlife damage management activities) is not expected to exceed 3 per year. Wildlife Services takes active measures following the National Bald Eagle Management Guidelines to avoid disturbance of Bald Eagle nests. Standard Operating Procedures are established in WS EA to minimize risk of capture, injury, or death of eagles (USDA 2000, 2004, 2009, 2013a, 2013b, 2013c). Based on this information and the increasing trend for the eagle population in Wisconsin, any eagle take by WS would not have an adverse cumulative impact on the state Bald Eagle population.

Wading/Shorebirds

Great Blue Heron Biology and Population Impacts.

Great Blue Herons are the most widely distributed heron in the United States and are commonly seen in Wisconsin during the spring, summer, and autumn. Herons feed primarily on fish and other aquatic vertebrates and are commonly viewed standing or wading on the shores of ponds, creeks, and rivers. However, Great Blue Herons will also stalk upland areas for rodents and other animals, especially in winter (Vennesland and Butler 2011).

BBS population trend data for 2002-2012 indicate that Great Blue Heron populations are relatively stable in Wisconsin and increasing in the BBS Eastern Region (1.35% per year) and nationwide (1.91% per year; Sauer et al. 2014). The Upper Mississippi Valley Great Lakes Waterbird Conservation Plan classifies Great Blue Herons as a species not at risk and estimates there are >12,000 breeding pairs of Great Blue Herons in Bird Conservation Region (BCR) 23 which includes the southern two thirds of Wisconsin (Wires et al. 2010). No population estimate was available for BCR 12 which includes the northern third of the state. Great Blue Herons usually don't breed until their second spring (>22 months old; Vennesland and Butler 2011), so the estimate of breeding pairs underestimates total population size.

Conflicts with Great Blue Herons in Wisconsin primarily involve risks to aircraft and predation on fish at aquaculture facilities. During CY 11 through 13 WS killed 9 Great Blue Herons to reduce risks to aircraft (Table 4-3). During CY 11 through 13, the USFWS reported that 195, 165, and 176 Great Blue Herons were removed in Wisconsin to protect property, which includes take by WS (Table 4-5). WS anticipates taking no more than 30 Great Blue Herons per year to protect human health and safety at airports or remove birds that are causing damage to aquaculture facilities. Given the low level of WS take and the stability of the Wisconsin Great Blue Heron population, and USFWS/WDNR oversight through DPs, the proposed action would have a low cumulative impact on state, regional, and national populations.

Green Heron Biology and Population Impacts.

Green Herons are small, compact, wading birds that are common to wetlands throughout North America (Davis and Kushlan 1994). Primarily solitary nesters, Green Herons have been known to nest in loose colonies (Davis and Kushlan 1994).

BBS population trend data for 2002-2012 show a decline in the population of Green Herons nationally (1.17% per year) and in the BBS Eastern Region (1.55% per year) (Sauer et al. 2014). However, the BBS population trend data for Wisconsin shows a stable population (Sauer et al. 2014). The Upper Mississippi Valley Great Lakes Waterbird Conservation Plan classifies Green Herons as a species of low concern (Wires et al. 2010). The plan does not provide population estimates for BCRs 23 and 12 in Wisconsin**.**

During CY 11 through 13 WS dispersed 2 Green Herons to reduce risks to aircraft (Table 4-2). The USFWS/WDNR issued 15 DP's in Wisconsin during CY 11 through 13 for the protection of aquaculture facilities. WS anticipates taking no more than 5 Green Herons per year to protect human health and safety at airports. However, considering WS' history of not having killed any Green Herons for damage management in the last three years, actual take in most years is likely to be far lower than this number. Given the low level of WS take, that take would be limited to isolated locations within the state, and the stability of Green Heron populations, the proposed action would have a low cumulative impact on statewide, regional, or national populations.

Greater Sandhill Crane Biology and Population Impacts.

The Greater Sandhill Crane is the largest of six subspecies of Sandhill Cranes and is common to Wisconsin during spring, summer, and autumn. About 30,000 Greater Sandhill Cranes breed in Wisconsin, Michigan, Ontario, and neighboring states. In late summer and early fall, these birds begin to congregate in preparation for fall migration. Greater Sandhill Cranes breeding habitats in the eastern United States consist of meadows, willow-dotted streams, shallow marshes, and other associated wetland habitats (Johnsgard 1983). Foraging behaviors of Sandhill Cranes vary

by season and area and they adjust their diets to local resources. However, corn and other small grains are the most important food items during spring migration and an important aspect of crane survival in winter and spring (Johnsgard 1983). Sandhill Cranes forage primarily on land and do much digging with their bills when necessary to extract food items from the soil (Johnsgard 1983).

Sandhill Cranes in Wisconsin are part of the Eastern Sandhill Crane Population (Van Horn et al. 2010). Most birds in this population breed in the Great Lakes Region (Wisconsin, Michigan, Ontario and Minnesota) although the breeding range is currently expanding (Kruse et al. 2014). The birds have historically wintered in Georgia and Florida, but increasing numbers of birds are wintering in more northern states. USFWS survey data for the population indicate a general increasing trend, although data can be highly variable among years. Fall index survey data indicate there were 63,322 cranes in the eastern population in 2013 with a 3-year average of 74,784 cranes. The 2010 Atlantic and Mississippi Flyways management plan for the Eastern Sandhill Crane population allows for a Sandhill Crane hunting season if the 3-year average for the population is over 30,000 birds (Van Horn et al. 2010). Birds from this population are hunted in Tennessee and Kentucky with 437 cranes harvested during the 2013 hunting season. Data from the Midwest Sandhill Crane Count indicate that the Sandhill Crane population is still increasing. In 2012, more than 1,900 volunteers counted more than 11,000 Sandhill Cranes in Wisconsin and portions of neighboring states (International Crane Foundation 2012).

Sandhill Cranes can cause extensive damage to planted corn crops by consuming newly planted corn seeds and damaging large sections of fields. Methods commonly used to reduce Sandhill Crane damage include use of frightening devices, repellent seed treatments, and shooting. Cranes are a large bird and their low and slow flight behavior can pose a serious threat to human safety and aviation around airports. Wisconsin WS killed 9 and dispersed 11 Sandhill Cranes in CY 11 through CY 13, to reduce risks to aircraft (Tables 4-2 and 4-3). Additionally, 296 cranes were shot in 2011, 490 in 2012, and 560 in 2013 by non-WS entities under DPs from the USFWS/WDNR to reduce damage to crops (Table 4-5). Based on anticipated increases in the Sandhill Crane population and requests to assist with bird hazard management at airports, WS could remove up to 30 Sandhill Cranes annually. Take by non-WS entities is difficult to predict but may vary depending on changes in the number of Sandhill Cranes in the state. Additionally, we are aware that Wisconsin and some other states are considering instituting hunting seasons. At present, the state and Eastern Sandhill Crane populations continue to increase despite cumulative impacts of WS actions, take under DPs and hunter harvest (Tennessee and Kentucky). The management plan for the Eastern Sandhill Crane population calls for maintaining a 5-year population index of 30,000 to 60,000 Sandhill Cranes. The USFWS/WDNR, through coordination with the states and Flyway Councils and migratory bird permits, will monitor cumulative impacts on the Sandhill Crane population and will work with the states and flyway councils to adjust harvest, depredation take and other management actions (e.g., habitat management) to achieve population management objectives and maintain a healthy and sustainable Sandhill Crane population. Given these management practices, the proposed WS action will not have a cumulative adverse impact on the state or regional Sandhill Crane population.

Killdeer Biology and Population Impacts

Killdeer occur over much of North America and a fraction of South America; from the Gulf of Alaska coastline the range extends southward throughout the United States to the Atlantic and Pacific coasts (Hayman et. al. 1986). Killdeer are technically in the family of shorebirds, but they are unusual shorebirds in that they often nest and live far from water. Killdeer are commonly

found in a variety of open areas, even concrete or asphalt parking lots at shopping malls, as well as fields and beaches, ponds, lakes, road-side ditches, mudflats, airports, pastures, and gravel roads and levees but are seldom seen in large flocks.

Although relatively abundant with an estimated 2 million birds in the United States, BBS population trend data for 2002-2012 indicate that the Killdeer population is decreasing in Wisconsin (3.01% per year) and the BBS Eastern Region (0.62% per year), but relatively stable nationally (Sauer et al. 2014). Killdeer are listed as being of moderate regional and national conservation concern in the United States and Upper Mississippi Valley/Great Lakes Shorebird Conservation Plans (de Szalay et al. 2000, Brown et al. 2001). Consultation with the USFWS indicates the primary factor impacting Killdeer populations in the Midwest is the loss of ephemeral wetlands, mainly in agricultural areas, due to tiling and other drainage schemes. With the loss of these wetlands such ponds are becoming increasingly scarce or dry out too quickly to aid Killdeer and the nests are either abandoned or plowed under before the chicks hatch. There seems to be little change in the wintering habitat in Louisiana where rice fields are still abundant (R. Robert, USFWS, pers. comm.).

WS primary involvement with Killdeer is to reduce bird hazards to aircraft. WS dispersed 1,662 and killed 62 Killdeer during CY11 through CY13 at airport facilities to reduce the risk of bird/aircraft strikes (Tables 4-2 and 4-3). The USFWS reported that an additional 5 Killdeer were killed from 2011 through 2013 under DPs by entities other than WS (Table 4-5). Based on an anticipated increase in requests for services, Wisconsin WS could remove an annual maximum of 50 Killdeer per year. Given localized nature of WS Killdeer take and the limited number of birds which could be taken, WS take is not likely to contribute substantively to current population trends. Oversight by the USFWS/WDNR through monitoring of the Killdeer population and the number of birds taken under migratory bird permits will ensure that WS limited lethal take of killdeer in Wisconsin would not have an adverse cumulative impact on the Killdeer population.

Gulls

Herring Gull Biology and Population Impacts.

The Herring Gull is the largest of the five species of gulls that could occur in Wisconsin with a body length of about 25 inches and wing span of about 58 inches (Sibley 2000). The most distinctive adult characteristics are a red dot on the lower bill and pinkish legs and feet. The Herring Gull can be found near garbage dumps and near lakes and rivers. Herring Gulls in Wisconsin are part of a larger Great Lakes regional population. Damage management actions in Wisconsin could conceivably result in birds moving along the Lake Michigan coast.

Data from the USGS Breeding Bird Survey for the period of 2002-2012 indicate that Herring gull populations have been relatively stable in Wisconsin, and stable to decreasing in the BBS Eastern Region and nationwide (Sauer et al. 2014). However, as noted at the beginning of Section (4.3.1), the BBS is not well suited to monitoring colonial nesting species such as gulls. The Wisconsin Checklist Project is a voluntary monitoring program that provides information on annual, seasonal, and geographical variation in abundance of 296 species of birds occurring in Wisconsin. The Wisconsin Checklist Project lacks the standardization and scientific rigor of the BBS survey, but, in combination with other surveys can provide additional insight into the status of the state bird populations. The Wisconsin Checklist project indicates that the Herring Gull population in Wisconsin had an increasing trend in the late 1980's to mid-1990s followed by a decreasing trend (Rolley 2010). A colonial waterbird survey is conducted roughly once every 10

years that counts waterbirds along the shoreline and islands of the Great Lakes and some inland colonies along the shoreline (Cuthbert and Wires 2013). Data from the survey show an increasing trend for Herring Gulls nesting along the Lake Michigan shoreline of Wisconsin from 4,988 breeding pairs in 19 colonies in 1977 to 6,226 pairs in 20 colonies in the 1989-91 survey, 8,183 breeding pairs in 39 colonies in the 1997-99 survey and 10,548 breeding pairs in the 2007-09 survey (Cuthbert and Wires 2013). The total number of breeding pairs of Herring Gulls along the Lake Michigan Shoreline (which includes the states of Michigan, Indiana, Illinois, and Wisconsin) increased from 12,302 pairs in 50 colonies in 1977 to 18,122 pairs in 70 colonies in the 1989-91 survey, decreased to 16,455 pairs in 76 colonies in the 1997-99 survey and increased again to 21,403 breeding pairs in 60 colonies in the 2007-09 survey. This survey was not a complete count of gulls nesting in the states and did not include any birds that might have been nesting on inland lakes and rivers or a complete census of rooftops and other nesting sites within metropolitan areas. It can be extremely difficult to locate all rooftop nesting locations in a major metropolitan area. Biologists often only find out about these sites when the presence of the birds results in complaints and requests for assistance with damage management. The colonial waterbird survey only counts nests, so it also underestimates the gull population because it doesn't include non-breeding birds. Herring Gulls generally take 4 years to reach reproductive maturity so a considerable portion of Herring Gull populations are not included in the waterbird survey numbers. The global Herring Gull population is estimated at 2,800,000 (National Audubon Society 2014b).

The primary requests Wisconsin WS receives for assistance with Herring Gulls involve bird strike hazards at airports; damage to property and risks to human health and safety from gulls nesting on rooftops, mainly along the Lake Michigan shoreline; and conflicts associated with landfills (e.g., Herring Gulls transporting materials from landfills to nearby rooftops). During CY 11 through 13, Wisconsin WS used non-lethal methods to disperse 50,022, 106,437, and 91,489 Herring Gulls, respectively in Wisconsin (Table 4-2). From 2011-2013, Wisconsin WS also lethally removed 749 Herring Gulls and removed 1,744 nests containing 4,972 eggs during BDM projects (Table 4-3). Herring Gull populations in Wisconsin have remained stable over the long term given this level of removal from both WS and non-WS sources. From CY 2011-2013 the USFWS/WDNR issued depredation permits to kill 640 Herring Gulls and remove 6,447 nests containing eggs (L. Harrison, USFWS, Pers. Comm. 6/26/2014). Herring Gulls were likely also taken under permits issued to non-WS entities that were recorded as "gulls" without the individual gull species being distinguished. From 2011-2013 there were 1,455 gulls and 14,616 nest taken from non-specific gull species reported (L. Harrison, USFWS Pers. Comm.).

Because Herring Gulls could occur on airport facilities and cause risk to the traveling public and aircraft from bird strikes and damage other resources such as moored boats at marinas, WS could remove up to 400 damaging or potentially damaging Herring Gulls per year, and 1000 nests. This level of lethal removal is approximately 2% of the estimated breeding Herring Gulls nesting along the Wisconsin portion of the Lake Michigan shoreline and 0.9% of all Herring Gulls breeding along the Lake Michigan shoreline. Given the long term increasing trend for breeding Herring Gulls in Wisconsin and the increase between the 1997-99 and 2007-09 surveys for all of Lake Michigan, and USFWS/WDNR oversight, the cumulative impacts of current and proposed damage management activities are not expected to adversely impact the state, regional, or national Herring Gull Population.

Ring-billed Gull Biology and Population Impacts.

Ring-billed Gull appearance is similar to Herring Gulls but they are smaller, have yellow feet, and a yellow bill with a black band near the tip. Ring-billed Gulls are a common gull in Wisconsin and populations are 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, parks, and sites with outdoor restaurants (Pollet et al. 2012). Spring arrival of migrants in Wisconsin begins in March/April and autumn migration is normally completed in October; however, some Ring-billed Gulls may remain longer.

Ring-billed Gulls in Wisconsin are part of the larger Great Lakes population. Damage management actions in Wisconsin could conceivably result in birds moving along the Lake Michigan coast. For example, Ring-billed Gulls banded in the Chicago and Lake Calumet areas in Illinois were observed in Wisconsin (5 observations), Indiana (1), Michigan (1), New York (1), and Ontario (1). Banding data from other studies have indicated little immigration or emigration in or out of the Great Lakes Region (Gabrey 1996, Weseloh 1984). A Colonial Waterbird Survey was conducted that covered the shoreline and islands of the Great Lakes and some inland colonies near the shores of the Great Lakes (Cuthbert and Wires 2013). The number of nesting Ring-Billed Gulls in Wisconsin increased from 1,888 pairs in 4 colonies in 1977 to 29,166 breeding pairs in 9 colonies in the 1997-99 survey, but decreased to 8,781 pairs in 13 colonies in the 2007-09 survey (Cuthbert and Wires 2013). The decrease may have been related in shifts in nesting locations in response to damage management efforts instead of decline in the regional population, because the total number of breeding pairs on the Lake Michigan shoreline increased from 34,144 pairs in 18 colonies in 1977 to 110,759 pairs in 24 colonies during the 1989-91 survey, 117,250 pairs in 32 colonies during the 1997-99 survey and 145,163 pairs in 40 colonies during the 2007-09 survey. As noted above for Herring Gulls, this survey likely underestimated the number of Ring-billed Gulls in the state and region.

Data from the USGS Breeding Bird Survey for the period of 2002-2012 indicate that the Ring-billed Gull population has been highly variable but relatively stable in Wisconsin and increasing 8.19% per year in the BBS Eastern Region and 6.17% per year nationwide (Sauer et al. 2014). Limits to the use of BBS data for colonial waterbirds such as gulls are discussed above for Herring Gulls. The Wisconsin Checklist Project indicates that the Ring-billed Gull population in Wisconsin has increased over the period of 1983-2010 (Rolley 2010). Without a comprehensive survey of Ring-billed Gulls in the state, it is difficult to determine if the differences in findings between the colonial waterbird survey data and other surveys are related to differences in the area included in the surveys or some other facet of survey design.

Wisconsin WS activities that impact Ring-billed Gulls include operations to reduce human health and safety hazards at airports and for the protection of property, mainly along the Lake Michigan shoreline, and reduce conflicts associated with landfills. During CY 11 through 13, Wisconsin WS used non-lethal methods to disperse 113,290, 200,783, and 181,324 Ring-billed Gulls, respectively, in Wisconsin (Table 4-2). From 2011-2013, Wisconsin WS killed 772 Ring-billed Gulls and also removed 6,706 nests containing 14,862 eggs during projects to reduce Ring-billed Gull damage and risks to human health and safety (Table 4-3). The USFWS/WDNR issues permits to take Ring-billed Gulls and to remove nest with eggs. From CY 2011-2013 the USFWS issued depredation permits to non-WS entities to kill an additional 103 Ring-billed Gulls and remove 19,501 nests containing eggs (L. Harrison, USFWS, Pers. Comm. 6/26/2014). Additional Ring-billed Gulls may have been taken on permits that were recorded as multiple gull species without the individual gull species being distinguished. From 2011-2013 there were

1,455 gulls and 14,616 nest taken from non-specific gull species reported. Nest and egg treatments are intended to cause relocation of gulls, so declines in nesting birds counted in the state during the colonial waterbird survey (Cuthbert and Wires 2013) may be the product of management efforts, especially given that the colonial waterbird survey data for all of Lake Michigan show an increasing trend and other survey data for the entire state of WI show stable or increasing trends (Sauer et al. 2014, Rolley 2010).

