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

ENVIRONMENTAL ASSESSMENT

BIRD DAMAGE MANAGEMENT IN ILLINOIS

FINAL ENVIRONMENTAL ASSESSMENT

BIRD DAMAGE MANAGEMENT BY THE ILLINOIS WILDLIFE SERVICES PROGRAM

Prepared by:

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

In Cooperation With:

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF DEFENSE
ARMY CORPS OF ENGINEERS

In Consultation With:

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

ILLINOIS DEPARTMENT OF PUBLIC HEALTH

CITY OF CHICAGO DEPARTMENT OF ENVIRONMENT

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ACRONYMS USED IN THE EA

AC	Alpha Chloralose
ADC	Animal Damage Control[1]
AI	Avian Influenza
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BA	Biological Assessment
BBS	Breeding Bird Surveys
BGEPA	Bald and Golden Eagle Protection Act
BO	Biological Opinion
CDC	Centers for Disease Control and Prevention
CDFG	California Department of Fish and Game
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOJ	Department of Justice
DP	Depredation Permit
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
IDOA	Illinois Department of Agriculture
IDNR	Illinois Department of Natural Resources
IDPH	Illinois Department of Public Health
ILCS	Illinois Compiled Statutes
IWDM	Integrated Wildlife Damage Management
INAD	Investigative New Animal Drug
LD	Lethal Dose
MA	Methyl Anthranilate
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MMWR	Morbidity and Mortality Weekly Report
MOU	Memoranda or Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
NOA	Notice of Availability
NWHS	National Wildlife Health Center
NWRC	National Wildlife Research Center
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedure
T/E	Threatened and Endangered Species
TGE	Transmissible Gastroenteritis
USACE	U.S. Army Corps of Engineers
USC	United States Code
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	Illinois Administrative Code
WS	Wildlife Services
WNV	West Nile Virus

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

SUMMARY

Wild, domestic or feral birds may have many positive values but they can also cause damage to property, agricultural resources, natural resources, and pose risks to human health and safety. This EA analyzes the potential environmental impacts of alternatives for United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) response to bird damage and conflicts with birds in Illinois. Actions proposed in the EA could be conducted on public and private property in Illinois when the resource owner (property owner) or manager requests assistance, a need for action is confirmed, and agreements specifying the nature and duration of the BDM activities to be conducted are completed. This analysis is prepared in cooperation with the U.S. Department of the Interior, Fish and Wildlife Service (USFWS), the U.S. Department of Defense, Army Corps of Engineers (USACE), the Illinois Department of Natural Resources (IDNR), the Illinois Department of Agriculture (IDOA), and the Illinois Department of Public Health (IDPH).

Alternatives examined in the EA include an alternative in which WS does not become involved in bird damage management (BDM) and an alternative in which WS is restricted to the use and recommendation of only non-lethal BDM methods (Chapter 3). The third alternative considered, the preferred alternative, is for WS and the cooperating agencies to continue an integrated BDM program that includes the use of the full range of legal non-lethal and lethal bird damage management techniques. WS would use an Integrated Wildlife Damage Management (IWDM) approach to apply these techniques, singly or in combination, to meet requester needs for reducing conflicts with birds. Cooperators requesting assistance would be provided with recommendations and information regarding the use of effective non-lethal and lethal techniques. Non-lethal methods recommended and used by WS may include resource management, physical exclusion, relocation, human behavior modification, frightening devices, and other deterrents (Appendix C). Lethal methods recommended and used by WS may include the use of shooting, toxicants, nest/egg destruction, live capture and transportation to an approved poultry processing facility and live capture and euthanasia (Appendix C). All WS activities would continue to be conducted in accordance with applicable State, Federal, 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; public and pet health and safety; humaneness of the alternatives used, relative efficacy in reducing damage and on sociological concerns including humaneness and animal welfare.

CHAPTER 1: PURPOSE 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 uses and needs of wildlife which increases the potential for conflicting human-wildlife interactions. In addition, certain segments of the public strive for protection of all wildlife. Such protection can create localized wildlife population increases and contribute to conflicts between humans and wildlife. The Final Environmental Impact Statement (EIS) (USDA 1997) for the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program summarizes the relationship in North American culture of wildlife values and wildlife damage in this way:

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

The alleviation of damage or other problems caused by or related to the behavior of wildlife is termed wildlife damage management and recognized as an integral component of wildlife management (The Wildlife Society 1992). WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)). The United States Department of the Interior, Fish and Wildlife Service (USFWS) is responsible for the conservation of the Nation's fish, wildlife, plants and their habitats including implementation of the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. The USFWS is also charged with implementation and enforcement of the Endangered Species Act of 1973, as amended and with developing recovery plans for listed species. The United States Department of Defense, Army Corps of Engineers (USACE) manages lands in Illinois which have been and/or could potentially be involved in conflicts with birds. These three federal action agencies, in cooperation with state regulatory and land management agencies (Appendix B), have prepared this Environmental Assessment (EA) to evaluate the environmental impacts of alternatives for reducing bird damage to property, agricultural resources, natural resources, and risks to human/public health and safety in Illinois.

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. WS and the cooperating agencies are preparing this Environmental Assessment (EA) to: 1) facilitate planning, interagency coordination, and the streamlining of program management; 2) clearly communicate to the public the analysis of individual and cumulative impacts of program activities; and 3) evaluate and determine if there are any potentially significant or cumulative adverse affects from the proposed program. All wildlife damage management conducted in Illinois would be undertaken in compliance with relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531-1543). This analysis relies primarily on existing data contained in published documents (Appendix A) including the *Animal Damage Control Program Final Environmental Impact*

Statement (USDA 1997 Revised).

1.2 PURPOSE OF THE EA

The purpose of this EA is to evaluate the potential impacts on the human environment from alternatives for WS, USFWS, and USACE involvement in the protection of agricultural resources, natural resources, property, livestock, and public health and safety from damage and risks associated with birds in Illinois. Damage problems can occur throughout the State. Under the Proposed Action, bird damage management (BDM) could be conducted on private, Federal, State, Tribal, county, and municipal lands in Illinois upon request.

Several bird species have potential to be the subject of WS BDM activities in Illinois. Bird species addressed in this EA include: American Crows (*Corvus brachyrhynchos*), Red-winged Blackbirds (*Agelaius phoeniceus*), Brown-headed Cowbirds (*Molothrus ater*), Common Grackle (*Quiscalus quiscula*), European Starlings (starlings) (*Sturnus vulgaris)*, House Sparrows (sparrows) (*Passer domesticus*), Gray Catbirds (*Durnetella carolinensis*), Rock Pigeon (*Columba livia*), Wild Turkeys (*Meleagris gallopavo*), Herring Gulls (*Larus argentatus*), Ring-billed Gulls (*Larus delawarensis*), Double-crested Cormorants (*Phalacrocorax auritus)*, Killdeer (*Charadrius vociferous*), Canada Geese (*Branta canadensis*), Mallards (domestic/wild) (*Anas platyrhynchos*), Blue-winged Teal (*Anas discors*), Green-winged Teal (*Anas crecca*), American Coot (*Fulica Americana*), Semipalmated Plover (*Charadrius semipalmatus*), Buff-Breasted Sandpiper (*Tryngites suberficllis*), Least Sandpiper (*Calidris minutilla*), Pectoral Sandpiper (*Calidris melantos*), Semipalmated Sandpiper (*Calidris pusilla*), Solitary Sandpiper (*Tringa solitaria*), Common Snipe (*Gallinago gallinago*), Lesser Yellowlegs (*Tringa flavipes*), Greater Yellowlegs (*Tringa melanoleuca*), Mourning Doves (*Zenaida macroura*), Mute Swans (*Cygnus olor*), Barn Swallows (*Hirundo rustica*), Cliff Swallows (*Hirundo pyrrhonota*), Bank Swallows (*Riparia riparia*), Tree Swallows (*Tachycineta bicolor*), Chimney Swift (*Chaetura pelagica*), Common Swift (*Apus apus*), Great Blue Herons (*Ardea herodias*), Green Heron (*Butorides virescens*), Great Egrets (*Ardea alba*), Cattle Egrets (*Bubulbus iris*), Red-tailed Hawks (*Buteo jamaicensis*), Rough-legged Hawk (*Buteo lagopus*), Great Horned Owls (*Bubo virginianus*), American Kestrels (*Falco sparverius*), Cooper's Hawk (*Accipiter cooperii*), Turkey Vultures (*Cathartes aura*), Black Vultures (*Coragyps atratus*), Northern Flickers (*Colaptes auratus*), Downy Woodpeckers (*Picoides pubescens*), Hairy Woodpeckers (*Picoides villosus*), and feral, domestic and exotic birds.

1.3 NEED FOR ACTION

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

1.3.1.1 Human Health Concerns. Certain bird species are known vectors of diseases (zoonoses) that are transmittable to humans or they act as reservoirs that infect a host that spreads the disease to humans (Table 1-1) (Weber 1979, Conover 2002). Starlings, 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 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. 1996). When disturbed, fungal spores become airborne and if inhaled may cause the respiratory disease *Histoplasmosis*. Although most individuals who are infected with Histoplasma are symptomatic, the acute disease can be caused by exposure to a large "dose" of spores. This can occur in when a large

accumulation of droppings on soil are disturbed, during construction, demolition, etc. Ornithosis a disease of birds caused by *Chlamydia psittaci* and contracted by humans through contact with infected birds. Pigeons are most commonly associated with the spread of Ornithosis to humans. In addition, 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.

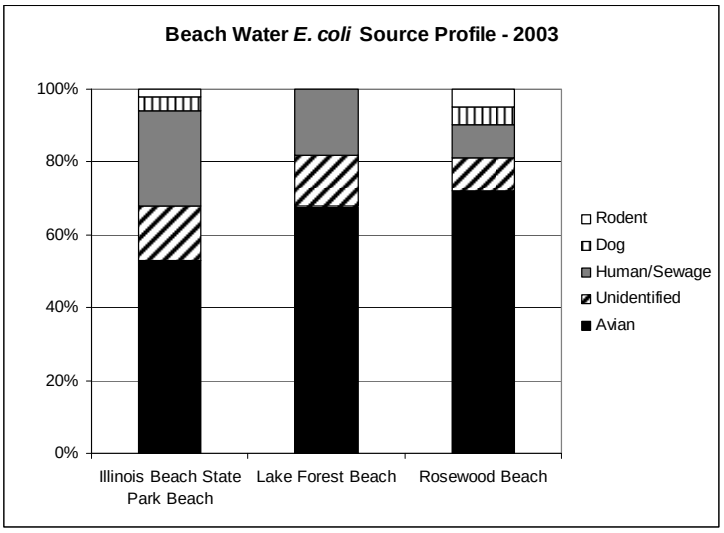

Figure 1-1. Sources of *E. coli* bacteria at Lake County Beaches in 2003. (Figure courtesy of Lake County Health Department)

Detecting contamination is relatively simple compared to the challenge of identifying where such contamination may originate. Fecal coliforms and *Escherichia coli* (*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 may 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 Units or CFU) per 100 mL of water, a health risk to humans may exist and recreational waters should be closed to the public.

Ring-billed and Herring Gulls are an example of two species that are currently causing problems in Illinois. Problems caused by gulls include damage to structures (e.g., flat roofs and stonework), adverse aesthetic impacts, foul odors near nesting sites, and health risks caused by accumulations of fecal material on buildings, near outdoor dining areas, and at recreational sites. Additionally, sites in northern Illinois have had to ban swimming on public beaches because of high levels of *E. coli* bacteria in the water. Swimming bans due to high *E. coli* levels are estimated to have cost the city of Chicago over $2 million dollars in lost revenue (Whitman et al. 2001). The high concentration of gulls is believed to contribute to the *E. coli* problem at beaches. Results from a United States Department of the Interior, Geological Survey (USGS) study indicate that gulls were among the largest contributors to *E. coli* contamination at the beaches at a northern Illinois beach (Whitman et al. 2001). When the numbers of gulls observed at the beach were logged one day, it correlated significantly with water and foreshore sand concentrations of *E. coli*. DNA fingerprinting of *Salmonella* isolates from sand and water at these beaches were a reasonably good match to gull feces isolates, but other birds could also have been *Salmonella* vectors. In Lake County, Illinois, the Lake County Health Department used genetic ribotyping to identify the probable sources of elevated *E. coli* bacteria levels responsible for beach closures at three beaches in the county in 2003. Over 50% of the *E coli* isolates collected at each of the three beaches

were from avian sources (Figure 1-1). Lake County Health Department Officials estimate that 95% or more of the birds observed at these sites were gulls (M. Adam, Lake County, pers. comm. March 20, 2007, Kinzelman et al 2006).

Birds may also be responsible for creating human health and safety concerns that are not related to transmission of zoonotic diseases. For example, in some instances birds (usually gulls) nesting near building air-intake vents. Feathers, fecal material and other substances are pulled into the building ventilation system and cause health problems (e.g., allergy and respiratory problems) for employees. There have been problems with health risks from scavenging birds which take material from waste disposal sites and drop it in municipal water reservoirs and/or other areas used by humans. Illinois WS receives calls from residents concerning the aggressive nature of nesting raptors and Canada Geese that exhibit aggressive behavior towards people approaching their nest and/or offspring.

1.3.1.2 Human Safety (Aviation).

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. In 1990 there were roughly 1,750 reported wildlife strikes compared to more than 7,136 in 2005 in the U.S. (Cleary et al. 2005). Between 1990 and 2005 there were 8536 wildlife strikes in the U.S. that caused damage to aircraft, of these 92% were caused by birds (Cleary et al. 2002). The number of airports requesting assistance from WS nationwide with wildlife issues has increased from less than 50 in 1990 to more than 674 in 2006 (Dolbeer 2007).

The FAA is responsible for setting and enforcing the Federal Aviation Regulations (FAR) and policies to enhance public safety. For commercial airports, 14CFR, Part 139.337 (Wildlife Hazard Management) directs the airport sponsor to conduct a wildlife hazard assessment if an air carrier aircraft experiences multiple wildlife strikes or an air carrier aircraft experiences substantial damage from striking wildlife. 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. WS works with the FAA under a MOU to provide wildlife damage management information or services, upon request, to airport managers. 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 Depredation Permits (DPs) for the purpose of reducing hazard threats posed by migratory birds, or may provide operational assistance with conducting wildlife hazard management activities.

Bird damage to property can have important monetary impacts such as the ingestion of birds into a jet engine. During FY04 an aircraft struck a flock of Double-crested Cormorants at a northern Illinois airport causing approximately $179,000 worth of damage to the aircraft (Wright 2007). In FY04 an aircraft struck a passerine at a northern Illinois airport causing about $15,000 in lost fuel (Wright 2007). Therefore, WS, on a limited basis, has been providing assistance to airports in Illinois to resolve conflicts

between wildlife and aviation traffic and to protect the traveling public. Work on these airports is being conducted under CEs to meet NEPA requirements in Illinois. WS has written nine wildlife hazard management plans for different airports and thirteen formal wildlife hazard assessments that provided airports with the necessary information to identify problematic species, seasonal trends in specie abundance, abatement recommendation, and legalities surrounding the management of these species. As wildlife/aviation hazards are identified at different airports throughout Illinois the number of requests for assistance may increase. WS either verified or had reported 198, 1,532, 2,130 potential threats to aviation traffic from a variety of species in FY04, 05 and 06, respectively (MIS 2004, 2005, and 2006). The bird species discussed/analyzed in this EA occur in Illinois and could occur on most airports in Illinois. If these birds present an aircraft/bird strike hazard or potential hazard, WS would respond with appropriate actions. Those actions could be non-lethal or lethal depending on the case-by-case situation as evaluated by WS and airport personnel and authorized by WS migratory bird DP (permit # MB020299-0).

Nationally, bird strikes cause an estimated seven fatalities and $245 million damage to civilian and military aircraft each year (Conover et al. 1995). According to FAA records, approximately 3,192 bird strikes to civil aircraft were reported in Illinois from FY90 through FY05 (FAA database, wildlife.pr.erau.edu/public/index1.html). Of those strikes reported to commercial aircraft, 1,555 strikes were from unknown species and gulls accounted for 142. It is estimated that only 20 to 25% of all bird strikes are reported (Conover et al. 1995, Dolbeer et al. 1995, Linnell et al. 1996, Linnell et al. 1999), consequently, the number of bird strikes in Illinois is most likely much higher than FAA records indicate.

1.3.1.3 Livestock Health. Pigeons, starlings, sparrows, and blackbirds have been implicated in the transmission of diseases significant to livestock production (Table 1-1). 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. 1996). Starlings also may be involved in the transmission of hog cholera. Cryptococcosis is a fungal disease spread by Pigeons and starlings to livestock that may result in chronic, usually fatal, meningitis.

The northern fowl mite (*Ornithonyssus sylviarum*) found on Pigeons is an important poultry pest (Cleary et al.1996). In addition to the spread of zoonotic diseases to livestock, WS also receives requests for assistance concerning birds of prey depredating domestic fowl.

Illinois WS provided information to livestock producers during the fall of 2005 which increased farmer awareness of a WS' assistance to reduce starling damage and the threat of damage at their facilities. The number of requests for assistance to reduce starling damage or potential damage at livestock facilities is expected to increase during the next several years.

Table 1-1. Diseases transmissible to humans and livestock associated with feral domestic 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

1.3.2 Need for Bird Damage Management to Reduce Damage to Property.

Property damage caused by birds can entail numerous resources and usually is not important nationally but may be significant on a local or regional basis. Woodpecker damage to residential dwellings from a national perspective is minimal; however, from a local perspective may cause home owners thousands of dollars in related damages. House Sparrows and starlings may damage buildings by pecking foam insulation and create aesthetic problems with their droppings and nesting materials.

Instances of property damage from birds may consist of Canada Geese defacing property due to overgrazing and deposition of large amounts of fecal material. The costs of reestablishing over-grazed lawns and cleaning goose droppings from sidewalks have been estimated at more than $60 per bird (Allan et at. 1995). Canada goose fecal deposits have also been found to carry *Cryptoporidium* spp, a diarrheal disease caused by microscopic parasites, in Illinois and Ohio (Zhou et al 2004). Research on human landscape preference has revealed that humans have a strong predilection, some assert an innate preference, for savannas with water (Cooper, in press[a]). Cooper (in press [a]) also reported that like humans, but evolutionarily much earlier, Canada Geese evolved to use the savanna landscape because the setting offered ample foraging opportunities, a high predator detection likelihood, and ready escape into nearby water. This preference for similar habitats has resulted in the increasing level of conflicts between humans and resident Canada Geese. In addition Roof-nesting gulls are undesirable because they cause damage to structures, plug drains with nesting material and food remains, defecate on vehicles, and harass maintenance personnel (Belant 1993).

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 Pigeon feces on limestone. Results from the study indicated that accumulations of 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 Pigeon excrement should be considered as a potentially important factor in the long-term decay of stone. Pigeon droppings can also deface signs and cause significant losses to sign companies attempting to maintain billboards.

Microbes within bird excrement also can cause damage to materials for buildings and monuments. Channon (2004) studied the impact of Pigeon excrement on marble, Portland stone, Bath stone and concrete which is used as building material for monuments and heritage stonework on buildings. They treated the stones with Pigeon excrement and at the end of one year of exposure to environmental conditions, cleaned the stones by scraping with a flat scraper then brushing with a stiff-bristled nylon brush and finally rinsing with a low-pressure water spray until all visible evidence of fouling had been removed and all that remained were a few persistent stains on the surface of the stonework. Condition of the stones was recorded at the end of the

cleaning process and then the stones were left exposed to the elements and monitored for an additional 4 years. Despite the cleaning process, nutrients from the excrement has penetrated the surface of the material and provided sufficient resources for moss to grow at the damage sites. Extent of initial damage and moss development varied between materials. In areas with acidic rainfall, the moss may serve as a pad which retains water and exacerbate problems with corrosion due to acid rainfall. Bassi and Chiatante (1976) determined that Pigeon excrement constituted a highly favorable substrate for fungal growth and that the fungal growth may contribute to the damage of marble surfaces mechanically and through the secretion of acidic products.

Although most examples are from Pigeons, similar impacts are likely for other bird species. Washing/scraping feces from surfaces can reduce the problem but require time and effort which, for some businesses/managers may result in loss of staff time as personnel are assigned to cleaning chores or the cost of hiring an individual/company to do the cleaning.

Birds can also cause damage to electrical utility structures. Electric utility companies in Tennessee have requested WS assistance with problems caused by large concentrations of starlings roosting at substations and on utility poles. Fecal accumulations on electrical equipment compromise insulators, resulting in fires, shorts in electrical systems, risks to employee safety, and loss of power to customers. One incident in Eastern Washington resulted in loss of power for 11 hours in December when temperatures were below freezing. Cost to replace equipment was $10,000 but there also was lost service revenue, employee overtime and other expenses. The loss of revenue due to outages can cost over 1 million dollars a day on major transmission lines in a power system.

There are methods available to wash equipment, but they often require shutting down power at the affected site and rerouting power to customers which can also cost over a million dollars in costs to route/acquire power from other sources.

Problems occur when large numbers of starlings perch on 2-3 spans of power lines. If the birds suddenly flush from the lines at one time it can cause the lines to swing close to one another and short the system. Some equipment can be reset but lines using fuses generally have loss of power until a team can replace the shorted fuse. Power utility problems with starlings as well as monk parakeets generally occur in locations near food sources including fruit orchards, dairies, cattle feedlots, and landfills.

In these situations WS endeavors to work with the utility company and the individuals owning/managing the food source to resolve the problem. Solutions to these problems include the range of non-lethal and lethal methods to reduce bird access to crops, livestock facilities, and landfills as well as visual frightening devices (reflectors) installed at the utility structures, noisemakers and similar frightening devices to discourage birds from loafing and roosting on utility structures, systems to clean utility equipment, and reduction of local starling numbers with lethal methods.

1.3.3 Need for Bird Damage Management to Protect Agricultural Resources.

1.3.3.1 Livestock Feeds. Bird damage to agricultural crops has cost U.S. farmers more than $100 million annually (Besser 1985) and can pose significant economic threats to agricultural producers (Besser et al. 1968, Dolbeer et al. 1978, Feare 1984). As the science of raising cattle progressed from range to feedlots, bird problems intensified. Cattle in feedlots and dairies provide a tremendous feeding opportunity for birds. With modern agriculture facilities came the concept of the complete cattle diet. The complete

diet contains all the nutrients and fiber that cattle need to increase weights, produce milk, and improve the flavor and texture of meat. The basic constituent of most rations is silage with the addition of barley, corn, or other grains which may be incorporated as whole, crushed or ground grains. The silage/grain mixture is normally combined with hay, or other high fiber roughage. While cattle are not able to select for certain ingredients, starlings and other birds select for grains, or other items, thereby altering the composition and energy value of the feed.
Livestock feed losses to starlings have been estimated by Besser et al. (1968) in feedlots near Denver, Colorado at $84 per 1,000 birds. Forbes (1995) reported starlings consume up to 50% of their body weight each day. Glahn and Otis (1981) reported consumption of about 10.5 lbs of pelletized feed per 1,000 bird minutes. The removal of high energy food ingredients is believed to reduce weight gains, milk yields, and is economically significant to individual producers (Feare 1984).

From FY04 thru FY06 WS responded to 11, 11, and 21 respectively, requests for assistance from agriculture producers that were concerned about starlings consuming livestock feed or spreading diseases to livestock (MIS 2004, 2005, 2006). Because livestock producers are becoming more aware of the Illinois WS program, the number of complaints received by WS is expected to increase. During FY00, WS conducted the first operational projects in Illinois under CEs to reduce starling damage at 5 dairies by reducing livestock feed consumption/ contamination. Assistance increased to 21 farms during FY06.

1.3.3.2 Aquaculture Resources. Bird damage to aquaculture resources can have significant economical impacts. The greatest economic losses result from Double-crested Cormorants feeding on Channel Catfish (*Ictalurus punctatus)* at aquaculture facilities in the southeastern United States. Stickley and Andrews (1989) estimated that Mississippi catfish farmers lose in excess of $3 million dollars annually to Double-crested Cormorants. In response to Double-crested Cormorants population expansion during the past 25 years, the USFWS has implemented an Aquaculture Resources Depredation Order[2] (50 CFR 21.47) modifying the legal protection for Double-crested Cormorants. Wading birds including herons and egrets (Family *Ardeidae*) also cause significant economic losses to aquaculture production facilities. 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 the greatest economic risk to fish hatcheries.

1.3.3.3 Field Crops. Canada Geese and blackbirds can cause considerable damage to field crops. The amount of damage and subsequent monetary losses vary considerably each year based upon seasonal variations in migrations, spatial differences in crop placement, and temporal differences affecting planting and harvesting dates. Cleary et al. (1996) 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

[2] This Depredation Order (50 CFR 21.47) does not apply to Illinois, but is referred to as background information for the reader.

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). Damage to rice crops by blackbirds nationwide has been estimated around 21 million dollars (Robert Byrd, MO WS, Pers. Comm.). Blackbirds and American Crows (*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 sweet corn (Conover 2002).

1.3.4 Need for Bird Damage Management to Reduce Nuisance Problems. Certain bird species and their associated nesting material and droppings may create nuisances or safety hazards. Accumulations of pigeon droppings may produce an objectionable odor, accelerate deterioration of buildings and increase maintenance costs. Pigeon manure deposited on park benches, cars, statues, and unwary pedestrians is aesthetically displeasing. House Sparrows may also create fire hazards by placing nesting material near electrical wiring and light fixtures. Gulls create nuisances when they nest on roof tops and attempt to gain food from people eating outdoors (Dolbeer et al. 1990). Winter Blackbird roosts can number into the millions, causing unsafe conditions if the roost is in a populated area, (Robert Byrd, MO WS, Pers. Comm.). Excessive amounts of gull droppings on other structures, such as a USACOE river lock, can cause slippery walking conditions and pose human safety threats after rainfall. Additionally, fecal accumulations from starlings have caused a slipping hazard on catwalks at industrial plants (along with a fire hazard at oil refineries).

1.3.5 Need for Bird Damage Management to Protect 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 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*). Starlings may also parasitize the nests of other species by destroying eggs or hatchlings (Fielder et al. 1990, Grabill 1977, Peterson and Gauthier 1985).

Total nest failure was the main factor influencing Eastern Bluebird (*Sialia sialis*) nesting success in nest boxes in Wisconsin (Randuzel et al. 1997). House Sparrows were one of the main factors influencing nest success, but risks appeared to be reduced through nest box design. Nest competition with starlings was identified as a factor determining selection of nest sites by Northern Flickers in British Columbia (*Colaptes auratus*; Fisher and Wiebe 2006). In Ohio, Ingold (1994) documented starling competition for freshly excavated nest sites created by Red-bellied Woodpeckers (*Melanerpes carolinus*) which lost 39% of their nest cavities to Starlings, Northern Flickers which lost 14% of their nest cavities to Starlings, and Red-headed Woodpeckers (*Melanerpes erythrocephalus*) which lost 15% of their nest cavities to Starlings. However, these interactions may not have had losses in fecundity since at least some of these birds were able to renest. In a different study twenty-seven of 40 pairs lost a total of 42 nest cavities to Starlings (Ingold 1998). The presence of nearby nest boxes did not appear to benefit nesting success for most flickers as only 1 pair of Flickers used a nest box. Potential for positive impacts on non-target species are limited because of the limited number of sites and relatively small area impacted by WS activities.

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 Forster's Tern (*Sterna forsteri*) and the Common Tern (*Sterna hirundo*) which are endangered species in Illinois. 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 Great Lakes population of Piping Plover is listed as an endangered species.

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.

1.4 WS PROGRAM AND THE USFWS AND IDNR BIRD PERMITTING PROGRAMS

1.4.1 USFWS Migratory Bird Permitting Program

The USFWS is the primary Federal agency responsible for conserving, protecting, and enhancing the Nation's fish and wildlife resources and their habitats. The USFWS mission is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. Responsibilities are shared with other Federal, State, tribal, and local entities; however, the USFWS has specific responsibilities for endangered species, migratory birds, inter-jurisdictional fish, and certain marine mammals, as well as for lands and waters they administer for the management and protection of these resources.

The USFWS regulates the taking of migratory birds under the four bilateral migratory bird treaties the United States entered into with Great Britain (for Canada), Mexico, Japan, and Russia. Regulations allowing the take of migratory birds are authorized by the 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. In 2004, Congress passed the Migratory Bird Treaty Reform Act to clarify the original intent of the MBTA, the conservation and protection of migratory birds *native* to North America, and directed USFWS to establish a list of non-native bird species found in the United States. Species on this list, including mute swans, are not afforded MBTA protection. Some non-migratory bird species (e.g., wild turkeys) are managed by the states. Certain other bird species in North America are not protected under the MBTA because neither the species nor their family was listed in the MBTA (e.g., European Starlings and House Sparrows). All actions proposed in the EA will be in compliance with the regulations of the MBTA, as amended.

The USFWS has authority for issuance of Depredation Permits (DPs) (50 CFR 21.41) to persons who clearly show evidence of migratory birds causing or about to cause damage. In Illinois, DPs issued by the USFWS are sent to the applicant, and then the applicant has to send a copy to the Illinois Department of Natural Resources (IDNR). The IDNR will issue an additional state permit once it reviews the DP. In most cases the IDNR state permit allows the same take numbers and methods as the USFWS DP. WS recommends to the USFWS the issuance of a DP to the resource owner after reviewing the

Table 1-2. DPs Recommended by WS during FY 04, 05, and 06

FY	Resource Protected	DP Recommended
04	Agriculture	4
	Health & Safety	46
	Natural Resources	4
	Property	68
05	Agriculture	7
	Health & Safety	40
	Natural Resources	2
	Property	78
06	Agriculture	8
	Health & Safety	33
	Natural Resources	3
	Property	55

conflicts and methods of abatement employed by the resource owner (WS Directive 2.301). Table 1-2 provides information on the number of DPs WS recommended and forwarded to the USFWS for FY 04-06.

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

Managing Damage by Resident Canada Geese: On August 20, 2007, the USFWS issued Final Regulations for Managing Resident Canada Goose Populations (FR Vol. 72, No 160, 7 pages 46403-46409). The new regulations were created in response to conflicts associated with high populations of resident Canada Geese in the US. The rule gives State wildlife management agencies, private and public landowners, and airports additional flexibility to deal with problems, conflicts, and damages caused by resident Canada Geese. The rule includes four specific control and depredation orders (Airports, Nests and Eggs, Agricultural, and Public Health) which directly relate to WS resident Canada Goose damage management activities conducted under this EA. Under these orders, the appropriate State wildlife agency, USFWS or other official agent (e.g., WS), or, in some cases, landowners and airport managers are authorized to conduct certain Resident Canada Goose Damage Management activities without needing to apply for USFWS Migratory Bird Permits. The control and depredation orders may only be implemented between April 1 and August 31, except for the take of nests and eggs which could be implemented in March. These regulations require individuals acting under the depredation order to report the number of birds killed and eggs oiled to the USFWS. Under the rule, individual states may continue to require permits for these types of activities. At this time the IDNR still requires State permits for all the activities described in this section.

Managing Damage by Blackbirds and Crows: USFWS has established a standing depredation order for use by the public to help address damage by blackbirds (defined as Yellow-headed, Red-winged, Rusty, and Brewer's blackbirds, cowbirds, grackles, crows, and magpies). Under this "order" (50 CFR 21.43), no Federal permit is required by anyone to remove the above species 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. Section 5.25.35 part d of the Illinois Administrative Code states: "Any person may remove or destroy, by use of a shotgun, air gun or traps and only on or over the threatened area, any Red-winged Blackbirds, Rusty Blackbirds, Brewer's blackbirds, cowbirds, grackles and crows when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance, without a permit, so long as he or she has written permission from the landowner or tenant." It should be noted that despite their inclusion in the USFWS blackbird depredation order, in Illinois, Yellow-headed Blackbirds are a state-listed endangered species and may not be lethally taken for damage management.

Managing Double-crested Cormorant (DCCO) Damage to Public Resources**:** In response to persistent conflicts and complaints relating to DCCOs, in 2003 the United States Department of Interior, Fish and Wildlife Service (USFWS), in cooperation with WS, completed an EIS on the management of DCCOs in the United States (USFWS 2003). The selected management alternative established a depredation order to reduce the actual occurrence, and/or minimize the risk, of adverse impacts of DCCOs to public resources including fish (both free-swimming fish and stock at Federal, State, and Tribal hatcheries that are intended for release in public waters),

wildlife, plants, and their habitats. It authorizes WS, State fish and wildlife agencies, and Federally-recognized Tribes to control DCCOs, without a Federal permit, in 24 States including Illinois. These regulations require individuals acting under the depredation order to report the number of birds killed and eggs oiled to the USFWS. A state permit is also required to remove DCCOs, their nests and eggs.

