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

ENVIRONMENTAL ASSESSMENT

Reducing Ring-billed Gull, Herring Gull, Great Black-Backed Gull, and Double-crested Cormorant Damage Through an Integrated Wildlife Damage Management Program in the State of New York

Prepared By:

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U.S. Department of Interior, Fish and Wildlife Service

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LIST OF TABLES AND FIGURES

SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (USDA, APHIS, WS) proposes to continue the current herring gull (*Larus argentatus*), ring-billed gull (*Larus delawarensis*), greater black-backed gull (*Larus marinus*), and double-crested cormorant (*Phalacrocorax auritus*) damage management program in the State of New York. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce damage activities to human health and safety, property, agriculture, threatened and endangered species, other wildlife, natural resources, and aquaculture. Damage management would be conducted on public and private property in New York when the resource owner (property owner) or manager requests WS assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification, repellants, or harassment would be recommended and utilized to reduce damage. In other situations, birds would be humanely removed through use of shooting, trapping, egg addling/destruction, nest destruction, or euthanasia following live capture by trapping and use of registered pesticides. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where the application of lethal methods alone would be the most appropriate strategy. Wildlife damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing take of gulls and double-crested cormorants, and their nest and eggs.

ACRONYMS

AC	Alpha-Chloralose
ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BBS	Breeding Bird Survey
BDM	Gull and Cormorant Bird Damage Management
CCE	Cornell Cooperative Extension
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
ECL	Environmental Conservation Law
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MA	Methyl anthranilate
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

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

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

USDA/APHIS/Wildlife Services (WS) is authorized by Congress to manage a program to reduce human/wildlife conflicts. WS's mission is to "provide leadership in wildlife damage control to protect America's agricultural, industrial and natural resources, and to safeguard public health and safety (USDA 1989)." This is accomplished through:

- training of wildlife damage management professionals;
- development and improvement of strategies to reduce economic 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 and;
- providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

This Environmental Assessment (EA) evaluates ways by which this responsibility can be carried out to resolve conflicts with herring gull (*Larus argentatus*), ring-billed gull (*Larus delawarensis*), greater black-backed gull (*Larus marinus*), and double-crested cormorant (*Phalacrocorax auritus*) bird species in the State of New York.

WS is a cooperatively funded, service-oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control* or *WS Work Plans* must be completed by WS and the land owner/administrator. WS cooperates with other Federal, State and Local government entities, 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.

Individual actions on the types of sites encompassed by this analysis may be categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) (7 CFR 372.5(c)). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c)) (60 Federal Register 6,000, 6,003 (1995)). Gull and cormorant damage management is a large component of the New York WS program. Therefore, WS has decided to prepare this EA to assist in planning gull and cormorant damage management activities and to clearly communicate with the public the analysis of cumulative effects for a number of issues of concern in relation to alternative means of meeting needs for such management in the State. This analysis covers WS's plans for current Gull and Cormorant Bird Damage Management (BDM) actions wherever they might be requested within the State of New York.

1.1 PURPOSE

The purpose of this EA is to analyze the effects of WS activities in New York to manage damage caused by the following migratory bird species: herring gulls (*Larus argentatus*), ring-billed gulls (*Larus delawarensis*), greater black-backed gulls (*Larus marinus*), and double-crested cormorants (*Phalacrocorax auritus*). Resources protected by such activities include human health and safety, property, agriculture, threatened and endangered species, other wildlife, natural resources, and aquaculture.

1.2 NEED FOR ACTION

1.2.1 Summary of Proposed Action

The proposed action is to continue the current portion of the New York WS program that responds to requests for gull and cormorant bird damage management (BDM) to protect human health and safety, property, agriculture, threatened and endangered species, other wildlife, natural resources, and aquaculture. A major component of BDM in the New York WS program is the goal of minimizing human health and safety threats and property damage in urban environments. An Integrated Wildlife Damage Management (IWDM) approach would be recommended and implemented to allow the use of any legal lethal or nonlethal technique or method, used singly or in combination, to meet the request or needs for resolving wildlife conflicts. See Appendix C for a description of the BDM methods that are available for use or recommendation by WS. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. Lethal methods used or recommended by WS could include shooting, trapping, egg addling/destruction, nest destruction, or euthanasia following live capture by trapping. Nonlethal methods used or recommended by WS could include chemical repellants, porcupine wires, wire barriers, netting; and harassment with pyrotechnics, lasers, lights, vehicles, and audio and visual repellents. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where the application of lethal methods alone would be the most appropriate strategy. Wildlife damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing take of gulls and double-crested cormorants, and their nest and eggs.

1.2.2 Need for BDM to Protect Human Health and Safety

1.2.2.1 Disease Transmission

Research has shown that gulls carry various species of bacteria such as *Bacillus* spp., *Clostridium* spp., *Campylobacter* spp., *Escherichia coli*, *Listeria* spp., and *Salmonella* spp. (MacDonald and Brown 1974, Fenlon 1981, Butterfield et al. 1983, Monaghan et al. 1985, Norton 1986, Vauk-Hentzelt et al. 1987, Quessey and Messier 1992). Transmission of bacteria from gulls to humans is difficult to document; however, Reilley et al. (1981) and Monaghan et al. (1985) both suggested that gulls were the source of contamination for cases of human salmonellosis. Concentrations of gulls at municipal water supply sources and waste water and sewage treatment facilities may also contribute to disease transmission (Jones et al. 1978, Hatch 1996).