Because Ring-billed Gulls could occur on airport facilities and cause risk to the traveling public and aircraft from bird strikes and damage buildings, property, and other resources such as moored boats at marinas, WS could remove up to 1,000 damaging or potentially damaging Ring-billed Gulls per year, and 2,000 nests with all eggs associated with those nests per year without adversely affecting populations. Based on the above information current and anticipated Ring-billed Gull damage management actions may result in local or state-level reductions in the Ring-billed Gull population. However, given the number of nest and egg treatments, the majority of impact is anticipated to be in the form of relocation of gull colonies and not a reduction in the regional or national Ring-billed Gull population. Given current regional population trends and USFWS/WDNR oversight, the proposed action is not anticipated to have an adverse cumulative impact on Ring-billed Gull populations.

Pigeons/Doves

Rock Pigeon Biology and Population Impacts.

Rock Pigeons were introduced to North America in the early 17th century as domesticated pigeons. The Rock Pigeon is now feral and lives throughout most of the North American continent (Lowther and Johnston 2014). Domesticated pigeons readily go feral and as a non-native introduced species are not protected by state or federal law.

Wisconsin BBS population trend data for the period of 2002-2012 indicate that Rock Pigeon population is relatively stable in Wisconsin, and stable to slightly decreasing in the eastern BBS region and nationwide (Sauer et al. 2014). The PIF landbird population database estimates there are approximately 800,000 Rock Pigeons in Wisconsin (Partners in Flight Scientific Committee 2013).

Rock Pigeons were taken to protect human health and safety, protection of livestock health, reduce consumption and contamination of feed, and damage to property. Executive Order 13112 - Invasive Species directs Federal agencies to prevent the introduction of invasive species and provide for their management and to minimize the economic, ecological, and human health impacts that invasive species cause. WS killed 254 Rock Pigeons from 2011-13 and removed 2 nests and one egg (Table 4-3). Permits are not required for the take of this species, so no information is available on Rock Pigeon take by non-WS entities. WS could take up to 5,000 Rock Pigeons annually for the protection of the public from disease threats or aircraft strikes (i.e., human safety) and property protection from defacing without adversely affecting populations. This level of take would only be 0.6% of the estimated statewide Rock Pigeon population. Given the current stable trend for the state Rock Pigeon population, the low portion of the population that could be removed, and that WS actions are limited to only a small portion of the state, the proposed action is unlikely to have a cumulative adverse impact on the state, regional or national Rock Pigeon populations. However, because Rock Pigeon populations are an invasive species, population reduction including eradication is considered by some biologists to have beneficial impacts on native ecosystems and species and consistent with EO 13112-Invasive Species.

Mourning Dove Biology and Population Impacts.

Mourning Doves are migratory birds with substantial populations throughout much of North America and are the most common native dove found in suburban and farmland areas and is the most widely hunted and harvested game bird (Otis et al. 2008). They are capable of producing multiple broods per year and their range is expanding northward (Ehrlich et al. 1988). After breeding season, most birds congregate in large flocks particularly around agricultural fields (Otis et al. 2008).

The BBS survey data for 2002-2012 indicate the Mourning Dove population has been relatively stable in Wisconsin, increasing in the Eastern BBS Region (0.35% per year) and decreasing nationwide (0.37% per year; Sauer et al. 2014). The PIF landbird database estimates there are approximately 1.4 million Mourning Doves in Wisconsin (Partners In Flight Scientific Committee 2013). Mourning Doves are considered a game species with a regulated hunting season in Wisconsin. Reported take from the 2011-12 season was 72,426 (+/- 29,160) birds and 50,602 (+/- 16,657) birds in the 2012-2013 season (Dhuey 2012, Dhuey 2013).

WS dispersed 3,581 Mourning doves and removed 2 from 2011-2013 (Table 4-2 and 4-3). One additional Mourning Dove was removed by a non-WS entity under a USFWS/WDNR depredation permit during that same time period. Based on an anticipated increase in requests for services, WS' lethal removal of Mourning Doves in Wisconsin could increase to a maximum of 200 birds per year and up to 20 nests. Take by non-WS entities is not anticipated to change substantially from current levels. WS take is approximately 0.01% of the estimated state Mourning Dove population and 0.4% or less of hunter harvest in 2011-12 and 2012-13 hunting seasons. Given the low level of take and that WS actions would be limited to only a small portion of the species range in the state, the proposed action will not adversely impact the state Mourning Dove population. The USFWS/WDNR will continue to work with states to manage hunter harvest and depredation permits to ensure that cumulative impacts do not adversely impact the viability of state, regional, or national Mourning Dove populations. WS activities would result in a low magnitude of impact on hunting opportunities because of the low number of animals removed by the program relative to the state population and because most lethal removals by WS are conducted on properties which are not open for hunting.

Swallows/Swifts

Barn Swallow Biology and Population Impact.

Barn Swallows are the most common and widely distributed swallow in the world. They are insectivorous aerial foragers that feed in open spaces, mainly at dusk and dawn (Brown and Brown 1999). Common near farms, bridges and other buildings, they build mud nests on building rafters, bridges, or other vertical structures.

BBS data for 2002-2012 indicate that Barn Swallow population is relatively stable in Wisconsin and in the Eastern BBS region while increasing nationwide (0.42% per year; Sauer et al. 2014). The PIF landbird data base estimates that there are 840,000 Barn Swallows in Wisconsin (Partners in Flight Scientific Committee 2013).

Barn Swallows can become a nuisance when defending nests during breeding and can be a hazard to aviation at airports. During 2011-2013, WS dispersed 15 Barn Swallows and did not remove any through lethal means (Table 4-2 and 4-3). During this same time from 2011-2012, the

USFWS issued 9 depredation permits for Barn Swallows with only 1 being taken on those permits (Table 4.5). Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 50 Barn Swallows per year for the reduction of hazards to human health and safety at airports and to reduce nuisance problems. The level of lethal removal by non-WS entities is not anticipated to change substantially from current levels. The WS level of take represents 0.006% of the estimated population in Wisconsin. However, considering WS' history of not having killed any Barn Swallows for damage management in the last three years, actual take in most years is likely to be far lower than this number. Given that Barn Swallow populations are stable in Wisconsin, having USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would have a low level of cumulative impact on the state Barn Swallow populations.

Cliff Swallow Biology and Population Impacts.

Cliff swallows are also common in Wisconsin. These swallows soar more than other swallows and can be distinguished by its orange rump, square tail, broad martin-like wings and buffy forehead (Brown and Brown 1995). Cliff Swallows are also colony nesters and build nests under eaves or bridges.

BBS data for 2002-2012 indicate that Cliff Swallow populations are relatively stable in Wisconsin and the Eastern BBS region, but increasing nationwide (5.05% per year; Sauer et al. 2014). PIF landbird data base estimates that there are 250,000 Cliff Swallows in Wisconsin (Partners in Flight Scientific Committee 2013).

Cliff Swallows can become a nuisance when defending nests during breeding and can be a hazard to aviation at airports. During 2011-2013, WS dispersed 60 Cliff Swallows and removed one nest containing 3 eggs (Table 4-2 and 4-3). During this same time from 2011-2012, the USFWS/WDNR issued 7 depredation permits for Cliff Swallows with 3 being taken on those permits (Table 4.5). Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 50 Cliff Swallows and up to 200 nests per year for the reduction of hazards to human health and safety at airports and reduce nuisance problems. The level of lethal removal by non-WS entities is not anticipated to change substantially from current levels. The WS level of take represents 0.02% of the estimated population in Wisconsin. Given that Cliff Swallow populations are stable in Wisconsin, USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would have a low level of cumulative impact on state Cliff Swallow populations.

Tree Swallow Biology and Population Impacts.

Tree Swallows inhabit open meadows, fields and marshy areas, but use trees and nest boxes for nesting and occasional roosting. Tree Swallows are similar to other swallows in that they are insectivorous aerial foragers. They rely heavily on woodpeckers and other species to excavate and abandon tree cavities to provide nest sites to raise their young (Winkler et al. 2011).

BBS data for 2002-2012 indicate that Tree Swallow populations are stable in Wisconsin and the Eastern BBS region, but increasing nationwide (2.08% per year; Sauer et al. 2014). PIF landbird data base estimates that there are 540,000 Tree Swallows in Wisconsin (Partners in Flight Scientific Committee 2013).

Flocks of Tree Swallows can be a hazard to aviation at airports. During 2011-2013, WS did not disperse or lethally remove any birds or remove any nests or eggs. During this same time from 2011-2012, the USFWS did not issue any depredation permits for Tree Swallows. Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 50 Tree Swallows and up to 10 nests per year for the reduction of hazards to human health and safety at airports. The level of lethal removal by non-WS entities is not anticipated to change substantially from current levels. The proposed level of WS take represents 0.009% of the estimated population in Wisconsin. However, considering WS' history of not having killed any Tree Swallows for damage management in the last three years, actual take in most years is likely to be far lower than this number. Given that Tree Swallow populations are stable in Wisconsin, having USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would have a low level of cumulative impact on state Tree Swallow populations.

Bank Swallow Biology and Population Impacts.

One of the most widely distributed swallows in the world, Bank Swallows nest along riparian areas in the bluffs and banks of rivers and streams in colonies of 10 to 2000 birds (Garrison 1999).

BBS trend data for 2002-2012 indicate that Bank Swallow populations are relatively stable in Wisconsin, the Eastern BBS region, and nationwide (Sauer et al. 2014). PIF landbird database estimates that there are 100,000 Bank Swallows in Wisconsin (Partners in Flight Scientific Committee 2013).

Bank Swallows can be a hazard to human health and safety at airports in Wisconsin. During CY 11 through 13, WS did not disperse, relocate, or lethally remove any Bank Swallows or remove any nest or eggs. During this same time from 2011-2012, the USFWS/WDNR did not issue any depredation permits for Bank Swallows. Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 50 Bank Swallows and 100 nests per year. The level of lethal removal by non-WS entities is not anticipated to change substantially from current levels. The WS level of lethal removal represents just 0.05% of the estimated population in Wisconsin. However, considering WS' history of not having killed any Bank Swallows for damage management in the last three years, actual take in most years is likely to be far lower than this number. Given that Bank Swallow populations in Wisconsin are stable, having USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would have a low level of cumulative impact on the state Bank Swallow populations.

Chimney Swift Biology and Population Impacts.

Chimney Swifts are small fast flying insectivorous areal foragers that breed in the eastern half of the United States from southern Canada to Texas and Florida and migrate to Central and South America during the winter months (Steeves et al. 2014).

BBS trend data for 2002-2012 indicate that Chimney Swift populations are declining in Wisconsin, the Eastern BBS region, and nationwide (-2.44%, -2.94%, and -2.99% per year respectively; Sauer et al. 2014). Chimney Swift populations may be affected by reduced nesting sites from modern building practices and changes in flying insect abundance (Steeves et al. 2014). There is a potential for negative effects from environmental pollutants that may be impacting

Chimney Swift populations. In the Netherland, a correlation was found between insectivorous bird population decline and surface water contamination by neonicotinoid pesticides (Gross 2014). PIF landbird database estimates that there are 180,000 Chimney Swifts in Wisconsin (Partners in Flight Scientific Committee 2013).

Chimney Swifts can be a hazard to human health and safety at airports in Wisconsin. During CY 11 through 13, WS did not disperse, relocate or lethally remove Chimney Swifts or remove any nests or eggs. During this same time from CY 2011-13 the USFWS/WDNR did not issue any permits to take Chimney Swifts. Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 10 Chimney Swifts and 10 nests per year, which represents just 0.01% of the estimated population in Wisconsin. However, considering WS' history of not having killed any Chimney Swifts for damage management in the last three years, actual take in most years is likely to be far lower than this number. The level of lethal removal by non-WS entities is not anticipated to change substantially from current levels. Given USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would not contribute substantively to current population trends and cumulative impacts on state, regional, or national Chimney Swift populations.

Woodpeckers

Northern Flicker Biology and Population Impacts.

Northern 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 (Weibe and Moore 2008). Some birds migrate to Mexico and the southern United States during winter, but many remain on the breeding range. 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.

Northern Flickers' diet consist of ants, termites, beetles, crickets, aphids, caterpillars, including their eggs, pupae, and larvae, and other insects obtained from trees and the ground (Weibe and Moore 2008). Vegetation such as berries and other fruits make up a large part of the diet in the autumn and winter. 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.

Although the BBS shows near term populations of Northern Flickers are stable in Wisconsin and nationwide, the long term (1966-2012) population trend has been declining for Wisconsin (-1.86%) and nationwide (-1.78%; Sauer et al. 2014). The Christmas Bird Count shows a stable population of Northern Flickers in Wisconsin (National Audubon Society 2014). PIF landbird database estimates that there are 84,000 Northern Flickers in Wisconsin (Partners In Flight Scientific Committee 2013).

Northern Flickers can be a hazard to human health and safety at airports and possibly cause damage to wood siding on homes. During CY 11 through 13, WS did not disperse, relocate, or lethally remove any Northern Flickers or remove any nests or eggs. During this time from 2011-13 the USFWS/WDNR did not issue any permits or record any take of Northern Flickers in Wisconsin. Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 10 Northern Flickers per year, which represents just 0.01% of the estimated population in Wisconsin. However, considering WS' history of not having killed any Northern

Flickers for damage management in the last three years, actual take in most years is likely to be far lower than this number. The lethal removal of Northern Flickers by non-WS entities is not anticipated to change substantially from current levels. Given the near term stable population in Wisconsin, having USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would have a low level of impact on the state Northern Flicker populations.

Pileated Woodpecker Biology and Population Impacts.

The Pileated Woodpecker is the largest woodpecker found in Wisconsin and lives exclusively in deciduous, coniferous, and mixed forests. Easily recognized by its large black body and red-crested head, the Pileated Woodpecker uses its large beak to excavate nesting cavities and obtain food (Bull and Jackson 2011). Pileated Woodpeckers are an important forest species in that the cavities that they excavate in trees are often utilized as nesting sites for other species (Bull and Jackson 2011). Pileated Woodpeckers have an average clutch size of four eggs and predation is the primary cause of mortality (Bull and Jackson 2011).

BBS trend data for 2002-2012 indicate that Pileated Woodpecker populations are increasing in Wisconsin, BBS Eastern Region, and nationwide (4.17%, 2.41%, and 1.25% per year respectively; Sauer et al. 2014). PIF landbird database estimate that there are 42,000 Pileated Woodpeckers in Wisconsin (Partners In Flight Scientific Committee 2013).

Pileated Woodpeckers can be a hazard to human health and safety at airports and can cause problems if woodpeckers damage wood siding on houses in their search for food. During CY 11 through 13, WS did not disperse, relocate, or kill Pileated Woodpeckers or remove any nest or eggs. During this same time from CY 11-13 the USFWS/WDNR did not issue or record any take of Pileated Woodpeckers. Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 5 Pileated Woodpeckers per year, which represents just 0.01% of the estimated population in Wisconsin. However, considering WS' history of not having killed any Pileated Woodpeckers for damage management in the last three years, actual take in most years is likely to be far lower than this number. The lethal removal by non-WS entities is not anticipated to change substantially from current levels. Given the increasing population of Pileated Woodpeckers in Wisconsin and regionally, having USFWS and WDNR oversight and monitoring, and that WS take would only occur at isolated sites in a very small portion of the state, the proposed action would have a low level of impact on the state Pileated Woodpecker populations.

Starlings/Blackbirds/Crows

The Blackbird group in North America includes about 10 species of birds (Dolbeer 1994) including some of the most prolific and abundant birds in North America (Dolbeer and Stehn 1983). Of these 10 species, Red-winged Blackbirds, Brown-headed Cowbirds, and Common Grackles are the species most commonly seen and involved in damage problems in Wisconsin. It is possible that some of these blackbird species could be present in flocks of starlings where Wisconsin WS conducts BDM at feedlots and dairies, or at airports. Because of this possibility, Wisconsin WS could potentially take up to 1,000 annually of each of these non-starling species. WS has determined that BDM would likely have minimal cumulative effects to populations of these blackbirds based on apparent breeding bird population trends as described by Sauer et al. (2014), and their reproductive potential and natural mortality (see Section 2.4.4). Therefore, removal of damaging blackbirds would have a low magnitude of impact. Additionally, blackbird

populations are healthy enough, 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 blackbirds listed in the order 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 starlings and blackbirds are healthy and viable in Wisconsin, BBS Eastern Region, and nationwide.

European Starling Biology and Population Impacts.

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

The current global starling population is estimated at 150 million birds (Partners in Flight Scientific Committee 2013). Meanly and Royall (1976) report that the 1974-75 winter starling population in the eastern United States was 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 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.

BBS data for the period of 2002-2012 indicate starling breeding populations have been slightly decreasing in Wisconsin (-1.68% per year), BBS Eastern Region (-1.07% per year), and nationwide (-0.96% per year). PIF estimate that there are 1.8 million European Starlings in Wisconsin (Partners In Flight Scientific Committee 2013).

WS killed 13,934, 11,510, and 9,786 starlings in CY's 11, 12, and 13, respectfully, at livestock and mink facilities using DRC-1339 (Table 4-3). This represents 0.5% or less of the population in Wisconsin. Because European Starlings are an invasive species and therefore not protected under any state or federal law, the USFWS/WDNR does not issue permits for depredation complaints from European Starlings and no other entities report take of starlings to the USFWS. Based on current and anticipated requests for assistance with starling damage management, WS could take up to 200,000 European Starlings and 1000 nests annually for the protection of livestock feed and health, and to protect the public from disease threats or aircraft strikes if program expansion occurs. The small reduction in population, plus the fact that an estimated 70 million starlings die of natural causes indicates that the impact from Wisconsin WS starling damage management is of low magnitude. Furthermore, starlings are non-native species considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction, even to the extent of complete eradication from the natural environment, could be considered a beneficial impact to native bird species and consistent with EO 13112 on the management of invasive species.