1.4.2 WS Program

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). Under the Act of March 2, 1931, and 7 U.S.C. §426c, APHIS may carry out these wildlife damage management programs itself, or it may enter into cooperative agreements with States, local jurisdictions, individuals and public and private agencies whereby they may fund and assist in carrying out such programs. These laws do not grant any regulatory authority.

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

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

WS is a cooperatively funded, service-oriented program. Before any wildlife damage management is conducted, a request must be received and an *Agreement for Control* must be signed by the landowner/administrator or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to effectively and efficiently reduce wildlife damage according to applicable Federal, State and local laws (WS Directive 2.210). WS has the responsibility for responding to and attempting to reduce damage caused by migratory birds as specified in an MOU with the USFWS.

WS aids the USFWS with the issuance of Depredation Permits by consulting and, conducting site evaluations with individuals, agencies and organizations experiencing bird damage problems (Table 1-4). WS confirms the species causing the damage problem, the extent of the damage and makes recommendations on non-lethal damage management strategies. Where appropriate, WS may also recommend use of lethal methods. If use of lethal methods is recommended, WS will help the landowner/manger obtain permits from the USFWS and/or state agency. WS prepares a report (WS form 37) detailing the type and extent of the damage problem and WS' recommendations for resolving the problem. The USFWS and state agencies use this information when determining whether or not to issue depredation permits.

Table 1-4 Requests to WS for assistance with bird damage management for FY 04, 05, and 06.

SPECIES	RESOURCES NEGATIVELY IMPACTED BY BIRDS				
	Human Health & Safety (Aviation)	Agriculture (aquaculture)	Agriculture (Field Crops)	Livestock (Feed or Animal Health)	Property (Buildings, Boats, Structures)
American crow	X				X
Red-winged Blackbird	X		X	X	
Brown-headed cowbird	X		X	X	
Common Grackle	X		X	X	
Wild turkey	X				
Herring gull	X				X
Ring-billed gull	X				X
Killdeer	X				
Canada goose	X		X		X
Mallard	X				X
Blue-winged Teal	X				
Green-winged Teal	X				
American Coot	X				
Mourning Dove	X				
Mute Swan	HHS/general				
Barn Swallow	X				X
Cliff Swallow	X				X
Great Blue Heron	X	X			
Green Heron	X	X			
Great Egret	X	X			
Cattle Egret	X	X			
Double-crested Cormorants	X	X			
Great Horned Owl	X				
Red-tailed Hawk	X				
Rough-legged Hawk	X				
American Kestrel	X				
Cooper's Hawk	X				X
Turkey Vulture	X			X	X
Black Vulture	X			X	
Northern Flicker					X
Downy Woodpecker					X
Hairy Woodpecker					X

1.4.3 IDNR Migratory Bird Depredation Permitting Program

The IDNR authority for managing most wildlife species in the State is given under Illinois Compiled Statutes (ILCS) Chapter 520 of the Wildlife Code. Subject to federal regulations and Section 3 of the Illinois Endangered Species Act, the Department may authorize owners and tenants of lands or their agents to remove or destroy any wild bird when the wild bird is known to be destroying property or causing a risk to human health or safety upon his or her land. Upon receipt by the Department of information from the owner, tenant, or sharecropper that any one or more species of wildlife is damaging dams, levees, ditches, or other property on the land on which he resides or controls, together with a statement regarding location of the property damages, the nature and extent of the damage, and the particular species of wildlife committing the damage, the Department shall make an investigation. If, after investigation, the Department finds that damage does exist and can be abated only by removing or destroying that wildlife, a permit shall be issued by the Department to remove or destroy the species responsible causing the damage.

Section 525.35 of the Illinois Administrative Code states; "Any owner or tenant of lands, including operations, associations and governmental bodies, may, without a permit, scare away migratory birds, either game or non-game, as defined in Section 2.2 of the Wildlife Code [520 ILCS 5/2.2] when they are:

1) causing damage to property or wildlife;
2) creating a risk to human health or safety; or
3) concentrated in such numbers and manner as to constitute a health hazard or other nuisance, provided that:

    A) the damage, risk, hazard or other nuisance must be identifiable to an employee of the Department; and
    B) scaring must be done in accordance with 50 CFR 21.41 (2004), except birds that have a nest with eggs and/or a nest with young may not be scared without proper authorization from the Department.

Since 2003 the IDNR has been issued a special Canada goose permit from the USFWS under 50CFR 21.26. Under this permit the IDNR is given the authority to issue Canada Goose egg and nest destruction permits as well as lethal shooting permits for agricultural damage for the state of Illinois. The applicant no longer needs a USFWS permit for the destruction of Canada goose eggs or nests under this special use permit. The IDNR is responsible for issuing, monitoring and reporting permit numbers, nest and egg take information and Canada goose population estimates to the USFWS under this special permit.

1.5 Summary of Current and Proposed Action

The WS, USFWS and USACE propose to continue to administer an adaptive IWDM program to alleviate bird damage to agriculture (*e.g.,* crops and domestic animals), property (*e.g.,* structures), natural resources (*e.g.,* interspecific competition), and risks to animal and human health and safety *(e.g*., disease transmission, aircraft/bird strikes,). An IWDM program would be implemented on private and public lands of Illinois[3] where a need exists, a request is received and funding is available. An IWDM strategy

[3] This EA addresses bird damage management on a statewide basis on lands under cooperative agreement or other comparable documents because birds are jointly managed by the IDNR and USFWS under statewide statutes, laws,

would be recommended and used, encompassing the use of practical and effective methods to prevent or reduce damage while minimizing harmful effects of damage management measures on humans, other species, and the environment. Under the proposed action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model[4] (Slate et al. 1992) to help determine the most appropriate action(s) to take. When appropriate, habitat modifications, harassment, repellents, and physical exclusion could be recommended and utilized to reduce bird damage. In other situations, birds could be removed as humanely as possible by utilizing shooting, registered pesticides and live capture followed by relocation[5] or euthanasia under permits issued by the IDNR or USFWS. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage or potential damage situation. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Bird damage management would be conducted in the State, when requested and after consultation with USFWS, IDNR, IDPH, USACE, and/or IDOA as appropriate, on private or public property after an *Agreement for Control* or other comparable document has been completed. During FY04, 05, and 06 WS provided technical assistance services to residents across the entire State of Illinois. In addition, consultations with the IDNR and USFWS may be appropriate to ensure WS actions do not adversely affect State and Federal T/E species.

1.6 Relationship of This EA to Other Management and Environmental Documents

1.6.1 WS Programmatic EIS. WS has issued a programmatic EIS which analyzed program activities (USDA 1997) and Record of Decision on the National APHIS-WS program. This EA is tiered to USDA (1997).

1.6.2 Bird Damage Management by the Illinois Wildlife Services Program EA. WS completed a state-wide EA that covered bird damage management in Illinois in 2002 (USDA 2002). Once completed, the new EA on bird damage management in Illinois will replace the 2002 analysis.

1.6.4 Final Environmental Impact Statement: Double-crested Cormorant Management. The USFWS has issued a Final EIS on the management of Double-crested Cormorants (USFWS 2003b). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

1.6.5 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 (USFWS 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

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regulations and policies. WS would consult with the IDNR and USFWS on a regular basis to insure no adverse impacts to wildlife populations or other resources of the State occur.

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

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

alternative selected by the USFWS allows for the issuance of depredation permits for the take of Ring-billed and Herring Gulls for damage management.

1.6.6 USFWS FEIS: Managing Resident Canada Goose Populations (USFWS 2005). On August 20, 2007 the USFWS issued Final Regulations for Managing Resident Canada Goose Populations (FR Vol. 72, No 160, 7 pages 46403-46409). Pertinent and current information available in the FEIS has been incorporated by reference into this EA.

1.6.7 Chicago's Bird Agenda 2006. The Chicago Bird Agenda was established by a collaboration of city and state planners, environmental organizations and federal conservation agencies to set priorities for preserving bird habitat, reducing hazards to birds and supporting desirable bird species (Chicago Department of the Environment 2006). It also provides general guidance on addressing problems with bird species causing nuisance conflicts including issues with goose droppings at parks, the potential impact of gull feces on beach closures and adverse impacts of non-native bird species on native birds.

1.7 Decision to Be Made

Based on agency relationships, Memorandum of Understanding (MOU) and legislative mandates, WS is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. The USFWS and USACE are cooperating federal agencies, and may adopt this EA and make and document their own decisions. The IDNR, IDPH, USACE, and IDOA had input during preparation of the EA to ensure an interdisciplinary approach in compliance with NEPA and agency mandates, policies and regulations.

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

- Should WS conduct a coordinated bird damage management program in Illinois to alleviate damage to agriculture, property, natural resources, and human health and safety;
- If so, what type of bird damage management program should be conducted; and
- Would the proposed action have significant impacts on the quality of the human environment requiring preparation of an EIS?

1.8 Scope of This Analysis

1.8.1 Actions Analyzed. This EA evaluates bird damage management to protect agriculture, aquaculture, property, natural resources, and human and animal health and safety as coordinated with the USFWS, USACE, IDNR, IDPH, USACE, and IDOA.

1.8.2 Native American Lands and Tribes. Currently there are no federally recognized Native American tribes in the state of Illinois. Illinois WS does not have any MOUs or signed agreements with any Native American tribes in Illinois. Any WS activities conducted on tribal lands would only be conducted at the request of the tribe and after appropriate authorizing documents were signed. Therefore, WS would only conduct bird damage management activities on tribal lands after agreements with the tribes to conduct such activities are in place. If WS enters into an agreement with a tribe for bird damage management, 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 Native American reservations would be coordinated with tribal governments.

1.8.3 Period for which this EA is Valid. If it is determined that an EIS is not needed, this EA will remain valid until Illinois WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA analysis is sufficient.

1.8.5 Site Specificity. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever bird damage, or potential bird damage occur and the resulting management actions taken. WS personnel use the WS Decision Model (Slate et al. 1992) as the *"on the ground"* site-specific procedure for each damage management action conducted by WS. The Decision Model is a thought process that guides WS though the analysis and development of the most appropriate individual strategy to reduce damages and detrimental environmental effects from damage management actions (see Chapter 3, Section 3.3.3 for a description of the Decision Model). The Decision Model (Slate et al. 1992) and WS Directive 2.105 describe the site-specific thought process that is used by WS. Decisions made using the model would be in accordance with plans, goals, and objectives of WS, USFWS, IDNR, FAA, IDOA and/or University of Illinois Extension and any mitigations and standard operating procedures (SOP) described herein and adopt or established as part of the decision.

WS, USFWS, USACOE, IDNR, IDPH, and IDOA analyzed the current program and proposed action, and the other alternatives in this EA against the issues that were raised. These issues were analyzed at levels that are *"site specifically"* appropriate for this action in Illinois. Determining affects requires that WS look at the *context* of the issue and *intensity* of the action. The range of bird populations is seldom a few acres or farm but rather over a much larger area that includes different land ownerships and political boundaries. Damage management actions are generally conducted on a much smaller portion of the habitat occupied by the target birds (see Section 1.5.1). As professional wildlife biologists, WS, IDNR and USFWS analyze affects to bird populations, and that the damage situation with birds may change at any time in any location; wildlife populations are dynamic and mobile.

In summary, WS and the cooperating agencies have prepared an EA that provides as much information as possible to address and predict the locations of potential bird damage management actions. WS and the USFWS, USACOE, IDNR, IDPH, and IDOA have cooperated together as appropriate, to insure that native bird populations remain healthy and viable in the State. Thus, the EA addresses substantive environmental issues pertaining to bird damage management in Illinois. To reduce damages, WS provides technical assistance and demonstrations to help prevent the need for operational damage management. WS can and does provide an analysis of affects of their actions and affects to reduce bird damage within the scope of the EA. The site-specificity problem occurs when trying to determine the exact location an animal would cause damage before the damage situation occurs. By using the Decision Model (Slate et al. 1992), WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission. WS determined that a more detailed and more site-specific level of analysis would not substantially improve the public's understanding of the proposal, the analysis, the decision-making process, and pursuing a more site-specific and more detailed analysis might even be considered inconsistent with NEPA's emphasis on reducing unnecessary paperwork (Eccleston 1995). In addition, in terms of considering cumulative impacts, one EA analyzing affects in Illinois will provide a better analysis than multiple EA's covering smaller zones within Illinois.

1.8.6 Public Involvement/Notification. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this

document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings to parties that have specifically requested to be notified[6]. New issues or alternatives raised after publication of this EA will be fully considered to determine whether the EA should be revisited and, if appropriate, revised.

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four Chapters and three Appendices. Chapter 2 discusses the issues relevant to the analysis, issues not analyzed in detail, and affected environment. Chapter 3 describes each alternative, alternatives not considered in detail, and Standard Operating Procedures (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 Illinois, and Appendix C describes bird damage management methods available for use in Illinois, Appendix D shows the Audubon Christmas Bird Count population trend data for blackbirds and starlings, Appendix E includes a list of State and Federal Threatened and Endangered Species.

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

CHAPTER 2: AFFECTED ENVIRONMENT AND ISSUES

2.1 INTRODUCTION

WS uses an IWDM approach (WS Directive 2.105[7]), commonly known as Integrated Pest Management wherein a combination of methods may be used or recommended to reduce wildlife damage. IWDM is the application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgment of trained personnel. Wildlife Service's wildlife damage management activities are not based on punishing offending animals but are implemented as part of damage management plans developed 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 and the need for bird damage management is derived from the specific threats to resources.

WS recognizes that birds have no *intent* to do harm. They inhabit (*i.e.,* reproduce, walk, forage, deposit waste, etc.) habitats where they can find a *niche*. If they do *"wrongs,"* people characterize this as damage. *Wrongs*, unfortunately, are determined not merely in spatial terms but also with respect to time and other circumstances that define the *wrongness* (*i.e.,* birds living in the wilds of Illinois may not be a problem while birds inhabiting an airport facility could cause human safety concerns, potential human injuries, and destruction of property.) With this said, the wildlife acceptance capacity and biological carrying capacity must be applied to resolving wildlife damage management problems. The wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations. Biological carrying capacity is the land or habitat's ability for supporting healthy populations of wildlife without degradation to the species' health or their environment over an extended period of time (Decker and Purdy 1988). These phenomena are especially important because they define the sensitivity of a community to a wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the species and any associated damage or their perspective. This damage threshold is a factor in determining the wildlife acceptance capacity. While Illinois may have a biological carrying capacity to support a higher population of some bird species that are analyzed in this document (see section 1.2) in many cases the wildlife acceptance capacity is lower or has been met. Once the wildlife acceptance capacity is met or exceeded, people begin to implement population or damage reduction methods, including lethal methods, to alleviate damage and public health or safety threats.

IWDM, described in USDA (1997, 1-7), includes methods such as habitat and behavioral modification to prevent or reduce damage or may require that the offending animal(s) be removed or that local populations or groups be reduced through lethal methods. Potential environmental affects resulting from the application of various bird damage management techniques are evaluated in this EA.

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

[7] The WS Policy Manual provides WS personnel guidance in the form of program directives. Information contained in the WS Policy Manual and its associated directives has been used throughout this EA, but has not been cited in the Literature Cited appendix.

2.2 AFFECTED ENVIRONMENT

Illinois encompasses 57,918 mi^2, not including those parts of the Mississippi River and Great Lakes located within the boundaries of the state. Its water area, covering more than 2,325 mi^2 makes up only 4% of the state's total surface area. Most of Illinois's water area is a small portion of Lake Michigan in the northeastern portion of the state. The state's average elevation is 600 feet above sea level. The state's highest point is Charles Mound which is 1,235 feet above sea level. The annual statewide average temperature was 47° F. The total statewide average rainfall is 33.34 inches. (http://www.usgs.gov/state/state.asp?State=IL)

2.2.1 Airports. Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue and costly repairs to aircraft (Linnel et al. 1996), and can erode public confidence in the airport transportation industry as a whole (Conover et al. 1995). Birds as a group represents the largest segment of wildlife populations that present hazards to aircraft, and therefore are considered a serious threat to human safety when found on or near airports.

2.2.2 State/Federally Owned Properties. State or Federal properties in urban and/or rural areas may be affected by birds causing damage to property, landscaping, natural resources, or threaten the health and safety of personnel working or living on the property. When bird problems arise on State or Federal properties, WS assistance to reduce damage and human health risks may be requested.

2.2.3 Urban and Suburban Areas. Public and private properties in urban/suburban areas may also be affected when birds cause damage to landscaping, natural resources, and property or affect human health and safety.

2.2.4 Agricultural, Aquaculture, Rural, and Forested Areas. Other areas of proposed action include farms, aquaculture, forested areas, hatcheries or nurseries, and rural areas where birds are causing or potentially cause disease transmission and damage to agriculture crops, livestock and feed, property, and natural resources.

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

2.3.1 Cumulative Effects of WS Bird Damage Management on Target Species Populations. A common concern among members of the public and wildlife professionals, including WS personnel, is the effect of bird damage management on the target species population. WS' take of target species is small in comparison to the overall population of target species and many of the target species are considered to be abundant due their ability to take advantage of changes resulting from human activities (e.g., artificial food sources, 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. 2007) for most species. WS would monitor impact of bird take on target species populations. Additional monitoring and analysis may be conducted by the USFWS and IDNR as part of their permitting processes.

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 bird damage management on non-target species, particularly T/E species. WS' uses an IWDM approach to reduce effects on non-target species' populations which is 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 and/or would apply such methods in ways to reduce the likelihood of adversely affecting non-target species populations. For example, prior to the application of DRC-1339, 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, application strategy or location may be changed, or use of the method could be cancelled. For trapping activities, WS would select trapping locations that are frequently used by the target species and use baits that are preferred by the target species.

WS uses trained professional employees to conduct bird damage management programs in Illinois. Employees would monitor work areas where bird damage management is scheduled to be conducted and notify the USFWS or IDNR if a Federal or State-listed T/E species is observed at a site. WS has completed consultation with the IDNR (S. Flood, IDNR, letter to S. Beckerman, WS, April 11, 2008) and USFWS (R. Nelson, USFWS letter to S. Beckerman, WS, April 22, 2008) regarding potential impacts of the proposed bird damage management methods on State and Federally-listed T/E species as part of this EA.

2.3.3 Risks Posed by WS Bird Damage Management Methods to the Public and Domestic Pets. The primary pesticide used and proposed for use by Illinois WS is DRC-1339. DRC-1339 is one of the most extensively studied chemicals for bird damage management (USDA 1995, 1997). DRC-1339 use is regulated by the EPA through the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), by the IDOA, IDPH and WS Directives. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used according to label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997 Revised). All WS pesticide storage, use, and disposal is conducted in accordance with state and EPA regulations for the protection of the environment.

Shooting with shotguns, air rifles, and other firearms is selectively used for the target species and helps to reinforce bird scaring and harassment efforts. Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are also required to certify that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Depending upon the alternative selected, WS may use several types of live traps to capture target

birds. These include: clover, funnel, and common pigeon traps, decoy traps, nest box traps, mist nets, cannon and rocket nets, net gun, pole traps, and bal-chatri traps. As these traps are live or cage-type traps, animals can be released without harm and the traps pose negligible risks to the public or domestic pets.

2.3.4 Efficacy of WS Bird Damage Management Methods. Under the current and proposed Illinois 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 and State laws and regulations. The efficacy of each method is based, in part, on the application of the method, the skill of the personnel using the method, and the guidance provided by WS Directives and policies for WS personnel.

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

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

2.3.5 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 and blackbirds). 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 bird damage management 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 wildlife. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety.

The WS program in Illinois 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/manger 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.

2.4 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.4.1 WS' Impact on Biodiversity. No WS bird damage management in Illinois is conducted to eradicate a native wildlife species. WS operates according to international, Federal, and State laws and regulations (and management plans thereof) 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. The affects of the current WS program on biodiversity are minor and not significant nationwide, statewide, or region wide (USDA 1997). WS operational programs primarily targeted Starlings and Pigeons which are introduced exotic species that do not add to the avian biodiversity of Illinois. Further, WS operates on a small percentage of the land area of the State (<0.50% of the State) (see Section 1.8.5) and WS' take of any wildlife species analyzed in this EA is a small proportion of the total population and insignificant to the viability and health of the total population.

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

Suffering is described as a *" . . . highly unpleasant emotional response usually associated with pain and distress*. However, suffering *" . . . can occur without pain . . .* ,"and ". . . *pain can occur without suffering . . ."* (American Veterinary Medical Association (AVMA) 1987). Because suffering carries with it the implication of a time frame, a case could be made for ". . . *little or no*

suffering where death comes immediately . . ." (California Department of Fish and Game (CDFG) 1999), such as shooting.

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

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since "*. . . neither medical or veterinary curricula explicitly address suffering or its relief*" (CDFG 1999).

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

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

Illinois WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

2.4.3 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 bird damage management should not be allowed until economic losses become unacceptable. However, this type of policy would be inappropriate to apply to public health and safety situations. In addition, 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 bird damage management, and it is program policy to aid each requester to minimize losses. The WS Decision Model (Slate et al. 1992) is used to determine an appropriate strategy.

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

2.4.4 Bird Damage Management Should Not Occur at Taxpayers Expense, but Should Be Fee Based. Funding for WS comes from many sources besides Federal appropriations. Such non-federal sources include various state appropriations, local government funds (county or city), and private funds that are all applied toward program operations. WS was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Federal, State and local officials have decided that WS 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, Illinois WS provides free technical assistance on bird damage management 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 *Agreements for Control* 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 bird damage management in Illinois is fee based.

2.4.5 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, and temporary "WNV fever", 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 geographically.

WNV has spread across the United States since 1999 and was reported to occur in 44 states and the District of Columbia in 2002 (MMWR 2002). WNV is typically transmitted between birds and mosquitoes. Mammals can become infected if bitten by an infected mosquito, but individuals in most species of mammals do not become ill from the virus. The most serious manifestation of the WNV is fatal encephalitis in humans, horses, and birds.

WNV has been detected in dead bird species of at least 317 species (Centers for Disease Control and Prevention (CDC 2003a, www.cdc.gov.ncidod/dvbid/westnile/birds&mammals.htm). Although birds infected with WNV can die or become ill, most infected birds survive and may subsequently develop immunity to the virus (CDC 2003b, www.cdc.gov.ncidod/dvbid/westnile/birds& mammals.htm, Cornell University 2003, http://environmentalrisk.cornell.edu/WNV/Summary2. cfm). In some bird species, particularly corvids (crows, blue jays, ravens, magpies), WNV causes disease (often fatal) in a large percentage of infected birds (Audubon 2003 www.audubon.org /bird/wnv/, CDC 2003 www.cdc.gov.ncidod/dvbid/westnile/birds&mammals.htm, Cornell University 2003, http://environmentalrisk.cornell.edu/WNV/Summary2.cfm, MMWR 2002). In 2002, WNV surveillance/monitoring programs revealed that corvids accounted for 90% of the dead birds reported with crows representing the highest rate of infection (MMWR 2002). Large birds that live and die near humans (*i.e.,* crows) have a greater likelihood of being discovered, therefore the reporting rates tend to be higher for these bird species and are a good "indicator species" for the presence of WNV in a specific area (Cornell University 2003, http://environmentalrisk.cornell. edu/WNV/ Summary2.cfm, Audubon 2003).

USGS states that it is not unusual for a new disease to cause high rates of infection or death

because birds do not have the natural immunity to the infection. Furthermore, it is not known how long it will take for specific bird population to develop sufficient immunity to the virus.

Surveys of wild birds have shown that some birds have already acquired antibodies to WNV (USGS-NWHC 2003, ttp://www.nwhc.usgs.gov/disease_information/west_nile_virus/index.jsp). Based upon available Christmas Bird Counts and BBS results, USGS-NWHC (2003, www.nwhc.usgs.gov/ research/west _nile.html) states that there have been declines in observations of some local bird populations, however they do not know if the decline can be attributed to WNV or to some other cause. A review of available crow population data by Audubon (2003, www.audubon.org /bird/wnv/) reveals that at least some local crow populations are suffering high WNV related mortality, but crow numbers do not appear to be declining drastically across broad geographic areas. USGS does not anticipate that the commonly seen species, such as crows and blue jays, will be adversely affected by the WNV to the point that these bird species will disappear from the United States (USGS-NWHC 2003, www.nwhc.usgs.gov/research/ west_nile.html). In the state of Illinois Chickadees, Tufted Titmice, American Crows and Blue Jays are experiencing population declines consistent with WNV being the cause (Ward et al 2007). Additionally, any bird found dead or incapacitated could be salvaged by WS personnel and deposited with USFWS, IDNR or health officials, as appropriate, for monitoring purposes.

2.4.6 Impacts of Avian Influenza (AI) on Bird Populations. AI is caused by a virus in the Orthomyxovirus group. Viruses in this group vary in the intensity of illness they may cause (virulence). Wild birds, in particular waterfowl and shorebirds, are considered to be the natural reservoirs for AI (Clark and Hall 2006). Most strains of AI rarely cause severe illness or death in birds although the H5 and H7 strains tend to be highly virulent and very contagious. However, even the strains which do not cause severe illness in birds are a concern for human and animal health officials because the viruses have the potential to become virulent and transmissible to other species through mutation and reassortment (Clark and Hall 2006).

Recently, the occurrence of highly pathogenic (HP) H5N1 AI virus has raised concern regarding the potential impact on wild birds, domestic poultry, and human health should it be introduced into the U.S. It is thought that a change occurred in a low pathogenicity AI virus of wild birds, allowing the virus to infect chickens, followed by further change into the HP H5N1 AI. High Pathogenicity H5N1 AI has been circulating in Asian poultry and fowl resulting in death to these species. High Pathogenicity H5N1 AI likely underwent further change allowing infection in additional species of birds, mammals, and humans. More recently, this virus moved back into wild birds resulting in mortality of some species of waterfowl, and other birds. This is only the second time in history that highly pathogenic form of AI has been recorded in wild birds. Numerous potential routes for introduction of the virus into the US exist including: illegal movement of domestic or wild birds, contaminated products, infected travelers, and the migration of infected wild birds. WS has been one of several agencies and organizations conducting surveillance for AI virus in migrating birds. The nationwide surveillance effort has detected some instances of low pathogenic AI viruses, as was expected given that waterfowl and shorebirds are considered to be the natural reservoirs for AI. Tens of thousands of birds have been tested, but there has been no evidence of the HP H5N1 virus in North America.

2.4.7 Lethal Bird Damage Management is Futile because 50-65% of Blackbird and Starling Populations Die Each Year. Because natural mortality in blackbird populations is 50-65% per year, some persons argue that this shows lethal bird damage management is futile (USDA 1997). However, the rate of natural mortality has little or no relationship to the effectiveness of bird damage management because natural mortality generally occurs throughout

a population and throughout the course of a year. Natural mortality is too gradual in concentrations of depredating birds to adequately reduce damage. It is apparent that the rate of mortality from bird damage management in Illinois is well below the extent of any natural fluctuations in overall annual mortality and is, therefore, inconsequential to regional populations. The resiliency of bird populations does not mean individual bird damage management actions are not successful in reducing damage, but that periodic bird damage management actions are necessary in many damage situations.

2.4.8 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area. Some individuals might question whether preparing an EA for an area as large as the state of Illinois 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, Illinois WS only conducts bird damage management in a very small area of the State where damage is occurring or likely to occur (see Section 1.8.5).

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

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

An analysis of cost-effectiveness in many bird damage management 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 bird damage management have been conducted, and, therefore, the number of cases *prevented* by effective bird damage management 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.

2.4.10 Bird Damage Management Should Be Conducted by Private Nuisance Wildlife Control Agents. Private nuisance wildlife control agents could be contacted to reduce bird damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, they are not required to comply with NEPA, or because they prefer to use

a private business rather than a government agency. However, some property owners would prefer to receive assistance from a government agency. In particular, large industrial businesses, airport managers, and cities and towns may prefer to use WS because of security and safety issues, legal requirements to be accountable to the public through NEPA compliance and reduced administrative burden.

CHAPTER 3: ALTERNATIVES

3.1 INTRODUCTION

This Chapter consists of five parts: 1) introduction, 2) description of alternatives considered and analyzed in detail, including the No Action/Proposed Action (Alternative 1), 3) bird damage management strategies and methodologies available to WS in Illinois, 4) alternatives considered but not analyzed in detail with rationale, and 5) Minimization Measures and SOPs for bird damage management. Three alternatives were recognized, developed, analyzed in detail by WS and the cooperating agencies. Four additional alternatives were considered but not analyzed in detail.

3.2 DESCRIPTION OF THE ALTERNATIVES

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

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the CEQ's (1981) definition which states that "No Action" may be interpreted as being the continuation of current management practices.

The current and proposed program is an adaptive integrated Illinois WS bird damage management program for the protection of agricultural and natural resources, aquaculture, property, and public health and safety. WS would continue to respond to requests for assistance with, at a minimum, technical assistance, or where appropriate and permitted by the USFWS and IDNR, operational damage management whereby WS personnel conduct bird damage management actions. The IWDM approach would allow for the use of legally available nonlethal and lethal bird damage management methods, either singly or in combination, to meet requester needs for reducing bird damage (Appendix C). Agricultural producers, airport managers, property owners and others requesting assistance would be provided information regarding the use of effective non-lethal and lethal techniques, as appropriate. Non-lethal methods include, but are not limited to, lure crops, environmental/habitat/behavior modification, decoy traps and other live traps, exclusionary devices, nest destruction, chemical repellents, reproductive inhibitors, and alpha chloralose (AC). Lethal methods considered by WS include: shooting, egg addling/ destruction, snap traps, DRC-1339, and euthanasia techniques, such as CO_2. WS may recommend hunting or DPs to resource owners when these methods are deemed applicable to certain bird damage management situations. Bird damage management would be conducted on private or public property where a need has been documented, WS assistance has been requested, and an *Agreement for Control* or other comparable document has been completed. All management actions would comply with applicable State, Federal and local laws and regulations.

3.2.2 Alternative 2 – Only Non-lethal Bird Damage Management.

This alternative would require WS to only use and recommend non-lethal methods to resolve bird damage problems. Appendix C provides a detailed description of nonlethal damage management methods available to WS. Requests for information regarding lethal management approaches would be referred to the IDNR, USFWS, extension agents, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS non-lethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS direct control services, use contractual services of private businesses, or take no action. Persons receiving technical assistance from WS could still resort to lethal methods that were legally available to them. WS would not make recommendations to the USFWS and IDNR regarding the

issuance of permits to resource owners to allow them to take birds by lethal methods. Under this alternative, AC would be used by WS personnel to capture and relocate birds. Currently, DRC-1339 and AC are only available for use by WS employees. Therefore, use of these chemicals by private individuals would be illegal. However, the avian toxicant Starlicide is similar to DRC-1339 and would remain available to licensed pesticide applicators. Appendix C of the EA describes a number of non-lethal methods available for use and recommendation by WS under this alternative.

3.2.3 Alternative 3 - No WS Bird Damage Management Program.

This alternative would terminate the WS program for bird damage management (operational and technical assistance) on all land classes in Illinois. WS would not be available to provide technical assistance or make recommendations to livestock producers, airport and landfill managers, property owners or others requesting assistance. However, State and local agencies, and private individuals could conduct bird damage management. In some cases, damage management methods applied by non-WS personnel could be used contrary to their intended or legal use, or more than what is recommended or necessary. In addition, DRC-1339 and AC are only available for use by WS employees. However, the avian toxicant Starlicide is similar to DRC-1339 and would remain available to licensed pesticide applicators.

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

The strategies and methodologies described below are common to Alternatives 1 and 2. Under Alternative 2, WS personnel would only use nonlethal methods to resolve conflicts with birds. Alternative 3 would terminate both WS technical assistance and operational bird damage management in Illinois. 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[8] manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM draws from an array of options to create a combination of methods for the specific circumstances. IWDM may incorporate cultural practices (*i.e.*, animal husbandry), 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 That WS Employs.

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

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

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

3.3.2.2.1 Preventive Damage Management is the practice of applying wildlife damage management strategies before damage occurs, based on historical problems and the probability of the damage recurring or an imminent threat of public health, or disease transmission. As requested and appropriate, WS personnel provide information and conduct demonstrations or take action to prevent historical losses from recurring or reduce the risk of potential losses from occurring. Examples would be applying bird-proof netting over fruit trees before the fruit becomes attractive to birds, and the removing a bird(s) from a food processing plant, restaurant, industrial plant, or a feedlot before the bird(s) has caused damage or threatened public or livestock health, or removing birds at airports.