Red-winged Blackbird Biology and Population Impacts.

Red-winged Blackbirds are perhaps the most abundant and common bird species in North America (Yasukawa and Searcy 1995). Red-winged Blackbirds breed and nest in marsh and

associated uplands from Alaska to Central America and from California to the Atlantic Coast. Adults have a mean life expectancy of 2.14 years. Predation is a leading cause of mortality for eggs and young. Losses to predation can range from 27 to 53% (Yasukawa and Searcy 1995). Dolbeer (1994) states that this high mortality rate is offset by a reproductive rate of 2 to 4 young fledged per female per year. Given the density-dependent relationships in a blackbird population (i.e., decreased mortality and increased fecundity of surviving birds) a high number of blackbirds would likely have to be killed in order to impact the regional breeding population. Modeling by Dolbeer (1994) indicated that killing 3.6% of the wintering blackbird population had no effect on breeding populations the following spring. Dolbeer et al. (1976) constructed a population model which indicated that a reduction of 14.8% of the wintering blackbird population would reduce the spring breeding population by 20% and that a 56.2% reduction in the wintering blackbird population would reduce spring breeding populations by only 33%. In an analysis of North American blackbird populations in 1975, USFWS concluded that removal of 67.5 million birds would not affect the following years post-breeding population (USDI 1976).

The BBS trend estimate for Red-winged Blackbirds in Wisconsin shows a slightly decreasing population trend (-1.62% per year; Sauer et al 2014). PIF landbird database estimate that there are 3.5 million Red-winged Blackbirds in Wisconsin (Partners in Flight Scientific Committee 2013).

Red-winged Blackbirds can be a particular concern to aviation safety due to their flocking tendencies, particularly during migration periods. Large flocks can also cause significant agricultural damage. WS dispersed 406 and killed 338 Red-winged Blackbirds CY 11 through CY 13 for the protection of human health and safety at airports (Table 4-2 and 4-3). Forty Red-winged Blackbirds were reported to the USFWS as taken under authority of the depredation order for blackbirds, cowbirds, grackles, crows, and magpies from non-WS entities during CY 11-13 (Table 4-5). Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 1,000 Red-winged Blackbirds and 20 nests per year. The lethal take of Red-winged Blackbirds in Wisconsin from non-WS entities is not anticipated to change substantially from current levels. The lethal removal of Red-winged Blackbirds by WS represents only 0.03% of the estimated population in Wisconsin. Wisconsin take of Red-winged Blackbirds, is site specific and extremely low compared to the population size of this species and there would be very minimal to no cumulative effects from WS BDM activities.

Common Grackle Biology and Population Impacts.

The Common Grackle is a large and abundant member of the blackbird (*Icterinae* subfamily) that populates the eastern two-thirds of the United States (Peer and Bollinger 1997).

The BBS trend estimate shows stable population trend in Wisconsin, but a decreasing trend in the BBS Eastern Region, and nationwide (-2.53%, and -2.1% per year respectively; Sauer 2014). PIF landbird database estimates that there are 1.1 million Common Grackles in Wisconsin.

Common Grackles can be a hazard to human health and safety at airports. WS dispersed 416 and killed 37 Common Grackles from CY 11-13, and most were taken to protect human health and safety at airports (Table 4-2 and 4-3). Only one other Common Grackle was reported killed to the USFWS in 2013 as part of the depredation order for blackbirds, cowbirds, grackles, crows, and magpies (Table 4-5). Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 500 Common Grackles per year. This represents only 0.05% of the estimated population in Wisconsin. Lethal removal by non-WS entities is not anticipated to change substantially from current levels. Wisconsin take of Common Grackles is site specific

and extremely low compared to population size of this species. There would be very minimal to no cumulative effects from WS BDM activities to the Common Grackle population in Wisconsin.

Brown-headed Cowbird Biology and Population Impacts.

Brown-headed Cowbirds are probably most known for their brood parasitism activities. These birds historically would follow herds of bison across the landscape feeding on and near the herds (Lowther 1993). European expansion in North America opened up vast areas to Brown-headed Cowbirds and their populations expanded so that now they are common across North America (Lowther 1993). Cowbirds do not build their own nests, but lay eggs in the nest of other birds with similar egg characteristics. The cowbird then relies on the host parent to raise and fledge the young. Female cowbirds can range wide and can lay up to 40 eggs per season (Lowther 1993). Brood parasitism can have an effect on the reproductive success of rare birds in areas of cowbird abundance.

The BBS trend estimate for Brown-headed Cowbirds shows a slight decline in Wisconsin (-1.68%), but stable for the BBS Eastern Region and nationwide (Sauer 2014). PIF landbird database estimates that there are 1.8 million Brown-headed Cowbirds in Wisconsin (Partners in Flight Scientific Committee 2013).

Brown-headed Cowbirds are detrimental to the breeding success of the endangered Kirtland's Warbler, a hazard for health and human safety at airports, and in agricultural damage. As part of Kirtland's Warbler recovery and conservation efforts WS killed 589 Brown-headed Cowbirds from CY 11-13 (Benson and Lovell 2013). Four Brown-headed Cowbirds where dispersed and 203 additional Brown-headed Cowbirds were taken for the protection of human health and safety at airports and agricultural damage from CY 11-13 (Table 4-2 and 4-3). During CY 2012-13, 610 Brown-headed Cowbirds were reported as taken to the USFWS under the depredation order for blackbirds, cowbirds, grackles, crows, and magpies from non-WS entities (Table 4-5). Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 2,000 Brown-headed Cowbirds per year. This represents only 0.1% of the estimated population in Wisconsin. The lethal take of Brown-headed Cowbirds by non-WS entities is not anticipated to substantially change from current levels. Wisconsin take of Brown-headed Cowbirds is site specific and extremely low compared to population size of this species. There would be very minimal to no cumulative effects from WS BDM activities to the population in Wisconsin.

American Crow Biology and Population Impacts.

American Crows are distributed north to south from the Yukon Territory, Canada, to Baja California and Gulf of Mexico, and are found from the west coast to the east coast (Verbeek and Caffrey 2002). American Crows can be found throughout the year in Wisconsin. American Crows are considered a small game bird species in Wisconsin, and can be killed during their hunting season. In addition, crow populations are healthy enough, 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*.

A recent publication by LaDeau, identifies American Crows as one of the species that have declining population trends which appear to correspond with the arrival of West Nile virus in

some locations (LaDeau et al. 2007). The BBS indicates that the trend for the American Crow population from 2002-2012 is stable in Wisconsin and the BBS Eastern Region, and slightly decreasing nationally (-0.46; Sauer et al. 2014). PIF landbird database estimate the population of American Crows in Wisconsin to be 750,000 (Partners In Flight Scientific Committee 2013).

American Crows can be a hazard to human health and safety at airports and can cause nuisance damage in urban settings. American Crows are considered a small game species in Wisconsin and a hunting season exists in the state. Based on hunting surveys from the WDNR, it is estimated that just over 28,000 crows were taken during the 2011-12 hunting season and 26,784 during 2012-2013 (Dhuey 2012, Dhuey 2013). Wildlife Services dispersed138 American Crows and killed 6 crows for the protection of property, and human health and safety during CY 2011-13 (Table 4-2 and 4-3). Ten American Crows were reported taken to the USFWS as part of the depredation order for blackbirds, cowbirds, grackles, crows, and magpies. Based on current anticipated increases in requests for assistance in crow management, WS does not anticipate killing more than 100 American Crows per year. This represents only 0.4% or less of the current harvest by hunters in the state and 0.01% of the estimated total population in Wisconsin. Given the stability of Wisconsin's crow population, the relative abundance of American Crows, and that WS' crow damage management activities would only be conducted at a limited number of sites involving a very small portion of the area in the state; we conclude that the proposed action will not adversely impact the state, regional or national American Crow population.

Other Birds

Wild Turkey Biology and Population Impacts

The Eastern Wild Turkey is the most widely distributed, abundant and hunted turkey subspecies of the five distinct subspecies found in the United States. It inhabits roughly the eastern half of the country. The Eastern Wild Turkey is found in the hardwood and mixed forests from New England and southern Canada to northern Florida and west to Texas, Missouri, Iowa and Minnesota. Turkeys have also been successfully transplanted in states outside of its original range including California, Oregon and Washington. They are considered weak fliers and are non-migratory; they forage on acorns, fruit, seeds and insects.

BBS data for the period of 2002-2012 are highly variable in Wisconsin and there is no clear population trend (Sauer et al. 2014). However, BBS data indicates turkey populations have been increasing in the BBS Eastern Region (10.78% per year) and nationwide (9.19% per year). The WDNR estimates the 2013 turkey population at approximately 500,000 birds (S. Walter, WDNR, 2014 pers. comm.). Turkeys are a game species in Wisconsin and have a regulated hunting season with approximately 42,500 -49,500 turkeys killed during the 2011-2013 hunting seasons (Dhuey 2014).

WS responded to 131 requests for technical assistance from damage caused by Eastern Wild Turkeys in Wisconsin. Primary conflicts with turkeys in Wisconsin include crop damage, nuisance individuals, and hazards to aircraft. WS killed 18 turkeys during CY11-13, with most birds taken to protect human health and safety at an airport (Table 4-3). One turkey was killed when it was inadvertently caught in a trap set for wolves. Based on an anticipated increase in requests for services, WS' BDM activities for airport safety or other resource protection could remove up to 100 Eastern Wild Turkey in any one year. This level of take is 0.02% of the estimated Wild Turkey population in the state and less than 0.3% of the turkeys taken annually by hunters during 2011-2013. Based on this information and oversight by the WDNR to ensure that cumulative impacts do not adversely impact the viability of the state Wild Turkey population, we

conclude the proposed action will not have an adverse cumulative impact on Eastern Wild Turkeys. The proposed action is also unlikely to adversely impact turkey hunting opportunities in the state because of the low number of animals removed and because most WS turkey removals occur in areas which are not open to hunters (e.g., airport properties).

American Robin Biology and Population Impacts

The American Robin is the largest, most abundant, and most widely distributed member of the Thrush family of birds in North America and it is one of the most recognizable of all bird species (Vanderhoff et al. 2014). The American Robin lives in urban, suburban, rural, and natural areas in North America and has a wide ranging diet that changes seasonally (Vanderhoff et al. 2014). During non-breeding seasons, robins can form flocks in the hundreds or thousands of immature and adult birds and migrate to lower latitudes (Vanderhoff et al. 2014).

BBS population trends from 2002-2012 show that American Robin populations are stable in Wisconsin, increasing in BBS Eastern Region (0.37%), and nationwide (0.33%) (Sauer et al. 2014). PIF landbird database estimates the population of American Robins in Wisconsin at 5.6 million (Partners In Flight Science Committee 2013).

Because robins are found in a variety of habitats, they can cause conflicts at airports, to property and buildings, and in agricultural settings. During CY11-13, WI WS dispersed 253 and killed 2 American Robins and removed 2 nests and 4 eggs (Table 4-2 and Table 4-3). During this same time from CY 11-13, the USFWS/WDNR issued 5 permits and recorded 76 American Robins taken on those permits (Table 4-5). WS does not anticipate removing more than 20 American Robins and 10 nests per year. This represents only 0.0004% of the estimated population of American Robins in Wisconsin. Lethal take of robins by non-WS entities is not anticipated to substantially change from current levels. Given the relative abundance of American Robins, long-term stable to increasing population trends, and that WS' robin damage management activities would only be conducted at a limited number of sites involving a very small portion of the area in the state; we conclude that the proposed action will not adversely impact the state, regional or national American Robin population.

House Sparrow Biology and Population Impacts.

House Sparrows or English Sparrows were introduced to North America from England in 1850 and have spread throughout the continent (Fitzwater 1994). The species is not protected by federal or state laws. House Sparrows are found in nearly every habitat except dense forest, alpine, and desert environments. It prefers human-altered habitats, and is abundant on farms, in cities and suburbs (Lowther and Kink 2006).

BBS population trends from 2002-2012 show that House Sparrow populations are decreasing in Wisconsin (-2.59%), BBS Eastern Region (-3.41%), and nationwide (-3.06%) (Sauer et al. 2014). PIF landbird database estimates the population of House Sparrows in Wisconsin at 3 million birds (Partners In Flight Science Committee 2013).

House Sparrows can be a hazard to human health and safety at airports in Wisconsin. During CY11 through CY13 WS did not disperse, relocate or kill any House Sparrows in Wisconsin. Permits are not required for the take of this species, so no information is available on House Sparrow take by non-WS entities. Due to WS activities on airports and other areas in the state, it is not anticipated that WS would take more than 2,500 House Sparrows and 100 nests in a year.

This represents only 0.08% of the population in WI. Any BDM involving lethal damage management by WS would probably be restricted to individual sites. Like European Starlings and Rock Pigeons, because of their negative impacts and competition with native bird species, House Sparrows are considered by many wildlife biologists, ornithologists and naturalists to be an undesirable component of North American native ecosystems. Any reduction in House Sparrow populations, even to the extent of complete eradication at these sites, could be considered beneficial on populations of native bird species and consistent with EO 13112 on management of invasive species. However, because WS activities are limited to a small portion of the state, the proposed action may temporarily reduce local House Sparrow populations but is unlikely to have a substantial impact on the overall state, regional, or national House Sparrow population.

Other Feral, Domestic and Exotic Birds Biology and Population Impacts.

WS is requested to provide BDM 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. "Domestic" refers to animals that have escaped temporarily from their confinements or owners and are still totally dependent on people for food and care and may include but are not limited to animals such as chickens, turkeys, guinea fowl, racing pigeons, domestic ducks and geese, ostriches, and emus. "Exotic" and "non-indigenous" refers to animals not native to Wisconsin which have been illegally or accidentally introduced or released in the wild. Birds classified as feral, free-ranging, domestic, and exotic are generally not considered wildlife and are not protected under state or federal law. Population estimates and population trend data generally do not exist for these species.

In Wisconsin, WS uses a combination of methods to distinguish feral and domestic 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 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), and/or flight ability (i.e., many domestic ducks cannot fly or fly very poorly). Flight ability alone is not used as a determining condition during the summer molt. Most feral and domestic ducks exhibit two or more of these characteristics. Feral ducks, when captured, are euthanized or placed into permanent captivity, while wild ducks may be released to the wild in accordance with permit guidance from the USFWS/WDNR.

Where practical, WS will use non-lethal methods for feral, domestic and exotic birds, including adoption of captured birds to the public when appropriate. Any lethal BDM by WS would be restricted to individual sites and would only be conducted under agreement with the landowner/manager. In those cases where birds are causing damage or are a nuisance, complete removal of the local population could be desired by the affected property owner, administrator, or resource management agency.

Other Target Species.

Target species, in addition to the bird species analyzed above may pose hazards to aircraft and human health and safety at airports. In most instances, these situations can be resolved through non-lethal hazing activities or capture and relocation. However, some situations may pose an immediate threat and require lethal removal of a bird or birds. Most of these birds are protected

by the USFWS under the MBTA and the take is limited by permit. Permits for Bird Hazard Management at airports provide for the lethal removal of birds under emergency circumstances for the protection of human health and safety, with the exception of eagles and threatened and endangered species. The removal must be reported to the USFWS within 72 hours of the incident and the permitee must provide a description of the circumstances associated with the removal. The USFWS, as the agency with management responsibility, would review the notices and could impose restrictions on future actions as needed to assure cumulative take does not adversely affect the continued viability of populations. Based upon experience with bird hazard management at airports in Wisconsin and elsewhere in the country, WS predicts that no more than 5 individuals and no more than 5 nests of other target species listed in appendix D would be removed annually. Species to be taken may not include state or federally listed threatened or endangered species. It is very likely that the number of birds taken for each species listed in Appendix D that would be removed annually would be zero, or average less than one per year. Given the provisions and protective measures listed herein, the proposed action would not have an adverse cumulative impact on bird species taken under emergency circumstances at airports.

4.3.1.2 Alternative 2 -Technical Assistance Only Program.

Alternative 2 would not allow any WS operational BDM in Wisconsin. Technical assistance or self-help information would be provided when requested to agricultural producers, airport managers, property owners, or others. Although technical assistance could lead to more selective use of BDM methods by private entities than that which would occur under Alternative 4, private efforts to reduce or prevent damage could result in less experienced persons implementing BDM methods and lead to a greater take of target wildlife than necessary. It is possible that, similar to Alternative 4, 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 by others could lead to unknown affects to target species populations.

4.3.1.3 Alternative 3 - Only Non-lethal Bird Damage Management.

Under this alternative, WS would not use lethal methods to resolve bird damage problems. Although some unintentional mortality might result from the use of bird capture devices like mist nets, these incidents are likely to be rare and would have negligible impact on target species populations. Individuals, agencies and organizations would still be able to obtain permits for lethal bird removal from the WDNR and USFWS. Efforts to reduce or prevent damage and risks to livestock and/or human health and safety risks would likely be higher than with Alternative 1. If BDM is conducted by individuals with limited training or experience, it is possible that additional birds may be taken in the course of attempts to resolve damage problems. Depending upon the experience, training and methods available to the individuals conducting the BDM, potential impacts on target bird populations would likely be the same or greater than with Alternative 1. However, for the same reasons shown in Section 4.3.1.1, it is unlikely that target species' populations 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 Alpha-Chloralose (AC) are currently only available for use by WS employees and would not be available under this alternative, although Starlicide Complete™, a product similar to DRC-1339 would be available for use by licensed pesticide applicators. 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, however to an unknown degree. Because WS would be able to provide assistance with non-lethal BDM, risks of adverse impacts from actions by non-WS entities are lower than with Alternative 4.

4.3.1.4 Alternative 4 - No WS Bird Damage Management.

Under this alternative, WS would not have any impact on target species' populations. Individuals, agencies and organizations would still be able to obtain permits for lethal bird removal from the WDNR and USFWS. Private efforts to reduce or prevent depredations would increase which could result in varying degrees of impacts to target species' populations depending upon the training and method available to the individuals conducting BDM. 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 target species populations would be adversely affected by implementation of this alternative. AC and DRC-1339 are currently only available for use by WS employees and would not be available under this alternative, although Starlicide Complete™, a product similar to DRC-1339 would be available for use by licensed pesticide applicators. 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, however to an unknown degree.

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 impacts on non-target species occur when WS program personnel inadvertently kill, injure, or harass animals that are not target species. In general, these effects result from the use of methods that are not completely selective for target species. Non-target wildlife are usually not affected by WS' non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, non-target animals may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. There is also a slight risk that a bird, reptiles, amphibians, and other non-target animals could become injured or killed by a live capture device. WS personnel are trained in the safe and effective use of live capture devices and risks are expected to be low and not exceed one or two birds (or other animals) a year with no injuries in most years.

Egg oiling/addling or nest and egg destruction may be conducted in areas used by mixed species groups of colonial waterbirds (e.g., oiling gull or pelican eggs). All activities in these types of areas are coordinated with the USFWS and WDNR, as appropriate, to identify practices needed to minimize risk of adverse effects on co-nesting species. Measures commonly used to minimize risk of adverse impacts include minimizing the period of time WS is in the colony and the number of trips to the colony, leaving buffer zones around sensitive species where WS does not conduct BDM, and avoiding conducting BDM during periods of unusual cold, heat, or rain to minimize risk of adverse impacts on eggs and chicks if adults are inadvertently flushed from nests.

To minimize risks to non-target species from the use of DRC-1339, WS uses pre-baiting observations and prior history information to determine likelihood of non-target bird presence. Mixed flocks of blackbirds can occur (although more so in the southern U.S.). Pre-baiting and pre-treatment observations would be utilized to look for mixed flocks that may contain non-target birds, such as Brewer's and Rusty Blackbirds. In addition any bait site would be monitored by WS staff and the cooperator to ensure that non-target birds do not utilize the bait site while the product is being applied. If non-target species are observed, WS may alter the location or type of

bait station to minimize or eliminate access by non-target birds, change the timing of bait application, or choose to use a different BDM method. If DRC-1339 pre-baiting 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 arrive and consume bait. In these instances, harassment would be used to deter non-target birds from accessing the bait site.

Lead Shot. Threats of lead toxicosis to waterfowl from the deposition of lead shot in waters where such species fed 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 Wisconsin WS BDM shooting activities conform to federal, state, and local laws. When using shotguns, WS uses only non-toxic shot for the purposes of BDM in Wisconsin wherever possible. Wildlife Services does, on occasion, use rimfire and air rifle ammunition that contains lead for BDM. This is a minimal part of WS operational activities. As non-toxic rimfire and air rifle ammunition is developed and released, WS will use that as a replacement to traditional rifle ammunition as long as performance and lethality of non-toxic ammunition is comparable and produces similar results as lead ammunition.

While every precaution would be taken to safeguard against killing non-target animals, at times changes in local flight patterns and other unanticipated events could result in the incidental death of non-target species. These occurrences are rare and would not affect the overall population of any species under the current program. WS non-target take of birds during BDM methods is listed in Table 4.6. The two Blue Jays and two Northern Orioles killed in CY 12 were the result of a Sharp-shinned Hawk that was caught in the trap with the other birds. The 4 Herring Gulls were killed when they became entangled in overhead wires. The low level of lethal non-target species take (4 or fewer individuals per species per year) is not of sufficient magnitude to adversely impact non-target species populations.

Table 4-6. Non-target birds taken during BDM activities from CY 11-13.

	CY 11		CY 12		CY 13	
Species	**Released**	**Killed**	**Released**	**Killed**	**Released**	**Killed**
Common Grackle	1					
Rose-Breasted Grosbeak	4		1		2	
Sharp-shined Hawk	2		2		1	
Common Raven			1			
Herring-Gull				4		
Blue Jay	12		26	2	16	
Northern Oriole				2		
Dark Eyed Junco	1					
American Robin	1		1			
Rufous-sided Towhee	1					
Brown Thrasher					1	

Eagles. The proposed action is not expected to result in the unintentional, capture, injury or death of a Bald Eagle. However, routine activities conducted by WS' personnel under the proposed action alternative could occur in areas where Bald Eagles are present, which could disrupt the current behavior of an eagle or eagles that were nearby during those activities. As discussed previously, "take" as defined by the Bald and Golden Eagle Protection Act, includes those actions that "disturb" eagles. Disturb has been defined under 50 CFR 22.3 as those actions that cause or are likely to cause injury to an eagle, a decrease in productivity, or nest abandonment by substantially interfering with their normal breeding, feeding, or sheltering behavior.

WS has reviewed those methods available under the proposed action alternative and the use patterns of those methods. The routine measures that WS conducts would not meet the definition of disturb requiring a permit for the non-purposeful take of Bald Eagles. The USFWS states, "Eagles are unlikely to be disturbed by routine use of roads, homes, or other facilities where such use was present before an eagle pair nesting in a given area. For instance, if eagles build a nest near your existing home, cabin, or place of business you do not need a permit." (USFWS 2012). Therefore, activities that are species specific and are not of a duration and intensity that would result in disturbance as defined by the Act would not result in non-purposeful take. Activities, such as walking to a site, discharging a firearm, or riding an ATV along a trail, generally represent short-term disturbances to sites where those activities take place. WS would conduct activities that were located near eagle nests using the National Bald Eagle Management Guidelines (USFWS 2007). The categories that would encompass most of these activities are Category D (Off-road vehicle use), Category F (Non-motorized recreation and human entry), and Category H (Blasting and other loud, intermittent noises). These categories generally call for a buffer of 330 to 660 feet for category D and F, and a ½-mile buffer for category H. WS would take active measures to avoid disturbance of Bald Eagle nests by following the National Bald Eagle Management Guidelines. However, other routine activities conducted by WS do not meet the definition of "disturb" as defined under 50 CFR 22.3. Those methods and activities would not cause injuries to eagles and would not substantially interfere with the normal breeding, feeding, or sheltering behavior of Bald Eagles.

Threatened and Endangered Species. Special efforts are made to avoid jeopardizing T/E species through biological assessments of the potential effects of WS actions and the establishment of special restrictions or minimization measures. WS is consulting with the USFWS and WDNR regarding risks to federal and state-listed T/E bird species from the methods proposed in this EA. Chapter 3 contains a list of SOPs intended to help reduce or eliminate potential negative impacts of the proposed program on state and federally-listed T&E species.

WS' activities under this alternative will not result in the destruction of wildlife habitat and are not expected to adversely impact critical habitat of T/E species. WS may recommend habitat alteration as a means of resolving bird damage problems, but the actual habitat management would be conducted by the landowner/manager. When WS proposes habitat management, WS will advise the landowner/manager that habitat management projects may have impacts on T&E species that would warrant consultation with the USFWS and WDNR prior to initiating work.

Few WS activities occur in aquatic habitats and WS does not conduct direct aquatic habitat alterations. Consequently the proposed action will not result in substantive disturbance of aquatic habitats. All pesticides proposed for use by WS would be applied in accordance with label requirements including provisions for the protection of water and T/E species. Consequently, WS has determined that none of the methods proposed in this EA would have an adverse impact on state or federally-listed insects, clams, snails, crustaceans or fish.

Repellents discussed in Appendix C would not be applied in areas where state or federally listed, reptiles, amphibians or plants occur. The BDM methods proposed for use by WS are not expected to result in the inadvertent capture or injury, or death of state or federally-listed reptiles, amphibians or plants. If a project is proposed in an area where T/E species occur, WS will further evaluate the methods proposed and consult with WDNR if needed to avoid impacts. Based on this information and the information above regarding habitat impacts, the proposed action is not likely to effect state or federally-listed reptiles amphibians or plants.

The primary risk to state and federally-listed bats would be inadvertent capture in mist nets. WS will not use mist nets during periods of the day when listed bats are likely to occur (one hour after sunrise to one hour before sunset). When in use, mist nets are continually monitored to minimize time birds are in the net and risk of injury to the bird. Wildlife Services will check nets approximately every 10 minutes, and not exceeding 15 minutes. WS will remove nets if bat activity is observed in the area where the nets are set. In the event a bat is captured, bats will be immediately removed and or cut out of the nets if they cannot be safely removed after 3-4 minutes. All equipment will be cleaned and sanitized following the unintentional capture of a bat to prevent any possible disease transmission from the equipment. Given these protective measures, the proposed action will have no effect on federally-listed bats.

None of the proposed methods is expected to result in the inadvertent capture of Canada lynx (*Lynx canadensis*) or in alteration of lynx habitat. WS is also unlikely to use DRC-1339 in areas where lynx may occur. However, DRC-1339 is a relatively slow-acting toxicant and birds usually die at roost locations away from the treatment site. Even in the highly unlikely event that lynx were to consume birds taken with DRC-1339, risks are expected to be negligible. 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 starlings killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. WS consulted with the USFWS regarding potential impacts to Canada lynx from all activities conducted by Wisconsin WS including the use of DRC-1339. The USFWS concurred with WS' determination that WS activities may affect but are unlikely to adversely impact Canada lynx (Letter from L. Lewis, USFWS, Acting Assistant Regional Director to G. Larson, WS Eastern Regional Director, May 9, 2001).

The proposed action may pose risks to state and federally listed birds through direct consumption of avian toxicants, secondary poisoning hazards to predators and scavengers that may eat target species that have consumed DRC-1339. Risks to state and federally listed species are negligible because the species either do not occur in areas where WS would use DRC-1339 (e.g., feedlots and blackbird/starling roost sites), and/or do not consume the types of grain baits used to deliver DRC-1339. Additionally, the protective measures noted above for application of DRC-1339 will ensure that no state or federally-listed species accesses DRC-1339 bait, so we anticipate no risks of primary toxicity to state or federally listed species from this method. WS would not use DRC-1339 if a T&E bird species that might consume the bait is observed in the treatment area.

None of the federally-listed birds would prey on or consume carcasses of birds that had eaten DRC-1339. There are two state-listed raptors (Peregrine Falcon, *Falco peregrinus*, state listed endangered; Red-shouldered Hawk, *Buteo lineatus*, state listed threatened) which, in theory, might consume birds which had eaten DRC-1339. DRC-1339 is highly toxic to sensitive species but only slightly toxic to non-sensitive 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 et

al. 1967). Many other bird species such as raptors, sparrows, and eagles are classified as non-sensitive and may consume higher doses of DRC-1339 without experiencing adverse affects. Secondary poisoning has not been observed with DRC-1339 treated baits. During research studies, carcasses of birds killed with 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 starlings killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Given the properties of DRC-1339, the proposed action is not anticipated to have adverse impacts on state-listed raptors.

The primary risk of disturbance to a state or federally-listed bird would be associated with egg oiling/addling and nest and egg destruction, and the use of frightening devices. WS only uses and recommends frightening devices for a relatively small portion of the state. Displacement of birds from these areas is unlikely to substantively impact the amount of feeding or nesting areas available to these species. Inadvertent frightening of state-listed species from the area around airfields is likely to have a beneficial effect because it reduces the likelihood that a listed species would be killed in a collision with an aircraft. WS will consult with the WDNR and USFWS, as appropriate, when state or federally listed bird species are observed in the area where WS intends to conduct BDM activities. WS will comply with WDNR and USFWS guidance on measures to manage potential impacts from the proposed activity. Consequently, WS proposed BDM activities will not result in adverse impacts on state or federally listed birds from disturbance.

Beneficial Impacts of WS BDM activities. WS BDM may benefit some of the species of special concern. Some activities are conducted for the benefit of T/E species. For example, Brown-headed Cowbirds parasitize federally endangered Kirtland's Warbler nests (Brown 1994). A survey conducted in 2007 indicated a total of eight singing males on three separate nests. WS began working with the USFWS and WDNR in 2009 to reduce the population of Brown-headed Cowbirds in these areas and therefore reduce nest parasitism (Benson and Lovell 2013). A total of 1,108 Brown-headed Cowbirds have been captured from 2009-2013. A record number of Kirtland's Warblers were recorded in 2012 with 30 males and 10 females with 14 nest attempts (4 successful) fledging an estimated 8-13 young (Benson and Lovell 2013).

Wisconsin WS may also benefit T/E species during its work to protect human health and safety at airports. The Whooping Cranes in Wisconsin that may be affected by WS are part of the Eastern U.S. Nonessential Experimental Population (NEP). When Nonessential Experimental Populations are located outside of National Wildlife Refuges or National Parks, they are treated as proposed for listing and WS would confer with the USFWS under section 7(a)(4) of the Endangered Species Act (ESA). Wildlife Service personnel could affect Whooping Crane in the NEP when using hazing devices around runways to reduce the chance of the cranes impacting aircraft. Wildlife Services will adjust its hazing recommendations in the vicinity of air traffic to avoid disturbance of Whooping Cranes that are actively nesting. In 2014, WS hazed a persistent Whooping Crane from a military airfield in Wisconsin. Under the supervision of the USFWS, WS personnel eventually captured the bird, which was later relocated to a zoo.

In other instances there may be indirect benefits from BDM activities. For example non-native starlings usurp nest sites of Wood Ducks, bluebirds, woodpeckers, and other cavity nesting species (Grabill 1977, Weitzel 1988, Ingold 1989). Localized reductions in starling populations for damage management could potentially reduce secondary nest cavity competition. Starlings may also parasitize the nests of other species by destroying eggs or hatchlings (Grabill 1977, Peterson and Gauthier 1985).

Based on the above analysis, WS concludes that the proposed actions would not adversely impact state or federally listed T&E wildlife species. The WDNR has concurred with WS determination that the proposed action will not affect critical habitat for any state listed species, will not affect state listed bats and rodents, and may affect but is unlikely to adversely affect state-listed birds, reptiles, and amphibians (Review submitted by D. Lopez et al., WDNR to J. Suckow, WS, December 16, 2014). Similarly, the USFWS concurred with WS determination that the proposed alternative may affect, but is unlikely to adversely affect Whooping Cranes, Kirtland's Warbler, Piping Plovers, and Northern long-eared bats (Letter from Peter Fasbender, USFWS, to J. Suckow, WS, December 11, 2014). WS has determined that proposed action will have no impact on any other federally-listed threatened or endangered species.

4.3.2.2 Alternative 2 -Technical Assistance Only Program.

Adverse Effects on Non-target Species, including T/E Species. Under this Alternative WS would not be involved in any operational BDM in Wisconsin. There would be no adverse effects on non-target or T/E species from WS BDM under this alternative. Technical assistance or self-help information would be provided when requested to agricultural producers, airport managers, property owners, or others. WS would still be able to assist landowners/managers in obtaining DPs through the completion of WS Form 37 for the USFWS. Although technical assistance could lead to more selective and effective use of BDM methods by non-WS entities than would occur under Alternative 4, private efforts to reduce or prevent damage could result in less experienced persons implementing BDM methods. Hazards to non-target species could be greater if inexperienced individuals are unable to effectively implement measures to reduce risks to non-target species or need to use methods for longer periods of time to resolve the damage problem. It is possible that, similar to Alternative 4, resource owners/managers frustrated by the inability to reduce losses could increase illegal use of toxicants, or other non-specific damage management methods which could increase cumulative risks to non-target species.

The ability to reduce negative effects caused by birds to other wildlife species and their habitats, including T/E species, would be variable based upon the skills and abilities of the person implementing actions. This alternative would have a greater chance of reducing damage than Alternative 4 because WS would be available to provide information and advice but would generally be less effective than Alternative 1.

4.3.2.3 Alternative 3 - Only Non-lethal Bird Damage Management.

Under this alternative, risks to non-target species from WS actions would likely be limited to disturbance from the use of frightening devices, and the risk of unintentional capture, injury, or death of a bird in a live-capture device as outlined under Alternative 1. Measures for reducing risk of disturbance from eagles would be implemented as in Alternative 1.

Under this alternative, non-WS entities could use legally available lethal BDM methods. However, the USFWS and WDNR would have to seek an alternative method to obtain the information necessary for DPs, because WS could not use or recommend lethal methods. The availability of WS assistance with non-lethal BDM methods could decrease incentives for non-WS entities to use lethal BDM methods and associated risks to non-target species. Overall risks to non-target species including T/E species and eagles from lethal BDM methods would vary depending on the experience of the individual implementing the method.be greater under this alternative for the same reasons presented in Alternative 2. There may be slightly more risks from use of lethal methods by non-WS entities because WS would not be able to provide technical assistance on the safe and effective use of lethal methods. Similar to Alternatives 2 and

4, there is an increased risk that landowners/managers who are unable to adequately resolve their damage problem without WS assistance may seek to use illegal toxicants, or other non-specific damage management methods which would likely have greater risks to non-target species than methods used by WS. Potential hazards and threats to non-target species could therefore be greater under this alternative than under alternatives 1 and 2, but less than Alternative 4.

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 BDM programs.

4.3.2.4 Alternative 4 - No WS Bird Damage Management.

Alternative 4 would not allow any WS BDM in Wisconsin. There would be no impact on non-target species including eagles and T/E species from WS. However, most individuals experiencing bird damage are still likely to seek to resolve their problems. The USFWS and WDNR and Tribes would have to seek an alternative method to obtain the information necessary for DPs, because WS would not be available to assist with DP applications. Risks to T/E species would vary depending upon the training and experience of the person implementing the method. Risks to non-target species from inexperienced or inappropriate use of BDM methods are likely to be greatest under this alternative because no assistance would be available from WS. As in Alternatives 2 and 3, possible frustrations caused by the inability to adequately reduce losses could lead to illegal use of toxicants which could impact local non-target species populations, including T/E species.

The ability to reduce negative affects 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 management actions.

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

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

Under this alternative, BDM conducted by WS in Wisconsin would be guided by WS, APHIS, and USDA Directives, Cooperative Agreements and MOUs with other agencies, ESA Consultations with the USFWS, and federal, state, and local law 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 BDM in Wisconsin. The BDM methods used by Wisconsin WS are discussed in more detail in Appendix C of this EA. All WS personnel are trained in safe and effective use of BDM methods. The use of pesticides by WS is regulated by the EPA through the FIFRA, by State law, the WDATCP and by WS Directives. All WS personnel who use pesticides maintain current pesticide applicators licenses.

DRC-1339 is the primary avicide used for BDM in Wisconsin. This chemical is one of the most extensively researched and evaluated pesticides ever developed. More than 30 years of studies have demonstrated the safety and efficacy of this compound. 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 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.
- 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 amount of the chemical or its metabolites into his/her system. This is highly unlikely to occur. Additionally, most non-target animals are not as sensitive to DRC-1339 as target species.
- The EPA has concluded that, based on mutagenicity (the tendency to cause gene mutations in cells) study, this chemical is not a mutagen or a carcinogen (i.e., cancer-causing agent). Regardless, however, the extremely controlled and limited circumstances in which DRC-1339 is used would prevent any exposure of the public to this chemical.