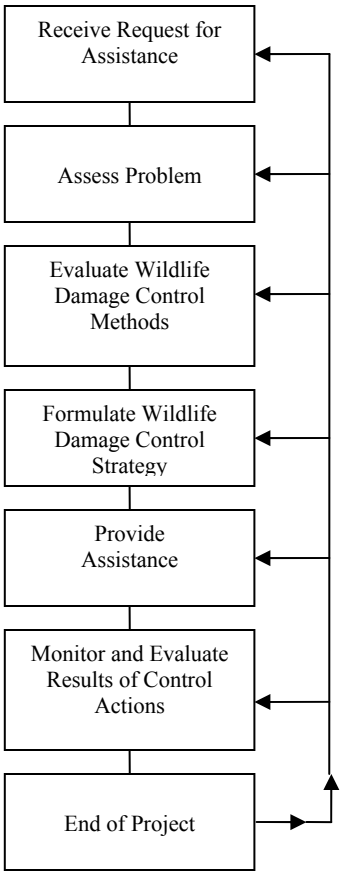
3.3.2.2.2 Corrective Damage Management is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, WS personnel provide information and conduct demonstrations, or with the appropriately signed *Agreement for Control* or other comparable document, take action to prevent additional losses. For example, in areas where birds are consuming livestock feed, WS may provide information to the resource owner about exclusionary methods, animal husbandry, mechanical scare devices and pyrotechnics, or conduct operational damage management to reduce losses.

3.3.2.3 Educational Efforts. Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of

recommendations and information to individuals or organizations sustaining damage, lectures, instructional courses, and demonstrations are provided to producers, homeowners, State and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

3.3.2.4 Research and Development. The National Wildlife Research Center (NWRC) functions as the research arm of WS 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 (MA) and Nicarbizin, a reproductive inhibitor for use on Canada Geese and pigeons. In addition, NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

Figure 3-1. APHIS, WS Decision Model



3.3.3 WS Decision Making. The WS Decision Making[9] process is a procedure for evaluating and responding to damage complaints (Figure 3-1). WS personnel are frequently contacted only after requesters have tried non-lethal methods and found them to be inadequate for reducing damage to an acceptable level. WS personnel evaluate the appropriateness of strategies, and methods are evaluated for their availability (legal and administrative) and suitability based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results with the damage management strategy.

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

3.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

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

3.4.1 Bounties.

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

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

3.4.2 Short Term Eradication and Long Term Population Suppression.

In Illinois, eradication of native bird species is not a desired population management goal of wildlife management agencies including WS. Although generally difficult to achieve, eradication of a local population of pigeons or starlings may be the goal of individual bird damage management projects. This could, in part, be because pigeons and starlings are not native to North America and are only present because of human introduction. However, eradication as a general strategy for reducing bird damage would not be considered in detail because:

- WS opposes eradication of any native wildlife species.
- IDNR opposes the eradication of native Illinois wildlife species.
- Eradication is not acceptable to most members of the public.
- Regional or statewide attempts at eradication of any native bird species would be next to impossible under the restrictions on methods and areas where bird damage management could be used in Illinois.

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

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

3.4.3 Only Technical Assistance. This alternative would restrict WS to only providing technical assistance (advice) on BDM. Producers, property owners, agency personnel, or others could obtain DPs from the USFWS as needed and appropriate and could conduct bird damage management using any of the legally available nonlethal and lethal BDM techniques. Technical assistance information is also readily available from entities other than Illinois WS such as the USFWS, Universities, extension agents, FAA, and private individual and organizations. Consequently, environmental impacts of this alternative are likely to be similar to Alternative 3 –

No WS Bird Damage Management Program. Consequently, the agencies have determined that detailed analysis of this alternative would not contribute substantive new information to the understanding of environmental impacts of damage management alternatives and have chosen to not analyze this alternative in detail.

3.5 MINIMIZING MEASURES AND STANDARD OPERATING PROCEDURES FOR BIRD DAMAGE MANAGEMENT

Standard Operating Procedures (SOPs) improve the safety, selectivity and efficacy of wildlife damage management techniques. SOPs used by the WS program are discussed in detail in USDA (1997 Revised, Chapter 5). The following SOPs apply to some or all of the alternatives, as indicated in the columns.

- Alternative 1. Integrated Bird Damage Management
- Alternative 2. Only Nonlethal Bird Damage Management
- Alternative 3. No Federal WS WDM in Illinois

Standard Operating Procedure	Alternatives		
	Current Program	Only Nonlethal Methods	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	
The WS Decision Model (Slate et al. 1992) would be used to identify effective biological and ecologically sound bird damage management strategies and their impacts.	X	X	
The use of newly developed, proven non-lethal methods would be encouraged when appropriate.	X	X	
WS would continue to improve the selectivity and humaneness of management devices.	X	X	
Chemical immobilization/euthanasia procedures that minimize pain would be used.	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 bird damage management strategies.	X	X	
All pesticides used by WS are registered with the EPA and IDOA.	X	X	
EPA-approved label directions would be followed.	X	X	
Most use of avicides and live traps would occur on private lands.	X	X	
Pesticide use would be by trained and licensed personnel.	X	X	

Standard Operating Procedure	Alternatives		
	Current Program	Only Nonlethal Methods	No WS Program
WS employees, who use pesticides, participate in IDPH 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	
Pesticide use, storage, and disposal conforms to label instructions and other applicable laws and regulations, and Executive Orders 12898 and 13045.	X	X	
Material Safety Data Sheets for pesticides are provided to all WS personnel involved with specific bird damage management activities.	X	X	
Research is being conducted to: 1) improve bird damage management methods and strategies, 2) increase selectivity for target species, 3) develop effective non-lethal methods, and, 4) evaluate non-target hazards and environmental impacts.	X	X	
Concerns about Impacts of Damage Management on Target Species, T/E Species, Species of Special Concern, and Non-target Species			
WS will adhere to all applicable USFWS and IDNR 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 to select the most appropriate methods for removing targeted birds and excluding non-target species.	X	X	
WS would initiate consultation with the USFWS and/or IDNR as applicable following any incidental take of T/E species.	X	X	
WS take of birds would be provided to the USFWS and IDNR for monitoring the potential impacts to bird populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of bird populations (See Chapter 4)	X		
WS consulted with the USFWS regarding the nationwide program and would continue to abide by all applicable measures identified by the USFWS to ensure protection of T/E species.	X	X	
The presence of non-target species is monitored before using avicides at feedlots and dairies to reduce the risk of mortality to non-target species. WS baiting strategies are altered/adjusted as needed to minimize or eliminate access by nontarget species.	X		

Standard Operating Procedure	Alternatives		
	Current Program	Only Nonlethal Methods	No WS Program
If non-target species are present or likely to be present at feedlots or dairies where avicides are being applied WS will remain on site to discourage non-target visitation.	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.

4.2 ENVIRONMENTAL CONSEQUENCES

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

4.2.1 Social and Recreational Concerns. It is not anticipated that the proposed action would result in any adverse cumulative effects to social and recreational resources. Further discussions of WS activities on social and recreational concerns are found in Section 4.3 and USDA (1997 Revised).

4.2.2 Wastes (Hazardous and Solid). When treated bait cannot be used or when baits are not totally consumed, the bait is disposed according to label instructions and directions provided by the IDOA. It is not anticipated that the proposed action would result in any adverse cumulative effects from solid or hazardous wastes.

4.2.3 Target and Non-target Wildlife Species. Cumulative impacts to potentially affected bird species are addressed in detail in Section 4.3.1.

4.2.4 Irreversible and Irretrievable Commitments of Resources. Other than relatively minor uses of fuels for motor vehicles and electricity for office operations, no irreversible or irretrievable commitments of resources result from the Illinois WS program. Based on these estimates, the Illinois WS program produces negligible impacts on the supply of fossil fuels and electrical energy.

4.2.5 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[10] of birds by all causes is the cumulative mortality. Cumulative impacts would be mortality caused by Illinois WS bird damage management and other known causes of mortality (USDA 1997 Revised). It is not anticipated that the proposed action would result in any adverse cumulative effects to target or nontarget species populations, including T/E species.

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

Estimating wildlife densities is not precise and populations and habitats are often dynamic, therefore, professional judgment is required to account for unknowns and variables. Some of the variables include things such as the ability of habitats to support populations of animals, habitat variability effects on population stability, predation and recruitment. In addition, wildlife populations can change considerably from one year to the next due to factors such as drought, food shortages or disease. Therefore, adverse effects assessments are based on conservative estimates and trends to better ensure that no unwanted adverse wildlife population impacts would occur.

4.2.6 Evaluation of Significance

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

4.2.6.1 Magnitude of the Impact (size, number, or relative amount of impact) (intensity). The "*Magnitude*" analysis for the alternatives analyzed in this EA follows the process described in USDA (1997 Revised). Magnitude is defined in USDA (1997 Revised) as *". . . a measure of the number of animals killed in relation to their abundance."* Magnitude may be determined either quantitatively or qualitatively. Qualitative analysis is based on population trends and harvest data or trends and modeling. "*Other Harvest*" includes the known sport harvest, and other information obtained from the IDNR and USFWS. "*Total Harvest*" is the sum of the Illinois WS kill combined with the "*Other Harvest*."

4.2.6.2 Duration and Frequency of the Action. Duration and frequency of bird damage management in Illinois is highly variable. Abiotic and biotic factors affecting bird behavior will affect the duration and frequency of bird damage management activities conducted by WS in Illinois. Bird damage management at airports may be long duration projects but the frequency of individual operational bird damage management actions may be highly variable depending upon spatial, temporal, and biotic factors affecting the behavior of the birds that are causing damage. For instance, the removal of several birds that continue to loaf near runways may be very infrequent if non-lethal techniques prevent additional birds from habituating to the area. Projects involving starling damage management at individual diaries will generally be short in duration but may happen frequently at different sites.

4.2.6.3 Likelihood of the Impact. Bird damage management in Illinois will have a low magnitude of impact on overall populations as compared to natural mortality factors that these populations experience. Because all wildlife populations may experience compensatory and additive mortalities year round, WS' relatively limited bird damage management will generally not result in adverse effects to populations.

4.2.6.4 Geographic Extent. Bird damage management could occur anywhere in Illinois where action is warranted, damage management assistance has been requested and agreements for such actions are in place. Actions would generally be limited to areas receiving damage by birds, areas with historical bird damage, or areas where a threat of damage exists. Illinois encompasses about 57,918 mi^2, not including those parts of the

Mississippi River and Great Lakes located within the boundaries of the State. During FY04, 05, and 06, WS had agreements for bird damage management on 29,340 acres (about 0.50% of the land area of Illinois). However, WS generally only conducts bird damage management on a small portion of the properties under Agreement in any year. For example, a large landowner may request assistance from WS with problems caused by gulls nesting on the roof of a structure. The work agreement and WS' information management system record the entire property held by the landowner even though WS' actions are confined to the immediate area of the building in question.

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 4-3). Five key issues have been identified as being important for informed decision-making. The five issues are:

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

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

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

Many bird species involved in damage problems are protected by the USFWS under the MBTA and/or the IDNR under (520 ILCS 2.2 and IDNR Wildlife Action Plan)[11]. All WS bird take is conducted in accordance a with applicable State and Federal laws and regulations authorizing take of birds, and their nests and eggs, including the USFWS and the IDNR permitting processes. The USFWS and IDNR, as the agencies with migratory bird management responsibility, could impose restrictions on depredation take as needed to assure cumulative take does not adversely affect the continued viability of specific bird populations. The USFWS and IDNR oversight and monitoring should assure that cumulative impacts on bird species would have no significant adverse impact on the quality of the human environment and long-term viability of the population.

The target species discussed below were selected for detailed analysis because Illinois WS has received requests for assistance with these species and they could be targeted by WS (nonlethal and lethal methods) to protect agricultural and natural resources, property and people from injury or damage (*i.e.,* bird damage management at airports to reduce or prevent risks to the traveling public from bird strikes to

[11] The exceptions are European Starlings, House Sparrows, Rock Pigeons and Monk Parakeets (520 ILCS 2.2; Roy Domazlicky, IDNR, Pers. Comm.).

aircraft). In addition, other target species could be killed or have nests removed by Illinois WS. This provision is allowed under Section G of WS' MBTA permit MB020299-0, which 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.

Non-lethal Damage Management Activities.

Preference is given to non-lethal damage management when practical and effective (WS Directive 2.101), because they rarely have adverse impacts on the target species population. WS commonly makes recommendations to landowners/managers on nonlethal methods that they can implement on their own (e.g., exclusion, habitat modification, human behavior management, crop selection, repellents, etc.). The primary nonlethal bird damage management techniques used operationally by WS staff is the use of frightening devices. In Fiscal Year (FY) 2004, Illinois WS dispersed approximately 1,738, birds of at least 8 species (*i.e.,* Crows, Mourning Doves, Ring-billed Gulls, Red-tailed Hawks, American Kestrels, Killdeer, Mallards, and Starlings) using non-chemical harassment methods such as propane exploders and pyrotechnics. WS use of nonlethal harassment techniques increased to approximately 79,727 birds of at least 26 species in FY06. In general, scaring and harassment devices may cause nontarget migratory birds and other affected wildlife to temporarily leave the immediate vicinity of scaring, but they would most likely return 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. Normally, large scale relocation activities are limited to wild and feral/domestic waterfowl in and around urban areas. Live capture and relocation is not normally practical for smaller birds such as Starlings, Pigeons, etc. because of: 1) the number of birds involved, 2) problems with birds returning to 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, and 6) relocated birds could create the same disease transmission potential to people or livestock in the relocation area.

A new nonlethal method with the potential to impact local bird populations is the use of reproductive inhibitors. Nicarbazin (OvoControl™) has been registered with the EPA for use in addressing problems with urban resident Canada Geese and Rock Pigeons. This product is currently registered for use in Illinois by the IDOA (Reg. No. 80224). However, use of this product is prohibited in Illinois under Illinois Compiled Statute 520 ILCS 2.33g which states, "it is unlawful to use poisons, chemicals or explosives for the purpose of taking any species protected by this act" (Roy Domazlicky, IDNR, Pers. Comm.). Status of this product could change; therefore impacts of the use of this product are included in the following impact analysis.

Lethal Damage Management Activities.

Lethal damage management activities 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 bird damage management problem cannot be practically or effectively resolved through non-lethal damage management and where *Agreements for Control* or other comparable documents provide for operational damage management. Table 4-1 provides information on the number of birds Illinois WS killed by method during in FY04, 05 and 06.

Table 4-1. Birds Killed by WS* during Fiscal Years 04, 05 and 06.

FY	Species	Damage Management Method				
		Trap	Shot	Chemical	Non-chemical Other	Trap and Relocate
04	Red-winged Blackbirds		30			
	Mourning Doves		51			
	Mallards		158		6	
	American Kestrel		15		15	142
	Canada Geese		81		10	30
	Common Grackles			37		
	Herring Gull		39			
	Ring-billed Gull		391			
	Cooper Hawk					1
	Red-tailed Hawk		2			63
	Rough-legged Hawk		1		3	2
	Great-blue Heron		1			
	Rock Pigeon	111	703	500		
	House Sparrow		1	138	1	
	European Starling		1,447	115,274		
05	Red-winged Blackbirds	6	38			
	Brown-headed Cowbirds		2			
	Northern Cardinals			(3)		
	Mourning Doves		144			
	Mallards	(1)	285			
	Blue-winged Teal		2			
	American Kestrels	10	28			98
	Peregrine Falcon					1
	Canada Geese		97		13	
	Common Grackles	25	4	47		
	Herring Gull		66			
	Ring-billed Gull		635			
	Red-Tailed Hawk	1	9			102
	Rough-legged Hawk					4
	Great blue Heron		1			
	Rock Pigeon	94	525	65	8	
	House Sparrow		11	309		
	European Starling	3	518	14,347		
	Downy Woodpeckers		1			
06	Red-winged Blackbirds		114			
	Brown-headed Cowbirds		9			
	Mourning Doves		413			
	Mallards		108	1		
	Green-winged Teal		1			
	American Kestrel	8	23			31
	Peregrine Falcon					1
	Canada Geese		97		13	

FY	Species	Damage Management Method				
		Trap	Shot	Chemical	Non-chemical Other	Trap and Relocate
	Common Grackle		10			
	Herring Gull		53			
	Ring-billed Gull		739			
	Red-tailed Hawk		8			51
	Rough-legged Hawk					2
	Great Blue Heron		2			
	Bank Swallow				(1)	
	Rock Pigeons	392	684			
	House Sparrow			142		
	European Starling	98	1845	1,960		
	Turkey Vulture		1			

(#) = Non-target Un-intentional Take from BDM actions or other WS programs in Illinois.

Bird Population Surveys

One of the primary methods used to track trends in bird abundance can be monitored by using data from the Breeding Bird Surveys (BBS). 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. 2007). The BBS is a combined set of over 3,700 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. 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 statistical significance of a trend's "change" is reflected in the calculated P-value (probability) for that species. P-values lower than 0.05 are generally considered statistically significant.

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. In Illinois, the detect ability of birds would vary based on terrain and cover.

- The chosen survey routes are totally random and are fully representative of Illinois habitats. However, when BBS routes are established, 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.

- Birds are equally distributed throughout the survey area and routes were randomly selected. However, routes are randomly picked throughout the State/areas, but are placed on the nearest

available road. The starting point is picked for accessibility by vehicle. Some birds tend to congregate along roadsides and others avoid roadside areas. However, most BBS routes are selected because they are "off the beaten path" so the observer can hear birds without interruption from vehicular noise.

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. Trend data reported for all species below reflect apparent trends in reported data. WS has not independently evaluated statistical significance in trend data. Because bird damage management is generally directed at individual birds or local populations of overabundant/ anthropogenic abundant (Conover 2002) species, the statistical significance of population trends over a large area are only marginally related to local populations where bird damage management occurs.

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

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 (USFWS Region 3, 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 Illinois WS bird damage management program which, based on historical information, is primarily conducted to reduce potential aircraft/bird strikes at airports in Illinois thereby minimizing human health and safety risks. An increasingly important function of the Illinois WS program is the protection of property, human health, recreation opportunities as well as natural resources from increasing numbers of Ring-Billed Gulls. The other primary area of WS' bird damage management activities will likely be at livestock facilities and industrial sites to reduce Starling risks to human health and damage to equipment from fecal accumulations, consumption and contamination of feed and potential risks of disease transmission to livestock.

European Starling Biology and Population Impacts.

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

Data from Packham (1965) suggests that an average of 57 starlings were killed per pound of DRC-1339 treated bait used at feedlots. In addition, research studies and field observations suggest DRC-1339 treatments kill about 75% of the starlings at cattle feeding facilities (Besser et al. 1967). Based on current and anticipated requests for assistance with starling damage management, WS could take up to 200,000 starlings for the protection of livestock feed and health, and to protect the public from disease threats or aircraft strikes if program expansion occurs. BBS data (Sauer et al. 2007) indicate that for the period of 1980 to 2006, starling breeding populations have been relatively stable in Illinois (-0.50% per year, $P = 0.40$), USFWS Region 3 (-0.20% per year, $P = 0.35$), and nationwide (-0.20% per year, $P = 0.13$). This information, plus the fact that an estimated 70 million starlings die of natural causes indicates that the impact from Illinois 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.

Blackbird Biology and Population Impacts.

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 Illinois. These species can be found in Illinois all year. Rusty Blackbirds, Brewer's Blackbirds, Yellow-headed blackbirds and Great-tailed Grackles are much less common and rarely, if ever, involved in damage problems (Sauer et al. 2007, Audubon 2002, Robbins et al. 2001). Yellow-headed Blackbirds may nest in northern Illinois, but their occurrence is so uncommon that the USGS Breeding Bird Survey does not provide population trend data for this species. Observations of Yellow-headed Blackbirds during the Audubon Christmas Bird Count do not occur every year and, when they do occur, are limited to only one or two individuals (Audubon 2002). Rusty Blackbirds, Brewer's Blackbirds and Great-tailed Grackles do not nest in Illinois, but may be found in the state during the winter months (Appendix D). Like Yellow-headed Blackbirds, winter observations of Great-tailed Grackles are infrequent and limited to only one or two individuals (Audubon 2002).

For the period of FY 2004-2006, WS has only killed 158 Red-winged Blackbirds, 11 Brown-headed Cowbirds and 86 Common Grackles. WS dispersed 1,776 blackbirds from FY2003 through FY2006. WS has not killed individuals of any of the other blackbird species. WS take of blackbirds has generally occurred during projects to prevent bird strikes at airports. However, limited numbers of Red-winged Blackbirds, Brown-headed Cowbirds and Common Grackles have been observed mixed in large winter feeding flocks of starlings at dairies and feedlots (see European Starlings above). Given current levels of Red-winged Blackbird, Brown-headed Cowbird and Common Grackle take, anticipated increases in requests for assistance in managing damage and conflicts caused by these species, and the possibility that some individuals of these 3 species may be taken when they are causing damage with large flocks of starlings at feedlots and dairies (see above), WS anticipates that total annual lethal take will not exceed 3,000 individuals of each species. Based on the fact that WS did not need to use lethal or nonlethal BDM methods on Brewer's Blackbirds, or Great-tailed Grackles during the period of FY 04-07, and because of their relative scarcity in the state, the potential for WS to take any of these species is negligible and unlikely to exceed 10 individuals per year (all 3 species combined). This level of take will

not adversely impact populations of Brewer's Blackbirds, or Great-tailed Grackles and impacts on these species will not be analyzed further. Yellow-headed Blackbirds are a state-listed endangered species and WS does not anticipate taking any individuals of this species. Audubon CBC data indicate that Rusty Blackbirds are more common than Brewer's Blackbirds, Yellow-headed Blackbirds, or Great-tailed Grackles. However, because of differences in Rusty Blackbird behavior discussed below, impacts on this species are likely to be similar to that anticipated for Brewer's Blackbirds or Great-tailed Grackles. Because of concerns regarding population trends for this species, impacts on Rusty Blackbirds are discussed in greater detail below.

Precise counts of blackbird populations do not exist but one estimate placed the United States summer population of the blackbird group at over 1 billion (USDA 1997 Revised) and the winter population at 500 million (Royall 1977). The majority of these birds occur in the eastern U.S. Meanley and Royall (1976) estimated 538 million blackbirds and starlings in winter roosts across the country during the winter of 1974-75. Of this total about 74% or about 400 million were in the eastern United States (Meanly and Royall 1976). Similarly, surveys in the southeastern part of the country estimated 350 million blackbirds and starlings in winter roosts (Bookhout and White 1981).

Natural mortality in blackbird populations is between 50 and 65% of the population each year regardless of human-caused control operations (USDA 1997 Revised). 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 et al. (1995) 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, FWS concluded that removal of 67.5 million birds would not affect the following years post-breeding population (USDI 1976).

Red-winged blackbird population trends from 1980 to 2006 show that the breeding populations are relatively stable in Illinois (-0.1% per year, $P = 0.67$), and decreasing in USFWS Region 3 (-0.8% per year, $P < 0.01$) and nationwide (-0.7% per year, $P < 0.01$; Sauer et al. 2007). Brown-headed Cowbird breeding populations are stable to increasing in Illinois (1.1% per year, $P = 0.06$), and decreasing in USFWS Region 3 (-0.6% per year, $P = 0.02$) and nationwide (-0.8% per year, $P < 0.01$; Sauer et al. 2007). Common Grackle breeding populations appear to be increasing in Illinois (1.5% per year, $P = 0.03$), relatively stable in USFWS Region 3 (0.1% per year, $P = 0.86$) and decreasing nationwide (-1.0% per year, $P < 0.01$; Sauer et al. 2007). Audubon CBC data indicate that Illinois winter populations of Brown-headed cowbirds have been relatively stable, and Red-winged Blackbirds have been stable to slightly increasing (Appendix D). Illinois CBC data for Common Grackles show wide fluctuations in numbers starting in approximately 1993, making determination of a population trend more difficult (Appendix D). National CBC data indicate decreasing trends for Common Grackles, Red-winged Blackbirds and Brown-headed Cowbirds.

The proposed level of Red-winged Blackbird, Brown-headed Cowbird and Common Grackle take by the Illinois WS program (total = 9,000) amounts to only 0.00003 of the estimated winter blackbird population in the Eastern U.S. (350 million birds) and 0.00006% of the estimated annual mortality in the Eastern blackbird population (assumes 50% mortality, Table 6, Bookhout and White 1981). As noted above, Dolbeer et al. (1995) used models to determine that take of

3.5% of the winter blackbird population would have no effect on breeding populations the following spring. Using the model predictions for a population of 350 million blackbirds, would indicate that a cumulative take of up to 12,250,000 blackbirds would not have an adverse impact on summer breeding population. Even if Illinois WS took the maximum number of blackbirds proposed in this alternative and the other BBS Eastern Flyway states could take millions of blackbirds per year and, the cumulative take would still be far less than the model by Dolbeer et al. (1995) predicted can be sustained by the population.

It is noteworthy that despite decreasing regional and national population trends for Red-Winged Blackbirds and Common Grackles in some areas, BBS data indicate that these species are among the 10 most common species observed during the BBS survey in Illinois, the Eastern and Central BBS Regions, and nationwide (Sauer et al. 2007; Table 3). Brown-headed Cowbirds are among the 10 species with the highest relative abundance in the Central BBS Region. Most 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 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*." In addition, in Illinois when blackbirds are creating a nuisance the IDNR also does not require a permit for take under Title 17: Conservation Chapter 1: Department of Natural Resources Part 525 Nuisance Wildlife Control Permits Section 525.35 Migratory Birds if they meet the following requirements; "*Any person may remove or destroy, by use of a shotgun, air gun or traps and only on or over the threatened area, any red-winged blackbirds, rusty blackbirds, Brewer's blackbirds, cowbirds, grackles and crows when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance, without a permit, so long as he or she has written permission from the landowner or tenant.".*

Rusty Blackbirds: In respect to potential impacts on Rusty Blackbirds, WS is aware that concerns have been expressed about the declines in BBS population trends for Rusty Blackbirds in Canada, the primary breeding area for the species (1980-2006: -14.8% per year, P = 0.02). CBC data for the United States also indicate declines in Rusty Blackbird populations over the past three decades. Declines have been linked to loss of wet woodland breeding habitat (Avery 1995). In light of concerns that have been expressed regarding Rusty Blackbird populations, we are providing additional information on Rusty Blackbird biology.

Differences in behavior of Rusty Blackbirds indicate that potential impacts on this species from the proposed blackbird damage management actions may be lower than for other blackbird species. The Rusty Blackbird is the most ecologically specialized of the North American blackbirds, both in its feeding habits and habitat uses. Throughout the year this species feeds to a considerable extent on animal prey and is one of the few blackbird species restricted year-round to wooded wetlands (Avery 1995). Rusty Blackbirds breed in Canada and Alaska and winter in the southeastern United States (Avery 1995). Analysis of CBC data suggests that the greatest winter concentrations are found in the Mississippi River Valley (M. Avery, NWRC, Gainesville, FL, 2007, unpub. rep.). The species roosts with other blackbird species, but often is found foraging in single species flocks or together with common grackles in or near wooded wetlands. Only occasionally are Rusty Blackbirds observed foraging in agricultural fields with other blackbirds (M. Avery, NWRC, Gainesville, FL, 2007 unpub. rep.). The preference for animal food and tendency to form single species foraging flocks make it highly unlikely that Rusty Blackbirds would be found in the large flocks of starlings at dairies and feedlots where WS works. Illinois WS personnel report that the only species they have observed with starlings at the

dairies and feedlots were they work are Brown-headed Cowbirds and English Sparrows (Aaron Spencer, Illinois WS pers. comm.). Consequently, use of the toxicant DCR-1339 on grain baits in Illinois likely has lower risk to Rusty Blackbirds than other blackbirds. There have been no reports of WS killing Rusty Blackbirds in any of the Mississippi Flyway states during the last three years (WS Annual Tables 2004-2006 http://www.aphis.usda.gov/wildlife_damage/prog_data_report.shtml).

It is possible that Rusty Blackbirds could roost at night with mixed groups of other blackbirds. However, available data indicate that Rusty Blackbirds are less abundant in these groups than would be indicated based on their occurrence in the CBC. To determine blackbird movement patterns, NWRC used aerial mass marking to mark 1,300,000 and 3,200,000 blackbirds in communal roosts in Missouri during October 2004 and 2005 respectively. WS recovered blackbirds taken during damage management activities in Missouri and the surrounding states during the subsequent January and February. NWRC did not encounter any Rusty Blackbirds among the 11,671 blackbirds recovered from blackbird damage management programs in their research in southern Missouri (Cummings et al 2007). Based on this information, WS records of blackbird take, and differences in Rusty Blackbird foraging behavior, lethal take of Rusty Blackbirds is likely to be low to nonexistent.

Based on the above information, WS has determined that the proposed bird damage management activities would likely have minimal cumulative effects to populations of blackbirds.

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.

Adult male turkeys, may measure up to 4 feet tall at maturity and weigh more than 25 pounds. A mature female, may be nearly as tall but is usually lighter, weighing between 8 and 12 pounds. Males have their upper tail coverts, which cover the base of the long tail feathers tipped with chestnut brown and tail tips with dark buff or chocolate brown. In contrast, the breast feathers are tipped in black. Other body feathers are characterized by rich, metallic, copper/bronze iridescence. Females are similar in color to the males but more brown, and the metallic reflections are less brilliant. Feathers of the hen's breast, flanks and sides are tipped with brown rather than the black and white tips of the male (National Wild Turkey Federation, www.nwtf.org).

They are considered weak fliers and are non-migratory; they forage on acorns, fruit, seeds and insects. Turkeys are a game species in Illinois and has a regulated hunting season with about 15,409 turkeys killed during the 2005 hunting seasons and 16,140 turkeys killed during the 2006 hunting seasons (IDNR 2006)

Illinois WS did not kill any wild turkeys during FY04 through FY06 and Illinois BBS population trend data (Sauer et al. 2007) indicate that, for the period of 1980 to 2006, Wild Turkey populations are increasing in Illinois, USFWS Region 3, and nationwide (12.9 - 21.7% per year, $P < 0.01$; Sauer et al. 2007). The IDNR estimates the 2006 turkey population at 509,635 birds and increasing (P. Shelton, IDNR, 2006 pers. comm. June 26, 2007). Based on an anticipated

increase in requests for services, WS' lethal management of wild turkeys for airport safety or other resource protection reasons could remove up to 20 birds in any one year without adversely affecting their population. More than 31,300 turkeys were killed by sport hunters in Illinois in 2005 and 2006. Some turkeys removed by WS are taken from areas like airports where hunting is not permitted. In these cases, removal of turkeys would have little to no direct impact on hunting opportuntities. Based on this analysis, the proposed WS activities would have a low magnitude of impact on the turkey population and turkey hunting opportuntities.

Canada Goose Biology and Population Impacts.

Canada geese are probably more abundant now than at any time in history. They rank first among wildlife watchers and second among harvests of waterfowl species in North America (Rusch et al 1995). Canada geese are also the most widely distributed and phenotypically (visible characteristics of the birds) variable species of bird in North America (Rusch et al 2007). Breeding populations now exist in every province and territory of Canada and in 49 of the 50 United States. The size of the 12 recognized subspecies ranges from the 1.4-kg (3-lb) cackling Canada goose *(B.c. minima*) to the 5.0-kg (11-lb) giant Canada goose (*B.c. maxima*; Delacour 1954; Bellrose 1976).

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. Winter surveys were begun to study population trends and set responsible harvest regulations for these long-lived and diverse birds.

Populations in rural and urban settings slowly grew through time, with urban populations growing at a faster rate than those nesting in the rural areas. These locally breeding, resident Canada geese are defined as those Canada geese that nest and reside predominantly within the conterminous United States (Rusch et al. 1995, Ankney 1996, and Grandy and Hadidian 1997), and are designated as "giants" by Mississippi Flyway Technical Section, Mississippi Flyway Giant Canada Goose Management Plan (1996).

Giant Canada geese do not become sexually mature and breed until two or three years of age (Mississippi Flyway Council Technical Section 1996). The process whereby geese annually replace their primary and secondary wing flight feathers, and become flightless, is termed the molting process (Welty 1982). The molt for resident Canada geese in Illinois occurs from mid-June through mid-July. Portions of a flock of geese can be flightless from about one week pre- and two weeks post-molt due to the asynchronous molting by individual birds. It is known that non-breeding Canada geese which have failed nesting attempts sometimes move to other areas in the summer prior to molting (Zicus 1981, Nelson and Oetting 1991, Abraham et al. 1999). The Mississippi Flyway Council (2007) estimated that 55% of Michigan's giant Canada goose population migrated, based on published estimates of molt migration.

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.

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. 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). Slipping hazards can be

caused by the buildup of fecal matter from geese 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.

The population trends of Giant Canada geese in Illinois are relatively stable with some fluctuation (Roy Domazlicky, IDNR, Pers. Comm., June 26, 2007). Data from the BBS also indicate that Canada Goose population has been increasing in Illinois, USFWS Region 3 and nationwide (9.3, 8.9, and 5.9%/year respectively, $P < 0.01$; Sauer et al. 2007). The giant Canada goose population in Illinois has increased from 81,600 in 2003 to 109,400 in 2006 (Giant Canada Goose Committee 2007). The population goal for giant Canada geese in Illinois is 80,000 (Giant Canada Goose Committee Report 2001). The state of Illinois is above its giant Canada goose population goal by over 29,000 birds. The IDNR issued 320, 393, and 482 Canada goose egg and nest destruction permits for airport, human health and safety, property and natural resources concerns in FY 04, 05 and 06. Under those permits 2196 nests and 11538 eggs were destroyed in 2004; 2040 nests and 9959 eggs in 2005, 2,461 nests and 12,994 eggs in 2006 (Roy Domazlicky, IDNR, Pers. Comm., August 24, 2007). WS killed 215 Canada geese, destroyed 63 nests with all the eggs associated with those nests, and dispersed 6,793 Canada geese from FY04 through FY06 (MIS 2004, 2005, and 2006).

Based on an anticipated increase in requests for services, WS anticipates maximum lethal removal of up to 3,000 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 1.9-2.9% of the 102,700 and 158,224 geese taken by licensed hunters in Illinois during 2005 and 2006 respectively (USFWS 2007).

Because of the labor and costs of implementing programs to reduce reproduction in geese (egg oiling/addling/destruction, and the reproductive inhibitor nicarbazin), widespread use of these methods is unlikely. In the case of nicarbazin[12], use of the product is also restricted to urban areas. Consequently, impacts of these methods on goose populations will likely be limited to local populations. Given the long lifespan of geese, exclusive use of these methods would take years to reduce a local goose population. The greatest value of this product may be in maintaining goose populations at manageable levels. These methods are not anticipated to result in the eradication of local goose populations where they are applied. Consequently, use of these methods is anticipated to have a low magnitude of impact on the state Canada Goose population.

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 control efforts will occur on urban goose populations which are not as available to hunting activities.

Wild Mallard Biology and Population Impacts.

[12] Nicarbazin is not currently available for use in Illinois (Section 4.1.3). It has been included in this analysis because legal status of the product could change.

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

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 limited nesting habitat. During the 2005 and 2006 regulated waterfowl hunting season, licensed hunters in Illinois killed an estimated 209,044, and 311,871 mallards respectively (USFWS 2007). The BBS population trend data from 1980 to 2006 shows the mallard population is relatively stable in Illinois (1.6% per year, $P = 0.30$) and USFWS Region 3 (-0.6% per year, $P = 0.39$), and increasing nationwide (2.0% per year, $P < 0.01$; Sauer et al. 2007). The 2007 USFWS and Canadian Wildlife Services' (CWS) Waterfowl Breeding Population and Habitat Survey data indicate that mallard abundance was 8.3 ± 0.3 million birds, which was 14% above the 2006 estimate of 7.3 ± 0.2 million birds and 11% above the long-term average (Wilkins et al. 2007).

Non-lethal methods were used in FY06 to move or disperse 3,133 mallards, and WS lethally removed 108 mallards to protect human health and safety. Based on an anticipated increase in requests for services, WS' lethal removal of up to 500 mallards, combined wild and domesticated, in any one year for airport safety and protection of other resources would not adversely affect mallard populations. Mallard populations are healthy in Illinois and USFWS Region 3, WS take is a small portion of authorized sport harvest, and because of USFWS 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 are small shy ducks of ponds, marshes and protected bays (Robbins et al. 1997). They 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. On low, marshy prairies in the central part of the continent, where blue-winged teal are most numerous, virtually every pond and pothole has a breeding pair. The male commonly "*stands guard*" on the pond while the female is incubating eggs. They are usually one of the first birds to migrate with many states opening an early hunting season for this duck. It is one of the faster flying ducks and since they are so small they appear to fly even faster. Both sexes have a light blue area on the forward edge of the wing, and a green speculum. During periods which males have breeding plumage they have a distinct white facial crescent.

During the 2005 and 2006, sport hunters killed 26,498 and 55,106 Blue-winged in Illinois (USFWS 2006). The BBS population trend data from 1980 to 2006 shows that breeding populations of blue-winged teal are relatively stable in Illinois (-7.7% per year, $P = 0.14$), and decreasing in USFWS Region 3 (-5.7% per year, $P < 0.01$) and relatively stable nationwide (1.4% per year, $P = 0.17$; Sauer et al. 2007). The 2007 USFWS and CWS Waterfowl Breeding Population and Habitat Survey data indicate that Blue-winged Teal abundance was 6.7 ± 0.4 million birds, which was the third highest estimate since 1955, 14% above the 2006 estimate of 5.9 ± 0.3 million birds, and 48% above the long-term average (Wilkins et al. 2007).

WS dispersed 10 Blue-winged Teal during the period of FY 04 through FY 06. During the same period WS killed only 2 Blue-winged Teal in order to protect human health and safety at airports

in Illinois (Table 4-1). Because the Illinois WS program is anticipated to expand to protect human health and safety at airports, the number of Blue-winged Teal could be killed by WS per year could increase to a maximum of 100 birds/year. This level of take would only be 0.2 - 0.4% of licensed harvest in 2005 and 2006, and would result in a low magnitude of impact on the Blue-winged Teal population and hunting opportunities.

Green-winged Teal Biology and Population Impacts

Green-winged Teal are the smallest dabbling duck in North America (Alsop 2001). They are very similar to Blue-winged Teal except smaller and green-winged teal without the pale blue wing patch on the forewings (Alsop 2001). 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 Illinois in the month of September. These ducks can be seen foraging on vegetative materials in shallows, agricultural fields, and woodlots (Alsop 2001). These ducks can also walk easily on land and can be found nesting in grasses and weeds of meadows as far away as 200 feet from water (Alsop 2001).

During the 2005 and 2006, licensed hunters in Illinois killed 24,928 and 32,575 Green-winged Teal per year, respectively (USFWS 2007). The BBS trend data for Green-winged Teal in Illinois is not available because they do not commonly breed in Illinois, but BBS data from 1980 to 2006 shows that the breeding populations of Green-winged Teal are stable in USFWS Region 3 (-5.3% per year, $P = 0.39$) and stable to decreasing nationwide (-2.4% per year, $P = 0.08$). The 2007 USFWS and CWS Waterfowl Breeding Population and Habitat Survey data indicate that Green-winged Teal abundance was 2.9 ± 0.2 million birds, which was similar to the 2006 estimate but still >54% above the long-term average (Wilkins et al. 2007). The apparent discrepancy between Region 3 BBS data and data from the Waterfowl Breeding Population Survey likely is attributable to the fact that Green-winged Teal primarily nest in Canada and only some of the northernmost U.S. states and may not be adequately represented in the USFWS Region 3 BBS survey data. In contrast, the Waterfowl Breeding Population Survey includes Canadian and U.S. Breeding areas and may more accurately cover more remote breeding areas.

Illinois WS dispersed 7 Green-winged Teal during the period of FY 04 through FY 06. During the same period WS killed only 1 Green-winged Teal in order to protect human health and safety at airports (Table 4-1). Because the Illinois WS program is anticipated to expand to protect human health and safety at airports, the number of Green-winged Teal that could be killed by WS per year could increase to a maximum of 100 birds/year. This level of take would only be 0.3 - 0.4% of licensed harvest in 2005 and 2006, and would result in a low magnitude of impact on the Green-winged Teal population and hunting opportunities.

Mourning Dove Biology and Population Impacts

Mourning Doves are migratory bird 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. This dove, found across the United States and southern Canada, is most common throughout the Great Plains in the Midwest. Mourning doves are one of Illinois's most widespread breeding bird species and have one of the 10 highest relative abundance estimates for a bird species in the BBS survey (Sauer et al. 2007). They can be found on telephone wires and trees in most neighborhoods in the southern half of the state and in conifer plantations between late March and late September or early October. They are capable of multiple brooding and their range is expanding northward (Ehrlich et al. 1988). After its prolonged breeding season, most congregate in large flocks particularly around agricultural fields (Walsh et al. 1999). They are seed eating birds and many states have regulated annual hunting

seasons for this species, including Illinois, and take is liberal.

WS dispersed 2,070 mourning doves and killed 570 during FY04 through FY06, to reduce the risk of bird/aircraft strikes (Table 4-1). WS take is included among the reported 672 mourning doves that were killed under DP's from the USFWS during CY04 through CY06 (Table 4-2). In Illinois, Mourning Doves are considered a game species with a regulated hunting season with estimated take of 798,800 and 948,700 birds in the 2005 and 2006 hunting seasons (USFWS 2007). Mourning dove breeding populations appear to be increasing in Illinois and USFWS Region 3 (2.2 and 1.1% per year, respectively, $P < 0.01$;) and are relatively stable nationwide (-2% per year, $P = 0.22$; Sauer et al. 2007). Based on an anticipated increase in requests for services, Illinois WS may have a maximum annual lethal take of up to 500 birds in any one year. Given the relative abundance of Mourning Doves in Illinois, the increasing population trend for Illinois and USFWS Region 3, and the low level of WS take relative to take by licensed hunters; WS' proposed activities would result in a low magnitude of impact on the dove population and on hunting opportunities.

Table 4-2. DPs Issued by the USFWS and Bird Take Under DPs* in Illinois.

Species	CY04		CY05		CY06	
	Issued	Take	Issued	Take	Issued	Take
American Kestrel	4	96	5	67	5	31
Barn Swallow	1	0	0	0	0	0
Belted Kingfisher	1	2	1	2	1	5
Blue-winged Teal	1	0	1	0	0	0
Canada Geese	17	99	17	104	15	124
Double-crested Cormorant	0	0	2	0	2	4
Great-blue Heron	2	10	4	17	4	38
Great-horned Owl	0	0	2	0	2	0
Green-backed Heron	2	2	2	5	2	14
Gull spp.	2	3	2	0	1	0
Ring-billed Gull	15	462	17	633	15	827
Herring Gull	9	45	11	75	11	63
Killdeer	1	14	1	0	1	76
Mallard	12	246	12	230	10	174
Mourning Dove	4	80	5	187	4	405
Red-tailed Hawk	3	16	4	23	4	12
Rough-legged Hawk	2	0	2	0	2	0
Turkey Vulture	0	0	2	0	2	1
Downy Woodpecker	11	1	7	0	2	0
Hairy Woodpecker	3	0	1	0	0	0

* USFWS data is summarized and reported on a calendar year (CY).

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 and reaches the Atlantic and Pacific coasts (Hayman et. al. 1986). Killdeer are technically in the family of shorebirds, 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. Killdeer appear in the Midwest in about February. It's also one of the last migrants to leave in the fall, remaining into November.

Distinguishing characteristics include a dark, double banded breast, with the top band completely encircling the upper body/breast. Another band is located at the head, resembling a mask absent of the facial portion. The band is continuous, thinning while going across the face along the forehead region and above the bill, and thickening at the supercilium; extending around the eye and onward around the back of the head. Plumage is relatively absent of complexity with the exception of a vividly colored, reddish-orange rump that is visible during flight and behavioral displays. The rest the body consists of a grayish-brown coloration along the dorsal side, crown and nape, while the ventral region is white. Sex characteristics are difficult to determine since killdeer are essentially monomorphic. The clutch of up to four eggs is laid in a ground scrape in open habitats (Leck 1984).

WS lethal take of killdeer would primarily occur on airports to reduce bird/aircraft strike hazards. WS dispersed 10 killdeer during FY04 through FY06 at airport facilities to reduce the risk of bird/aircraft strikes (Table 4-1) and the USFWS reported that 14 killdeer were killed in 2004 and 76 in 2006 under DPs listed to all entities in the state. BBS population trend data for 1980-2006 indicate that killdeer populations in Illinois and USFWS Region 3 have increased (5.6 and 1.6% per year, respectively, $P < 0.01$), but the nationwide population has decreased (-0.5% per year, $P = 0.02$; Sauer et al. 2007).

Based on an anticipated increase in requests for services, Illinois WS could remove an annual maximum of 100 Killdeer per year. Given that the Killdeer population in Illinois and USFWS Region 3 appears to be increasing, IDNR and USFWS oversight, and the localized nature of WS Killdeer take, WS limited lethal take of killdeer in Illinois would have a low magnitude of impact on the Killdeer population.

Gulls

In addition to increases in gull populations in natural habitats, there has been an increase in populations in urban areas where gulls have established colonies on buildings (Dolbeer et al. 1990). Dwyer et al. (1996) documented 7,922 pairs of roof-nesting gulls at 30 colonies in four Great Lakes states, including Ohio with 17 colonies and Illinois with 8 colonies. The growth in these populations has been dramatic, for example, in Cuyahoga County, Ohio, there were three roof-nesting colonies with 265 pairs in 1990 and more that 2,549 breeding pairs in 13 colonies in 1994 (Dwyer et al. 1996).

Ring-billed Gull Biology and Population Impacts.

Ring-billed Gull appearance is similar to California and 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 Illinois 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. Spring arrival of migrants in Illinois begins in March/April and autumn migration is normally completed in October, however, some Ring-billed Gulls may remain longer. Ring-billed Gulls are long lived birds. They attain sexual maturity in 2-3 years. USGS records indicate the oldest band record for a Ring-billed Gull is 27 years, 3 months but the average Ring-billed Gull lifespan is 10-15 years (Ryder 1993).

Data on the Ring-billed Gull population in Illinois are limited. Ring-billed Gulls in Illinois are part of the larger Great Lakes population. Damage management actions in Illinois 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). Data on gull populations in Indiana, Wisconsin and the Great Lakes Region are provided for informational purposes.

Data from the USGS Breeding Bird Survey (Sauer et al. 2007) for the period of 1980-2006 indicate that the Ring-billed Gull population has increased 17.9% per year ($P \leq 0.03$) in Illinois and remained stable in Wisconsin (5.0% per year, $P = 0.25$), Indiana (0.9% per year, $P = 0.95$) and USFWS Region 3 (1.0% per year, $P = 0.54$). However, the BBS works best for species which are evenly distributed across the landscape. Colonial species like gulls may not be adequately represented because shifts in bird use of colony sites and formation of new colonies may not be detected unless the colonies are located within survey routes. Additionally, BBS survey routes tend to be primarily located in rural and suburban areas and underrepresent bird populations like Ring-billed Gulls that flourish in urban areas. 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. However, similar to the BBS trend for Illinois, the Wisconsin Checklist project indicates that the Ring-billed Gull population in Wisconsin is increasing (Rolley 2006).

In 1999 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. Survey data indicate that there were 7,381 nesting pairs of Ring-billed Gulls on the Illinois portion of the Lake Michigan Coast, an additional 31,161 pairs of Ring-billed Gulls along the Indiana portion of the lake Michigan Coast, and 29,166 pairs of Ring-billed Gulls at 21 sites along the southern half of the Wisconsin portion of the lake Michigan Coast. The survey was repeated in 2007. However complete data are not currently available. Preliminary information does indicate substantial increases in the Ring-billed Gull population for Illinois and Indiana. For example, WS observed 3,089 and 31,395 Ring-billed Gull nests at the Lake Calumet and Dime Pier sites in 2007, compared to 506 and 14,755 nests observed at the same sites in the 1999 colonial waterbird survey (Scharf 1978, Scharf and Shugart 1998, Cuthbert et al 2003). Available 2007 colonial waterbird survey data indicate 42,279 Ring-billed Gull nests in Indiana, up from 33,161 in 1999 (L. Wires, University of Minnesota, unpub. data). Even this survey likely underestimated the number of Ring-billed Gulls in the region because it 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 mangement. For example, in 2006, WS provided technical and/or operational assitance at 5 roof-top Herring Gull nesting sites in Lake and Cook counties, none of which were included in the 1999 Colonial Waterbird Survey. The colonial waterbird survey only counts nests, and underestimates the gull population because it doesn't include non-breeding birds. Ring-billed Gulls are usually 3 yrs old before they reach breeding age, so a considerable portion of the gull populations are not included in the waterbird survey numbers.

WS has received requests from the City of Chicago to assist with the management of conflicts and damage caused by Ring-billed Gulls. Concerns exist regarding potential impacts the high

gull concentrations may be having on E. coli levels at public beaches and the need for swim bans (Rader et al. 2007, unpublished report). In 2007, under a separate Categorical Exclusion, WS participated in a Ring-billed Gull Damage Management Pilot Project with the objectives of: (1) reducing the production of Ring-billed Gulls; 2) reducing the severity of conflicts with gulls; and (3) evaluating the difference in movements between gulls with and without young to provide a better understanding of gull behavior (Rader et al. 2007, unpublished report). Illinois WS oiled Ring-billed Gull eggs in two of the largest nesting colonies in the state and then collaborated with the National Wildlife Research Center (NWRC) to observe the effect of the treatments. WS oiled 50,517 gull eggs in 18,470 nests to prevent hatching at two major nesting colonies in Chicago. However, no gulls were killed by WS to reduce conflicts with gulls during the Gull Damage Management Pilot Project. Seven hundred twenty five gulls from treated and control nests were marked and observed throughout the summer. WS observed more birds from treated nests at beaches than control nests early in the swim season. This may have been due to the need for control birds to increase foraging efforts at non-beach locations to feed young. Belant *et al.* (1993, 1998) found that both Ring-billed and Herring Gulls used either landfills or fish resources to feed young prior to fledging. This increase in use of beaches by failed nesters during the pre-fledging period is relatively minor compared to the reduction in hatching-year birds that occurred via the egg-oiling project. Based on a fledge rate of 1 or 2 birds per nest, the hatch-year gull population in the Chicago region would have increased by 18,000 to 35,000 birds beginning in July 2007 if we had not oiled gull eggs. Although additional time and research is needed to make definitive conclusions, early evidence indicates that the use of the egg-oiling program appeared to reduce some of the conflicts associated with the birds without resulting in abandonment/relocation of the nest colonies.

In addition to egg oiling in the Chicago study discussed above, WS killed 48 Ring-billed Gulls in FY04, 635 in FY05 and 739 in FY06 by shooting to protect human health and safety at airports (Table 4-2). In addition, the USFWS Region 3 reported that 462, 633, and 827 Ring-billed Gulls were killed under DP in 2004, 2005, and 2006, respectively (WS take were included in these numbers) (Table 4-2). Based on current WDM activities, the current rate of population increase for the state Ring-billed Gull population (17.9% per year from Illinois BBS data: Sauer et al. 2007), and anticipated future projects including efforts to assist the City of Chicago, WS anticipates killing up to 7,000 Ring Billed Gulls per year and oiling up to 65,000 nests. Egg oiling and lethal removal would only be used as part of integrated damage management programs. For example, ongoing efforts by the Chicago Park District (CPD) to address problems with gulls have included use of trash receptacles with lids at parks and beaches, education signs encouraging the public to not feed birds, harassing birds with border collies, installing wire grid systems over a portion of a swimming beach and installing perch deterrents on field houses at beaches. Litter often attracts opportunistic gulls to the area in search of forage. In 2007, the CPD added solar powered trash compactors at beaches and parks to supplement previously placed receptacles in efforts to control trash accumulation in and on beaches and park grounds. The CPD also continues to investigate the use of dogs to chase gulls from the beaches as part of the integrated strategy to manage conflicts with gulls at beaches. Unfortunately, dogs which are used to harass gulls may also adversely impact other much less abundant shorebirds that are enjoyed by park visitors. Numbers of other shorebird species at beaches are low enough that they are not likely contributing substantially to difficulties with *E. coli* levels.

As noted above, BBS population trend data indicate that the Ring-billed Gull population in Illinois and the USFWS Region 3 has increased from 1980 to 2006 (Sauer et al. 2007). The WS count of 35,192 Ring-billed Gull nests just in the Lake Calumet and Dime Pier areas equates to 70.384 breeding gulls. This does not include non-breeding birds or Ring-billed Gulls in other parts of the state. Ring-billed Gulls are usually 2-3 yrs old before they reach breeding age so a

considerable portion of the gull population is not included in the count of breeding birds. The proposed level of lethal take (up to 7,000 Ring-billed Gulls per year) would only be 9.9% of the breeding population observed in Chicago by WS and is less than the 17.9% annual rate of increase reported by the BBS for Illinois (Sauer et al. 2007).

In addition to the lethal take, WS proposes to oil most nests in the Lake Calumet and Dime Pier/DuSable Harbor areas as part of the efforts to manage Ring-billed Gulls discussed above. The majority of egg oiling would be conducted for the City of Chicago at Lake Calumet and Dime Pier areas. As noted above, WS anticipates that up to 65,000 Illinois Ring-billed Gull nests may be oiled to help reduce damage and conflicts with Ring-billed Gulls. Actual number of nests that could be oiled would vary depending on annual population fluctuations and bird response to egg oiling efforts. Gulls relocating to rooftops in Chicago may still have their eggs oiled but gulls moving outside the Chicago/Lake Calumet area would not be included in the egg oiling for the Chicago damage management effort. Additionally, even within the nest colonies, some nests may not be subject to egg oiling because of site specific measures to protect non-target species and other factors. For example, in 2007, after consultation with the Illinois Department of Natural Resources, WS modified activities at the Lake Calumet colony and did not access approximately 50% of the gull colony (15,000 nests) to avoid adversely affecting nesting Black-crowned Night Herons (a state-listed Endangered species). Gulls are a long-lived species with a lifespan of approximately 10-15 years. Egg oiling for a limited period of time and at limited sites in the region may inhibit population growth in the years in which it is conducted but will not adversely impact viability of the population. The egg oiling level proposed in this EA would only be conducted for a maximum of an additional 5 years at which point, the impact of the program on the gull population would be evaluated and made available for public comment pursuant to APHIS procedures for implementing NEPA. Additionally, more information from other studies will hopefully be known about the connection between gulls and *E. coli* contamination at Chicago beaches. The project will also be subject to internal and agency review (WS, USFWS, IDNR, City of Chicago) and could be discontinued at any time if it is determined to have unanticipated adverse impacts on the gull population. Given the analysis and protective measures described above, WS has determined that the proposed action would not have adversely impact the viability of on the state, regional or national Ring-billed Gull population.

Herring Gull Biology and Population Impacts.

The Herring Gull is the largest of the five species of gulls that could occur in Illinois with the body length of about 20 inches and wing span of about 55 inches. 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. Data on Herring Gull populations in Illinois are limited. As noted above for Ring-billed Gulls, Herring Gulls in Illinois are part of a larger Great Lakes regional population. Damage management actions in Illinois could conceivably result in birds moving along the Lake Michigan coast. Data on gull populations in Indiana, Wisconsin and the Great Lakes Region are provided for informational purposes.

Data from the USGS Breeding Bird Survey (Sauer et al. 2007) for the period of 1980-2006 indicate that Herring gull populations have been stable in Illinois (0.2%, $P = 0.93$) and Wisconsin (-2.8%, $P = 0.44$), stable to decreasing in USFWS Region 3 (-5.0% per year, $P = 0.06$) and relatively stable nationwide (-2.0%, $P = 0.32$). The Wisconsin Checklist project indicates that the Herring Gull population in Wisconsin is stable (Rolley 2006). In 1999 there was a Colonial Waterbird Survey conducted which covered the shoreline and Islands of the Great Lakes and some inland colonies near the shore of the Great Lakes. Survey data indicate, there were 46 nesting pairs of Herring Gulls on the Illinois portion of the Lake Michigan Coast, an additional

460 pairs of Herring Gulls along the Indiana portion of the lake Michigan Coast, and 464 pairs of Herring Gulls at 21 sites along the southern half of the Wisconsin portion of the lake Michigan Coast. 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 area. 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 mangement. For example, although Breeding Bird Survey data indicate the population of Herring Gulls in Illinois has been stable in 2006, WS provided technical and/or operational assistance at 5 roof-top nesting sites in Lake and Cook counties, none of which were included in the 1999 Colonial Waterbird Survey. 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 yrs to reach reproductive maturity so a considerable portion of the gull populations are not included in the waterbird survey numbers. Complete data from the 2007 colonial waterbird survey are not currently available.

Illinois WS killed 2 Herring Gulls in FY04, 66 gulls in FY05 and 53 in FY06 to protect resources and human health and safety (Table 4-2). In addition, the USFWS Region 3 reported that 45, 75, and 63 Herring Gulls killed under DP in 2004, 2005, and 2006, respectively (Table 4-2).

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 100 damaging or potentially damaging Herring Gulls per year, and 100 nests with all eggs associated with those nests per year without adversely affecting populations. Based on the above information, USFWS oversight, this level of take by WS in Illinois would have a low magnitude of impact on local, statewide, or regional herring gull populations.

Great Blue Heron Biology and Population Impacts.

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

During FY 04 through 06 WS shot three great blue herons to reduce risks to aircraft (Table 4-1). The USFWS issued 2, 4 and 4 DPs in 2004, 2005 and 2006, respectively in Illinois (Table 4-2). During CY 04 through 06 the USFWS reported that 10, 17, and 38 Great Blue Herons were removed in Region 3 to protect property.

BBS population trend data for 1980-2006 indicate that Great Blue Heron populations are increasing in Illinois, USFWS Region 3 and nationwide (1.1-7.5% per year, $P \leq 0.01$ Sauer et al. 2007). 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 depredating nursery fish stocks. Given the low level of WS take and the increasing heron population trends, the proposed action would have a low magnitude of impact on statewide, regional or national Great Blue Heron 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. 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. 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. They are local breeders in Central America and are widely distributed throughout South America. 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.

Kestrels consume primarily insects in the summer; however, they will also eat small rodents and birds. Wintering birds feed primarily on rodents and birds. 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 must often compete with Starlings, an aggressive, invasive, secondary cavity nester.

BBS population trends for the period of 1980-2006 indicate that kestrel populations are increasing in Illinois (8.3% per year, $P < 0.01$), stable to increasing in USFWS Region 3 (1.7% per year, $P = 0.06$), but stable to decreasing nationwide (-0.6% per year, $P = 0.07$; Sauer et al. 2007). During FY 04 through 06, WS dispersed 99 American Kestrels. During the same period WS captured and relocated 131 American Kestrels as part of an ongoing raptor relocation program at two northern Illinois airports. WS killed 69 American Kestrels during the period of FY 04 through FY 06 (Table 4-1). Because Kestrel populations appear healthy, are increasing in Illinois and stable to increasing in USFWS Region 3, removal of up to 200 kestrels causing damage or potentially causing damage annually (*i.e.,* bird aircraft strikes) under a DP issued by the USFWS would result in a low magnitude of impact on the kestrel population.

Turkey Vulture Biology and Population Impacts.

This species breeds from Canada to southern South America, adapting equally well to deserts, eastern deciduous forests, and tropical lowlands (Wilbur 1983). Adult turkey vultures are black in color with a bright-red, naked head (Robbins et al. 1997), while immature vultures have black heads. Turkey vultures migrate to Illinois during April, nest, and return to their winter range in about September. Turkey vultures nest in caves, hollow trees, thickets, or old buildings (Jackson 1983, Ritter 1983). Usually two eggs are laid during nesting but as many as four eggs have been documented (Jackson 1983).

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

A major range expansion into the northeastern United States began after 1920, possibly caused by a decline in bison carrion in the west and an increase of white-tailed deer populations and other road-killed animals. BBS population trend data from 1980 to 2006 indicate the turkey vulture breeding population has increased in Illinois, USFWS Region 3, and nationwide (2.0-14.3% per year, $P < 0.01$; Sauer et al. 2007).

During FY 04 through 06, WS killed one turkey vulture. WS recommended 2 DPs be renewed by the USFWS for turkey vulture damage problems in FY05 (Table 4-2). Since turkey vulture population trends appear to be increasing, WS could take up to 70 turkey vultures per year under a DP issued by the USFWS to protect human health and safety, property and agricultural

resources without adversely affecting populations. Based upon the low level of anticipated take and the increasing turkey vulture population, WS activities would have a low magnitude of impact.

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. 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. 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 (Robbins et al. 1997).

During FY04 through FY06 WS killed 462 House Sparrows (Table 4-1). Permits are not required for the take of this species, so no information is available on House Sparrow take by non-WS entities. BBS population trends from 1980-2005 show that House Sparrow populations are decreasing in Illinois, USFWS Region 3, and nationwide (-3.6 to -4.1% per year, $P < 0.01$; Sauer et al. 2007).

Any bird damage management involving lethal damage management by WS would probably be restricted to individual sites. 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 since house sparrows are considered an 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.

Rock Pigeon Biology and Population Impacts.

Pigeons, also known as Rock Pigeons, are an introduced non-native species to North America and are not protected by law. Any lethal Illinois WS bird damage management would likely be restricted to sites where pigeons are causing damage, or are considered a health threat or nuisance, and reduction or removal of a local population could be attempted. This action would be considered beneficial since it would reduce disease threats and property damage/defacing.

In FY05 WS shot 525, lethally trapped 94, hand gathered 8 pigeons (Table 4-1) and used 285 grams of DRC-1339 to remove 65 pigeons to reduce property damages and to address human health and safety concerns related to these birds. Permits are not required for the take of this species, so no information is available on Rock Pigeon take by non-WS entities.

Illinois BBS population trend data for the period of 1980 to 2006 indicate that Rock Pigeon populations are decreasing in Illinois, USFWS Region 3 and nationwide (-1.3 to -3.8% per year, $P < 0.01$; Sauer et al. 2007). The impact of Illinois WS current bird damage management program is not having an adverse effect on pigeon populations in Illinois or in USFWS Region 3. However, WS could take up to 15,000 pigeons 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. If nicarbazin is registered for use in Illinois, it would be possible for WS to use this product to help stabilize or reduce local pigeon populations. Because Rock Pigeon populations are an invasive species, WS or any other sources of mortality could be considered beneficial to native species and a low magnitude of impact.

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

WS is requested to provide bird damage management for losses or nuisances created by feral, free-ranging, domestic, non-indigenous, and exotic birds (WS Directive 2.320). The terms "feral" and "free-ranging" relate to domestic animals which have permanently escaped confinement or have been released into the wild, rural areas, city parks, etc. Feral and free-ranging birds are not necessarily dependent upon people for food or care. The domestic duck, commonly found on farms and inter-urban lakes and ponds, is a product of the domestication of the mallard, a larger bird than generally found in truly wild populations and may have color variations not typical of wild birds. Examples of other domestic or domestic hybrid birds include Muscovy ducks, peacocks, golden pheasants, etc. "Domestic" refers to animals which are generally animals such as chickens, turkeys, guinea fowl, racing pigeons, domestic ducks and geese, ostriches, emus, etc. and have escaped temporarily from their confinements or owners and are still totally dependent on people for food and care. "Exotic" and "non-indigenous" refers to animals not native to Illinois which have been illegally or accidentally introduced or released in the wild (i.e. Monk Parakeets). The ILCS prohibits the importation of non-protected species, which includes most exotics (Roy Domazlicky, Pers. Comm., 12/21/07). If an exotic is from a protected family and has formed a truly wild population, then it may be protected and permits may need to be obtained from IDNR for their removal. The only example of this occurring in Illinois is the Mute Swan (Roy Domazlicky, Pers. Comm., 12/21/07).

Birds classified or termed feral, free-ranging, domestic, and exotic are not considered wildlife and are not afforded protection or managed by the USFWS or IDNR. Consequently, no populations or population trend data exist for most of these species.

Feral and Escaped Domestic Ducks: In Illinois, WS uses a combination of methods to distinguish feral ducks and escaped 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 (*i.e.,* mottled) or very dark plumage on hens), weight (ducks in excess of 3¾ lbs (1.7 kg) during most of the year or 4½ lbs (2.0 kg) from November through January) 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 ducks exhibit two or more of these characteristics. Feral ducks, when captured, are euthanized while wild ducks may be released to the wild in accordance with permit guidance from the USFWS and the IDNR.

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 bird damage management by WS would be restricted to individual sites. In those cases where birds are causing damage or are a nuisance, complete removal of the local population could be desired. This would be considered beneficial to the human environment since it would be requested by the affected property owner, administrator, or resource management agency.

During FY 04 through FY 06 WS captured 29 exotic waterfowl. WS does not anticipate killing more than 200 feral or domestic waterfowl per year. Because of the non-native status of these birds, lethal removal would not be considered to have an adverse affect on native species and may be considered by some biologists to have beneficial ecological impacts. Consequently, WS take for escaped and feral waterfowl will have a low magnitude of impact.