The above analysis indicates that human and pet health risks from use of DRC-1339 would be virtually nonexistent under any alternative.

Carbon dioxide (CO_2) gas is a colorless, odorless, noncombustible gas approved by the AVMA as a euthanasia method (Leary et al. 2013) and is a common euthanasia agent because of its ease of use, safety, and ability to euthanize many animals in a short time span. The advantages for using CO_2 are: 1) the rapid depressant, analgesic, and anesthetic effects of CO_2 are well established, 2) it is readily available and can be purchased in compressed gas cylinders, 3) it is inexpensive, nonflammable, nonexplosive, and poses minimal hazard to personnel when used with properly designed equipment, and 4) it does not result in accumulation of tissue residues.

Other Bird Damage Management Chemicals. Non-lethal BDM chemicals that might be used or recommended by WS would include repellents such as: 1) methyl or di-methyl anthranilate (artificial grape flavoring used in foods and soft drinks sold for human consumption), which has been used as an area repellent, 2) anthraquinone, another repellent, presently marketed as Flight Control™ and 4) the tranquilizer alpha-chloralose. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before EPA or FDA will register them. All storage, disposal and operational use of these chemicals would be in accordance with label requirements under FIFRA, FDA and state laws and regulations which are established to avoid unreasonable adverse effects on the environment.

Following label requirements and use restrictions are built-in minimization measures that would assure that use of registered chemical products would avoid significant adverse effects on human or pet health. WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment.

Most mechanical methods used by WS pose little to no risk to the safety of humans and pets. The two methods of primary concern are shooting and use of pyrotechnics. Firearm use is very sensitive issue because of public concerns relating to the potential for misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are subject to WS Directive 2.615 (Firearms Use and Safety) which requires initial firearms training from an NRA

certified instructor prior to any use of firearms, and annual refresher training. 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.

Some BDM programs are conducted specifically to reduce risks to human and pet health from birds. Examples of these types of projects include bird hazard management at airports, projects to reduce fecal contamination in areas where people work and play, and management of aggressive birds. Under this alternative, WS would have access to the full range of lethal and non-lethal methods discussed under Appendix C. Access to a variety of methods would enable WS to develop site-specific management strategies that minimize any potential risks to human and pet health and safety from BDM methods.

Given the protective measures noted above and WS history of no incidents of injury to humans or pets from WI WS use of the proposed BDM methods, we conclude the propose action will not adversely affect human health and safety. This alternative has the greatest likelihood of success in reducing threats to human and pet health and safety from birds.

4.3.3.2 Alternative 2 -Technical Assistance Only Program.

Under this alternative, operational BDM assistance by WS would not be authorized in the State. 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. Landowners/managers would be responsible for implementation of BDM methods which could result in less experienced persons implementing chemical or other damage management methods and increased health and safety risks from BDM methods. Frustration caused by the inability to reduce losses could lead to illegal use of toxicants and other BDM methods and increased risks to humans and pets. Risks under this alternative are expected to be lower than for Alternative 4 because WS would be able to provide technical assistance for BDM.

Efficacy of BDM conducted to reduce risks to human and pet health and safety from birds will vary depending on the training and skills of the individual conducting the action. If BDM programs are implemented by individuals with less experience than WS, they may not be able to effectively resolve the problem, or it may take longer to resolve the problem than with a WS program. Overall, this alternative is likely to be less effective in reducing damage than Alternative 1, but more effective than Alternative 4 because WS would be able to provide guidance on appropriate methods to use for the project and safe and effective use of BDM methods.

4.3.3.3 Alternative 3 - Only Non-lethal Bird Damage Management.

Under this alternative, WS would not use lethal BDM methods. Concerns about human health risks from WS' use of lethal BDM methods would be alleviated because no such use would occur. DRC-1339 is only available to WS personnel and would not be used under this alternative. However, the toxicant Starlicide Complete™ which has the same active ingredient as DRC-1339 would be available to licensed pesticide applicators. Non-WS efforts to reduce or prevent damage would be expected to increase, and would likely result in less experienced persons implementing chemical or other damage management methods which could increase risks to human and pet health and safety. Ignorance and/or frustration caused by the inability to reduce losses could lead to illegal use of toxicants and other methods which could also lead to unknown impacts to humans and pets. Overall risks would be greater than Alternative 1, but less than Alternatives 2 and 4 because WS would be able to provide operational assistance with the use of

non-lethal methods. Access to WS assistance with non-lethal BDM may decrease the likelihood that individuals will seek to use lethal or inappropriate BDM methods.

Benefits to the public from WS BDM activities will depend on the ability of WS to resolve problems using non-lethal methods and the effectiveness of non-WS BDM efforts. In situations where risks to human health and safety from birds cannot be resolved using non-lethal methods, benefits to the public will depend on the training and experience of the individual implementing lethal BDM methods. If lethal BDM programs are implemented by individuals with less experience than WS, they may not be able to effectively resolve the problem or it may take longer to resolve the problem than with a WS program.

4.3.3.4 Alternative 4 - No WS Bird Damage Management Program.

Alternative 4 would not allow any WS BDM in Wisconsin. The absence of WS BDM in Wisconsin could result in adverse effects on human health and safety because of the possibility of bird-borne diseases and increases in bird strikes on aircraft. Property managers fear that the absence of BDM activities would lead to accumulation of bird droppings and feathers (i.e., pigeons, gulls, etc.) near rooftop ventilation systems and work areas which may increase the risk of disease transmission or other health risks to humans. WS assists airport management who seek to resolve wildlife hazards to aviation in Wisconsin. Airport managers and air safety officials are concerned that the absence of a WS BDM 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.

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

Wildlife Services' extensive experience with wildlife damage management has shown that each damage management situation has its own unique challenges and needs. There are not any BDM techniques that are effective or appropriate for every situation. 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 (Appendix C contains additional information on individual BDM methods). Consequently, it is important to maintain the widest possible selection of damage management methods to effectively resolve bird damage problems. Under the current and proposed Wisconsin BDM program, all methods are used as effectively as practically possible, in conformance with the WS

Decision Model (Slate et al. 1992), WS Directives and relevant federal, state, tribal and local 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 BDM method. All WS personnel applying pesticides are certified by WDATCP 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.

Cost effectiveness is one of the many factors considered when WS personnel use the Decision Model thought process to develop site specific management strategies. However, cost effectiveness may not be the primary concern for many projects. Additional constraints, such as measures to reduce risks to non-target species, land management goals, and safety 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.

An analysis of cost-effectiveness in many BDM situations is exceedingly difficult or impossible to perform because the value of benefits is not readily determined. For example, the potential benefit of eliminating pigeons from nesting in industrial buildings could reduce incidences of illness among unknown numbers of building users. Since some bird-borne diseases are potentially fatal, or severely debilitating, the value of the benefit may be high. However, no studies of disease problems with and without BDM have been conducted, and, therefore, the number of cases *prevented* by effective BDM is not possible to estimate. Also, it is rarely possible to conclusively prove that birds are responsible for individual disease cases or outbreaks.

Another 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.

4.3.4.2 Alternative 2 – Technical Assistance Only Program.

Under this alternative, WS would only provide technical assistance on BDM methods. WS would be able to use the WS Decision Model to help landowners develop the most effective strategy for their situation. However, ultimate effectiveness of the program will depend on the skills of the individuals conducting the BDM. Damage management programs conducted by individuals who are less skilled than WS personnel may take longer to resolve the issue or may not be as effective as a WS program. Additionally, the toxicant DRC-1339 and the avian sedative Alpha-Chloralose would not be available under this alternative. Starlicide Complete™, a product with the same active ingredient as DRC-1339, would be available to licensed pesticide applicators. However, this product comes in a pre-mixed formulation and it is not possible to adjust the bait used to optimize acceptance by the target species. In situations where available foods are more attractive to the target species than Starlicide Complete™, this alternative is likely to be less effective than Alternative 1.

4.3.4.3 Alternative 3 – Only Non-lethal Bird Damage Management.

Under this Alternative WS would only be able to provide assistance with non-lethal BDM methods. The success or failure of the use of non-lethal methods can be quite variable. Methods of frightening or discouraging birds have been effective at specific sites. In many instances however, these methods have simply shifted the problem elsewhere (Conover 1984, Aguilera et al. 1991, and Swift and Felegy 2009). If WS is providing direct operational assistance in dispersing birds, coordination with local authorities, who may assist in monitoring the birds' movements, is generally conducted to assure they do not reestablish in other undesirable locations. Habituation (birds becoming accustomed to frightening stimuli) may limit the length of time a frightening device is effective. For optimal efficacy, some frightening strategies require long-term commitment of staff and/or financial resources that many not be available to everyone with a bird damage problem. Habitat modifications can be a very effective long term solution to bird damage problems, but it may be costly and/or may be incompatible with the uses of many sites. The avian sedative Alpha-Chloralose would be available under this alternative for use in capture and relocation projects and projects which live capture birds to collect samples for disease surveillance. As with Alternative 2, DRC-1339 would not be available for use under this alternative, but certified pesticide applicators could use Starlicide Complete™ for many of the same projects where WS would use DRC-1339. Use of Starlicide Complete™ is expected to be less effective in some situations than DRC-1339 because the bait used to deliver the toxicant cannot be adjusted to suit conditions at the treatment site.

In some situations, use of non-lethal methods may not provide the immediate resolution of a damage problem that may be warranted as in cases of risk to human health and safety (e.g., bird hazards at airports). In situations where non-lethal methods are not effective, the WS program will be less effective than under Alternative 1 unless lethal methods can be effectively employed by non-WS entities. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 4 because WS would be available to provide assistance with non-lethal BDM, but could still be less effective at reducing damage than Alternative 1.

4.3.4.4 Alternative 4 - No WS Bird Damage Management Program.

Under this alternative, the efficacy of WS BDM would not be a consideration because the Wisconsin WS program would not conduct operational activities or provide technical assistance to entities experiencing bird damage. The toxicant DRC-1339 and the avian sedative Alpha-Chloralose would not be available under this alternative which may also reduce the efficacy of BDM programs under this alternative. Starlicide Complete™, a product with the same active ingredient as DRC-1339, would be available to licensed pesticide applicators. However, this product comes in a pre-mixed formulation and it is not possible to adjust the bait used to optimize acceptance by the target species. In situations where available foods are more attractive to the target species than Starlicide Complete™, this alternative is likely to be less effective than Alternative 1. Efficacy of Non-WS efforts will vary depending upon the training and resources available to the individuals conducting BDM. Overall program effectiveness is expected to be lower than any of the other alternatives under consideration.

4.3.5 Impacts on Stakeholders, including Aesthetics

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

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

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

Under this alternative, operational assistance in reducing bird problems, in which droppings from the birds cause an unsightly mess, would improve aesthetic values of affected properties. In addition, individuals objecting to the presence of invasive non-native species, such as Mute Swans, European Starlings, Rock Pigeons, and English Sparrows, and whose aesthetic enjoyment of other birds is diminished by the presence of such species, will be positively affected by programs which result in reductions in the presence of such birds.

Relocation or dispersal of nuisance roosting or nesting populations of birds (e.g., starling roosts) by harassment can sometimes result in the birds causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

4.3.5.2 Alternative 2 – Technical Assistance Only.

Under this alternative, WS would not conduct any direct BDM, but would still provide technical assistance or self-help advice to persons requesting assistance with bird damage. Those who oppose assistance with wildlife damage management by the government, but favor government technical assistance, would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because animals would not be killed by WS. However, other private entities would likely conduct BDM activities similar to those that would no longer be conducted by WS, which means the cumulative effects would be similar to the Proposed Action Alternative 1.

4.3.5.3 Alternative 3 – Only Non-lethal Bird Damage Management.

Under this alternative, WS would not conduct any lethal BDM, but may conduct harassment of birds that are causing damage. Some people who oppose lethal management of wildlife by the government, but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct BDM activities similar to those

that would no longer be conducted by WS, which means the effects would then be similar to the Proposed Action Alternative.

Assuming property owners would choose to allow and pay for the implementation of non-lethal methods by WS, this alternative could result in birds relocating to other sites where they would likely cause or aggravate similar problems for other property owners. Thus, this alternative would likely result in more property owners experiencing adverse effects on the aesthetic values of their properties than the Proposed Action Alternative. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

4.3.5.4 Alternative 4 - No WS Bird Damage Management Program.

Under this alternative, WS would not conduct any lethal removal of birds nor would the program conduct any harassment of birds. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS' activities under this alternative. However, other private entities would likely conduct BDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

If BDM actions by non-WS entities are less effective than a WS program, aesthetic values of some properties would continue to be adversely affected. Relocation of birds causing a nuisance by roosting or nesting activities (e.g., starling roosts) through harassment, barriers, or habitat alteration can sometimes result in the birds causing the same problems at a new location. Coordination of dispersal activities by local residents with local authorities to monitor the birds' movements to assure the birds do not re-establish in other undesirable locations might not be conducted, thereby increasing the potential of adverse effects to nearby property owners.

4.3.6 Humaneness and Animal Welfare Concerns of Methods

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

WS personnel are experienced, professional, and humane in their use of management methods. WS' use of BDM methods under the proposed action would follow the requirements in WS' directives (WS Directive 2.430, WS Directive 2.505) and recommendations from the AVMA for use on free-ranging wildlife under field conditions (AVMA 2013). Nonetheless, BDM methods viewed by some persons as inhumane would be employed by WS under this alternative. Lethal methods are most likely to be considered inhumane by some members of the public, although there are individuals who also consider non-lethal methods such as repellents or frightening devices inhumane because they cause stress or discomfort in the target animal. Opinions may be mixed or situational for methods like egg oiling and addling, with some individuals considering the methods preferable to killing an animal once it has hatched, or acceptable only in the early stages of incubation.

Duration of impact is one of the factors considered in review of the humaneness of management actions. For example, despite SOPs designed to maximize humaneness, the perceived stress and trauma associated with being held in a trap until the WS employee arrives at the capture site to dispatch or release an animal is unacceptable to some persons. Other BDM methods used to take target animals such as shooting may be considered more humane because the animals die

instantly or within seconds to a few minutes. If birds are to be live-captured, WS' personnel would be present on-site during capture events or devices would be checked frequently to minimize stress and distress to the birds and to reduce risk of a bird injuring itself in the capture device. Brown-headed Cowbird traps are not continually monitored during trapping activities, but are checked as required by law. Appropriate food and water are provided during times when traps cannot be continually monitored to maximize humaneness.

The euthanasia methods being considered for use under the proposed action for live-captured birds are cervical dislocation and carbon dioxide. The AVMA guidelines on euthanasia list cervical dislocation and carbon dioxide as acceptable methods of euthanasia for free-ranging birds (Leary et al. 2013). The use of cervical dislocation or carbon dioxide for euthanasia would occur after the animal has been live-captured and away from public view. Although the AVMA guidelines also list gunshot as a conditionally acceptable method of euthanasia for free-ranging wildlife, there is greater potential the method may not consistently produce a humane death (Leary et al. 2013). WS' personnel that employ firearms to address bird damage or threats to human safety would be trained in the proper placement of shots to ensure a timely and quick death.

DRC-1339 causes irreversible necrosis of the kidney and the affected bird is subsequently unable to excrete uric acid with death occurring from uremic poisoning and congestion of major organs (DeCino et al. 1966, Knittle et al. 1990). Birds ingesting a lethal dose of DRC-1339 become listless and lethargic, and a quiet death normally occurs in 24 to 72 hours following ingestion. This method appears to result in a less stressful death than which probably occurs by most natural causes, which are primarily disease, starvation, and predation. DRC-1339 is the only lethal method that would not be available to other entities under the other alternatives. However, Starlicide Complete™ uses the same active ingredient as DRC-1339 and would be available to certified pesticide applicators for most situations in Wisconsin where WS would propose use of DRC-1339.

Alpha-chloralose is used by WS as a sedative to live-capture geese and other waterfowl and can reduce stress in animals during handling. When using Alpha-Chloralose, WS' personnel would be present on site to retrieve birds that become sedated. Some concern occurs that waterfowl may drown if sedation occurs while they are loafing on water. WS would ensure that a boat and/or a canoe were available for quick retrieval of birds that become sedated while in the water.

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

4.3.6.2 Alternative 2 – Technical Assistance Only.

Under this alternative, WS would not conduct any BDM, but would still provide technical assistance or self-help advice to persons requesting assistance with bird damage. Lethal methods viewed as inhumane by some persons would not be used by WS, but most methods, with the exception of DRC-1339 and Alpha-Chloralose, would still be available to the public. Use of BDM methods by inexperienced individuals may result in greater risk of injury, stress or distress to target animals from improper or imprecise use of the method. Risks of this type of impact are likely lower with this alternative than Alternative 4, wherein no guidance from WS would be available.

4.3.6.3 Alternative 3 – Only Non-lethal Bird Damage Management.

Generally, non-lethal methods are considered more humane than lethal methods. However, as noted for Alternative 1, some individuals also consider non-lethal methods such as frightening devices and repellents to be inhumane because they may cause temporary illness or stress to the target animal. For individuals opposed to the use of lethal BDM methods, WS actions under this alternative would be considered more humane than Alternative 1. However, most lethal BDM methods would still be available to and used by non-WS personnel. Use of BDM methods by inexperienced individuals may result in greater risk of injury, stress or distress to target animals from improper or imprecise use of the method. Risks of this type of impact are likely lower with this alternative than Alternatives 2 and 4 because individuals would have access to WS operational assistance with non-lethal methods.

4.3.6.4 Alternative 4 - No WS Bird Damage Management Program.

The perceived humaneness of this alternative would depend on the actions taken by non-WS entities. Individuals experiencing damage or threats associated with birds could continue to use most BDM methods available to WS under Alternative 1, and general perceptions of the humaneness of the methods used under this alternative are likely to be similar to Alternative 1. However, even methods generally regarded as being a humane method could be employed in inhumane ways if used by those persons inexperienced in the use of those methods. Risks of improper or ineffective use of BDM methods and stress and injury to animals would be greatest for this alternative because WS would not be available to provide technical assistance on safe, humane and effective use of BDM methods.