Monk Parakeet: The Monk Parakeet (*Myiopsitta monachus*) was introduced into the United

States in the late 1960's (Hyman and Pruett-Jones 1995). The Monk Parakeet can be found in semi-open habitat and does not travel far from their nest sites (Eberhard 1998). The Monk Parakeet's nests are constructed of twigs and are generally domed shaped with some nests having many chambers within the nest that house several pairs of birds (Eberhard 1998). Eberhard also states that the nest is used year round by nesting and non-nesting birds. The young fledge 40 days after hatching and remain in the nest for three months (Eberhard 1998).

Almost the entire population of monk parakeets in Illinois can be found in the northern portion of the state (Hyman and Preuett-Jones 1995). Hyman and Pruett-Jones also state that Monk Parakeets were seen nesting in the Chicago area as early as 1979. There are no BBS survey dataon Monk Parakeets for Illinois. However, the numbers of Monk Parakeets observed on the Audubon CBC in Illinois have increased from 4 in 1991 to 244 in 2007.

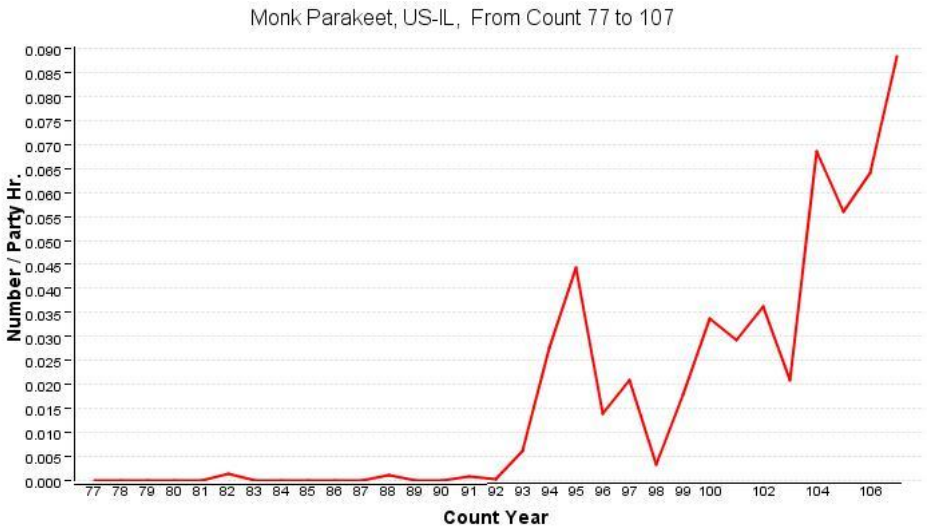


Figure 4-2. Audubon Christmas Bird Count (CBC) data on Monk Parakeets in Illinois (Audubon 2002).

Damage caused by Monk Parakeets in Illinois has been limited to transmission towers, power sub-stations and telephone poles. The large nests created by these birds create a fire hazard that can damage property and threat human health and safety. WS has not conducted any damage management activities for Monk Parakeets. However, an increasing number of technical assistance telephone calls dealing with Monk Parakeets demonstrate an escalating amount of damage that can lead to future Illinois WS involvement with damage management activities.

The parrot family (including Monk Parakeets) is not afforded protection from the USFWS or the IDNR, (Roy Domazlicky, Pers. Comm., 12/21/07). Therefore a permit is not required to lethally remove a Monk Parakeet causing damage. WS will only remove Monk Parakeets nesting on transmission towers, communication towers, power sub-stations/transformers, and telephone/power poles. WS will conduct Monk Parakeet damage management projects in accordance with state, property owner and local government (e.g., Chicago Bird Agenda) policy regarding the disposition of parakeet eggs and young. Due to the non-native status of these birds and the increasing numbers, lethal removal, even to the extent of total eradication, would be considered by many biologists and ecologists to have a beneficial environmental impact. However, WS activities will be limited to locations where Monk Parakeets and their nests are causing problems for utility companies (e.g., transmission poles and towers, and electric

substations) WS lethal removal of monk parakeets is not likely to be widespread enough to result in substantial reductions in the local population, especially considering the rate of population increase indicated by the CBC survey data.

Mute Swan Biology and Population Impacts

The mute swan was introduced from Europe into the United States in the late 19th century near New York City. Feral breeding took place after 544 more individuals were introduced in the lower Hudson Valley in 1910 and on Long Island in 1912. In the eastern United States, scattered breeding now occurs from Massachusetts to Virginia (Master 1992). Feral populations became established over time as swans that had escaped or been intentionally released from captivity survived and reproduced in the wild. Mute swans prefer freshwater ponds and streams of 10 acres or less and coastal bays and salt marshes. The swan's diet consists mostly of rooted submerged aquatic vegetation. Small islands, narrow peninsulas, and clumps of aquatic vegetation are preferred nesting sites. Nesting territories vary in size from 4 to 10 acres and are sometimes used year-around or reoccupied each year. The mute swan lays the largest of all swan eggs, and a typical clutch of four to eight eggs takes 35 to 38 days to hatch.

IDNR and BBS do not have data on current mute swan populations for the state of Illinois. The overall population trend for Mute Swans for the period of 1980-2006 shows relatively stable population in USFWS Region 3 and nationwide (1.4 and 2.2% per year respectively, $P \geq 0.58$; Sauer et al. 2007). WS did not kill any Mute Swans from during the period of FY04 through FY06 (Table 4-1).

Mute Swans are viewed as an exotic species and are not protected by the USFWS under the MBTA; therefore a federal permit is not needed to remove a Mute Swan. However, Mute Swans are still considered a protected species in Illinois (Roy Domazlicky IDNR, pers. comm., 06/26/07) and therefore an IDNR permit is required to remove mute swans. WS does not anticipate removing more than 15 Mute Swans per year. Lethal methods would only be used to remove Mute Swans in situations where there is a demonstrable threat to human health and safety and practical and effective nonlethal methods have failed or are inadequate as well as consulting with the IDNR on a case by case basis (e.g., some bird hazards at airports) to resolve the problem.

Based on the above information, USFWS and IDNR oversight, and the low level of proposed lethal take, WS would have a low magnitude of impact on the state Mute Swan population.

Woodpecker Biology and Population Information

Woodpeckers have a strong bill, sharply pointed for chipping and digging into tree trunks or branches for wood-boring insects, but also chisel holes into structures, presumably for nesting cavities (Robbins et al. 1997). They use their stiff tail as a prop to aid in chiseling. In addition, most species "*drum*" on resonant limbs, poles, drainpipes, or other structures. Flight is usually undulating, with wings folded against the body after each series of flaps. Woodpeckers chisel a cavity into a tree branch or trunk, or structure to nest. Woodpecker damage to structures is the primary reason for people requesting WS assistance with these species.

A. Northern Flicker Biology and Population Impacts.

Flickers have black spots on a tanish-white breast and belly and are about 11 inches in length. Males have a black or red "mustache" extending from the gape of the beak to below the eyes. In summer, flickers are distributed from Alaska to the southern regions

of the United States (Short 1982) and migrate to Mexico and the southern United States during winter. The habitats of the flicker are diverse, from shrub deserts and tree-bordered streams of the Great Plains to everglade hammocks, city parks, mountain fir forests, and farm pastures.

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 (Short 1982). Vegetation such as berries and other fruits make up a large part of the diet in the autumn and winter. The nesting season in Illinois begins in April/May. Males claim territories and attract females by "*drumming*," vocalizing, wing flicking, and other displays. Nests are constructed in cavities of dead trees, buildings, fence posts, telephone poles, etc. The BBS trend data for 1980 – 2006 (Sauer et al. 2007) indicate that breeding flicker populations are decreasing in Illinois, USFWS Region 3 and nationwide (-2.0 to -3.2% per year, $P < 0.01$; Sauer et al. 2007).

During FY04 through 06, Illinois WS did not remove any flickers to protect resources and did not disperse any flickers using non-lethal techniques. The USFWS did not issue any to resolve woodpecker problems in Illinois in 2004, 2005 and 2006, respectively (Table 4-2). WS may receive requests for assistance in the future and could remove damaging flickers. WS does not anticipate removing more than 15 flickers per year. Considering WS' history of not having taken any flickers 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 proposed take, USFWS and IDNR 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 population.

B. Downy Woodpecker Biology and Population Impact.

The Downy Woodpecker is the most common North American woodpecker, and also the woodpecker reported most frequently by Project FeederWatch participants (GBBC, http://www.birdsource.org/gbbc/learning/hear-bird-sounds/). During the 2005-2006 Project FeederWatch season, the Downy Woodpecker was the fifth most common Project FeederWatch bird. They are seen in suburbs, orchards, shade trees, and wooded areas. They appear similar to Hairy Woodpeckers, only smaller; the Downy Woodpecker is approximately 6.5 inches in length. Downy Woodpeckers have plumage that is a sharply contrasting pattern of blacks and whites. The Downy Woodpecker breeds over a widespread area encompassing most of North America, except for the extreme southwestern United States and areas above tree line.

During FY 04 through 06, Illinois WS removed one Downy Woodpecker to protect property and did not disperse any Downy Woodpeckers using non-lethal techniques. The USFWS issued 11, 7 and 2 DPs to resolve Woodpecker problems in Illinois in 2004, 2005 and 2006, respectively (Table 4-2).

The BBS trend data for 1980 – 2006 (Sauer et al. 2007) indicate that breeding Downy Woodpecker populations are stable in Illinois (-1.0% per year, $P < 0.14$), and decreasing in USFWS Region 3 and nationwide (-0.5% per year, $P \leq 0.05$). WS removed one Downy Woodpecker during FY 04 through FY06. WS anticipates increasing requests for assistance with Downy Woodpecker management in the future and could kill up to 25 Downy Woodpeckers per year during projects to protect property and human health and safety (i.e., airports). However, considering WS' history of having killed only one

Downy Woodpecker for damage management in the last three years, actual take in most years is likely to be far lower than this number. Given that Downy Woodpeckers are relatively abundant in Illinois, the low level of proposed take, USFWS and IDNR 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 Downy Woodpecker population.

C. Hairy Woodpecker Biology and Population Impact.

Hairy woodpeckers are common in Illinois and found in suburban areas, parklands, orchards and in forests. They have white vertical stripes on their back and are considered a medium sized bird and are larger than the similar Downy Woodpecker (Robbins et al. 1997); Hairy Woodpeckers are between 9 and 13 inches in length.

Hairy Woodpecker populations appear to be stable or increasing across most of the United States; however, they have become rare and localized in Florida and adjacent Georgia, where it continues to decline. In this region, they are found strictly in mature pine forests and strongly prefer recently burned areas. Natural wildfires play a vital ecological role in the southeastern United States, and fire suppression by humans has made many species--including the Hairy Woodpecker--become threatened in this region (Cornell Laboratory of Ornithology 2007, www.birds.cornell.edu/BOW/HAWP/). In addition, these birds suffer when they have to compete with House Sparrows and European Starlings for nest cavities (www.wbu.com/ chipperwoods/photos/hwood.htm).

During FY 04 through 06, Illinois WS did not remove any Hairy Woodpeckers to protect resources and did not disperse any Hairy Woodpeckers using non-lethal techniques. WS recommended that 4 DPs be issued/renewed by the USFWS from FY04 through FY06. The USFWS issued 3 and 1 DPs to resolve Hairy Woodpecker problems in Illinois in 2005 and 2006, respectively (Table 4-2). These DP's were issued because hairy woodpeckers are very similar in appearance to the downy woodpecker, and many are misidentified.

The BBS trend data for 1980 - 2006 indicate that breeding Hairy Woodpecker populations are stable in Illinois, USFWS Region 3 and nationwide (0.5 – 2.0% per year; $P \geq 0.14$; Sauer et al. 2007). WS did not remove or disperse any Hairy Woodpeckers during FY 04 through FY06; however, WS may receive requests for assistance and could remove damaging Hairy Woodpeckers in the future. WS does not anticipate removing more than 25 Hairy Woodpeckers per year. Considering WS' history of not having taken any Hairy Woodpeckers 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 proposed take, USFWS and IDNR 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 Hairy Woodpecker population.

Swallow Biology and Population Impact.

Barn Swallow - Barn Swallows are common near farms, bridges and other buildings, where they build mud nests on building rafters, bridges, or other vertical structures. BBS data for 1980 – 2006 indicate that Barn Swallow population is relatively stable in Illinois (0.3% per year, $P = 0.34$), but decreasing in USFWS Region 3 and nationwide (-0.9 and -1.2% per year, respectively; $P \leq 0.01$; Sauer et al. 2007).

Cliff Swallows - Cliff swallows are also common in Illinois. These Swallows soar more than other Swallows and can be distinguished by its orange rump, square tail, broad martin-like wings and buffy forehead. Cliff Swallows are also colony nesters and build nests under eaves or bridges. BBS data for 1980 – 2006 indicate that the Cliff Swallow population is increasing in Illinois (11.7% per year, $P < 0.01$), relatively stable in Region 3 (-0.2% per year, $P = 0.89$) and stable to increasing nationwide (0.9% per year, $P = 0.07$; Sauer et al. 2007).

During FY 04 through 06, WS did not kill any swallows. The USFWS issues 1 DP for problems in Illinois with swallows from FY04 through FY06, respectively (Table 4-2). Based on anticipated increases in requests for WS assistance with BDM, WS could remove up to 50 Barn and 50 Cliff Swallows per year. Given that Barn and Cliff Swallow populations are stable or increasing in Illinois, USFWS and IDNR oversight and monitoring, and that WS take would onlyoccur at isolated sites in a very small portion of the state, the proposed action would have a low level of impact on the state Barn and Cliff Swallow populations.

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 (Johnston 1961). American Crows can be found throughout the year in Illinois. From their spring nesting colonies, or autumn and winter roosts, they forage for insects, grain, and carrion. Johnston (1961) reports that crows reach their peak abundance in agricultural areas where there are wooded areas, and have increased in numbers where agricultural practices have increased. American Crows are considered a migratory game bird in Illinois, and can be killed during their hunting season.

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). Despite recent population declines in local areas, long-term population trend data for the period of 1980-2006 indicate that the American Crow population is relatively stable in Illinois (-0.7% per year, $P = 0.29$), and increasing in USFWS Region 3 and nationwide (0.5 and 0.8% per year, respectively $P \leq 0.01$; Sauer et al. 2007) and current relative abundance figures are still above 1980 levels. Based on relative abundance estimates from the BBS, American Crows are among the ten most commonly seen bird species in the state (Table 3). 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*.

During FY04 through 06, WS did not use lethal methods to reduce damage caused by crows. If damage occurs or if crows present a threat at airport facilities to the traveling public or aircraft from aircraft strikes, WS does not anticipate killing more than 500 crows per year. Given the relative abundance of American Crows, long-term stable to increasing population trends, 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 aversely impact the state, regional or national American Crow population.

Double-crested Cormorant Biology and Population Impacts.

The Double-crested Cormorant is one of six species of cormorants breeding in North America and has the widest range (Hatch 1995). They range throughout North America, from the Atlantic

coast to the Pacific coast. They are also a long-lived bird. From 1990 to 1997, the overall growth rate in the Interior region was estimated at 6% (Tyson et al. 1999) with the most dramatic increases occurring on Ontario, Michigan, and Illinois waters (Wires et al. 2001). From 1970 to 1991, the Great Lakes breeding population alone increased from 89 nests to more than 38,000 nests, an average annual increase of 29% (Weseloh et al. 1995). From 1991 to 1997, the number of nests in the Great Lakes further increased to approximately 93,000, an average annual increase of 22%. Data from the BBS (1980-2006) shows that the Double-crested Cormorant populations has been increasing in Illinois and nationwide (10.3 and 5.8% per year, respectively, $P \leq 0.04$) and has been relatively stable in USFWS Region 3 (3.4% per year, $P < 0.21$; Sauer et al. 2007). In 2005, 118,860 DCCO nests were counted during a survey of nesting Double Crested Cormorants in the Great Lakes Region. Assuming one non-breeding bird for each non-breeding pair would indicate that the cormorant population in the Great Lakes was approximately 356,580 birds. (S. Hanisch, USFWS, unpub. data).

The USFWS published in the Federal Register on October 8, 2003 their final rule and notice of record of decision adopting a Public Resource Depredation Order (50 CFR 21.48) based upon analysis of this alternative and other alternatives in their final EIS addressing cormorant management in the United States. The Public Resource Depredation Order allows people to take cormorants when they are in the act or about to commit depredations to fish, wildlife, plants, and their habitats. The final rule identifies 24 states, including Illinois, which may implement provisions of the public resource depredation order.

To date, Illinois WS has not used lethal means to reduce cormorant damage to aquaculture or public resources; however WS has used non-lethal methods to move or disperse cormorants from airports to protect human safety. The USFWS issued 4 DPs in Illinois to resolve cormorant damage from FY04 through FY06, respectively (Table 4-2). Based upon the above information, Illinois WS anticipates that future requests to reduce cormorant damage could result in the lethal removal of up to 125 cormorants annually. Given current DCCO population estimates and that the Illinois cormorant population is increasing, the proposed level of cormorant removal would not have an adverse impact on state, regional or national Double-crested Cormorant population

Raptors.

Raptors are a large, worldwide family of diurnal birds of prey equipped with strong, curved talons for capturing and killing live prey and heavy, sharp, hooked bills to cut and tear flesh for consumption. In most species the sexes appear alike; however the males are smaller than the females. In addition, there is much individual variation in coloration, and several species have dark forms.

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 uniformly colored tails of the adult and dark belly band are the best field marks; however, they show a great deal of individual variation in plumage. They often perch on poles or treetops to hunt. The Red-tailed Hawk is the largest hawk, usually weighing between 2 and 4 pounds. As with most raptors, the female is nearly $^1/_3$ larger than the male and may have a wing span of 56 inches.

BBS population trend data for 1980 – 2006 indicate that Red-tailed Hawk populations have

steadily increased in Illinois, USFWS Region 3 and nationwide (1.9 – 7.2% per year, $P < 0.01$; Sauer et al. 2007). During FY 04 through 06, WS dispersed 120 Red-tailed Hawks using non-lethal control tools. During the same period WS captured and relocated 173 Red-tailed Hawks as part of an ongoing raptor relocation program at two northern Illinois airports. WS also killed 19 Red-tailed Hawks to protect human health and safety at airports throughout the state of Illinois during FY 04 through FY 06. The USFWS issued 3, 4 and 4 DPs in Illinois to resolve conflicts with Red-tailed Hawks in 2004, 2005, and 2006, respectively (Table 4-2). Because Red-tailed Hawk populations are increasing, removal of up to 150 Red-tailed Hawks annually for bird damage management activities at a limited number of sites within the state would result in a low magnitude of impact on the 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. In size, it falls between the larger Northern Goshawk (*Accipiter gentiles*) and the smaller sharp-shined hawk (*Accipiter striatus*). Males are about crow size and females larger. Although it occasionally captures small rodents, especially chipmunks, it has evolved to prey upon smaller birds; it is more of a specialist in the pursuit of medium-sized birds, like Mourning Doves, Northern Flickers, American Robins (*Turdus migratorius)* and other similarly sized birds.

Nesting often occurs in man-made open clearings. Wintering habitats are similar to nesting habitats and birds are less prone to migrate than Sharp-shined Hawks. Home range of these hawks is relatively large. In Illinois, a breeding male was found to have a territory of 1,900 acres. Because of large home range, densities are quite low and 80% of prey are other avian species. Stick nests are placed in trees with overhead cover with clutch size from three to six eggs.

BBS population trends indicate that Cooper's Hawks population trends are stable in Illinois (9.6% per year, $P = 0.11$) and increasing in USFWS Region 3 and nationwide (6.9 – 9.6% per year, $P < 0.01$; Sauer et al. 2007). During FY04 through 06, WS did not kill any Cooper's Hawks (Table 4-1). WS did not recommend the issuance of any DPs to the USFWS from FY04 through FY06 (Table 4-2). Because Cooper's Hawk populations appear to be stable to increasing, removal 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 would result in a low magnitude of impact.

Great Horned Owl Biology and Population Impacts.

The Great-horned Owl is common in Illinois and throughout the United States and the largest owl in North America. The Great-horned Owl's color pattern is similar to Long-eared Owls, however, Great horned Owl "*ear tufts*" are larger and farther apart; their bellies are finely barred horizontally. They are found in woods, mountain forests, desert canyons, marshes, city parks, and urban forests. The owls prefer open areas to dense woodlands or nest sites close to the edge of a forest where they can hunt. Great-horned Owls commonly occupy the abandoned nests of large birds, nests in tree cavities, stumps, in caves or on rocky ledges.

Great-horned Owls are one of the earliest spring nesting birds; eggs may be laid in January or February through April. They lay from one to three eggs but typically two eggs are laid. The young fledge from the nest at 45-55 days old. They can live more than 12 years and some captive birds have lived to 29 years old.

During FY 04 through 06, WS did not kill any Great-horned Owls (Table 4-1). The USFWS issued 4 DPs to resolve conflicts in Illinois from FY04 through FY06, respectively (Table 4-2). Based on anticipated increases in requests for WS assistance, WS might kill up to 15 Great-horned Owls per year. 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 this number.

BBS population trends for 1980 – 2006 indicate that Great-horned Owl populations have remained relatively stable in Illinois (0.1, $P < 0.97$), but are decreasing in USFWS Region 3 and nationwide (-3.5, -1.4 $P < 0.03$) (Sauer et al. 2007). Because Great-horned Owl populations are relatively stable in Illinois, the low level of proposed take, and that WS kill of owls would only be conducted at a very small proportion of the state, and USFWS and IDNR oversight and monitoring, removal of up to 15 Great-horned Owls annually would result in a low magnitude of impact on the state owl population.

Other Target Species.

Target species, exclusive of state or federally-listed T/E species, In addition to the bird species analyzed above, other bird species listed in Section 1.2 could be killed or have nests removed in small numbers by WS during damage management activities. Most of these birds are protected by the USFWS under the MBTA and the take is limited by permit. The USFWS and IDNR, as the agencies with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on these bird populations would have no significant adverse impact on the quality of the human environment.

Based upon an anticipated increase in future requests for WS assistance, WS predicts that no more than 10 individuals and no more than 10 nests of other target species would be removed annually. This low level of take would not adversely affect state bird populations and would have a low magnitude of impact.

4.3.1.2 Alternative 2 - Only Nonlethal 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 IDNR 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 Alhpa Chloralose (AC) are currently only available for use by WS employees and would not be available under this alternative, although Starlicide, 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 nonlethal BDM, risks of adverse impacts from actions by non-WS entities are lower than with Alternative 3.

4.3.1.3 Alternative 3 - 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 IDNR 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, 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 Nontarget (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. Nontarget migratory bird species and other nontarget wildlife species are usually not affected by WS' nonlethal management methods, except for the occasional scaring from harassment devices. In these cases, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. WS' take of nontarget species during bird damage management activities have been extremely low and are not expected to increase above current levels of take. To minimize risk to nontarget species from the use of DRC-1339 or other pesticides, WS uses prebaiting observations and prior history information to determine likelihood of non-target bird presence. In addition any bait site would be monitored by the cooperator to ensure that non-target birds do not utilize the bait site. Alternatively, some type of structure or feeding station could be used that would only allow access by the target species but not by non-target birds, as well as baiting would not be conducted until non-target species are not present.

Avitrol is an avicide registered for use on Rock Pigeons, crows, gulls, blackbirds, starlings, and House Sparrows in various situations. Illinois WS uses avitrol for the reduction of damage caused by species listed on the product label, with the exception of Rock Pigeons[13]. For blackbirds, grackles, cowbirds, gulls and crows seagulls, and to a lesser extent, starlings, this product also functions as a chemical frightening agent by causing distress behavior in the birds that consume treated baits from a mixture of treated and untreated bait (EPA 2007). Birds that consume treated bait usually die, but the vast majority of birds are frightened from the site by the distress vocalizations and abnormal flying behavior of birds which have consumed the bait. In

13 If Illinois WS targets Rock Pigeons with an avicide, DRC-1339 would be applied.

House Sparrows and Rock Pigeons, treated birds do not exhibit as strong a response to avitrol and flock members are less responsive to the behavior of treated birds. For this species, avitrol primarily works as a toxicant. Avitrol is a restricted use pesticide that can only be sold to licensed pesticide applicators. The majority of avitrol use in the U.S. is by private wildlife control operators and other non-WS entities.

Any granivorous bird associated with the target species could be affected by Avitrol. The Ecological Incident Information System (EIIS) contains records of four predatory bird deaths, including one Peregrine Falcon, that were determined to be due to ingestion of poisoned birds (EPA 2007). The Canadian Peregrine Foundation has also raised concerns that sublethal exposure to avitrol might result in a slight degree of disorientation which could be fatal at the speeds achieved by birds of prey in flight (Canadian Peregrine Foundation 2006). WS measures to reduce nontarget species risks from the use of avitrol meet and exceed EPA label requirements for the protection of the environment. WS would use a prebaiting period with untreated bait to monitor bird use of the treatment site. Bait placement and timing of baiting would be adjusted to eliminate use by nontarget species. WS would remain on site when treated bait is available to monitor for and disperse any nontarget species which may approach the site including raptors. This on-site monitoring during avitrol treatment is not required by the product label. Avitrol is relatively fast-acting and treated birds usually die on site. WS collects carcasses of treated birds and disposes of them so that they are not available to predators and scavengers. If bait application cannot be adjusted to eliminate nontarget species use of bait sites or if there are difficulties in dispersing nontarget birds during bait application, WS would discontinue bait application. Given these protective measures, risks to nontarget species from WS use of avitrol are extremely low.

While every precaution would be taken to safeguard against killing non-target birds, at times changes in local flight patterns and other unanticipated events could result in the incidental death of unintended species. These occurrences are rare and would not affect the overall population of any species under the current program.

Beneficial Effects on Nontarget Species. Programs to reduce damage and interspecific competition between native species and invasive species can benefit native wildlife species that are adversely affected by predation or competition for habitat. Interspecific nest competition has been well documented with some non-indigenous species. Miller (1975) and Barnes (1991) reported Starlings were responsible for a severe depletion of the Eastern Bluebird population due to nest competition. Nest competition by Starlings has also been known to adversely affect American Kestrels (Nickell 1967, Von Jarchow 1943, Wilmers 1987), Red-bellied Woodpeckers (Ingold 1994, Kerpez and Smith 1990), and Wood Ducks (*Aix sponsa*) (Shake 1967, Heusmann et al. 1977, Grabill 1977, McGilvery and Uhler 1971). Weitzel (1988) reported nine native species of birds have been displaced by Starling nest competition, and Mason et al. (1972) reported Starlings evicting bats from nest holes. Reduction of nest site competition could be a beneficial effect for some native species. Although such reductions are not likely to be significant, the benefits would probably outweigh any adverse effects from non-target takes.

Interspecific brood parasitism is defined as the laying of an egg or eggs by one species of bird into a host nest of another species of birds. Unsuspecting of the egg laying, the host normally accepts and incubates the egg(s) and raises the young as their own. The Brown-headed Cowbird is one of five species of Cowbirds that are brood parasites (Orians 1985) which have lost the instinct to nest build, egg incubate, and care for young (Smith 1977). As a result of the brood parasitism, egg and chick survival of the hosts is jeopardized. In most cases of brood parasitism, the young of the host species die because they are unable to compete with the Cowbird chick for

food and space inside the nest. Gulls are generally very aggressive nesting area colonizers and will force other species such as terns and plovers from prime nesting areas. The recent increase in the population of Double-crested Cormorants in the Great Lakes Region has also impacted colonial bird nesting areas. Besides competing for nesting space, the acidic droppings of cormorants destroy vegetation, making the area unsuitable for rapid nesting colony restoration. This alternative has the greatest possibility to successfully reduce bird damage and conflicts to wildlife species since all bird damage management methods could be implemented or recommended by WS.

T/E Species Effects. Special efforts are made to avoid jeopardizing T/E species through biological assessments of the potential effects and the establishment of special restrictions or minimization measures. WS is consulting with the USFWS and IDNR regarding risks to federal and state-listed T/E bird species from the methods proposed in this EA, except for nicarbazin which is not currently available for use in Illinois (Section 4.3.1). 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 proposed action will not result in the destruction of wildlife habitat. 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 IDNR prior to initiating work. 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, reptiles, amphibians, fish, lichens or plants. For the same reasons, WS has also concluded that the proposed action would have no impact on the state and federally-listed bats. In theory, state-listed rodents could eat avitrol or DRC-1339 treated baits. However, none of the state listed rodents would be found in the feedlots, urban areas and roost sites where WS would use these products. Concequently, the proposed action will have no impact on state listed rodents.

Risks of secondary poisoning to state-listed gray wolves from the proposed action are negligible. Carcasses of birds taken using DRC-1339 and Avitrol are unlikely to be available to state-listed gray wolves. Furthermore, 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. Laboratory studies on secondary hazards to predator and scavenger species from avitrol have shown minimal potential for secondary poisoning, and during field use only magpies and crows appear to have been affected (Schafer 1991). However, a laboratory study by Schafer et al. (1974) showed that magpies exposed to two to 3.2 times the published Lethal Dose (LD_{50}) in contaminated prey for 20 days, were not adversely affected and three American kestrels that were fed contaminated blackbirds for seven to 45 days were not adversely affected. A formal Risk Assessment found no probable risk is expected for pets and the public, based on low concentrations and low hazards quotient value for non-target indicator species tested on this compound (USDA 1997, Revised, Appendix P).

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 pesticide and risk of disturbance by WDM activities. None of the federally-listed bird species are predators or scavengers on other birds, nor would they be found in areas where WS would use avitrol or DRC-1339. The primary risk of disturbance to a state or federally-listed bird would be associated with the proposed gull research and egg oiling activities. As discussed above in the section on impacts on target gull species, WS has and will continue to consult with the IDNR 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 IDNR and USFWS guidance on measures to manage potential impacts from the proposed activity. Consequently, WS proposed bird damage management activities will not result in adverse impacts on state or federally listed birds from disturbance.

None of the federally-listed bird species are predators or scavengers on other birds, nor would they be found in areas where WS would use avitrol or DRC-1339. There are some state-listed bird species (e.g., Yellow-headed blackbird, Henslow's sparrow (*Ammodramus henslowii*) and Greater Prairie Chickens (*Tympanuchus cupido*) which might consume treated bait. However, bait will not be used in areas where it will be accessible to Greater Prairie Chickens. As noted above, prior to using DRC-1339 and Avitrol, WS conducts a prebaiting period to determine if nontarget species are using a site. If nontarget species are using the untreated bait, WS either adjusts the baiting strategy (e.g., timing of baiting or location of bait) to eliminate the hazard or cancels plans to use the product. WS would not use toxicant if a T&E bird species that might consume the bait is observed in the treatment area. Additional protective measures relative to the use of avitrol are discussed above in the section on, "Adverse Effects on Nontarget (non-T/E) Species". Consequently the proposed use of toxicant will pose no primary hazards to state or federally-listed species (Appendix E).

There are several state-listed raptors which, in theory, might consume birds which had eaten avitrol or DRC-1339. 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. As discussed above, numerous studies show that DRC-1339 poses minimal risk of primary poisoning to nontarget and T&E species (USDA 1997 Revised). 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. Additional protective measures relative to the use of avitrol are discussed above in the section on, "Adverse Effects on Nontarget (non-T/E) Species". Given the properties of DRC-1339 and WS protective measures for the use of DRC-1339 and avitrol, the proposed action is not anticipated to have adverse impacts on state-listed raptors.

Nicarbazin: Nicarbazin is not currently legally available for use in Illinois. Analysis of the nontarget species risks from nicarbazin are analyzed here so that WS may have access to this method in the event that this product becomes available at a future date. Nicarbazin baits for geese are to be used at sites, office complexes, golf courses, residential communities, and municipalities. Although it is possible that other egg-laying species such as birds, reptiles, amphibians, fish, and invertebrates, could feed on the baits, which could reduce their egg-laying

potential, the sites where the bait would be used are not as conducive to attracting many species of egg-laying animals. These areas are also places where T&E species are typically not found. Birds in urban and suburban habitats are typically common species that have adapted to the presence of man. Only a few other species are expected to consume the baits, primarily Mallards, domestic waterfowl, and possibly Gulls, Crows, and Rock Pigeons. In an Oregon field study, the primary nontarget avian species to consume the bait were American Crows, Ravens and Mallards. However, because most bait consumption by non-target species is expected to be occasional or intermittent and the bait must be consumed regularly throughout the breeding season to inhibit reproduction, nicarbazin is not expected to have any significant impact on these species. Additionally, the size of the baits will prevent small birds and songbirds from eating the baits; small pieces of bait will be removed during the manufacturing process by sifting through screens. Studies on waterfowl in the Fort Collins, Colorado area have shown that most mallards will not eat the bait; they pick up the bait, manipulate it with their bill and then spit it out. However, mallards that are use to being fed by people could eventually eat the bait after the Canada Geese on site began eating the bait. Since Canada Geese will typically aggressively protect their food sources, they are expected to chase away any other birds attempting to eat the bait offered. WS will also monitor the site prior to and during bait application to ensure that non-target species access to the site is limited to nonexistent and that there is no State or Federally listed species that could consume the bait present at the site. Unconsumed bait will be picked up after the bait application period.

Canada Geese typically nest earlier in the year than most other waterfowl species that would consume the bait and before many songbirds. Nicarbazin bait will be offered as early as February and will end in early April. Nicarbazin bait must be consumed for several days to achieve blood levels that affect the hatchability of eggs that are forming. Since most waterfowl do not begin to nest until at least May, no effects on the hatchability of eggs of non-target waterfowl that do consume bait are expected as bait exposure will stop before their nesting season is beginning.

Risk of nontarget species access to nicarbazin when used for Rock Pigeons is likely to be lower due to differences in the application strategy. As with the goose formulation, nicarbazin for pigeons in only registered for use in urban areas, applicators must ensure that children and pets do not come into contact with the product, the product cannot be used within 20 feet of any body of water, and the product may only be applied on rooftops or other flat paved or concrete surfaces. Applicators must confirm by visual observation that Rock Pigeons are eating the bait and nontargets are not feeding on the bait. The label stipulates that the bait application must be discontinued at sites if nontargets are observed feeding on the bait. As with the goose formulation, no excess bait may remain after feeding. The chemistry of the active ingredient assures that there is a low risk of any effect on a raptor. To have an effect, the bird must consume the bait. Once Nicarbazin is digested and absorbed, it is no longer biologically available to another bird. There is effectively no risk of secondary toxicity (http://www.innolyticsllc.com/new%20pigeon%20pages/pigeon_FAQ.html).

Studies of the effects of nicarbazin on animals other than birds that lay eggs have been limited to snakes. When Brown Tree Snakes were treated with nicarbazin, the number of eggs laid, the hatchability of the eggs, and the health of the offspring were not affected by treatment. It is possible, but not probable, that other egg-laying species could feed on the bait such as turtles. However, WS will monitor the site prior to and during bait application and will remove the bait and/or change the bait application system to avoid exposure to nontarget species.

Toxicity studies in birds and mammals given short and long-term doses of nicarbazin show minimal effects. The volume of Nicarbazin bait that would have to be consumed by nontarget

birds and mammals precludes them from being killed by exposure to the bait. For example, a rat would have to consume over 2.2 pounds of the Nicarbazin bait in a singe feeding to reach the lethal dose required to kill 50% of the rats to consume that level of bait (LD_{50}). Extrapolations from data on chickens indicate that Crows would have to eat 1.4 lbs of bait each day for 84 days before they would reach the LD_{50} (Binam et al. 2005). Mammalian predators of geese that have eaten bait could also be exposed to the bait. However, calculations of a worst case scenario by Binam et al. (2005) indicate that a Coyote would have to eat over 40 geese in a single day in order to reach the acute (one dose) LD_{50} for Nicarbazin determined for dogs weighing 25 lbs., or over 13 geese per day for 163 days to reach the chronic (repeated dose) LD_{50}.

Beneficial Impacts of WS BDM activities: WS bird damage management may benefit some of the species of special concern. For example Starlings usurp nest sites from Wood Ducks, Bluebirds, Woodpeckers, and many other secondary cavity nesters (Grabill 1977, Weitzel 1988, Ingold 1989). (*e.g.,* Starling damage management could potentially reduce secondary nest cavity competition). 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. Starlings may also parasitize the nests of other species by destroying eggs or hatchlings (Fielder et al. 1990, 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 IDNR has concurred with WS determination that the proposed action will not affect critical habitat for any state listed species, will have no effect on state-listed reptiles and amphibians, will not affect state listed bats and rodents, may effect but is unlikely to adversely affect gray wolves and may affect but is unlikely to adversely affect state-listed birds (letter from S. Flood, IDNR to S. Beckerman, WS, April 11, 2008). Similarly, the USFWS concurred with WS determination that the proposed alternative may affect, but is unlikely to adversely affect Whooping Cranes, Least Terns and Piping Plovers (Letter from R. Nelson, USFWS, to S. Beckerman, WS, April 22, 2008). WS has determined tha proposed action will have no impact on any other federally-listed threatened or endangered species.

4.3.2.2 Alternative 2 - Only Nonlethal Bird Damage Management.

Adverse Effects on Nontarget Species, including T/E Species. Under this alternative, risks to nontarget species from WS actions would likely be limited to the use of frightening devices, and the risks of unintentional capture of a bird in a live-capture device. Use of frightening devices may cause migratory birds and other affected non-target wildlife to temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Although the availability of WS assistance with nonlethal BDM methods could decrease incentives for non-WS entities to use lethal BDM methods, non-WS efforts to reduce or prevent damage could result in less experienced persons implementing bird damage management methods and lead to a greater take of non-target wildlife. Hazards to T/E species could be greater under this alternative than Alternative 1. It is possible that, similar to Alternative 3, frustration from the resource owner due to the inability to reduce losses could lead to illegal use of toxicants, or other non-specific damage management methods by others could lead to unknown affects to non-target species populations, including T/E species (Appendix E). Potential hazards and threats to nontarget species could therefore be greater under this alternative if methods that are less selective or toxicants that cause secondary poisoning are used by non-WS entities.

Beneficial Effects on Nontarget 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 BDM programs.

4.3.2.3 Alternative 3 - No WS Bird Damage Management.

Adverse Effects on Nontarget Species. Alternative 3 would not allow any WS bird damage management in Illinois. There would be no impact on non-target or T/E species from WS bird damage management under this alternative. However, non-WS efforts to reduce or prevent damage would likely increase; which may result in less experienced persons implementing damage management methods and could lead to greater take of non-target wildlife than the *No Action/Proposed Action* Alternative. As in Alternative 2, possible frustrations caused by the inability to reduce losses could lead to illegal use of toxicants by others which could impact local non-target species populations, including T/E species. Hazards to nontarget species including T/E species could, be greater under this alternative than Alternatives 1 and 2.

Beneficial Effects on Nontarget 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 control actions.

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

The positive effects on human and pet health and safety from WS bird damage management include potential benefits by fostering a safer environment by reducing risks of disease transmission, problems associated with aggressive bird behavior, and bird/aircraft strikes. Potential negative effects might result from the exposure of the public and pets to bird damage management methods. WS uses chemical methods that are deemed appropriate to reduce a variety of damage problems, and WS personnel are aware of the potential risks to non-target species and humans (See Appendix C for a detailed description of bird damage management methods and chemicals potentially used by WS). The use of pesticides by WS is regulated by the EPA through the FIFRA, by State law, the IDOA, IDPH and by the WS Directives. Along with effectiveness, cost and social acceptability, risk is an important criterion for the selection of damage management strategies. Determination of risks to non-target animals, the public, and WS personnel are important prerequisites for successful application of the IWDM approach. Based on a thorough Risk Assessment (USDA 1997 Appendix P), APHIS concluded that, when chemicals used by WS are used according to label directions, they are selective for target individuals or populations, and such use has negligible adverse effects on the environment.

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

Under this alternative, bird damage management conducted by WS in Illinois is guided by WS, APHIS, and USDA Directives, Cooperative Agreements and MOUs with other agencies, USFWS (1992), 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 bird damage management in Illinois. The bird damage management methods used by Illinois WS are discussed in more detail in Appendix C of this EA and USDA (1997) and used as prudently as possible. In addition, the current MBTA and damage management strategies will continue to address complaints on a case-by-case basis providing the most flexibility in addressing damage complaints.

Avitrol (4-Aminopyridine) is available as a prepared grain bait mixture or as a powder. It is formulated in such a way that ratios of treated baits to untreated baits are no greater than 1:9. Factors that virtually eliminate health risks to pets and members of the public from use of this

product as an avicide are:

- It is readily broken down or metabolized into compounds that are excreted in urine in the target species (EXTOXNET 1996). Therefore, little of the chemical remains in birds killed with avitrol to present a hazard to humans or pets.
- Secondary hazard studies with mammals and birds have shown that there is low risk of secondary poisoning.
- Although Avitrol has not been specifically tested as a cancer-causing agent, the chemical was found not to be mutagenic in bacterial organisms. Therefore, the best scientific information available indicates it is not a carcinogen. Notwithstanding, the extremely controlled and limited circumstances in which Avitrol is used would prevent exposure of members of the public to this chemical.

The above analysis indicates that human and pet health risks from Avitrol use would be virtually nonexistent.

DRC-1339 is the primary avicide used for bird damage management in Illinois. 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 (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 biologically active soil and photodegradation occurs in water with a half-life that ranges from 6.5-41 hours depending on seasonal variations; in general, treated bait material is nearly 100% broken down within a week.
- It is more than 90% metabolized in target birds within the first few hours after they consume the bait. Therefore, little material is left in bird carcasses that may be found or retrieved by people or pets.
- Application rates are extremely low (Ranging from .05 lb to 0.1 lb. of active ingredient per acre).
- 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 (Beaver et al. 2001) and 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) 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. Nonlethal bird damage management 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™, 3) Mesurol, a chemical repellent used for non-lethal taste aversion, and 4) the tranquilizer AC. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before EPA or Food and Drug Administration (FDA) will register them. Any operational use of these chemicals would be in accordance with labeling requirements under FIFRA, FDA and State laws and regulations which are established to avoid unreasonable adverse effects on the environment.

Following labeling 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. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997).

Mechanical Damage Management Methods

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

- Resource management, which include practices that, may be used by resource owners to reduce the potential for wildlife damage.
- Cultural practices which generally involve modifications to the level of care or attention given to the resource, which may vary depending on the age, size, and location of the resource.
- Environmental/habitat modification is an integral part of bird damage management to not produce or attract certain bird species or to repel certain birds. Most habitat management revolves around airports and bird aircraft strike problems and blackbird and starling winter roosts.
- Animal behavior modification 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).
- Live traps which 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. Traps are baited with grains or other food material, which attract the target birds.
- Egg addling/oiling destruction is the practice of destroying the embryo prior to hatching.
- Shooting is more effective as a dispersal technique than as a way to reduce bird densities when a large number of birds are present, however, some birds may be removed using shooting when warranted (*i.e.*, at airports if the bird will not leave the area).
- Snap traps are wooden based rat snap traps and can be used effective in killing offending birds, such as woodpeckers damaging structures.

Nicarbazin: When used for geese or Rock Pigeons, signs or posters informing people of the presence of bait will be posted at various locations around the study site to increase awareness of the presence of the nicarbazin bait. WS will be monitoring the site before and during bait application and can also advise people to not eat the bait. There is a remote chance that a child might pick up and consume a limited number of pieces of the bait. If a child consumes the nicarbazin bait, no adverse effects are expected, although the bait is very hard and may pose a

slight choking hazard to very small children. The untreated bait has no taste or a slight corn flour taste to humans and would not appeal to humans/children. The treated bait has a mild astringent quality and would cause a "cotton-mouth" feeling and would provide a negative stimulus to children for continued consumption.

The FDA has a rigorous evaluation system to determine the human food safety of any product used in food animals. It has been determined that nicarbazin is safe in chicken meat at a level of 4 milligrams per kilogram with a human consumption of 1 pound (500 grams) of meat per day by a 120 pound (60 kilogram) human over a lifetime (US Department of Health and Human Services, Public Health Service, FDA, Center for Veterinary Medicine Guidance Document Guideline No. 3. General Principles for Evaluating the Safety of compounds Used in Food-Producing Animals Part IV. Guideline For Establishing A Tolerance changed to Guideline For Establishing A Safe Concentration; Code of Federal Regulations, Title 26, Volume 6, Parts 500 to 599, 2003; Code of Federal Regulations, Title 21, Volume 6, 2003). It is not anticipated that humans will consume geese treated with nicarbazin prior to the hunting season in the fall, which is well beyond the FDA recommended 4-day withdrawal period for treatment of chickens with nicarbazin. However, there is a slight chance that a treated goose could be illegally consumed by a human during or immediately following treatment with nicarbazin bait during the study. Based on calculated lifetime exposures, no effect on humans consuming meat with nicarbazin residues is expected even if meat is consumed prior to the 4-day withdrawal period.

Based on the analysis in the EA and the above discussion of nicarbazin, the proposed action, including the use of nicarbazin, will not adversely impact human health and safety and will better enable WS to respond to the need to protect human health and safety from risks associated with birds.

4.3.3.2 Alternative 2 -Only Nonlethal Bird Damage Management.

Under this alternative, WS would not use lethal BDM methods. Concerns about human or pet health risks from WS' use of lethal bird damage management methods would be alleviated because no such use would occur. However, Avitrol and the toxicant "Starlicide" which has the same active ingredient as DRC-1339 would be available to licensed pesticide applicators. Private 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 may have a greater risks to human and pet health and safety than under Alternative 1.. Ignorance and/or frustration caused by the inability to reduce losses could lead to illegal use of toxicants by others which could lead to unknown impacts to humans and pets.

Benefits to the public from WS BDM activities will depend on the ability of WS to resolve problems using nonlethal methods and the effectiveness of non-WS BDM efforts. In situations where risks to human and pet health and safety from birds cannot be resolved using nonlethal methods, benefits to the public and pets will depend on the efficacy of non-WS use of 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.

Nicarbazin: The addition of nicarbazin as a management option would give WS another alternative that could be used when designing BDM strategies. However, the addition of nicarbazin is anticipated to be an alternative means of successfully resolving conflicts with urban and suburban Canada Geese and Rock Pigeons, but is not necessarily anticipated to be more effective than current management strategies.

4.3.3.3 Alternative 3 - No WS Bird Damage Management Program.

Alternative 3 would not allow any WS bird damage management in Illinois. The absence of WS bird damage management in Illinois 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 bird damage management 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 Illinois. Airport managers and air safety officials are concerned that the absence of a WS bird damage management program would fail to adequately address complex wildlife hazard problems faced by the aviation community. Hence, potential effects of not conducting such work could lead to an increased incidence of human injuries, property damage or loss of life due to bird strikes to aircraft.

However, commercial pest control services and private individuals would be able to use Avitrol and Starlicide, 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 and Starlicide, 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 aren't any bird damage management 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. Under the current program, all methods are used as effectively as practically possible, in conformance with the WS Decision Model (Slate et al. 1992) and WS Directives. WS is best able to develop effective site-specific damage management strategies if it has access to the full range of legal damage management techniques including lethal and nonlethal methods. Consequently, this alternative would be more effective than any of the other alternatives in reducing or minimizing damage caused by birds because it allows access to the widest range of damage management techniques. Appendix C contains additional information on individual BDM methods.

4.3.4.2 Alternative 2 - Only Nonlethal Bird Damage Management.

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with bird damage problems. 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 1998). 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. 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, while potentially effective, may be costly and/or are incompatible with the uses of many sites. Habituation (birds becoming accustomed to frightening stimuli) may limit the length of time a frightening device is effective. In some situations, use of nonlethal methods may not provide the immediate resolution of a damage problem that may be warranted in cases of risk to human health and safety (e.g., bird hazards at airports). In situations where nonlethal 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 3 since WS would be available to provide assistance with nonlethal BDM but could still be less effective at reducing damage than Alternative 1.

4.3.4.3 Alternative 3 - No WS Bird Damage Management Program.

Under this alternative, the efficacy of WS bird damage management would not be a consideration because the Illinois WS program would not conduct operational activities or provide technical assistance to entities experiencing bird damage. Private efforts to reduce or prevent damage would probably increase which could result in less efficacy in using bird damage management methods depending upon the training and resources available to the individuals conducting BDM. It is reasonable to assume that frustration caused by the inability to reduce losses through legal means in a timely manner could lead to the use of illegal techniques which could result in unwanted impacts to bird populations and the environment.

4.3.5 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 control 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 control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Lethal removal of birds from airports should not affect the public's enjoyment of the aesthetics of the environment since airport properties are closed to public access. The ability to view and interact with 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 nonnative species, such as 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.

Nicarbazin: The use of nicarbazin would likely decrease the need for lethal bird removal and would probably be more acceptable to people who enjoy the presence of Geese and Pigeons than lethal removal of birds. However, in situations where the bird problem is related to high numbers of birds at a site some removal of birds may still be necessary. Used exclusively, nicarbazin would likely take years to reduce a local goose population because Canada Geese are relatively long-lived (Klimkiewicz 2000), and because the method is unlikely to be 100% effective. It may be necessary to first reduce the number of geese present at the site and then use the nicarbazin to keep the local population at the reduced levels. In this instance, use of nicarbazin will not prevent the initial removal of geese that some people find objectionable, but may still be a preferable long-term solution because it would reduce the need for future goose removal.

4.3.5.2 Alternative 2 – Only Nonlethal 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 control 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 nonlethal 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.

4.3.5.3 Alternative 3 - No Federal WS Bird Damage Management

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 the 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.

4.4 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 and 2, WS would address damage associated with birds in situations throughout the State. The Illinois WS bird damage management program would be the primary Federal program with bird damage management responsibilities; however, some State and local government agencies may conduct bird damage management activities in Illinois as well. Through ongoing coordination and cooperation with the USFES and IDNR, WS is aware of other bird damage management activities and may provide technical assistance in such efforts. WS does not normally conduct operational damage management activities concurrent with other agencies in the same area, but may conduct bird damage management activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct bird damage management activities in the same area. The potential cumulative impacts analyzed in this EA could occur either as a result of WS bird damage management, or as a result of the effects of other agencies and individuals. Those activities and the birds removed are tracked by the USFWS and IDNR through their permitting system to insure no long-term cumulative adverse affects 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.

Bird damage management methods used or recommended by the WS program in Illinois will have no cumulative adverse effects on target and non-target wildlife populations. Population trend data indicate that target bird populations have remained relatively stable or increasing in Illinois and USFWS Region 3. When damage management actions are implemented by WS, the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

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 Illinois WS bird damage management 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 (USDA 2001). Additionally, the relatively small quantities of DRC-1339 are used in the bird damage management program in Illinois, 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.

Avitrol exhibits a high persistence in soil and water but, according to literature, does not bioaccumulate (USDA 1997 and EXTOXNET 1996). Because of the characteristic of Avitrol to bind to soils, it is not expected to be present in surface or ground water as a result of its use on land. A combination of chemical characteristics and baiting procedures used by WS would reduce the likelihood of environmental accumulation of Avitrol. The EPA has not required studies on the fate of Avitrol in the soil because, based on use patterns of the avicide, soil residues are expected to be low.

Based on potential use patterns, the chemical and physical characteristics of DRC-1339 and Avitrol, and factors related to the environmental fate of these pesticides; no cumulative impacts are expected from the lethal chemical components used or recommended by the WS bird damage management program in Illinois. Avitrol may be used or recommended by the Illinois WS program. Most applications would not be in contact with soil, applications would not be in contact with surface or ground water, and uneaten baits will be recovered and disposed of according to EPA label specifications.

Non-lethal chemicals may also be used or recommended by the WS bird damage management program in Illinois. 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 bird damage management program in Illinois.

Cumulative Impact Potential from Non-chemical Components.

Non-chemical methods used or recommended by WS' bird damage management 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 non-chemical method, the deposition of lead shot in the environment is a factor considered in this EA.

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 Illinois WS bird damage management shooting activities conform to Federal, State and local laws. If activities are conducted near or over water, WS uses non-toxic shot during activities. Consequently, no deposition of lead in nontoxic shot zones is likely to occur as a result of Illinois WS' bird damage management actions. Therefore, cumulative impacts are not likely to occur if lead shot is used. Additionally, WS will evaluate other bird damage management actions which entail the use of shot on a case-by-case basis to determine if deposition of lead shot poses any risk to non-target animals, such as domestic livestock. If such risk exists, WS will use nontoxic shot in those situations.

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 over time occurs, 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 Illinois 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 since only trained and experienced wildlife biologists/specialists would conduct and recommend bird damage management activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternative 1 and conduct their own bird damage management, and when no WS assistance is provided in Alternative 3. In all three Alternatives, however, it would not be to the point that the impacts would be significant. Although some persons will likely be opposed to WS' participation in bird damage management activities on public and private lands in Illinois, the analysis in this EA indicates that WS integrated bird damage management program would not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-3 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-3 Comparisons of Issues/Impacts and Alternatives.

Issues/Impacts	*Alternative 1*	*Alternative 2*	*Alternative 3*
Effects of WS Bird Damage Management on Target Species Populations	WS would have little effect on local bird populations. If resource owners conduct bird damage management, effects would be more or less than Alternative 2 or 3.	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 than Alternatives 1 and 2 depending on the level of control by others.
Effects on non-target species, including T/E species	Low risk of averse affects from WS activities. Potential positive effects to those species that are being negatively impacted by invasive target species.	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 collisions.	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.	No risks from WS. Potential negative affect from the misuse of methods or toxicants or increase disease transmission or aircraft/bird collision risks.
Efficacy of WS Bird Damage Management Methods	Alternative provides most effective means to reduce bird damage or potential bird damage.	WS less effective than Alternative 1. Overall efficacy depends on access to and effectiveness of non-WS entities when using lethal methods.	No impact by WS. Overall efficacy depends on access to and effectiveness of non-WS entities when using lethal methods.
Impact 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 Bird damage problems most likely to be resolved without creating or moving problems elsewhere.	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. Increased risk that birds may move to other sites which can create aesthetic damage problems at new sites. Less likely than Alt. 3 because WS would conduct nonlethal.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall regional, state and national bird population. Greatest risks of adverse effects. Increased risk that birds may move to other sites which can create aesthetic damage problems at new sites.

CHAPTER 5: LIST OF PREPARERS, REVIEWERS AND PERSONS CONSULTED

5.1 PREPARERS AND REVIEWERS

Andrew T. Clapper, USDA-APHIS-WS, Springfield, IL
Scott Beckerman, USDA-APHIS-WS, Springfield, IL
Kimberly Wagner, USDA-APHIS-WS, Sun Prairie, WI

5.2 PERSONS CONSULTED

Mike Adams, Lake County, Illinois Health Department
Robert Byrd, Wildlife Biologist, Missouri WS
Sarah Beazley, City of Chicago, Department of Environment
John, Buhnerkempe, IDNR, Springfield, Illinois
Curt Colwell, IDPH, Springfield, Illinois
Roy Domazlicky, IDNR, Bartlett, Illinois
Deanne Endrizzi, USFWS, Fort Snelling, Minnesota
Linn Haramis, IDPH, Springfield, Illinois
Larry Harrison, USFWS, Fort Snelling, Minnesota
Joe Kath, IDNR, Springfield, Illinois
Fred Reicks, IDPH, Springfield, Illinois
Keith Ryder, ACOE, Chicago, Illinois
Paul Shelton, IDNR, Springfield, Illinois
Aaron Spencer, Wildlife Biologist, Illinois WS

APPENDIX A

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APPENDIX B

AUTHORITY AND COMPLIANCE

I. United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS)

WS is authorized by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authorities for the WS program are 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). The Secretary of Agriculture has delegated his authority under both the statutes listed below to the Animal and Plant Health Inspection Service (APHIS). Within that agency, the authority resides with the Wildlife Services (WS) program.

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, state and local agencies, private organizations, and individuals. 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.

WS is a cooperatively funded, service-oriented program. Before any operational wildlife damage management is conducted, an Agreement for Control or similar document must be completed by WS and the landowner/administrator. WS cooperates with other Federal, State, Tribal, and local government entities, educational institutions, private property owners and managers, and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable Federal, State, and local laws. WS has the responsibility for responding to and attempting to reduce damage caused by migratory birds as specified in an MOU with the USFWS.

United States Department of the Interior, Fish and Wildlife Service (USFWS)

The primary responsibility of the USFWS is conserving fish, wildlife, plants 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. While some of the USFWS' responsibilities are shared with other Federal, State, Tribal, and local entities, the USFWS has special authorities in managing the National Wildlife Refuge System; conserving migratory birds, endangered species, certain marine mammals, and nationally significant fisheries; and enforcing federal wildlife laws. The Migratory Bird Treaty Act (MBTA) gives the USFWS primary statutory authority to manage migratory bird populations in the United States. The USFWS is also charged with implementation and enforcement of the Endangered Species Act of 1973, as amended and with developing recovery plans for listed species.

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 USFWS regulates take of bird species listed as T/E under the ESA. The USFWS cooperates with the IDNR 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.*

United States Army Corps of Engineers

The mission of the Corps of Engineers Regulatory Program is to protect the Nation's aquatic resources, while allowing reasonable development through fair, flexible and balanced permit decisions. The Corps evaluates permit applications for essentially all construction activities that occur in the Nation's waters, including wetlands. Corps permits are also necessary for any work, including construction and dredging, in the Nation's navigable waters. The Army Corps of Engineers is responsible for managing property at various locations in Illinois including Chicago Lock and the DuSable Harbor Breakwall. The USACE may seek to manage bird damage on it's properties and/or may work with adjacent property owners and managers when birds using USACE property cause problems at adjacent sites (e.g., gulls nesting on Chicago Lock and the DuSable Harbor Breakwall).

Illinois Department of Natural Resources Legislative Authority

The Illinois Department of Natural Resources authority in wildlife management is given under Illinois Compiled Statutes (ILCS) Chapter 520. The mission of the IDNR is to manage, protect and sustain Illinois' natural and cultural resources; provide resource-compatible recreational opportunities and to promote natural resource-related issues for the public's safety and education.

> **520 ILCS 5/2.37. Permit to Take, Kill, or Capture Wild Animal Damaging Property.**
>
> Subject to federal regulations and Section 3 of the Illinois Endangered Species Act, the Department may authorize owners and tenants of lands or their agents to remove or destroy any wild bird or wild mammal when the wild bird or wild mammal is known to be destroying property or causing a risk to human health or safety upon his or her land.
>
> Upon receipt by the Department of information from the owner, tenant, or sharecropper that any one or more species of wildlife is damaging dams, levees, ditches, or other property on the land on which he resides or controls, together with a statement regarding location of the property damages, the nature and extent of the damage, and the particular if, after investigation, the Department finds that damage does exist and can be abated only by removing or destroying that wildlife, a permit shall be issued by the Department to remove or destroy the species responsible causing the damage. Permits to control the damage shall be valid for a period of up to 90 days, specify the means and methods by which and the person or persons by whom the wildlife may be removed or destroyed, and set forth the disposition procedure to be made of all wildlife taken and other restrictions the Director considers necessary and appropriate in the circumstances of the particular case. Whenever possible, the specimens destroyed shall be given to a bona-in fide

public or State scientific, educational, or zoological institution. The permittee is required to advise the Department in writing, within 10 days after the expiration date of the permit, of the number of individual species of wildlife taken, disposition made of them, and any other information which the Department may consider necessary.

520 ILCS 5/2.38

No person at any time shall:

1) Falsify, alter or change in any manner, or provide deceptive or false information required for, any license, permit or tag issued under the provisions hereof;
2) Falsify any record required by this act;
3) Counterfeit any for of license, permit or tag provided for this act;
4) Loan or transfer to another person any license, permit or tag issued under this act; or
5) Use in the field any license, permit or tag issued to another person.

It is unlawful to possess any license, permit or tag issued under the provisions knew, or should have known, was falsified, altered, changed in any manner or fraudulently obtained. The department shall suspend privileges, under this Act, of any person found guilty of violating this section for a period of not less than one year.

Illinois Department of Agriculture

The mission of IDOA is to be an advocate for Illinois' agricultural industry and provide the necessary regulatory functions to benefit consumers, agricultural industry, and our natural resources. The agency will strive to promote agri-business in Illinois and throughout the world. The IDOA registers pesticides for use in the state of Illinois.

Illinois Department of Public Health

The mission of the IDPH is to promote the health of the people of Illinois through the prevention and control of disease and injury. The IDPH is responsible for certifying structural pesticide applicators in the state of Illinois for both general use and restricted use pesticides in accordance with the Illinois Structural Pest Control Act. Illinois WS employees applying pesticides are certified pesticide applicators through the IDPH.

Illinois Native American Tribes

Currently, Illinois WS does not have MOUs with any American Indian Tribes. 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 bird damage management 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 bird damage management, 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 bird damage management on reservation lands.

II. Compliance with Federal and State Laws, Executive Orders and Regulations

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

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

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 has completed an informal Section 7 consultation with the USFWS on the risks to federally-listed threatened and endangered species from the actions proposed in this EA (letter from R. Nelson, USFWS to S. Beckerman, WS, April 22, 2008).

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as amended: The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect families of birds that contain species which migrate outside the United States. The law prohibits any "take" of these species by any entities, except as permitted or authorized by the USFWS. The Migratory Bird Treaty Reform Act of 2004 clarifies the original purpose of the MBTA as pertaining to the conservation and protection of migratory birds native to North America and directs the USFWS to establish a list of bird species found in the United States which are non-native, human-introduced species and therefore not federally protected under the MBTA.

The USFWS issues permits to requesters for reducing migratory bird damage in certain situations. WS provides on-site assessments for persons experiencing migratory bird damage to obtain information needed to make damage management recommendations. Damage management recommendations could be in the form of technical assistance or operational assistance. In severe cases of migratory bird damage, WS provides recommendations to the USFWS for the issuance of depredation permits to private entities or other agencies. The ultimate responsibility for issuing such permits rests with the USFWS. The USFWS has established special regulations for the management of damage by Blackbirds (Yellow-

headed, Red-winged, Rusty, and Brewer's Blackbirds, Cowbirds, all Grackles, Crows, and Magpies), resident Canada Geese and Double-crested Cormorants which eliminate and/or simplify permitting requirements for the management of specific types of damage caused by these species.

Bald and Golden Eagle Protection Act (16 USC 668): Congress enacted the Eagle Protection Act (16 U.S.C. 668) in 1940, thereby making it a criminal offense for any person to "take" or possess any bald eagle or any part, egg, or nest. The Act contained several exceptions which permitted take under select circumstances. The Secretary of the Interior could take and possess bald eagles for scientific or exhibition purposes of public museums, scientific societies, and zoological parks; possession of any bald eagle (or part, nest, or egg) taken prior to 1940 was not prohibited; and the terms of the Act did not apply to Alaska. Since its original enactment, the Act has been amended several times to increase protections for eagles and/or provide exemptions for specific types of activities. For example, the amendment in 1962 was designed to give greater protection to immature bald eagles, and to include golden eagles. The 1962 amendment also created two exceptions to the Act: first, it allowed the taking and possession of eagles for the religious purposes of Indian tribes and second, it provided that the Secretary of the Interior, on request of the governor of any State, could authorize the taking of golden eagles to seasonally protect domesticated flocks and herds in that State.

While Bald Eagles were federally listed as a threatened species, the Endangered Species Act was the primary regulation governing the management of Bald Eagles in the lower 48 states. Now that Bald Eagles have been removed from the federal list of threatened and endangered species, the Bald and Golden Eagle Protection Act is the primary regulation governing Bald Eagle management. For purposes of this Act, "take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb." If an APHIS action could potentially affect either bald or golden eagles in any of these ways, APHIS must consult with FWS. If these species are found in a location where a proposed action will be carried out, APHIS must ensure that its actions do not impact eagles in a way that fits the definition of "take". When there is the potential to affect eagles, it is advisable to coordinate with FWS to assure actions avoid "take."

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 Illinois are registered with, and regulated by the EPA, the IDPH and the IDOA. Illinois WS uses all chemicals according to label directions as required by the EPA, IDPH and IDOA.

National Historical Preservation Act (NHPA) of 1966 as amended: The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR§800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office 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 properties in areas of these federal undertakings.

The WDM methods described in Chapter 3 and 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, does not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. With the potential exception of noise-making devices, the proposed methods generally 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. 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 birds or other wildlife causing a nuisance. 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. 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.

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 varied depending on whether the Federal action involved a permit, license, financial assistance, or a federally authorized activity.

The lead and cooperating agencies have determined that the Preferred Alternative would be consistent with the state's Coastal Zone Management Program. WS has initiated consultation with the Illinois Office of Coastal Management requesting concurrence with this determination.

Environmental Justice and EO12898 - *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations":* Environmental Justice (EJ) 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.

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 their development 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 bird damage management 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.

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 control and to minimize the economic, ecological, and human health impacts that invasive species cause. The EO, in part, states that each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and the associated damages, 2) monitor invasive species populations, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control, 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 WS**:** EO 13186 directs Federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration between WS and the USFWS, in coordination with State, Tribal, and local governments. A National-level MOU between the USFWS and WS has been drafted to facilitate the implementation of EO 13186.