4.4 CUMULATIVE EFFECTS

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

Under Alternatives 1, 2, and 3, WS would address damage associated with birds in situations throughout the state. The Wisconsin WS BDM program would be the primary federal program with BDM responsibilities; however, some federal, state, and local government agencies may conduct BDM activities in Wisconsin as well. Through ongoing coordination and cooperation with the WDNR, WDATCP and USFWS, WS is aware of other BDM 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 BDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct BDM activities in the same area. The potential cumulative impacts analyzed in this EA could occur either as a result of WS BDM, or as a result of the effects of other agencies and individuals. Those activities and the birds removed are tracked by the USFWS and WDNR through their permitting system to insure no long-term cumulative adverse effects to bird populations. The USFWS reviews annually the take of migratory birds under standard conditions of DPs (50 CFR 21.41) and has the ability to determine if the cumulative effects of all take under DPs may be negatively affecting a species.

Cumulative Impacts on Wildlife Populations.

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

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

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

Cumulative Impact Potential from Chemical Components.

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 on the environment as such impacts relate to deposit of pesticide residues in the physical environment and environmental toxicosis. DRC-1339 is the primary pesticide currently used by the Wisconsin WS BDM program for the purpose of reducing damage or health threats to people or livestock. 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. Additionally, the relatively small quantities of DRC-1339 used in the BDM program in Wisconsin, the chemical's instability which results in speedy degradation of the product, and application protocol used in WS programs further reduces the likelihood of any environmental accumulation.

Based on potential use patterns, the chemical and physical characteristics of DRC-1339 and factors related to the environmental fate of this product; no cumulative impacts are expected from the lethal chemical components used or recommended by the WS BDM program in Wisconsin. Most applications would not be in contact with soil, applications would not be in contact with surface or ground water, and uneaten baits would be recovered and disposed of according to EPA label specifications and WDATCP guidelines.

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

Cumulative Impact Potential from Non-chemical Components.

Non-chemical methods used or recommended by WS' BDM program may include exclusion through use of various barriers, habitat modification of structures or vegetation, live trapping and euthanasia of birds, harassment of birds or bird flocks, nest and egg destruction, and shooting.

Because shooting may be considered as a component of the non-chemical, the deposition of lead shot in the environment is a factor considered in this EA and discussed in more detail in Section 4.3.2.1.

Roost Harassment/Relocation. Some potential exists for cumulative impacts to human health and safety related to the harassment of large flocks of birds in urban environments. If birds are dispersed from one site and relocate to another where human exposure to concentrations of bird droppings occurs over time, human health and safety could be threatened. If WS is providing operational assistance in relocating such birds, coordination with local authorities would be conducted to assure they 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. Under the Current/Proposed Action, the lethal removal of birds by WS would not have a significant impact on overall bird populations in Wisconsin or USFWS Region 3, 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 because only trained and experienced wildlife biologists/specialists would conduct and recommend BDM activities. There is a slight increased risk to public safety when individuals reject WS assistance and recommendations in Alternative 1 and conduct their own BDM, and when no or limited WS assistance is provided as in Alternatives 2-4. In Alternatives 2-4, however, the anticipated increases in impacts would not be to the point that the impacts would be significant. Although some persons will likely be opposed to WS' participation in BDM activities on public and private lands in Wisconsin, the analysis in this EA indicates that WS integrated BDM program would not result in significant cumulative adverse impacts on the quality of the human environment.

CHAPTER 5: LIST OF PREPARERS, REVIEWERS AND PERSONS CONSULTED

5.1 PREPARERS AND REVIEWERS

Pam Engstrom, USDA-APHIS-WS, Rhinelander, WI
Jason Suckow, USDA-APHIS-WS, Sun Prairie, WI
David Terrall, USDA-APHIS-WS, Waupun, WI
Kimberly Wagner, USDA-APHIS-WS, Sun Prairie, WI
Robert Willging, USDA-APHIS-WS, Rhinelander, WI

5.2 PERSONS CONSULTED

Daniel Hirchert, WDNR, Madison, WI
Taylor Finger, WDNR, Madison, WI
Kent Van Horn, WDNR, Madison, WI
Davin Lopez, WDNR, Madison, WI
Rich Staffen, WDNR, Madison, WI
Kim Grveles, WDNR, Madison, WI
Sumner Matteson, WDNR, Madison, WI
Nick Anich, WDNR, Madison, WI
Lisie Kitchel, WDNR, Madison, WI
Paul White, WDNR, Madison, WI
Melissa Tumbleson, WDNR, Madison, WI
Rori Paloski, WDNR, Madison, WI
Carly Lapin, WDNR, Madison, WI
Joel Trick, USFWS, retired
Sarah Warner, USFWS, Madison, WI
Billy Brooks, USFWS, Jacksonville, FL

APPENDIX A: LITERATURE CITED IN THE EA

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APPENDIX B: AUTHORITY AND COMPLIANCE

USDA-APHIS-Wildlife Services

The USDA is authorized by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the WS Program is the Act of March 2, 1931, as amended (7 U.S.C. 426-426c; 46 Stat. 1468), which provides that:

> "*The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."*

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

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

Further, in 2001, Congress amended WS authority in the 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."*

To fulfill this Congressional direction, WS conducts activities to prevent or reduce wildlife damage to agricultural, industrial and natural resources, property, and threats to public health and safety on private and public lands in cooperation with other federal, tribal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing animals but as one means of reducing damage, with actions being implemented using the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public. WS' mission is to improve the coexistence of people and wildlife by providing federal leadership to reduce problems.

Wisconsin Department of Natural Resources Legislative Authority

The WDNR, under the direction of a Governor appointed Natural Resources Board, is specifically charged by the Legislature with the management of the state's wildlife resources. Although legal authorities of the Natural Resources Board and the WDNR are expressed throughout Wisconsin Administrative Code (WAC), the primary statutory authorities include establishment of a system to protect, develop and use the forest, fish and game, lakes, streams, plant life, flowers, and other outdoor resources of the state (s. §§23.09 Wis. Stats.) and law enforcement authorities (s. §§23.10, s. 23.50, s. 29.001 and s. 29.921 Wis. Stats.). The Natural Resources Board adopted mission statements to help clarify and interpret the role of WDNR in managing natural resources in Wisconsin. They are:

- To protect and enhance our natural resources: our air, land and water; our wildlife, fish and forests and the ecosystems that sustain all life.
- To provide a healthy sustainable environment and a full range of outdoor opportunities.
- To ensure the right of all people to use and enjoy these resources in their work and leisure.
- To work with people to understand each other's views and carry out the public will.
- And in this partnership consider the future and generations to follow.

Conditions of permits to shoot or trap wild animals causing damage

WDNR WAC NR §§12.15 is established to define conditions of permits issued by the WDNR authorizing shooting or trapping of wild animals causing damage. General provisions for the issuance of such permits include: public use of property during open seasons, refusal of public use, compliance with all other hunting and trapping rules, carcass care and disposition, WDNR assistance in implementing permitted activities, permit kill limit, authorized area, violations and use restrictions, as well as some additional provisions.

The WDNR also approves form 2300-080, Repel and Destroy Wild Birds Permit and Application, which allows WS to use registered pesticides to reduce damage caused by starlings, pigeons, and House Sparrows.

Wisconsin Department of Agriculture, Trade, and Consumer Protection

The WDATCP, under the direction of a Governor appointed nine member Board of private citizens and Secretary of the WDATCP, is specifically charged by the Legislature with providing consumer and business information, handling complaints, providing agricultural development and marketing services, assisting agricultural production and much more. The mission of WDATCP is to serve the citizens of Wisconsin by assuring:

- The safety and quality of food
- Fair business practices for the buyer and seller
- Efficient use of agricultural resource in a quality environment
- Consumer protection
- Healthy animals and plants
- The vitality of Wisconsin agriculture and commerce

WDATCP administers many laws. Most of them are found in chapters 88 to 100, 126 and 136 of the Wisconsin Statutes. WDATCP has adopted rules to implement these laws. WDATCP rules are found in the WAC, Chapters ATCP 1 to ATCP 162. DATCP rules have the full force and effect of law.

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): 1) to manage migratory birds internationally, 2) to sustain healthy migratory bird populations for harvesting needs, and 3) to 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 WDNR 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.

The USFWS is responsible for managing and regulating the take of Bald and Golden Eagles under the authority of the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). The take of Bald and Golden Eagles is prohibited by the BGEPA. However, the USFWS can issue depredation permits for the take of eagles when certain criteria are met pursuant to the BGEPA. Depredation permits can be issued to take or disturb eagles on a limited basis to alleviate damage and threats of damage. Under the permitting application process, the USFWS requires applicants to describe prior non-lethal damage management techniques that have been used.

Federal Aviation Administration

The FAA is the federal agency responsible for developing and enforcing air transportation safety regulations and 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.

Great Lakes Indian Fish and Wildlife Commission

The Great Lakes Indian Fish and Wildlife Commission is an agency of eleven Ojibwe nations in Minnesota, Wisconsin, and Michigan, with off-reservation treaty rights to hunt, fish and gather in treaty-ceded lands. It exercises powers delegated by its member tribes. GLIFWC assists its member bands in the implementation of off-reservation treaty seasons and in the protection of treaty rights and natural resources. GLIFWC provides natural resource management expertise, conservation enforcement, legal and policy analysis, and public information services. GLIFWC's member tribes include: the Bay Mills Indian Community, Keweenaw Bay Indian Community, and the Lac Vieux Desert Band in Michigan; the Bad River, Red Cliff, Lac du Flambeau, Lac Courte Oreilles, Sokaogon, and St. Croix Bands in Wisconsin; the Fond du Lac and Mille Lacs tribes in Minnesota. All member tribes retained hunting, fishing and gathering rights in treaties with the U.S. government, including the 1836, 1837, 1842, and 1854 Treaties.

GLIFWC's Board of Commissioners, comprised of a representative from each member tribe, provides the direction and policy for the organization. Recommendations are made to the Board of Commissioners from several standing committees, including the Voigt Intertribal Task Force (VITF). The VITF was formed following the 1983 Voigt decision and makes recommendations regarding the management of the fishery in inland lakes and wild game and wild plants in treaty-ceded lands of Wisconsin.

Wisconsin Indian Tribes

Currently, Wisconsin WS has MOUs with three American Indian Tribes: the Forest County Potawatomi, the Red Cliff Band of Lake Superior Chippewa, and the Lac du Flambeau Band of Lake Superior Chippewa. Any WS activities conducted on reservation lands would only be conducted at the request of the tribe and after appropriate authorizing documents were signed. Therefore, WS would only conduct BDM activities on reservation lands after agreements with the tribes to conduct such activities are in place. If WS enters into an agreement with a tribe for BDM, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOUs, agreements and NEPA compliance would be conducted as appropriate before conducting BDM 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 tribal governments.

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.

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA): The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife. Those requirements are: (1) a valid "veterinarian-client-patient" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under the proposed action. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period of time after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human within the withdrawal period must be identified; the Western Wildlife Health Committee (WWHC) of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC 1999). APHIS-WS establishes procedures in each state for administering drugs used in wildlife capture and handling that must be approved by state veterinary authorities in order to comply with this law.

Bald and Golden Eagle Protection Act (16 USC 668-668c), as amended: Populations of Bald Eagles showed periods of steep declines in the lower United States during the early 1900s attributed to the loss of nesting habitat, hunting, poisoning, and pesticide contamination. To curtail declining trends in Bald Eagles, Congress passed the Bald Eagle Protection Act (16 USC 668) in 1940 prohibiting the take or possession of Bald Eagles or their parts. The Bald Eagle Protection Act was amended in 1962 to include the Golden Eagle and is now referred to as the Bald and Golden Eagle Protection Act. Certain populations of Bald Eagles were listed as *"endangered"* under the Endangered Species Preservation Act of 1966, which was extended when the modern Endangered Species Act was passed in 1973. The *"endangered"* status was extended to all populations of Bald Eagles in the lower 48 States, except populations of Bald Eagles in Minnesota, Wisconsin, Michigan, Washington, and Oregon, which were listed as *"threatened"* in 1978. As recovery goals for Bald Eagle populations began to be reached in

1995, all populations of eagles in the lower 48 States were reclassified as *"threatened"*. In 1999, the recovery goals for populations of eagles had been reached or exceeded and the eagle was proposed for removal from the ESA. The Bald Eagle was officially de-listed from the ESA on June 28, 2007 with the exception of the Sonora Desert Bald Eagle population. Although officially removed from the protection of the ESA across most of its range, the Bald Eagle is still afforded protection under the Bald and Golden Eagle Protection Act.

Under the Bald and Golden Eagle Protection Act (16 USC 668-668c), the take of Bald Eagles is prohibited without a permit from the USFWS. Under the Act, the definition of "*take*" includes actions that "*pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb*" eagles. The regulations authorize the USFWSto issue permits for the take of Bald Eagles and Golden Eagles on a limited basis (see 74 FR 46836-46837, 50 CFR 22.26, 50 CFR 22.27). As necessary, WS would apply for the appropriate permits as required by the Bald and Golden Eagle Protection Act.

Coastal Zone Management Act of 1972, as amended (16 USC 1451-1464, Chapter 33; P.L. 92-583, October 27, 1972; 86 Stat. 1280): This law established a voluntary national program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management plans. Funds were authorized for cost-sharing grants to states to develop their programs. Subsequent to federal approval of their plans, grants would be awarded for implementation purposes. In order to be eligible for federal approval, each state's plan was required to define boundaries of the coastal zone, to identify uses of the area to be regulated by the state, the mechanism (criteria, standards or regulations) for controlling such uses, and broad guidelines for priorities of uses within the coastal zone. In addition, this law established a system of criteria and standards for requiring that federal actions be conducted in a manner consistent with the federally approved plan. The standard for determining consistency varies, depending on whether the federal action involves a permit, license, financial assistance, or a federally authorized activity. Wildlife Services consulted with the Wisconsin Department of State regarding the consistency of the proposed BDM program with the state coastal management plan. The state concluded that they had no comments on the EA and that the proposed action and that formal consistency review was not warranted for this project (Wisconsin Coastal Management Program letter, December 22, 2014).

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

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 and consultations with the USFWS at the local level as appropriate (P. Fasbender, USFWS letter to Jason Suckow, WS, December 11, 2014).

Environmental Justice and EO12898 - *"Federal Actions to Address Environmental Justice(EJ) in Minority Populations and Low-Income Populations"*: Environmental Justice is a movement promoting the fair treatment of people of all races, income and culture with respect to the development, implementation and enforcement of environmental laws, regulations and policies. EJ has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. The EJ movement is also known as Environmental Equity - which is the equal treatment of all individuals, groups or communities regardless of race, ethnicity, or economic status, from environmental hazards. EJ is a

priority both within APHIS and WS. EO 12898 requires federal agencies to make EJ 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. To meet this, WS developed a strategy that: 1) identifies major programs and areas of emphasis to meet the intent of the EO, 2) minimize any adverse effects on the human health and environment of minority and low-income persons or populations, and 3) carries out the APHIS mission. To that end, APHIS operates according to the following principles: 1) promote outreach and partnerships with all stakeholders, 2) identify the impacts of APHIS activities on minority and low-income populations, 3) streamline government, 4) improve the day-to-day operations, and 5) foster non-discrimination in APHIS programs. In addition, APHIS plans to implement EO 12898 principally through its compliance with the provisions of NEPA.

All WS activities are evaluated for their impact on the human environment and compliance with EO 12898 to insure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

Executive Order 13112 - Invasive Species: Authorized by President Clinton, EO 13112 establishes guidance to federal agencies to prevent the introduction of invasive species and provide for their management 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, 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 management, 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 agencies activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, 3) the development of recommendations for international cooperation in addressing invasive species, 4) develop, in consultation with the CEQ, guidance to federal agencies, 5) facilitate 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) facilitate establishment of a coordinated, up-to-date information-sharing system that utilizes, and 7) prepare and issue a national Invasive Species Management Plan.

Executive Order 13186 and MOU between USFWS and APHIS: 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 APHIS and the USFWS, in coordination with state, tribal, and local governments. A National-level MOU between the USFWS and APHIS has been completed to facilitate the implementation of EO 13186 (K. Shea, APHIS and D. Ashe, USFWS. 2 August 2012).

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

Federal Insecticide, Fungicide, and Rodenticide Act: 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 Wisconsin are registered with, and regulated by, the EPA and the WDATCP. Wisconsin WS uses all chemicals according to label directions as required by the EPA and WDATCP.

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 telephone and on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of 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, and Brewer's Blackbirds, cowbirds, all grackles, crows, and magpies found committing or about to commit depredation upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance (50 CFR 21.43).

National Historical Preservation Act (NHPA) of 1966 as amended: requires: 1) federal agencies to evaluate the effects of any federal undertaking on cultural resources, 2) consult with the SHPO regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural resources in areas of these federal undertakings. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties. All Native American tribes in Wisconsin and GLIFWC were invited to be cooperating agencies in the production of this EA.

Each of the BDM methods described in the EA and in Appendix C that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

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

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 federal actions' impact, 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.

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

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

Protection of Children from Environmental Health and Safety Risks (EO 13045): Children may suffer disproportionately from environmental health and safety risks for many reasons, including the development of their physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionably affect children, WS has considered the impacts that this proposal might have on children. The proposed BDM would occur by using only legally available and approved damage management methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an adverse environmental health or safety risk to children from implementing this proposed action. In contrast, the proposed action may reduce adverse environmental health or safety risks by reducing risks (i.e., disease, bird/aircraft strikes, etc.) to which children may potentially be exposed.

APPENDIX C: BIRD DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE IN WISCONSIN

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 the 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) are potentially available to the WS program in Wisconsin relative to the management or reduction of bird damage. WS develops and recommends or implements IWDM strategies based on resource management, physical exclusion and wildlife management approaches. Within each approach there may be a number of specific methods or tactics available.

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

Management Method	Alternative 1 Current Program	Alternative 2 Technical Assistance	Alternative 3 Nonlethal Only	Alternative 4 No Program
Habitat Management	Y	Y	Y	No
Lure Crops/Cultural Methods	Y	Y	Y	No
Exclusion	Y	Y	Y	No
Frightening Devices	Y	Y	Y	No
Repellents	Y	Y	Y	No
Live Traps	Y	Y	Y	No
Shooting	Y	Y	No	No
DRC-1339 [1, 2]	Y	No	No	No
Alpha-chloralose [1, 2]	Y	No	Y	No
Euthanasia	Y	Y	No	No

1 Only certified applicators could use.
2 Only registered for USDA-APHIS-WS use.

Various federal, state, tribal, 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 operational damage management efforts of the WS program in Wisconsin. The effectiveness of the program can be defined in terms of reduced economic losses, decreased health hazards, minimized 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 WS' control

may make some inadvertent mortality occur during some non-lethal damage management implementation. Non-lethal damage management techniques may include:

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.

Animal Behavior Modification. This refers to tactics that alter the behavior of wildlife and 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). Some but not all devices used to accomplish this are:

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

Auditory scaring devices. Auditory devices such as propane exploders, pyrotechnics, electronic guards, auditory scare crows, 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).

Bird Proof Exclusions. Bird proof exclusions can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which require 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 in excluding birds (Johnson and Glahn 1994). Plastic strips, however, can prevent filling of the feed troughs at livestock feeding facilities or can be covered up when the feed is poured into the trough by the feed truck. They are not practical for open-air feedlot operations that are not housed in buildings. Anti-perching wire can be placed on ledges to exclude birds from perching or nesting on the ledges. This too can be expensive and debris often collects in the anti-perching wire making it ineffective and unsightly.

Bird Tracking and Warning Systems. This method involves the use of radar systems to provide real-time identification of bird hazards so that aircraft can take measures to avoid the hazard in the same manner that they would use information to avoid hazards such as hail and extreme turbulence due to thunderstorms. Airport radar systems can provide location data as well as use radar cross-section data to determine bird size in order to provide real-time information to aircraft (Nohara et al. 2011). Avian radar systems need to be thoroughly calibrated in order to maintain operational effectiveness (Nohara et al. 2011).

Chemical Repellents

Alpha-chloralose (AC) is a chloral derivative of glucose and a central nervous system depressant (i.e., depresses cortical centers in the brain) used as an immobilizing agent to capture and remove nuisance waterfowl and other birds, and for capture of birds for research purposes[7]. It is labor intensive 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.

USDA APHIS is currently authorized by FDA to use AC to capture waterfowl, coots, pigeons and ravens under Investigative New Animal Drug (INAD) 6602 under a category of nuisance animals. In addition, FDA granted also include use of AC to capture Sandhill Cranes by the International Crane Foundation for marking and research purposes (Hartup et al. 2014, Hayes et al. 2003).

The 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 organisms. Factors supporting the determination of this low potential included the lack of exposure to pets, non-target 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.

Anthraquinone (Flight Control™) 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 and virtually insoluble in water and there are no known hazards to non-target species from repellent application of anthraquinone. 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).
Avipel© is a seed treatment designed to prevent birds from consuming newly planted seeds. In WI it is recommended by WS to reduce damage to newly planted corn fields by Sandhill Cranes. Avipel© is a formulation using Anthraquinone as the active ingredient and has similar characteristics to Anthraquinone with respect to its toxicity and environmental impacts. Avipel© is highly recommended as a non-lethal method that needs to be employed prior to issuance of a DP for Sandhill Cranes.

[7] With proper use and follow-up, AC reduces the potential for stress, injury and death in many situations over other capture techniques.

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

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. Husbandry practices include but are not limited to techniques such as night feeding, indoor feeding, closed barns or corrals, removal of spilled grain or standing water, and use of bird proof feeders (Johnson and Glahn 1994).

Dogs. Dogs can be effective at 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 and Felegy 2009). Although dogs can be effective in keeping birds off individual properties, they do not contribute to a solution for the larger problem of overabundant/anthropogenic abundant bird populations (Castelli and Sleggs 1998). Swift and Felegy (2009) and numerous individuals in Wisconsin have reported that when harassment with dogs ceases, the number of birds usually return to pre-treatment numbers. WS has recommended and encouraged the use of dogs where appropriate.

Environmental/Habitat Modification. Environmental/habitat modification is an integral part of BDM. The type, quality, and quantity of habitat are directly related to the wildlife that is produced. Therefore, habitat can be managed to not produce or attract certain bird species or to repel certain birds. Most habitat management revolves around airports and bird aircraft strike problems in Wisconsin. 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 around 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 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.

Falconry. Falconry is the practice of using falcons and hawks to chase/hunt other wildlife species and return to the handler. It is regulated under both federal and state laws and all raptors in the United States are protected under various statutes; any "take" of a raptor must be done 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 permit).

Lasers. Lasers are a relative new technique used to frighten and disperse birds from their roosts or loafing areas. Although the use of a lasers (the term of "laser" is an acronym for Light Amplification by Simulated Emission of Radiation) to alter bird behavior was first used over 40 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, Canada Geese, other waterfowl, gulls, vultures (*Cathartes aura* and *Coragyps atratus*), and American Crows have 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 targeted at birds, can have substantial effects on behavior and may illicit changes in physiological processes (APHIS 2001). Best results are achieved under low-light conditions (i.e., sunset through dawn) and targeting structures or trees proximate to roosting birds,

thereby reflecting the beam. In field situations, habituation to lasers has not been observed (APHIS 2001).

The avian eye generally filters most damaging radiation (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 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).

Live capture devices include:

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. are 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 shape 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. These traps are visually monitored when in use so that captured birds can be restrained and removed from the trap quickly.

Cannon nets/rocket nets are normally used for larger birds such as pigeons, feral ducks, Wild Turkeys, and waterfowl and use mortar projectiles to propel a net up and 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 to other types of capture.

Clover, funnel, and 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.

Coda© Net Gun is a classified as a tool, and not a gun. It launches a net out a short distance and can be used to capture a variety of bird species. This type of capture device is most effective on larger birds such as Wild Turkeys, cranes, and Canada Geese that are on the ground and can be readily approached.

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 and required by law or permits, 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.

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*). It was introduced in 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.

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).

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 foot-hold trap (No. 1½ or other appropriate size), snare or tangle snares set on the top of poles. Poles that are 3-foot high near the threatened area where they can be seen easily 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 the bird can rest.

Talon© Net Gun is a capture device that uses a small disposable CO^2 charge to launch a net a short distance. This is a small capture device and is quieter than the Coda© net gun. Similar to the Coda© net gun, it is best used for larger bird species that can be readily approached on the ground.

Lure crops/alternate foods. When damage cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate the loss potential. 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 would be 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 otherwise 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 Wisconsin. 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 over 11.2 million acres of the state are in corn, wheat, hay, and soybean production (USDA 2014) which provides high quality foods for much of the year.

Nest destruction. Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. 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 populations. This method poses no imminent danger to pets or the public. If eggs or young are present, this would then be considered take

and would require a permit from the USFWS and/or WDNR for bird species protected under the MBTA. A permit would not be necessary for those species not protected under the MBTA (e.g., House Sparrows, European Starlings, Rock Pigeons)

Overhead Wires. 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 maintaining proper wire tension and replacing broken wires, and the spacing varies with the species being excluded. They have also been demonstrated to be most applicable on areas $\leq$ two acres, but may be considered unsightly or aesthetically unappealing to some people. In addition, wire grids can render a pond unusable for boating, swimming, fishing, and other recreational activities. Installation costs are about $1,000 per surface acre for materials. The expense of maintaining wire grids may be burdensome for some people.

Relocation. Relocation of damaging birds to other areas following live capture generally would not be effective or cost-effective. Since starlings, blackbirds, pigeons, and most other damaging species are common and numerous throughout Wisconsin, they are rarely if ever relocated because habitats in other areas are generally already occupied. Relocation of wildlife often involves stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats, or they 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 were considered to have high value such as migratory waterfowl or T/E species. An example in Wisconsin is the relocation of raptors off of airfields for human health and safety purposes. Bird locations are monitored and data recorded for a long term study on raptor relocation. In these cases, WS would consult with the USFWS and WDNR to coordinate capture, transportation, and selection of suitable relocation sites.

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.

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.

Scarecrows. The use of scarecrows has had 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 and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Mott 1985, Shirota et al. 1983, Conover 1982, Arhart 1972, Bomford and O'Brien 1990). Mylar tape has produced mixed results in its effectiveness to frighten 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.

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 has a much reduced price. The sacrifice in reduced pricing also limits the range and effectiveness of this method when compared to the laser. An additional

downside to using spotlights is that the bright lights may cause a disturbance to people in the area.

Tactile Repellents. 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 on a surface with a caulking gun will often discourage the birds from specific perches in structures, or on 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.

Paintballs. Paintballs can be used as a non-lethal method to haze birds away from an area. Paintballs have been used to harass geese and gulls at landfills and airports. This method is often used on large birds which have habituated to other hazing methods. It is the adverse conditioning of habituated birds which makes paintballs particularly effective as a non-lethal tool. The paintballs are shot in the direction of loafing birds and few actually hit the birds. A few birds such as Canada Geese which have habituated to other hazing methods sometimes must be struck by the paintball to get them to leave the site. If paintballs are used, it is important to use clear or colorless paint to prevent "marking" a bird. If colored paint is used, a marking or banding permit is necessary.

LETHAL METHODS

Egg addling/oiling/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 oiling is the process of spraying the entire egg(s) with 100% corn oil which prevents the egg from obtaining oxygen. Egg destruction is the process of removing the eggs and/or breaking them.

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when a large number of birds are present. Shooting with shotguns provides an auditory hazing component that can make lethal and non-lethal removal methods more effective.

Normally shooting is conducted with shotguns, rim and center-fire rifles, or air rifles. Shooting is a very individual specific method and is normally used to remove a single offending bird, or group of birds numbering less than 50 at one location. Shooting can be relatively expensive because of the staff hours sometimes required. It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting with shotguns, air rifles, or rim and center-fire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. All firearm safety precautions are followed by WS when conducting BDM 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 prior to the use of firearms and annual firearms safety training thereafter (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 (Smith et al. 1999). WS may recommend that resource owners receive DPs from the USFWS/WDNR 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 that would be used for blackbird, starling, and pigeon damage management in the current program and proposed action (Table C-2). For more than 30 years, DRC-1339 has proven to be an effective method of 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.

Table C-2. Chemicals Used by Wisconsin WS.

CY	Product Name	EPA Reg.	Species	Quantity Used
11	DRC-1339 Feedlots	56228-10	Starlings	291.05g
	DRC-1339 Staging Areas	56228-30	Starlings	4.5g
12	DRC-1339 Feedlots	56228-10	Starlings	218.5g
	DRC-1339 Staging Areas	56228-30	Starlings	27.0
13	DRC-1339 Feedlots	56228-10	Starlings	231.4g
	DRC-1339 Staging Areas	56228-30	Starlings	
	Methyl Anthranilate	58035-9	Herring Gull	0.33gal

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 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 non-target and T/E species. 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 which leaves 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. 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. Wooden based rat snap traps can be effective in killing offending birds, usually woodpeckers. The trap is attached to the building with the trigger pointed downward alongside the area of the building sustaining 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 (CO_2) gas is a colorless, odorless, noncombustible gas approved by the AVMA as a euthanasia method (Leary et al. 2013). CO_2 is a common euthanasia agent apparently because of its ease of use, safety, and ability to euthanize many animals in a short time span. The advantages for using CO_2 are: 1) the rapid depressant, analgesic, and anesthetic effects of CO_2 are well established, 2) CO_2 is readily available and can be purchased in compressed gas cylinders, 3) CO_2 is inexpensive, nonflammable, nonexplosive, and poses minimal hazard to personnel when used with properly designed equipment, and 4) CO_2 does not result in accumulation of tissue residues. CO_2 has 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 CO_2 is an effective euthanatizing agent. Inhalation of CO_2 caused little distress to the birds, suppresses nervous activity, and induced death within 5 minutes. In addition, inhalation of CO_2 at a concentration of 7.5% increases the pain threshold, and higher concentrations of CO_2 have a rapid anesthetic effect.

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

APPENDIX D: Checklist of the Birds of Wisconsin 2012
Wisconsin Society for Ornithology

Abundance: 1 = common 2 = uncommon 3 = rare/very rare but regular 4 = casual/accidental; not regular

Order	Family	Common name	*Scientific name*	Abundance
Anserifomes				
	Anatidae: Ducks/Geese/Swans			
		Black-bellied Whistling-Duck	*Dendrocygna autumnalis*	4
		Fulvous Whistling-Duck	*Dendrocygna bicolor*	4
		Greater White-fronted Goose	*Anser albifrons*	2
		Ross's Goose	*Chen rossii*	3
		Brant	*Branta bernicla*	4
		Cackling Goose	*Branta hutchinsii*	2
		Trumpeter Swan	*Cygnus buccinator*	2
		Tundra Swan	*Cygnus columbianus*	1
		Wood Duck	*Aix sponsa*	1
		Gadwall	*Anas strepera*	1
		Eurasian Wigeon	*Anas penelope*	3
		American Wigeon	*Anas americana*	1
		American Black Duck	*Anas rubripes*	2
		Cinnamon Teal	*Anas cyanoptera*	3
		Northern Shoveler	*Anas clypeata*	1
		Northern Pintail	*Anas acuta*	2
		Canvasback	*Aythya valisineria*	2
		Redhead	*Aythya americana*	1
		Ring-necked Duck	*Aythya collaris*	1
		Greater Scaup	*Aythya marila*	1
		Lesser Scaup	*Aythya affinis*	1
		King Eider	*Somateria spectabilis*	3
		Common Eider	*Somateria mollissima*	4
		Harlequin Duck	*Histrionicus histrionicus*	3
		Surf Scoter	*Melanitta perspicillata*	2
		White-winged Scoter	*Melanitta fusca*	2
		Black Scoter	*Melanitta americana*	2
		Long-tailed Duck	*Clangula hyemalis*	2
		Bufflehead	*Bucephala albeola*	1
		Common Goldeneye	*Bucephala clangula*	1
		Barrow's Goldeneye	*Bucephala islandica*	3
		Smew	*Mergellus albellus*	4
		Hooded Merganser	*Lophodytes cucullatus*	1
		Common Merganser	*Mergus merganser*	1
		Red-breasted Merganser	*Mergus serrator*	1
		Masked Duck	*Nomonyx dominicus*	4
		Ruddy Duck	*Oxyura jamaicensis*	1
Galliformes				
	Odontophoridae - New World Quail			
		Northern Bobwhite	*Colinus virginianus*	2
	Phasianidae: Partridges/Grouse/Turkeys/Quail			
		Gray Partridge	*Perdix perdix*	2
		Ring-necked Pheasant	*Phasianus colchicus*	1
		Ruffed Grouse	*Bonasa umbellus*	1
		Willow Ptarmigan	*Lagopus lagopus*	4
		Sharp-tailed Grouse	*Tympanuchus phasianellus*	2
Gaviiformes				
	Gaviidae - Loons			
		Red-throated Loon	*Gavia stellata*	2
		Pacific Loon	*Gavia pacifica*	3
		Common Loon	*Gavia immer*	1
Podicipediformes				
	Podicipedidae - Grebes			
		Pied-billed Grebe	*Podilymbus podiceps*	1
		Horned Grebe	*Podiceps auritus*	1
		Eared Grebe	*Podiceps nigricollis*	3
		Western Grebe	*Aechmophorus occidentalis*	3

Ciconiiformes			
	Ciconiidae - Storks		
	Wood Stork	*Mycteria americana*	4
Suliformes			
	Fregatidae - Frigatebirds		
	Magnificent Frigatebird	*Fregata magnificens*	4
	Phalacrocoracidae - Cormorants		
	Neotropic Cormorant	*Phalacrocorax brasilianus*	4
	Anhingidae - Darters		
	Anhinga	*Anhinga anhinga*	4
Pelecaniformes			
	Pelecanidae - Pelicans		
	Brown Pelican	*Pelecanus occidentalis*	4
	Ardeidae - Herons/Bitterns/Allies		
	American Bittern	*Botaurus lentiginosus*	2
	Least Bittern	*Ixobrychus exilis*	2
	Snowy Egret	*Egretta thula*	3
	Little Blue Heron	*Egretta caerulea*	3
	Tricolored Heron	*Egretta tricolor*	4
	Cattle Egret	*Bubulcus ibis*	2
	Black-crowned Night-Heron	*Nycticorax nycticorax*	1
	Threskiornithidae - Ibises/Spoonbills		
	White Ibis	*Eudocimus albus*	4
	Glossy Ibis	*Plegadis falcinellus*	3
	White-faced Ibis	*Plegadis chihi*	3
	Roseate Spoonbill	*Platalea ajaja*	4
Accipitriformes			
	Cathartidae - New World Vultures		
	Black Vulture	*Coragyps atratus*	4
	Pandionidae - Osprey		
	Osprey	*Pandion haliaetus*	1
	Accipitridae - Hawks/Kites/Eagles/Allies		
	Swallow-tailed Kite	*Elanoides forficatus*	4
	White-tailed Kite	*Elanus leucurus*	4
	Mississippi Kite	*Ictinia mississippiensis*	3
	Northern Harrier	*Circus cyaneus*	1
	Sharp-shinned Hawk	*Accipiter striatus*	1
	Northern Goshawk	*Accipiter gentilis*	2
	Harris's Hawk	*Parabuteo unicinctus*	4
	Broad-winged Hawk	*Buteo platypterus*	1
	Swainson's Hawk	*Buteo swainsoni*	3
	Ferruginous Hawk	*Buteo regalis*	4
	Golden Eagle	*Aquila chrysaetos*	2
Gruiformes			
	Rallidae - Rails/Gallinules/Coots		
	Black Rail	*Laterallus jamaicensis*	4
	King Rail	*Rallus elegans*	3
	Virginia Rail	*Rallus limicola*	1
	Sora	*Porzana carolina*	1
	Purple Gallinule	*Porphyrio martinicus*	4
	Common Gallinule	*Gallinula galeata*	2
	American Coot	*Fulica americana*	1
Charadriiformes			
	Charadriidae - Lapwings/Plovers		
	Black-bellied Plover	*Pluvialis squatarola*	1
	American Golden-Plover	*Pluvialis dominica*	1
	Snowy Plover	*Charadrius nivosus*	4
	Wilson's Plover	*Charadrius wilsonia*	4
	Semipalmated Plover	*Charadrius semipalmatus*	1
	Recurvirostridae - Stilts/Avocets		
	Black-necked Stilt	*Himantopus mexicanus*	3
	American Avocet	*Recurvirostra americana*	2
	Scolopacidae - Sandpipers/Phalaropes/Allies		
	Spotted Sandpiper	*Actitis macularia*	1
	Solitary Sandpiper	*Tringa solitaria*	1
	Greater Yellowlegs	*Tringa melanoleuca*	1
	Willet	*Tringa semipalmata*	2
	Lesser Yellowlegs	*Tringa flavipes*	1
	Eskimo Curlew	*Numenius borealis*	4