APPENDIX C

BIRD DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE IN ILLINOIS

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, consideration is given to the species responsible for the damage and the magnitude, geographic extent, duration, 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 Illinois 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.

Various Federal, State, and local statutes and regulations and WS Directives govern WS use of damage management tools and substances. The following methods and materials are recommended or used in technical assistance and operational damage management efforts of the WS program in Illinois. 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.

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 Only Nonlethal	Alternative 3 No Program
Habitat Management	✓	✓	No
Lure Crops/Cultural	✓	✓	No
Human Behavior	✓	✓	No
Exclusion	✓	✓	No
Frightening Devices	✓	✓	No
Repellents	✓	✓	No
Reproductive Inhibitors	✓[1]	✓[1]	No
Live Traps	✓	✓	No
Alpha-chloralose [2, 3,4]	✓	✓	No
Egg oil/addle/destruction	✓	No	No
Shooting	✓	No	No
DRC-1339 [2, 3]	✓	No	No
Avitrol®	✓	No	No
Euthanasia	✓	No	No
Hunting/DPs	✓	No	No

1 Depends on legal availability of this method in Illinois.
2 Only certified applicators could use.
3 Only registered for USDA-APHIS-WS use.
4 When used as a nonlethal technique birds captured with AC would not be killed.

NONLETHAL 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 possible during some non-lethal damage management implementation.

Contraception: Inhibiting reproduction is one way of reducing some bird populations. However, in long-lived species like geese (Cramp and Simmons 1977) exclusive use of contraceptive methods may take a period of years to reduce local bird populations. Contraceptive methods are likely to be most valuable as a means of maintaining waterfowl populations at desired levels.

Canada geese have been successfully vasectomized to prevent production of young; this method is only effective if the female does not form a bond with a different male. In addition, vasectomies can only prevent the production of the mated pair. The ability to identify breeding pairs for isolation and to capture a male bird for vasectomizing becomes increasingly difficult as the number of birds increase (Converse and Kennelly 1994). Keefe (1996) estimated mechanical sterilization of a Canada goose to cost over $100 per bird.

The NWRC has been instrumental in the development and registration of a new product, nicarbazin (OvoControl-GTM; CAS 330-95-0/4,4-dinitrocarbanilide (DNC, CAS 587-90-6)/ 2-hydroxy-4,6-dimethylpyrimidine (HDP, CAS 108-79-2) (1:1)), which is an infertility agent for Canada geese and Rock Pigeons in urban areas. Nicarbazin is available to certified pesticide applicators and is not restricted to use by WS. Use of baits containing nicarbazin would allow the numbers of small to moderate sized groups of Canada geese and Rock Pigeons to be controlled by reducing the hatchability of eggs laid by treated birds without requiring the location of each individual nest to be determined (as is the case for egg oiling/addling/destruction). Currently it is illegal to use in the state of Illinois.

Nicarbazin is thought to induce infertility in birds by two main mechanisms. Nicarbazin may disrupt the membrane surrounding the egg yolk, resulting in intermixing of egg yolk and white (albumin) components, creating conditions in which the embryo cannot develop. Nicarbazin may also inhibit incorporation of cholesterol into the yolk, a step that is necessary for yolk formation, thereby limiting energy for the developing embryo. If the yolk does not provide enough energy, the embryo will not completely form and the egg will never hatch. Nicarbazin bait must be consumed for several days to achieve blood levels that affect the hatchability of eggs that are forming. Nicarbazin is undetectable in the plasma of Canada Geese, Mallards, and chickens by 4-6 days after consumption of nicarbazin bait has stopped. The levels of active ingredient in the blood are reduced by half within one day after bait consumption stops. If the level of active ingredient falls by approximately one half its peak levels, no effects on egg formation can be seen. By two days after bait consumption has stopped, no effects on the egg being formed are seen. Consequently, the bait must be offered to the birds each day of the nesting period for best impact on reproduction.

In a field study conducted in Oregon (Yoder et al. 2005), use of nicarbazin reduced hatchability of eggs 35.6% ($P = 0.062$). When considering the success of individual nests at sites rather than flocks as a whole, percent hatchability was significantly reduced 50.7% ($P < 0.001$). The high degree of variability among Canada Geese in their movement patterns, nesting and habitat use complicates use of this product (Vercauteren and Marks 2004). The variability in goose behavior can make it difficult

to get the required doses to the geese (see below). Under current label guidelines, the cost for nicarbazin (Ovocontrol®) applications exceeds the cost of other control methods (Cooper and Keefe 1997) until the goose population reaches a critical threshold of approximately > 80 birds (Caudell and Shwiff 2006).

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

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

Relocation of damaging birds to other areas following live capture generally would not be effective or cost-effective. Since Starlings, Blackbirds, Rock Pigeons, and most other damaging species are common and numerous throughout Illinois, 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. In these cases, WS would consult with the USFWS and IDNR to coordinate capture, transportation, and selection of suitable relocation sites.

Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. Nest destruction would only be applied when dealing with a single or very few birds. 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.

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).

Agricultural producer/property owner practices. These consist primarily of non-lethal preventive methods such as cultural methods and habitat modification. Cultural methods and other management techniques are implemented by the agricultural producer and property owners. Producers and property owners are encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. Producer and property owner practices recommended by WS include:

Lure crops/alternate foods. When depredations cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate 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 Illinois. 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 22.4 million acres of the State are in corn, wheat, hay and soybean production (Illinois Agricultural Statistics 2007) which provides high quality foods for much of the year.

Environmental/habitat modification is an integral part of bird damage management. The type, quality, and quantity of habitat are directly related to the wildlife that are 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 Illinois. 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 from 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 (USDA 1997).

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

Bird proof exclusions can be effective but are often cost-prohibitive, particularly because of the 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. Porcupine 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 porcupine wire making it ineffective and unsightly.

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scare crows, and audio distress/predator vocalizations, are often not practical in suburban, urban or rural areas if they disturb people or pets. Pyrotechnics used as scare devices may be a temporary solution until geese become accustomed to the noise (Heinrich and Craven1990). 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). Holevinski et al(2007) found that geese hazed from an area using pyrotechnics returned to the area within 1-25 minutes. Using multiple techniques instead of only pyrotechnics will increase the chances of successful harassment (Holevinski et al 2007).

Surface Coverings: Some birds may be excluded from ponds or other areas using overhead wire grids (Pochop et al 1990, 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.

Floating mats and balls approximately five inches in diameter can be used to cover the surface of a pond. Floating mats and "ball blankets" renders a pond unusable for boating, swimming, fishing, and other recreational activities. This method is very expensive, costing about $80,000 - $130,000 per surface acre of water.

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, Rossbach 1975, 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.

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 $\leq$ 2 acres in size (Swift 1998). In New York, use of dogs was particularly effective when combined with remote controlled boats to harass geese that had moved into the water to avoid the dogs (Pecor et al. 2007). 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 (1998) and numerous individuals in New York 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.

Lasers are a relative new technique used to frighten and disperse birds from their roosts or loafing areas. Although the use of a laser (the term of "laser" is an acronym for Light Amplification by Simulated Emission of Radiation) to alter bird behavior was first introduced nearly 30 years ago (Lustick 1973), it received very little attention until recently when it was tested by the NWRC. Results have shown that several bird species, such as Double-crested Cormorants, Canada Geese, other waterfowl, Gulls, Vultures (*Cathartes aura* and *Coragyps atratus*), and American Crows 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 my illicit changes in physiological processes (APHIS 2001). Best results are achieved under low-light conditions (*i.e.*, sunset through dawn) and targeting structures or tree 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).

Spotlights. The use of light to disturb or move loafing and or roosting birds can be an effective technique if the harassment is maintained over a long period of time (VerCauteren et al 2003). 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.

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. Holevinski et al reported that in trials with the use of remote control boats and border collies they were able to remove >90% of geese 97% of the time, however the geese returned within 30 minutes.

Falconry is the practice of using falcons and hawks to chasing/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 condition permit).

Live traps include:

Clover, funnel, and common pigeon traps are enclosure traps made of nylon netting or hardware cloth and come in many different sizes and designs, depending on the species of birds being captured. The entrances of the traps also vary greatly from swinging-door, one-way door, funnel

entrance, to tip-top sliding doors. Traps are baited with grains or other food material, which attract the target birds. WS' standard procedure when conducting trapping operations is to ensure that an adequate supply of food and water is in the trap to sustain captured birds for several days. Active traps are checked daily, every other day, or as appropriate, to replenish bait and water and to remove captured birds.

Decoy traps are used by WS for preventive and corrective damage management. Decoy traps are similar in design to the Australian Crow Trap as reported by Johnson and Glahn (1994) and McCracken (1972). Live decoy birds of the same species that are being targeted are usually placed in the trap with sufficient food and water to assure their survival. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds which enter and become trapped themselves. Active decoy traps are monitored daily, every other day, or as appropriate, to remove and euthanize excess birds and to replenish bait and water. Decoy traps and other cage/live traps, as applied and used by WS, pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Nest box traps are used by WS for corrective damage management and are effective in capturing local breeding and post breeding starlings and other targeted secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976).

Mist nets are more commonly used for capturing small-sized birds such as house sparrows, finches, etc. but can be used to capture larger birds such as ducks and ring-neck pheasants (*Phasianus colchicus*). 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.

Cannon nets/rocket nets are normally used for larger birds such as pigeons, feral ducks, and waterfowl and use mortar projectiles to propel a net 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.

Pole traps are generally set for raptors which perch on poles prior to making an attack. Problem hawks and owls can be safely trapped using a well padded (***i.e.,*** with foam rubber wrapped in electricians tape, surgical tubing) steel leg-hold trap (No. 1½ or other appropriate size), snare or tangle snares set on the top of poles. Poles that are 5 to 10-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. A study by Stucker et al. (2007) assessed trap-induced injury to 109 raptors captured with the device. None of the birds captured sustained more than minor injuries that would not prohibit the bird's chance of survival once released.

Bal-chatri traps and Noose Mats are small traps used for capturing birds of prey such as hawks and eagles. Live bait such as pigeons, starlings, rodents, etc. is used to lure raptors into landing on the trap (Hygnstrom and Craven 1994) where nylon nooses entangle their feet and hold the bird. The trap is made of chicken wire or other wire mesh material and formed into a Quonset hut 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. Noose mats use a series of small nooses on a mat similar to nooses used on Bal-chatri traps and are used to live-capture shorebirds (Mehl et al. 2003).

Chemical Repellents

Methyl anthranilate (MA) artificial grape flavoring used in foods and soft drinks for human consumption) could be used or recommended by WS as a bird repellent. MA is currently registered as a repellent to protect turf from bird grazing and as a spray for airport runways to reduce bird activity/risk on or near airports. It is also been 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.

Tactile Repellents (*i.e.*, sticky or tacky bird repellents such as Tanglefoot®, 4-The-Birds®, and Roost-No-More®) smeared or placed in wavy bands with a caulking gun will often discourage the birds from 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. Experimental data in support of this claim are sparse (Mason et al. 1989). The repellency of tactile products is generally short-lived because dust and other materials covers the sticky surface, and 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.

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

Anthraquinone (Flight Control™), a non-lethal repellent currently registered in the United States for use on geese and is also registered for use in Illinois. It has also shown effectiveness as a

foraging repellent against Canada Goose grazing on turf and as a seed repellent against Brown-headed Cowbirds (Dolbeer et al. 1998). Additional bird-repellent applications are being developed for rice and corn seed treatments and aerial application to ripening rice (Avery 2003). Anthraquinone, a naturally occurring chemical found in many plant species and in some invertebrates as a natural predator defense mechanism, has shown effectiveness in protecting rice seed from red-winged blackbirds and boat-tailed grackles (Avery et al. 1997). 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).

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 waterfowl and other birds causing a nuisance, and for capture of birds for research purposes[14]. 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. WS 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.

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

Other chemical repellents. A number of other chemicals have shown bird repellent capabilities. Compounds extracted from common spices used in cooking and applied to perches in cage tests have been shown repellent characteristics against roosting Starlings (Clark 1997). Naphthalene (moth

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

balls) was found to be ineffective in repelling starlings (Dolbeer et al. 1998).

LETHAL METHODS

Alpha-chloralose is described above under "non-lethal – chemical". When used as a lethal WDM technique, captured animals are euthanized instead of released.

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 destruction can be accomplished in several different ways, but the most commonly used methods are manually gathering eggs and breaking them, or by oiling or spraying the eggs with a liquid which covers the entire egg and prevents the egg from obtaining oxygen. The advantage of egg addling and egg oiling is that adult birds may continue to incubate the eggs even though they are not viable. This delay helps reduce the likelihood that the adults will resent. WS uses egg addling/oiling or destruction, as valuable damage management tool and it has shown to be effective.

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when a large number of birds are present. Normally shooting is conducted with shotguns or air rifles. Shooting is a very individual specific method and is normally used to remove a single offending bird, or group of birds numbering less than 50 at one location. However, at times, a few birds could be shot from a flock to make the remainder of the birds more wary and to help reinforce non-lethal methods. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997 Revised). 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 bird damage management activities, and laws and regulations governing the lawful use of firearms are strictly complied with.

Non-toxic shot will be used to harass or take migratory birds at all times; however lead shot may be used to harass or take non-migratory bird species in non-wetland/riparian areas.

Firearm use is very sensitive issue and a public concern because of safety issues relating to the misuse of firearms. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. In the state of Illinois every person that is a resident of Illinois that owns carries or uses a firearm must have a valid Firearm Owners Identification Card. Every Illinois WS employee who uses firearms in carrying out official duties will hold a Firearm Owners Identification Card.

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 Rock Pigeon damage management at feedlots, dairies, airports, and in urban areas (West et al. 1967, Besser et al. 1967, Decino et al. 1966). Studies 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 Rock Pigeon population reduction. Glahn and Wilson (1992) noted that baiting with DRC-1339 is a cost-effective method of reducing damage by Blackbirds to sprouting rice. DRC-1339 is a slow acting avicide that is registered with the EPA for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 was developed as an avicide because of it is much less toxic to mammals than birds, which minimizes risks to mammals from its use. DRC-1339 is highly toxic to sensitive species such as starlings, blackbirds, pigeons, crows, magpies, and ravens, 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). Many other bird species, such as raptors, sparrows, and eagles, are classified as nonsensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to nontarget and T/E species (USDA 1997). Secondary poisoning has not been observed with DRC-1339 treated baits. During research studies, carcasses of birds which died from DRC-1339 were fed to raptors and scavenger mammals for 30 to 200 days with no symptoms of secondary poisoning observed (Cunningham et al. 1981). This can be attributed to relatively low toxicity to species that might scavenge on blackbirds and European starlings killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Secondary hazards of DRC-1339 are almost nonexistent. DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultraviolet radiation. DRC-1339 is highly soluble in water but does not hydrolyze and degradation occurs rapidly in water. DRC-1339 tightly binds to soil and has low mobility. The half life is about 25 hours, which means it is nearly 100% broken down within a week, and identified metabolites (*i.e.,* degradation chemicals) have low toxicity. Aquatic and invertebrate toxicity is low (USDA 1997). Appendix P of USDA (1997) contains a thorough risk assessment of DRC-1339 and the reader is referred to that source for a more complete discussion. That assessment concluded that no adverse effects are expected from use of DRC-1339.

Table C-2. Chemicals Used by Illinois WS.

FY	Product	Quantity Used (Grams)
04	DRC-1339	187[1]
	Avitrol	142
05	DRC-1339	2,343
	Avitrol	850
	Alpha Chloralose	2
06	DRC-1339	656
	Avitrol	833
	Alpha Chloralose	4

[1] Quantity used represents amount of toxicant applied

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.

Avitrol is an avicide registered for use on Rock Pigeons, crows, gulls, blackbirds, starlings, and English Sparrows in various situations. Illinois WS uses avitrol for the reduction of damage caused by species listed on the product label, with the exception of Rock Pigeons. If Illinois WS targets Rock Pigeons with an avicide, DRC-1339 will be used. For blackbirds, grackles, cowbirds, gulls and crows seagulls, and to a lesser extent, starlings, this product also functions as a chemical frightening agent by causing distress behavior in the birds that consume treated baits from a mixture of treated and untreated bait (EPA 2007). Birds that consume treated bait usually die, but the vast majority of birds are frightened from the site by the distress. In House Sparrows and Rock Pigeons, treated birds do not

exhibit as strong a response to avitrol and flock members are less responsive to the behavior of treated birds. For this species, avitrol primarily works as a toxicant.

Prebaiting is usually necessary to achieve effective bait acceptance by the target species. WS would use a prebaiting period with untreated bait to monitor bird use of the treatment site. Avitrol treated bait is placed in an area where the targeted birds are feeding and a few birds consume treated bait and become affected by the chemical. Bait placement and timing of baiting would be adjusted to eliminate use by nontarget species. If bait application cannot be adjusted to eliminate nontarget species use of bait sites or if there are difficulties in dispersing nontarget birds during bait application, WS would discontinue bait applications. The affected birds then broadcast distress vocalizations and display abnormal flying behavior, thereby, frightening the remaining flock away. WS would remain on site when treated bait is available to monitor for and disperse any nontarget species which may approach the site including raptors. This on-site monitoring during Avitrol treatment is not required by the product label. WS collects carcasses of treated birds and disposes of them so that they are not available to predators and scavengers. Avitrol is a restricted use pesticide that can only be sold to licensed applicators and is available in several bait formulations where only a small portion of the individual grains carry the chemical.

Any granivorous bird associated with the target species could be affected by Avitrol. Avitrol is water soluble, but laboratory studies demonstrated that Avitrol is strongly absorbed onto soil colloids and has moderately low mobility. Biodegradation is expected to be slow in soil and water, with a half-life ranging from three to 22 months. However, Avitrol may form covalent bonds with humic materials, which may serve to reduce its bioavailability in aqueous media, is non-accumulative in tissues and rapidly metabolized by many species (Schafer 1991). Laboratory studies with predator and scavenger species have shown minimal potential for secondary poisoning, and during field use only magpies and crows appear to have been affected (Schafer 1991). However, a laboratory study by Schafer et al. (1974) showed that magpies exposed to two to 3.2 times the published Lethal Dose (LD_{50}) in contaminated prey for 20 days were not adversely affected and three American kestrels were fed contaminated blackbirds for seven to 45 days were not adversely affected. Therefore, no probable risk is expected, based on low concentrations and low hazards quotient value for nontarget indicator species tested on this compound. No probable risk is expected for pets and the public, based on low concentrations and low hazards quotient value for non-target indicator species tested on this compound.

Snap traps. Wooden based rat snap traps can be effective in killing offending birds, usually woodpeckers. The trap is nailed 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 (Beaver et al. 2001). 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.

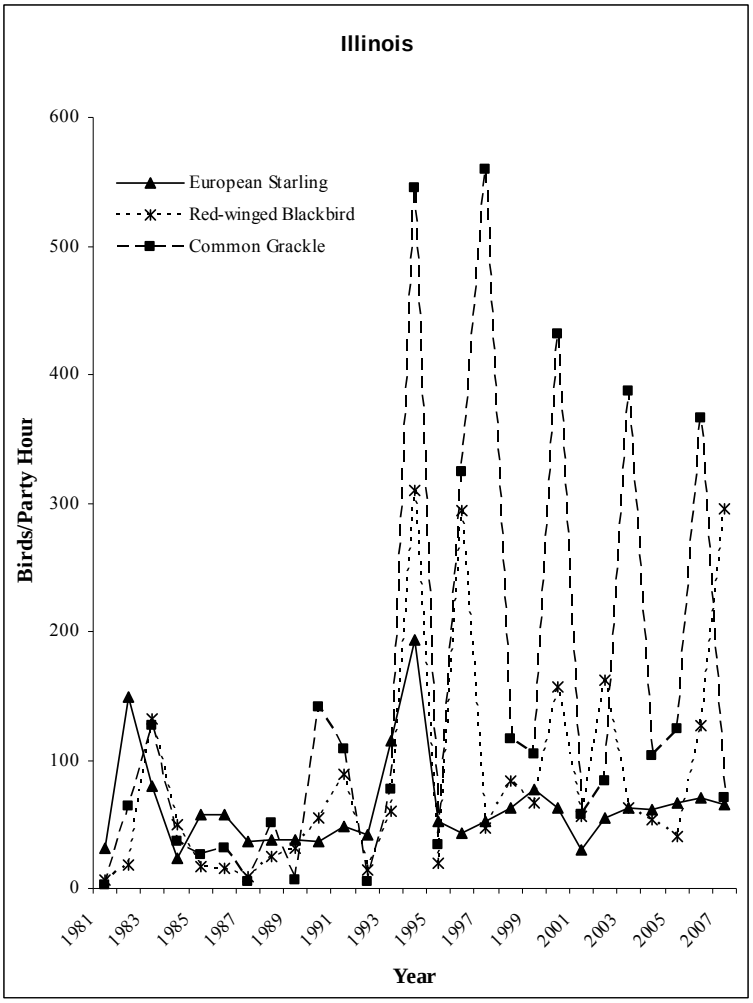
WS sometimes uses CO_2 to euthanize birds which have been captured in live traps, by hand, or by chemical immobilization and when relocation is not feasible. Live birds are placed in a container or chamber and CO_2 gas from a cylinder is released into the chamber. The birds quickly expire after inhaling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

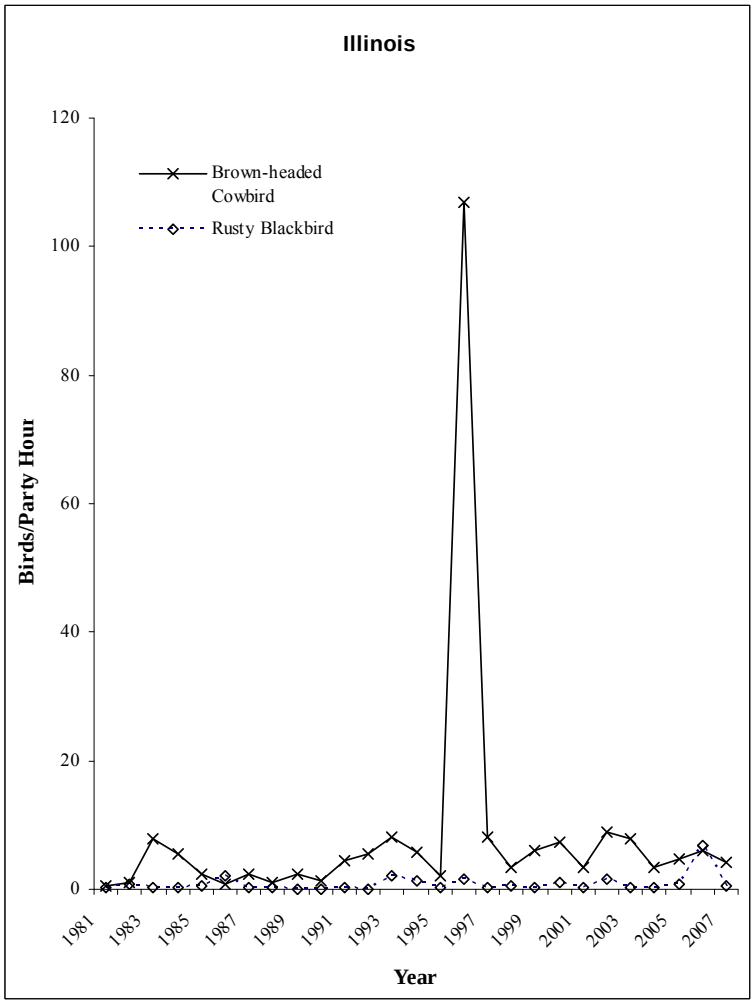
Hunting and DPs. WS sometimes recommends that resource owners consider legal hunting as an option for reducing game bird species damage. Although legal hunting is impractical and/or prohibited in many urban/suburban areas, it can be used to reduce some local populations of game birds. Legal hunting also reinforces harassment programs (Kadlec 1968). WS may recommend that resource owners receive DPs from the USFWS to legally take bird species that are protected under the MBTA. In these situations, WS will investigate the complaint and provide this information to the USFWS either recommending issuance of a permit or recommend against issuance of a permit by submitting a Form 37 (Migratory Bird Damage Project Report).

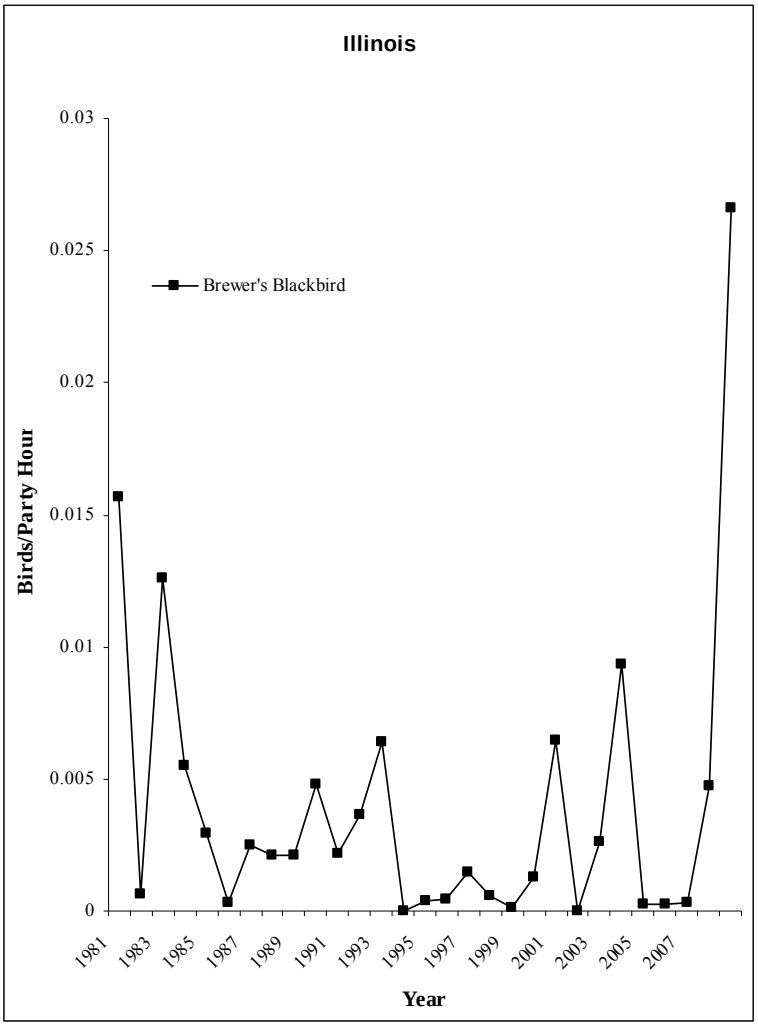
APPENDIX D

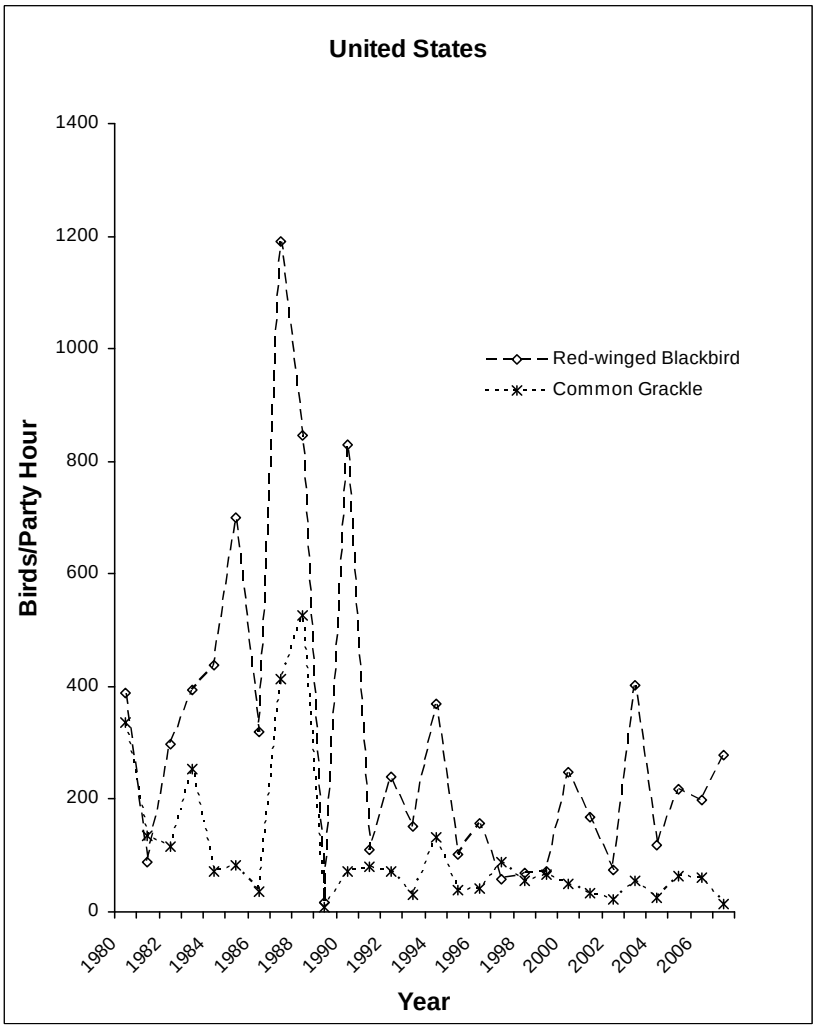
AUDUBON CHRISTMAS BIRD COUNT

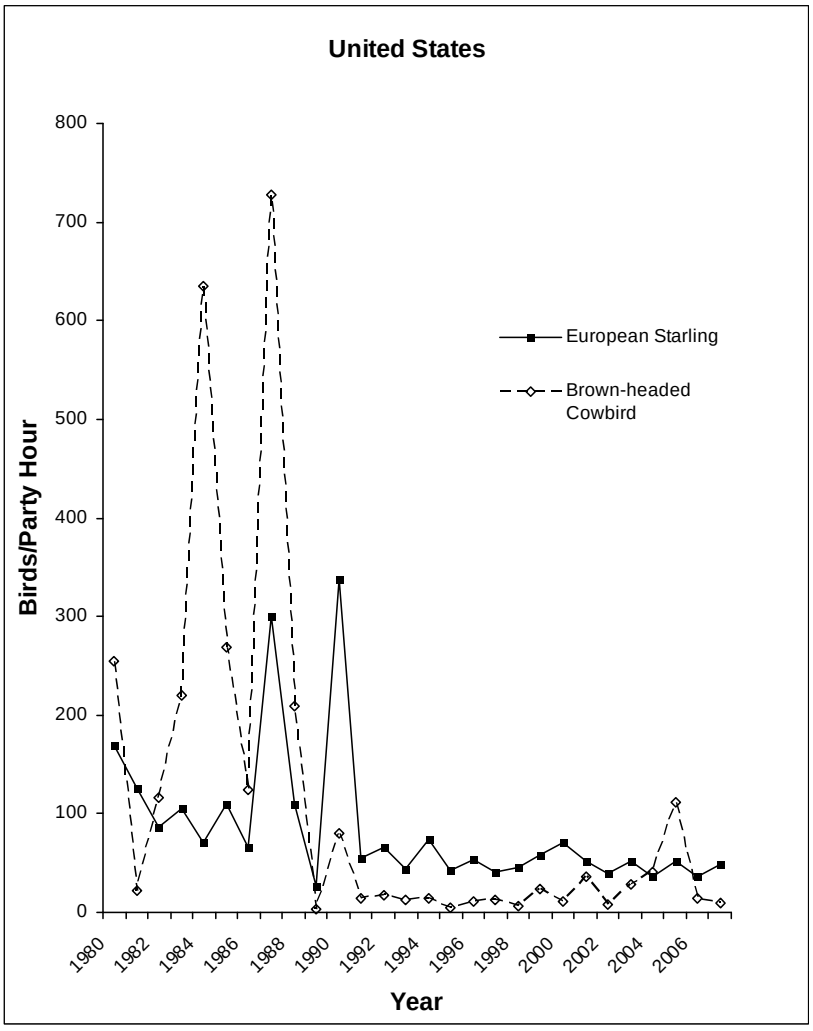
POPULATION TREND DATA FOR BLACKBIRDS AND STARLINGS