	Whimbrel	*Numenius phaeopus*	2
	Long-billed Curlew	*Numenius americanus*	4
	Hudsonian Godwit	*Limosa haemastica*	2
	Marbled Godwit	*Limosa fedoa*	2
	Ruddy Turnstone	*Arenaria interpres*	1
	Black Turnstone	*Arenaria melanocephala*	4
	Red Knot	*Calidris canutus*	2
	Sanderling	*Calidris alba*	1
	Semipalmated Sandpiper	*Calidris pusilla*	1
	Western Sandpiper	*Calidris mauri*	3
	Least Sandpiper	*Calidris minutilla*	1
	White-rumped Sandpiper	*Calidris fuscicollis*	2
	Baird's Sandpiper	*Calidris bairdii*	1
	Pectoral Sandpiper	*Calidris melanotos*	1
	Purple Sandpiper	*Calidris maritima*	3
	Dunlin	*Calidris alpina*	1
	Curlew Sandpiper	*Calidris ferruginea*	4
	Stilt Sandpiper	*Calidris himantopus*	1
	Buff-breasted Sandpiper	*Tryngites subruficollis*	2
	Ruff	*Philomachus pugnax*	4
	Short-billed Dowitcher	*Limnodromus griseus*	1
	Long-billed Dowitcher	*Limnodromus scolopaceus*	1
	Wilson's Snipe	*Gallinago delicata*	1
	American Woodcock	*Scolopax minor*	1
	Wilson's Phalarope	*Phalaropus tricolor*	2
	Red-necked Phalarope	*Phalaropus lobatus*	3
	Red Phalarope	*Phalaropus fulicarius*	3
Laridae - Gulls/Terns			
	Black-legged Kittiwake	*Rissa tridactyla*	3
	Ivory Gull	*Pagophila eburnea*	4
	Sabine's Gull	*Xema sabini*	3
	Bonaparte's Gull	*Chroicocephalus philadelphia*	1
	Black-headed Gull	*Chroicocephalus ridibundus*	4
	Little Gull	*Hydrocoloeus minutus*	3
	Ross's Gull	*Rhodostethia rosea*	4
	Laughing Gull	*Leucophaeus atricilla*	3
	Franklin's Gull	*Leucophaeus pipixcan*	2
	Black-tailed Gull	*Larus crassirostris*	4
	Mew Gull	*Larus canus*	3
	California Gull	*Larus californicus*	3
	Thayer's Gull	*Larus thayeri*	2
	Iceland Gull	*Larus glaucoides*	2
	Lesser Black-backed Gull	*Larus fuscus*	2
	Slaty-backed Gull	*Larus schistisagus*	4
	Glaucous-winged Gull	*Larus glaucescens*	4
	Glaucous Gull	*Larus hyperboreus*	2
	Great Black-backed Gull	*Larus marinus*	2
	Sooty Tern	*Onychoprion fuscatus*	4
	Least Tern	*Sternula antillarum*	4
	White-winged Tern	*Chlidonias leucopterus*	4
	Arctic Tern	*Sterna paradisaea*	3
	Royal Tern	*Thalasseus maximus*	4
Stercorariidae - Jaegers			
	Pomarine Jaeger	*Stercorarius pomarinus*	3
	Parasitic Jaeger	*Stercorarius parasiticus*	2
	Long-tailed Jaeger	*Stercorarius longicaudus*	3
Alcidae - Auks/Murres/Puffins			
	Dovekie	*Alle alle*	4
	Thick-billed Murre	*Uria lomvia*	4
	Ancient Murrelet	*Synthliboramphus antiquus*	4
Columbiformes			
Columbidae - Pigeons/Doves			
	Band-tailed Pigeon	*Patagioenas fasciata*	4
	Eurasian Collared-Dove	*Streptopelia decaocto*	2
	White-winged Dove	*Zenaida asiatica*	4
	Inca Dove	*Columbina inca*	4
	Common Ground-Dove	*Columbina passerina*	4

Cuculiformes				
	Cuculidae - Cuckoos/Roadrunners/Anis			
		Yellow-billed Cuckoo	*Coccyzus americanus*	1
		Black-billed Cuckoo	*Coccyzus erythropthalmus*	1
		Groove-billed Ani	*Crotophaga sulcirostris*	4
Strigiformes				
	Tytonidae - Barn Owls			
		Barn Owl	*Tyto alba*	3
	Strigidae - Typical Owls			
		Eastern Screech-Owl	*Megascops asio*	1
		Northern Hawk Owl	*Surnia ulula*	3
		Burrowing Owl	*Athene cunicularia*	4
		Barred Owl	*Strix varia*	1
		Great Gray Owl	*Strix nebulosa*	3
		Long-eared Owl	*Asio otus*	2
		Short-eared Owl	*Asio flammeus*	2
		Boreal Owl	*Aegolius funereus*	3
		Northern Saw-whet Owl	*Aegolius acadicus*	1
Caprimulgiformes				
	Caprimulgidae - Goatsuckers			
		Common Nighthawk	*Chordeiles minor*	1
		Chuck-will's-widow	*Antrostomus carolinensis*	3
		Eastern Whip-poor-will	*Antrostomus vociferus*	1
Apodiformes				
	Trochilidae - Hummingbirds			
		Green Violet-ear	*Colibri thalassinus*	4
		Green-breasted Mango	*Anthracothorax prevostii*	4
		Broad-billed Hummingbird	*Cynanthus latirostris*	4
		Ruby-throated Hummingbird	*Archilochus colubris*	1
		Anna's Hummingbird	*Calypte anna*	4
		Rufous Hummingbird	*Selasphorus rufus*	2
Coracuufirnes				
	Alcedinidae-Kingfishers			
		Belted Kingfisher	*Megaceryle alcyon*	1
Piciformes				
	Picidae - Woodpeckers/Allies			
		Lewis's Woodpecker	*Melanerpes lewis*	4
		Red-headed Woodpecker	*Melanerpes erythrocephalus*	1
		Red-bellied Woodpecker	*Melanerpes carolinus*	1
		Yellow-bellied Sapsucker	*Sphyrapicus varius*	1
		American Three-toed Woodpecker	*Picoides dorsalis*	3
		Black-backed Woodpecker	*Picoides arcticus*	2
		Hairy Woodpecker	*Picoides villosus*	1
		Downy Woodpecker	*Picoides pubescens*	1
Falconiformes				
	Falconidae - Caracaras/Falcons			
		Merlin	*Falco columbarius*	1
		Gyrfalcon	*Falco rusticolus*	3
		Prairie Falcon	*Falco mexicanus*	4
Passeriformes				
	Tyrannidae - Tyrant Flycatchers			
		Olive-sided Flycatcher	*Contopus cooperi*	1
		Western Wood-Pewee	*Contopus sordidulus*	4
		Eastern Wood-Pewee	*Contopus virens*	1
		Yellow-bellied Flycatcher	*Empidonax flaviventris*	1
		Alder Flycatcher	*Empidonax alnorum*	1
		Willow Flycatcher	*Empidonax traillii*	1
		Least Flycatcher	*Empidonax minimus*	1
		Dusky Flycatcher	*Empidonax oberholseri*	4
		Eastern Phoebe	*Sayornis phoebe*	1
		Say's Phoebe	*Sayornis saya*	4
		Vermilion Flycatcher	*Pyrocephalus rubinus*	4
		Ash-throated Flycatcher	*Myiarchus cinerascens*	4
		Great Crested Flycatcher	*Myiarchus crinitus*	1
		Tropical/Couch's Kingbird	*Tyrannus melancholicus*	4
		Western Kingbird	*Tyrannus verticalis*	3
		Eastern Kingbird	*Tyrannus tyrannus*	1
		Scissor-tailed Flycatcher	*Tyrannus forficatus*	3
		Fork-tailed Flycatcher	*Tyrannus savana*	4

Laniidae - Shrikes			
	Northern Shrike	*Lanius excubitor*	1
Vireonidae - Vireos			
	White-eyed Vireo	*Vireo griseus*	2
	Gray Vireo	*Vireo vicinior*	4
	Yellow-throated Vireo	*Vireo flavifrons*	1
	Blue-headed Vireo	*Vireo solitarius*	1
	Warbling Vireo	*Vireo gilvus*	1
	Philadelphia Vireo	*Vireo philadelphicus*	1
	Red-eyed Vireo	*Vireo olivaceus*	1
Corvidae - Jays/Crows			
	Gray Jay	*Perisoreus canadensis*	2
	Blue Jay	*Cyanocitta cristata*	1
	Clark's Nutcracker	*Nucifraga columbiana*	4
	Black-billed Magpie	*Pica hudsonia*	3
	Common Raven	*Corvus corax*	1
Alaudidae - Larks			
	Horned Lark	*Eremophila alpestris*	1
Hirundinidae - Swallows			
	Purple Martin	*Progne subis*	1
	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	1
	Cave Swallow	*Petrochelidon fulva*	4
Paridae - Chickadees/Titmice			
	Black-capped Chickadee	*Poecile atricapillus*	1
	Boreal Chickadee	*Poecile hudsonicus*	2
	Tufted Titmouse	*Baeolophus bicolor*	1
Sittidae - Nuthatches			
	Red-breasted Nuthatch	*Sitta canadensis*	1
	White-breasted Nuthatch	*Sitta carolinensis*	1
	Brown-headed Nuthatch	*Sitta pusilla*	4
Certhiidae - Creepers			
	Brown Creeper	*Certhia americana*	1
Troglodytidae - Wrens			
	Rock Wren	*Salpinctes obsoletus*	4
	House Wren	*Troglodytes aedon*	1
	Winter Wren	*Troglodytes hiemalis*	1
	Sedge Wren	*Cistothorus platensis*	1
	Marsh Wren	*Cistothorus palustris*	1
	Bewick's Wren	*Thryomanes bewickii*	4
	Carolina Wren	*Thryothorus ludovicianus*	2
Polioptilidae - Gnatcatchers			
	Blue-gray Gnatcatcher	*Polioptila caerulea*	1
Regulidae - Kinglets			
	Golden-crowned Kinglet	*Regulus satrapa*	1
	Ruby-crowned Kinglet	*Regulus calendula*	1
Turdidae - Thrushes			
	Eastern Bluebird	*Sialia sialis*	1
	Mountain Bluebird	*Sialia currucoides*	3
	Townsend's Solitaire	*Myadestes townsendi*	2
	Veery	*Catharus fuscescens*	1
	Gray-cheeked Thrush	*Catharus minimus*	1
	Swainson's Thrush	*Catharus ustulatus*	1
	Hermit Thrush	*Catharus guttatus*	1
	Wood Thrush	*Hylocichla mustelina*	1
	Varied Thrush	*Ixoreus naevius*	2
Mimidae - Mockingbirds/Thrashers			
	Gray Catbird	*Dumetella carolinensis*	1
	Northern Mockingbird	*Mimus polyglottos*	2
	Sage Thrasher	*Oreoscoptes montanus*	4
	Brown Thrasher	*Toxostoma rufum*	1
	Curve-billed Thrasher	*Toxostoma curvirostre*	4
Motacillidae - Wagtails/Pipits			
	American Pipit	*Anthus rubescens*	1
Bombycillidae - Waxwings			
	Bohemian Waxwing	*Bombycilla garrulus*	2
	Cedar Waxwing	*Bombycilla cedrorum*	1

Ptilogonatidae - Silky-Flycatchers		
Phainopepla	*Phainopepla nitens*	4
Calcariidae - Longspurs and Snow Buntings		
Lapland Longspur	*Calcarius lapponicus*	1
Chestnut-collared Longspur	*Calcarius ornatus*	4
Smith's Longspur	*Calcarius pictus*	3
Snow Bunting	*Plectrophenax nivalis*	1
Parulidae - Wood-Warblers		
Ovenbird	*Seiurus aurocapilla*	1
Louisiana Waterthrush	*Parkesia motacilla*	2
Northern Waterthrush	*Parkesia noveboracensis*	1
Golden-winged Warbler	*Vermivora chrysoptera*	2
Blue-winged Warbler	*Vermivora cyanoptera*	1
Black-and-white Warbler	*Mniotilta varia*	1
Prothonotary Warbler	*Protonotaria citrea*	1
Swainson's Warbler	*Limnothlypis swainsonii*	4
Tennessee Warbler	*Oreothlypis peregrina*	1
Orange-crowned Warbler	*Oreothlypis celata*	1
Nashville Warbler	*Oreothlypis ruficapilla*	1
Connecticut Warbler	*Oporornis agilis*	2
MacGillivray's Warbler	*Geothlypis tolmiei*	4
Mourning Warbler	*Geothlypis philadelphia*	1
Common Yellowthroat	*Geothlypis trichas*	1
American Redstart	*Setophaga ruticilla*	1
Cape May Warbler	*Setophaga tigrina*	1
Northern Parula	*Setophaga americana*	1
Magnolia Warbler	*Setophaga magnolia*	1
Bay-breasted Warbler	*Setophaga castanea*	1
Blackburnian Warbler	*Setophaga fusca*	1
Yellow Warbler	*Setophaga petechia*	1
Chestnut-sided Warbler	*Setophaga pensylvanica*	1
Blackpoll Warbler	*Setophaga striata*	1
Black-throated Blue Warbler	*Setophaga caerulescens*	2
Palm Warbler	*Setophaga palmarum*	1
Pine Warbler	*Setophaga pinus*	1
Yellow-rumped Warbler	*Setophaga coronata*	1
Prairie Warbler	*Setophaga discolor*	3
Black-throated Gray Warbler	*Setophaga nigrescens*	4
Townsend's Warbler	*Setophaga townsendi*	4
Hermit Warbler	*Setophaga occidentalis*	4
Black-throated Green Warbler	*Setophaga virens*	1
Canada Warbler	*Cardellina canadensis*	1
Wilson's Warbler	*Cardellina pusilla*	1
Yellow-breasted Chat	*Icteria virens*	2
Emberizidae - Emberizids		
Green-tailed Towhee	*Pipilo chlorurus*	4
Spotted Towhee	*Pipilo maculatus*	3
Eastern Towhee	*Pipilo erythrophthalmus*	1
Rufous-crowned Sparrow	*Aimophila ruficeps*	4
American Tree Sparrow	*Spizella arborea*	1
Chipping Sparrow	*Spizella passerina*	1
Clay-colored Sparrow	*Spizella pallida*	1
Field Sparrow	*Spizella pusilla*	1
Vesper Sparrow	*Pooecetes gramineus*	1
Lark Sparrow	*Chondestes grammacus*	1
Black-throated Sparrow	*Amphispiza bilineata*	4
Lark Bunting	*Calamospiza melanocorys*	3
Savannah Sparrow	*Passerculus sandwichensis*	1
Grasshopper Sparrow	*Ammodramus savannarum*	2
Baird's Sparrow	*Ammodramus bairdii*	4
Le Conte's Sparrow	*Ammodramus leconteii*	2
Nelson's Sparrow	*Ammodramus nelsoni*	3
Fox Sparrow	*Passerella iliaca*	1
Song Sparrow	*Melospiza melodia*	1
Lincoln's Sparrow	*Melospiza lincolnii*	1
Swamp Sparrow	*Melospiza georgiana*	1
White-throated Sparrow	*Zonotrichia albicollis*	1
Harris's Sparrow	*Zonotrichia querula*	2
White-crowned Sparrow	*Zonotrichia leucophrys*	1
Golden-crowned Sparrow	*Zonotrichia atricapilla*	4

	Dark-eyed Junco	*Junco hyemalis*	1
Cardinalidae - Cardinals/Saltators/Allies			
	Summer Tanager	*Piranga rubra*	2
	Scarlet Tanager	*Piranga olivacea*	1
	Western Tanager	*Piranga ludoviciana*	3
	Northern Cardinal	*Cardinalis cardinalis*	1
	Pyrrhuloxia	*Cardinalis sinuatus*	4
	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	1
	Black-headed Grosbeak	*Pheucticus melanocephalus*	3
	Blue Grosbeak	*Passerina caerulea*	3
	Lazuli Bunting	*Passerina amoena*	4
	Indigo Bunting	*Passerina cyanea*	1
	Painted Bunting	*Passerina ciris*	4
	Dickcissel	*Spiza americana*	1
Icteridae - Blackbirds			
	Bobolink	*Dolichonyx oryzivorus*	1
	Eastern Meadowlark	*Sturnella magna*	1
	Western Meadowlark	*Sturnella neglecta*	2
	Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	1
	Rusty Blackbird	*Euphagus carolinus*	2
	Brewer's Blackbird	*Euphagus cyanocephalus*	1
	Great-tailed Grackle	*Quiscalus mexicanus*	4
	Orchard Oriole	*Icterus spurius*	1
	Hooded Oriole	*Icterus cucullatus*	4
	Streak-backed Oriole	*Icterus pustulatus*	4
	Bullock's Oriole	*Icterus bullockii*	3
	Baltimore Oriole	*Icterus galbula*	1
	Scott's Oriole	*Icterus parisorum*	4
Fringillidae - Fringilline/Cardueline Finches			
	Brambling	*Fringilla montifringilla*	4
	Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*	4
	Pine Grosbeak	*Pinicola enucleator*	2
	Purple Finch	*Haemorhous purpureus*	1
	House Finch	*Haemorhous mexicanus*	1
	Red Crossbill	*Loxia curvirostra*	2
	White-winged Crossbill	*Loxia leucoptera*	2
	Common Redpoll	*Acanthis flammea*	1
	Hoary Redpoll	*Acanthis hornemanni*	3
	Pine Siskin	*Spinus pinus*	1
	American Goldfinch	*Spinus tristis*	1
	Evening Grosbeak	*Coccothraustes vespertinus*	2
Passeridae - Old World Sparrows			
	Eurasian Tree Sparrow	*Passer montanus*	4