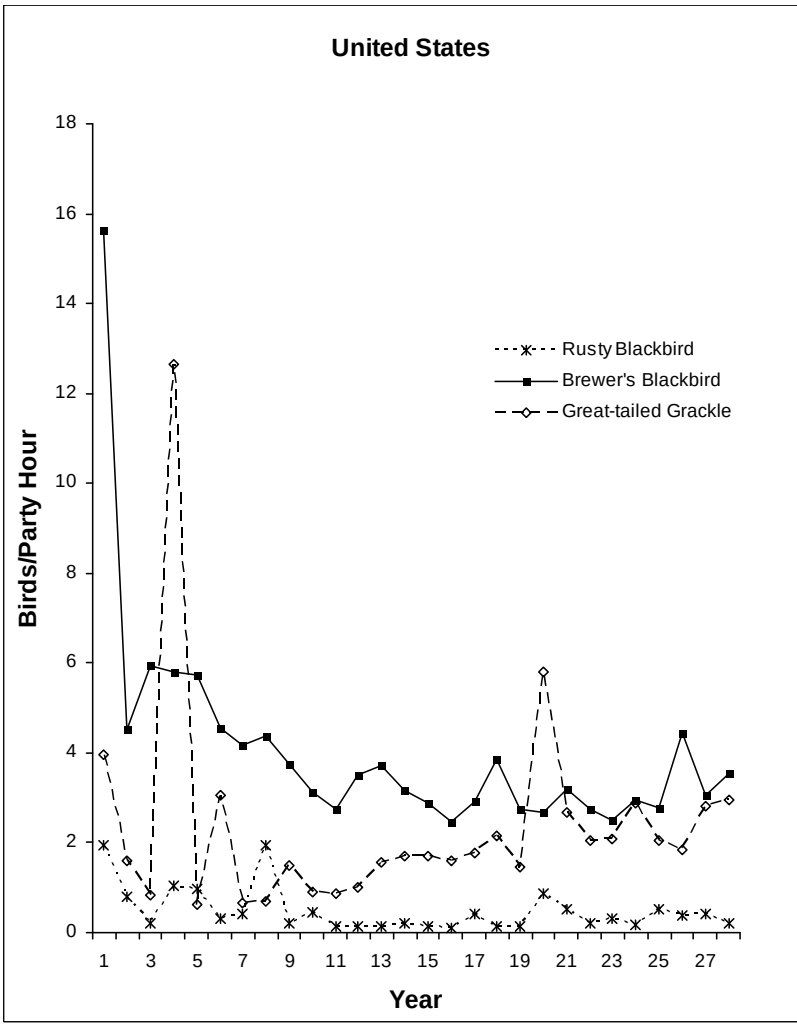





Illinois
Brewer's Blackbird
Birds/Party Hour
Year
0.03
0.025
0.02
0.015
0.01
0.005
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007


United States
Red-winged Blackbird
Common Grackle
Birds/Party Hour
Year
1400
1200
1000
800
600
400
200
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006


United States
Birds/Party Hour
Year
European Starling
Brown-headed Cowbird
0
100
200
300
400
500
600
700
800
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006


United States
Birds/Party Hour
Year
Rusty Blackbird
Brewer's Blackbird
Great-tailed Grackle
0
2
4
6
8
10
12
14
16
18
1
3
5
7
9
11
13
15
17
19
21
23
25
27

APPENDIX E

STATE AND FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES IN ILLINOIS

E – State Endangered, T – State Threatened, * Federal Threatened, **Federal Endangered, *** Federal Candidate

PLANTS

Moschatel - *Adoxa moschatellina* (E)
Speckled Alder - *Alnus incana subsp. rugosa* (E)
Shadbush - *Amelanchier sanguinea* (E)
Marram Grass - *Ammophila breviligulata* (E)
Smooth False Indigo - *Amorpha nitens* (E)
Bearberry - *Arctostaphylos uva-ursi* (E)
Dragon Wormwood - *Artemisia dracunculus* (E)
Wooly Milkweed - *Asclepias lanuginosa* (E)
Mead's Milkweed - *Asclepias meadii* (E)*****
Oval Milkweed - *Asclepias ovalifolia* (E)
Narrow-leaved Green Milkweed - *Asclepias stenophylla* (E)
Bradley's Spleenwort - *Asplenium bradleyi* (E)
Black Spleenwort - *Asplenium resiliens* (E)
Large Ground Plum - *Astragalus crassicarpus var. trichocalyx* (E)
Bent Milk Vetch - *Astragalus distortus* (E)
Tennessee Milk Vetch - *Astragalus tennesseensis* (E)
Yellow Wild Indigo - *Baptisia tinctoria* (E)
Screwstem - *Bartonia paniculata* (E)
American Slough Grass - *Beckmannia syzigachne* (E)
Allegheny Barberry - *Berberis canadensis* (E)
Supple-jack - *Berchemia scandens* (E)
Yellow Birch - *Betula alleghaniensis* (E)
Alkali Bulrush - *Bolboschoenus maritimus* (E)
Prairie Moonwort - *Botrychium campestre* (E)
Daisyleaf Grape Fern - *Botrychium matricariifolium* (E)
Northern Grape Fern - *Botrychium multifidum* (E)
Dwarf Grape Fern - *Botrychium simplex* (E)
Blue Grama - *Bouteloua gracilis* (E)
Wooly Buckthorn - *Bumelia lanuginosa* (E)
Bluejoint Grass - *Calamagrostis insperata* (E)
Water Arum - *Calla palustris* (E)
Oklahoma Grass Pink Orchid - *Calopogon oklahomensis* (E)
Grass Pink Orchid - *Calopogon tuberosus* (E)
Wild Hyacinth - *Camassia angusta* (E)
Cuckoo Flower - *Cardamine pratensis var. palustris* (E)
Winged Sedge - *Carex alata* (E)
Arkansas Sedge - *Carex arkansana* (E)
Brownish Sedge - *Carex brunnescens* (E)
Silvery Sedge - *Carex canescens var. disjuncta* (E)
Cordroot Sedge - *Carex chordorrhiza* (E)
Crawford's Sedge - *Carex crawfordii* (E)
Yellow Sedge - *Carex cryptolepis* (E)
Sedge - *Carex cumulata* (E)
Cypress-knee Sedge - *Carex decomposita* (E)
Sedge - *Carex diandra* (E)
Shortleaf Sedge - *Carex disperma* (E)
Sedge - *Carex echinata* (E)
Sedge - *Carex formosa* (E)
Elk Sedge - *Carex garberi* (E)
Large Sedge - *Carex gigantea* (E)
Plains Sedge - *Carex inops subsp. heliophila* (E)
Sedge - *Carex lucorum* (E)
Black-edged Sedge - *Carex nigromarginata* (E)
Few-seeded Sedge - *Carex oligosperma* (E)
Bellow's Beak Sedge - *Carex physorhyncha* (E)
Reniform Sedge - *Carex reniformis* (E)
Lined Sedge - *Carex striatula* (E)
Three-seeded Sedge - *Carex trisperma* (E)
Tuckerman's Sedge - *Carex tuckermanii* (E)
Pale Hickory – *Carya pallida* (E)
Downy Yellow Painted Cup - *Castilleja sessiliflora* (E)
Redroot - *Ceanothus herbaceus* (E)
Fairy Wand - *Chamaelirium luteum* (E)
Seaside Spurge - *Chamaesyce polygonifolia* (E)
Spotted Wintergreen - *Chimaphila maculata* (E)

Pipsissewa - *Chimaphila umbellata* (E)
American Bugbane - *Cimicifuga americana* (E)
False Bugbane - *Cimicifuga racemosa* (E)
Small Enchanter's Nightshade - *Circaea alpina*(E)
Yellowwood - *Cladrastis lutea* (E)
Blue Jasmine - *Clematis crispa* (E)
Mountain Clematis - *Clematis occidentalis* (E)
Leatherflower - *Clematis viorna* (E)
Violet Collinsia - *Collinsia violacea* (E)
Sweetfern - *Comptonia peregrina* (E)
Hemlock Parsley - *Conioselinum chinense* (E)
Bunchberry - *Cornus canadensis* (E)
Golden Corydalis - *Corydalis aurea* (E)
Hale's Corydalis - *Corydalis halei* (E)
Pink Corydalis - *Corydalis sempervirens* (E)
Beaked Hazelnut - *Corylus cornuta* (E)
Cynosciadium - *Cynosciadium digitatum* (E)
Galingale - *Cyperus lancastriensis* (E)
Moccasin Flower - *Cypripedium acaule* (E)
Small Yellow Lady's Slipper - *Cypripedium parviflorum var. makasin* (E)
Showy Lady's Slipper - *Cypripedium reginae* (E)
Laurentian Fragile Fern - *Cystopteris laurentiana* (E)
Leafy Prairie Clover - *Dalea foliosa* (E)**
Hay-scented Fern - *Dennstaedtia punctilobula* (E)
Hairgrass - *Deschampsia flexuosa* (E)
Northern Panic Grass - *Dichanthelium boreale* (E)
Panic Grass - *Dichanthelium joorii* (E)
Hemlock Panic Grass - *Dichanthelium portoricense* (E)
Ravenel's Panic Grass - *Dichanthelium ravenelii* (E)
Panic Grass - *Dichanthelium yadkinense* (E)
Whitlow Grass - *Draba cuneifolia* (E)
Round-leaved Sundew - *Drosera rotundifolia* (E)
Log Fern - *Dryopteris celsa* (E)
Small Burhead - *Echinodorus tenellus* (E)
Capitate Spikerush - *Eleocharis olivacea* (E)
Few-flowered Spikerush - *Eleocharis pauciflora* (E)
Dwarf Scouring Rush - *Equisetum scirpoides* (E)
Woodland Horsetail - *Equisetum sylvaticum* (E)
Rusty Cotton Grass - *Eriophorum virginicum* (E)
Eryngo - *Eryngium prostratum* (E)
American Strawberry Bush - *Euonymus americanus* (E)
Hyssop-leaved Thoroughwort - *Eupatorium hyssopifolium* (E)
Spurge - *Euphorbia spathulata* (E)
Queen-of-the- Prairie - *Filipendula rubra* (E)
Vahl's Fimbristylis - *Fimbristylis vahlii* (E)
Boykin's Dioclea - *Galactia mohlenbrockii* (E)
Wild Licorice - *Galium lanceolatum* (E)
Dwarf Bedstraw - *Galium virgatum* (E)
Northern Cranesbill - *Geranium bicknellii* (E)
Arkansas Manna Grass - *Glyceria arkansana* (E)
Oak Fern - *Gymnocarpium dryopteris* (E)
Scented Oak Fern - *Gymnocarpium robertianum* (E)
Stickseed - *Hackelia deflexa var. americana* (E)
Silverbell Tree - *Halesia carolina* (E)
Tall Sunflower - *Helianthus giganteus* (E)
Slender Heliotrope - *Heliotropium tenellum* (E)
Mud Plantain - *Heteranthera reniformis* (E)
Crested Coralroot Orchid - *Hexalectris spicata* (E)
False Heather - *Hudsonia tomentosa* (E)
Water-pennywort - *Hydrocotyle ranunculoides* (E)
One-flowered Hydrolea - *Hydrolea uniflora* (E)
Shore St. John's Wort - *Hypericum adpressum* (E)
Kalm's St. John's Wort - *Hypericum kalmianum* (E)
Kankakee Mallow - *Iliamna remota* (E)
Bloodleaf - *Iresine rhizomatosa* (E)
Butler's Quillwort - *Isoetes butleri* (E)
Small Whorled Pogonia - *Isotria medeoloides* (E)*
Whorled Pogonia - *Isotria verticillata* (E)
Richardson's Rush - *Juncus alpinoarticulatus* (E)
Vasey's Rush - *Juncus vaseyi* (E)
Trailing Juniper - *Juniperus horizontalis* (E)
Water Willow - *Justicia ovata* (E)
Beach Pea - *Lathyrus maritimus* (E)
Prairie Bush Clover - *Lespedeza leptostachya* (E)*
Silvery Bladderpod - *Lesquerella ludoviciana* (E)
Red Honeysuckle - *Lonicera dioica var. glaucescens* (E)
Yellow Honeysuckle - *Lonicera flava* (E)
Hairy Woodrush - *Luzula acuminata* (E)
Bog Clubmoss - *Lycopodiella inundata* (E)
Running Pine - *Lycopodium clavatum* (E)
Ground Pine - *Lycopodium dendroideum* (E)
Creeping Loosestrife - *Lysimachia radicans* (E)
Narrow-leaved Crabapple - *Malus angustifolia* (E)
False Mallow - *Malvastrum hispidum* (E)
Climbing Milkweed - *Matelea decipiens* (E)
Indian Cucumber Root - *Medeola virginiana* (E)
Water Marigold - *Megalodonta beckii* (E)

White Melanthera - *Melanthera nivea* (E)
Two-Flowered Melic Grass - *Melica mutica* (E)
Millet Grass - *Milium effusum* (E)
Yellow Monkey Flower - *Mimulus glabratus* (E)
Hairy Umbrella-wort - *Mirabilis hirsuta* (E)
Baby Blue-eyes - *Nemophila triloba* (E)
Prairie Dandelion - *Nothocalais cuspidata* (E)
Fragile Prickly Pear - *Opuntia fragilis* (E)
Clustered Broomrape - *Orobanche fasciculata* (E)
Illinois Wood Sorrel - *Oxalis illinoensis* (E)
Bead Grass - *Paspalum dissectum* (E)
Short-sepaled Beard Tongue - *Penstemon brevisepalus* (E)
Large-flowered Beard Tongue - *Penstemon grandiflorus* (E)
Tube Beards Tongue - *Penstemon tubaeflorus* (E)
Ozark Phacelia - *Phacelia gilioides* (E)
Long Beech Fern - *Phegopteris connectilis* (E)
Sangamon Phlox - *Phlox pilosa subsp. sangamonensis* (E)
Jack Pine - *Pinus banksiana* (E)
Shortleaf Pine - *Pinus echinata* (E)
Red Pine - *Pinus resinosa* (E)
Heart-leaved Plantain - *Plantago cordata* (E)
Orange Fringed Orchid - *Platanthera ciliaris* (E)
Wood Orchid - *Platanthera clavellata* (E)
Tubercled Orchid - *Platanthera flava var. flava* (E)
Eastern Prairie Fringed Orchid - *Platanthera leucophaea* (E)*****
Purple Fringed Orchid - *Platanthera psycodes* (E)
Grove Bluegrass - *Poa alsodes* (E)
Weak Bluegrass - *Poa languida* (E)
Wolf's Bluegrass - *Poa wolfii* (E)
Snake-mouth - *Pogonia ophioglossoides* (E)
James' Clammyweed - *Polanisia jamesii* (E)
Pink Milkwort - *Polygala incarnata* (E)
Downy Solomon's Seal - *Polygonatum pubescens* (E)
Halbred-leaved Tearthumb - *Polygonum arifolium* (E)
Carey's Heartsease - *Polygonum careyi* (E)
Balsam Poplar - *Populus balsamifera* (E)
White-stemmed Pondweed - *Potamogeton praelongus* (E)
Spotted Pondweed - *Potamogeton pulcher* (E)
Fern Pondweed - *Potamogeton robbinsii* (E)
Stiff Pondweed - *Potamogeton strictifolius* (E)
Cinquefoil - *Potentilla millegrana* (E)
Bird's-eye Primrose - *Primula mistassinica* (E)
Mock Bishop's Weed - *Ptilimnium nuttallii* (E)
White Mountain Mint - *Pycnanthemum albescens* (E)
Nuttall's Oak - *Quercus texana* (E)
Seaside Crowfoot - *Ranunculus cymbalaria* (E)
Alder Buckthorn - *Rhamnus alnifolia* (E)
Dull Meadow Beauty - *Rhexia mariana* (E)
Clustered Beak Rush - *Rhynchospora glomerata* (E)
Northern Gooseberry - *Ribes hirtellum* (E)
Bristly Rose - *Rosa acicularis* (E)
Purple-flowering Raspberry - *Rubus odoratus* (E)
Prairie Rose Gentian - *Sabatia campestris* (E)
Arrowhead - *Sagittaria australis* (E)
Autumn Willow - *Salix serissima* (E)
Dune Willow - *Salix syrticola* (E)
Red-berried Elder - *Sambucus racemosa subsp. pubens* (E)
American Burnet - *Sanguisorba canadensis* (E)
Southern Sanicula - *Sanicula smallii* (E)
Pitcher Plant - *Sarracenia purpurea* (E)
Early Saxifrage - *Saxifraga virginiensis* (E)
False Melic Grass - *Schizachne purpurascens* (E)
Weak Bulrush - *Schoenoplectus purshianus* (E)
Smith's Bulrush - *Schoenoplectus smithii* (E)
Bulrush - *Scirpus hattorianus* (E)
Bulrush - *Scirpus microcarpus* (E)
Muhlenberg's Nut Rush - *Scleria muhlenbergii* (E)
Carolina Whipgrass - *Scleria pauciflora* (E)
Buffaloberry - *Shepherdia canadensis* (E)
Ovate Catchfly - *Silene ovata* (E)
Royal Catchfly - *Silene regia* (E)
Mountain Blue-eyed Grass - *Sisyrinchium montanum* (E)
American Mountain Ash - *Sorbus americana* (E)
American Burreed - *Sparganium americanum* (E)
Green-fruited Burreed - *Sparganium emersum* (E)
Yellow-lipped Ladies' Tresses - *Spiranthes lucida* (E)
Spring Ladies' Tresses - *Spiranthes vernalis* (E)
Great Chickweed - *Stellaria pubera* (E)
Grass-leaved Lily - *Stenanthium gramineum* (E)
Patterson's Bindweed - *Stylisma pickeringii* (E)
Bigleaf Snowbell Bush - *Styrax grandifolius* (E)
Snowberry - *Symphoricarpos albus var. albus* (E)
Hairy Synandra - *Synandra hispidula* (E)
Fameflower - *Talinum calycinum* (E)
Lakeside Daisy - *Tetraneuris herbacea****** (E)
New York Fern - *Thelypteris noveboracensis* (E)

White Basswood - *Tilia heterophylla* (E)
Pole Manna-grass - *Torreyochloa pallida* (E)
Marsh St. John's Wort - *Triadenum virginicum* (E)
Filmy Fern - *Trichomanes boschianum* (E)
Tufted Bulrush - *Trichophorum cespitosum* (E)
Star-flower - *Trientalis borealis* (E)
Nodding Trillium - *Trillium cernuum* (E)
Ill-scented Trillium - *Trillium erectum* (E)
Green Trillium - *Trillium viride* (E)
Rock Elm - *Ulmus thomasii* (E)
Horned Bladderwort - *Utricularia cornuta* (E)
Small Bladderwort - *Utricularia minor* (E)
Highbush Blueberry - *Vaccinium corymbosum* (E)
Large Cranberry - *Vaccinium macrocarpon* (E)
Small Cranberry - *Vaccinium oxycoccos* (E)
Deerberry - *Vaccinium stamineum* (E)
Marsh Valerian - *Valeriana uliginosa* (E)
Corn Salad - *Valerianella chenopodifolia* (E)
Corn Salad - *Valerianella umbilicata* (E)
American Brooklime - *Veronica americana* (E)
Hairy White Violet - *Viola blanda* (E)
Canada Violet - *Viola canadensis* (E)
Primrose Violet - *Viola primulifolia* (E)
Rusty Woodsia - *Woodsia ilvensis* (E)
White Camass - *Zigadenus elegans* (E)
Pale False Foxglove - *Agalinis skinneriana* (T)
Shadbush - *Amelanchier interior* (T)
Forked Aster - *Aster furcatus* (T)
Kitten Tails - *Besseya bullii* (T)
Decurrent False Aster - *Boltonia decurrens* (T)*****
Southern Grape Fern - *Botrychium biternatum* (T)
Sea Rocket - *Cakile edentula* (T)
Sedge - *Carex atlantica* (T)
Golden Sedge - *Carex aurea* (T)
Sedge - *Carex bromoides* (T)
Fibrous-rooted Sedge - *Carex communis* (T)
Swollen Sedge - *Carex intumescens* (T)
Sharp-scaled Sedge - *Carex oxylepis* (T)
Drooping Sedge - *Carex prasina* (T)
Little Green Sedge - *Carex viridula* (T)
Willdenow's Sedge - *Carex willdenowii* (T)
Pretty Sedge - *Carex woodii* (T)
Water Hickory - *Carya aquatica* (T)
Leatherleaf - *Chamaedaphne calyculata* (T)
Black Cohosh - *Cimicifuga rubifolia* (T)
Pitcher's (Dune) Thistle - *Cirsium pitcheri******
Spotted Coral-root Orchid - *Corallorhiza maculata* (T)
Umbrella Sedge - *Cyperus grayioides* (T)
White Lady's Slipper - *Cypripedium candidum* (T)
French's Shootingstar - *Dodecatheon frenchii* (T)
Narrow-leaved Sundew - *Drosera intermedia* (T)
Beaked Spike Rush - *Eleocharis rostellata* (T)
Bearded Wheat Grass - *Elymus trachycaulus* (T)
Downy Willow Herb - *Epilobium strictum* (T)
Meadow Horsetail - *Equisetum pratense* (T)
Narrow-leaved Sunflower - *Helianthus angustifolius* (T)
Cliff Clubmoss - *Huperzia porophila* (T)
Old Plainsman - *Hymenopappus scabiosaeus* (T)
Ground Juniper - *Juniperus communis* (T)
Tamarack - *Larix laricina* (T)
Pale Vetchling - *Lathyrus ochroleucus* (T)
Pinweed - *Lechea intermedia* (T)
Blazing Star - *Liatris scariosa* var. *nieuwlandii* (T)
Climbing Milkweed - *Matelea obliqua* (T)
Bunchflower - *Melanthium virginicum* (T)
Squirting Cucumber - *Melothria pendula* (T)
Buckbean - *Menyanthes trifoliata* (T)
Slender Sandwort - *Minuartia patula* (T)
Small Sundrops - *Oenothera perennis* (T)
Broomrape - *Orobanche ludoviciana* (T)
Water Elm - *Planera aquatica* (T)
Tubercled Orchid - *Platanthera flava* var. *herbiola* (T)
Grass-leaved Pondweed - *Potamogeton gramineus* (T)
Rock Chestnut Oak - *Quercus montana* (T)
Willow Oak - *Quercus phellos* (T)
Prairie Buttercup - *Ranunculus rhomboideus* (T)
Beaked Rush - *Rhynchospora alba* (T)
Dwarf Raspberry - *Rubus pubescens* (T)
Bristly Blackberry - *Rubus schneideri* (T)
Missouri Orange Coneflower - *Rudbeckia missouriensis* (T)
Blue Sage - *Salvia azurea* subsp. *pitcheri* (T)
Hall's Bulrush - *Schoenoplectus hallii* (T)
Bulrush - *Scirpus polyphyllus* (T)
American Orpine - *Sedum telephioides* (T)
Eastern Blue-eyed Grass - *Sisyrinchium atlanticum* (T)
Cliff Goldenrod - *Solidago sciaphila* (T)
Storax - *Styrax americana* (T)
Sullivantia - *Sullivantia sullivantii* (T)
Small Flower-of-an-hour - *Talinum parviflorum* (T)
False Asphodel - *Tofieldia glutinosa* (T)
Ear-leafed Foxglove - *Tomanthera auriculata* (T)

Prairie Spiderwort - *Tradescantia bracteata* (T)
Buffalo Clover - *Trifolium reflexum* (T)
Common Bog Arrowgrass - *Triglochin maritima* (T)
Slender Bog Arrowgrass - *Triglochin palustris* (T)
Flat-leaved Bladderwort - *Urtica chamaedryoides* (T)
Nettle - *Utricularia intermedia* (T)
Marsh Speedwell - *Veronica scutellata* (T)
Arrowwood - *Viburnum molle* (T)
Dog Violet - *Viola conspersa* (T)

FISH

Lake Sturgeon - *Acipenser fulvescens* (E)
Western Sand Darter - *Ammocrypta clarum* (E)
Bluebreast Darter - *Etheostoma camurum* (E)
Harlequin Darter - *Etheostoma histrio* (E)
Cypress Minnow - *Hybognathus hayi* (E)
Bigeye Chub - *Hybopsis amblops* (E)
Pallid Shiner - *Hybopsis amnis* (E)
Northern Brook Lamprey - *Ichthyomyzon fossor* (E)
Sturgeon Chub - *Macrhybopsis gelida* (E)
Greater Redhorse - *Moxostoma valenciennesi* (E)
River Chub - *Nocomis micropogon* (E)
Pugnose Shiner - *Notropis anogenus* (E)
Bigeye Shiner - *Notropis boops* (E)
Blacknose Shiner - *Notropis heterolepis* (E)
Taillight Shiner - *Notropis maculatus* (E)
Weed Shiner - *Notropis texanus* (E)
Northern Madtom - *Noturus stigmosus* (E)
Pallid Sturgeon - *Scaphirhynchus albus* (E)**
Eastern Sand Darter - *Ammocrypta pellucidum* (T)
Longnose Sucker *Catostomus catostomus* (T)
Cisco - *Coregonus artedi* (T)
Gravel Chub - *Erimystax x-punctatus* (T)
Iowa Darter - *Etheostoma exile* (T)
Banded Killifish - *Fundulus diaphanus*
Starhead Topminnow - *Fundulus dispar* (T)
Least Brook Lamprey - *Lampetra aepyptera* (T)
Redspotted Sunfish - *Lepomis miniatus* (T)
Bantam Sunfish - *Lepomis symmetricus* (T)
River Redhorse - *Moxostoma carinatum* (T)
Ironcolor Shiner - *Notropis chalybaeus* (T)
Blackchin Shiner - *Notropis heterodon* (T)

AMPHIBIANS

Silvery Salamander - *Ambystoma platineum* (E)
Hellbender - *Cryptobranchus alleganiensis* (E)
Spotted Dusky Salamander - *Desmognathus conanti* (E)
Jefferson Salamander - *Ambystoma jeffersonianum* (T)
Eastern Narrowmouth Toad - *Gastrophryne carolinesnsis* (T)
Four-toed Salamander - *Hemidactylium scutatum* (T)
Bird-voiced Treefrog - *Hyla avivoca* (T)
Illinois Chorus Frog - *Pseudacris streckeri* (T)

REPTILES

Spotted Turtle - *Clemmys guttata* (E)
Great Plains Ratsnake - *Elaphe emoryi* (E)
Illinois Mud Turtle - *Kinosternon flavescens* (E)
Alligator Snapping Turtle - *Macrochelys temminckii* (E)
Coachwhip - *Masticophis flagellum* (E)
Broad-banded Watersnake - *Nerodia fasciata* (E)
River Cooter - *Pseudemys concinna* (E)
Eastern Massasauga - *Sistrurus catenatus* (E)***
Kirtland's Snake - *Clonophis kirtlandi* (T)
Timber Rattlesnake - *Crotalus horridus* (T)
Blanding's Turtle - *Emydoidea blandingii* (T)
Western Hognose Snake - *Heterodon nasicus* (T)
Mississippi Green Watersnake - *Nerodia cyclopion* (T)
Flathead Snake - *Tantilla gracilis* (T)
Eastern Ribbon Snake - *Thamnophis sauritus* (T)
Lined Snake - *Tropidoclonion lineatum* (T)

BIRDS

Short-eared Owl - *Asio flammeus* (E)
Upland Sandpiper - *Bartramia longicauda* (E)
American Bittern - *Botaurus lentiginosus* (E)
Swainson's Hawk - *Buteo swainsoni* (E)
Piping Plover - *Charadrius melodus* (E)**
Black Tern - *Chlidonias niger* (E)
Northern Harrier - *Circus cyaneus* (E)
Little Blue Heron - *Egretta caerulea* (E)
Snowy Egret - *Egretta thula* (E)
Mississippi Kite - *Ictinia mississippiensis* (E)
Black Rail - *Laterallus jamaicensis* (E)
Swainson's Warbler - *Limnothlypis swainsonii* (E)
Yellow-crowned Night-heron - *Nyctanassa violacea*
Black-crowned Night-heron - *Nycticorax nycticorax*
Osprey - *Pandion haliaetus* (E)
Wilson's Phalarope - *Phalaropus tricolor* (E)

King Rail - *Rallus elegans* (E)
Least Tern - *Sterna antillarum* (E)**
Forster's Tern - *Sterna forsteri* (E)
Common Tern - *Sterna hirundo* (E)
Bewick's Wren - *Thryomanes bewickii* (E)
Greater Prairie Chicken - *Tympanuchus cupido* (E)
Barn Owl - *Tyto alba* (E)
Yellow-headed Blackbird - *Xanthocephalus xanthocephalus* (E)
Henslow's Sparrow - *Ammodramus henslowii* (T)
Cerulean Warbler - *Dendroica cerulea* (T)
Peregrine Falcon - *Falco peregrinus* (T)
Common Moorhen - *Gallinula chloropus* (T)
Sandhill Crane - *Grus canadensis* (T)
Bald Eagle - *Haliaeetus leucocephalus* (T)
Least Bittern - *Ixobrychus exilis* (T)
Loggerhead Shrike - *Lanius ludovicianus* (T)
Whooping Crane – Grus Americana (Federal non-essential, experimental population)**

MAMMALS

Rafinesque's Big-eared Bat - *Corynorhinus rafinesquii* (E)
Southeastern Myotis - *Myotis austroriparius* (E)
Gray Bat - *Myotis grisescens* (E)**
Indiana Bat - *Myotis sodalis* (E)**
Eastern Woodrat - *Neotoma floridana* (E)
Gray/Timber Wolf - *Canis lupus* (T)
Golden Mouse - *Ochrotomys nuttalli* (T)
Rice Rat - *Oryzomys palustris* (T)
Franklin's Ground Squirrel - *Spermophilus franklinii* (T)

INVERTEBRATES

Redveined Prairie Leafhopper - *Aflexia rubranura* (T)
Slippershell - *Alasmidonta viridis* (T)
Arogos Skipper - *Atrytone arogos* (E)
Isopod - *Caecidotea lesliei* (E)
Isopod - *Caecidotea spatulata* (E)
Swamp Metalmark - *Calephelis muticum* (E)
Anomalous Spring Amphipod - *Crangonyx anomalus* (E)
Packard's Cave Amphipod - *Crangonyx packardi* (E)
Spectaclecase - *Cumberlandia monodonta* (E)***
Purple Wartyback - *Cyclonaias tuberculata* (T)
Fanshell - *Cyprogenia stegaria* (E)**
Iowa Pleistocene Snail - *Discus macclintocki* (E)**
Butterfly - *Ellipsaria lineolata* (T)
Elephant-ear - *Elliptio crassidens* (T)
Spike - *Elliptio dilatata* (T)
Snuffbox - *Epioblasma triquetra* (E)
Hydrobiid Cave Snail - *Fontigens antroecetes* (E)
Ebonyshell - *Fusconaia ebena* (T)
Illinois Cave Amphipod - *Gammarus acherondytes* (E)**
Cobweb Skipper - *Hesperia metea* (T)
Ottoe Skipper - *Hesperia ottoe* (T)

INVERTEBRATES – cont.

Hoary Elfin - *Incisalia polios* (E)
Pink Mucket - *Lampsilis abrupta* (E)**
Wavy-rayed Lampmussel - *Lampsilis fasciola* (E)
Higgins Eye - *Lampsilis higginsii* (E)**
Black Sandshell - *Ligumia recta* (T)
Karner Blue Butterfly - *Lycaeides melissa samuelis* (E)**
Elfin Skimmer - *Nannothemis bella*
Indiana Crayfish - *Orconectes indianensis* (E)
Kentucky Crayfish - *Orconectes kentuckiensis* (E)
Shrimp Crayfish - *Orconectes lancifer* (E)
Bigclaw Crayfish - *Orconectes placidus* (E)
Eryngium Stem Borer - *Papaipema eryngii* (E)
Leafhopper - *Paraphlepsius lupalus* (E)
Orangefoot Pimpleback - *Plethobasus cooperianus* (E)**
Sheepnose - *Plethobasus cyphyus* (E)***
Clubshell - *Pleurobema clava* (E)**
Ohio Pigtoe - *Pleurobema cordatum* (E)
Fat Pocketbook - *Potamilus capax* (E)**
Kidneyshell - *Ptychobranchus fasciolaris* (E)
Rabbitsfoot - *Quadrula cylindrica* (E)
Salamander Mussel - *Simpsonaias ambigua* (E)
Hine's Emerald Dragonfly - *Somatochlora hineana* (E)**
Regal Fritillary - *Speyeria idalia* (T)
Iowa Amphipod - *Stygobromus iowae* (E)
Purple Lilliput - *Toxolasma lividus* (E)
Rainbow - *Villosa iris* (E)
Little Spectaclecase - *Villosa lienosa*

Source: Illinois. Endandered Species Protection Board, One Natural Resources Way, Springfield, IL 62702