Public health concerns often arise when gulls feed and loaf near fast food restaurants, and picnic facilities; deposit waste from landfills in urban areas; and contaminate industrial facility ventilation systems with feathers, nesting debris, and droppings. Gulls feeding on vegetable crops and livestock feed can potentially aid in the transmission of salmonella.

Many times, individuals or property owners that request assistance with nuisance gull problems are concerned about potential disease risks but are unaware of the types of diseases that can be associated with these birds. In most situations, BDM is requested because the mess associated with droppings left by concentrations of birds is aesthetically displeasing and can result in recurrent clean-up costs. Under the proposed action, WS could agree to assist in resolving these types of problems.

1.2.2.2 Airport Safety

It is widely recognized throughout the civil and military aviation communities that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer 2000). 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 (Linnell et al. 1996, Robinson 1996), as well as erode public confidence in the air transport industry as a whole (Conover et al. 1995).
In several instances, wildlife-aircraft collisions in the United States have resulted in human fatalities, the most recent of which occurred in 1995 when an Air Force E-3B AWACS aircraft collided with a flock of Canada geese on Elmendorf Air Force Base, Alaska, killing all 24 passengers and crew. In addition, a $190 million plane was lost (Dolbeer 1997). The risk that birds pose to aircraft is well documented with the worst case reported in Boston in 1960 when 62 people were killed in the crash of an airliner which collided with a flock of European starlings (Terres 1980). In 2000, a Boeing 747 ingested a western gull on take-off from Los Angeles International Airport. Parts of the engine fell onto a beach and the pilot dumped 83 tons of fuel into the ocean before making an emergency landing. The cost of repairs to the plane was $400,000 (Cleary et al. 2002a).

Cleary et al. (2002b) reported that gulls were the most commonly struck bird group from 1990-2001. New York ranked 4th in the nation for the number of bird strikes reported from 1990-2001 (Cleary et al. 2002b). Gulls pose a serious threat to aviation safety in New York (USDA 1994, Cleary et al. 2002b). From 1992 to 2003, the FAA National Wildlife Strike Database reported 636 gull strikes throughout the State of New York. During this same period, there were six cormorant strikes in New York (FAA 2003).

Dolbeer et al. (2003) stated that gulls accounted for 86% of bird strikes (an aircraft striking $\geq$1 bird) from 1988-1990 at the John F. Kennedy International Airport (JFKIA), averaging 261 strikes per year. From 1979 to 2002, bird strikes at JFKIA resulted in at least 83 aborted takeoffs and 64 damaged engines. Strikes for gulls declined in 1992-2002 to 26-60% of 1991 levels and 12-26% of 1988-1990 levels (Dolbeer et al. 2003). This decrease in aircraft strikes is most likely attributed to the bird management program carried out by WS at JFKIA from 1991 to 2002, outlined in the JFK EIS (USDA 1994). This program consisted of seasonal lethal control (shooting) of gulls flying over the airport, which enhanced the original bird management program that consisted of habitat alteration and bird-frightening techniques to discourage birds from feeding, drinking, and resting on airport grounds (Dolbeer et al. 2003).

1.2.2.3 Landfills

Gull attraction to landfills as a food source has been well documented (Mudge and Ferns 1982, Patton 1988, Belant et al. 1995a, 1998, Gabrey 1997). Large numbers of gulls are attracted to and use landfills as feeding and loafing areas throughout North America. In the northeastern United States, landfills often serve as foraging and loafing areas for gulls throughout the year, while attracting larger populations of gulls during migration periods (Bruleigh 1998). Landfills have even been suggested as contributing to the increase in gull populations (Verbeek 1977, Patton 1988, Belant and Dolbeer 1993). Federal (Federal Register 1991) and State regulations (6NYCRR Part 360-1.14) mandate that landfills prevent or control potential vectors, such as gulls. Gulls that visit landfills may loaf and nest on nearby rooftops, causing health concerns, aesthetic distractions and structural damage to buildings and equipment.

Bird conflicts associated with landfills include accumulation of feces on equipment and buildings, distraction of heavy machinery operators, and the potential for birds to transmit disease to workers on site. The tendency for gulls to carry waste off site results in accumulation of feces and deposition of garbage on surrounding industrial and residential areas creates a nuisance, as well as generates the potential for birds to transmit disease to neighboring residents.

New York WS often receives requests for assistance from landfill operators to disperse gulls that create damage or are a nuisance for property or people. Under the proposed action, WS could agree to assist in resolving these types of problems.

1.2.3 Need for BDM to Protect Property

Birds frequently damage structures on private property, or public facilities, with fecal contamination. Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Corrosion damage to metal structures and painted finishes, including those on automobiles, can occur because of uric acid from bird droppings. Roof-top colonies of nesting gulls have been well documented and frequently cause damage to urban structures. Gulls transport large amounts of nest material and food remains to the roof-tops which can obstruct roof drainage systems and lead to structural damage to buildings (Vermeer et al. 1988, Blokpoel and Scharf 1991a, Belant 1993). Property losses associated with cormorants include impacts to privately-owned lakes that are stocked with fish, damage to boats and marinas or other properties found near cormorant breeding or roosting sites, and damage to vegetation on privately-owned land.

New York WS often receives requests for assistance to help reduce damaged caused by nesting gull and cormorant colonies. Under the proposed action, WS could agree to assist in resolving these types of problems.

1.2.4 Need for BDM to Protect Agriculture

The State of New York reported an estimated 37,500 farms in 2001, with about 7.6 million acres in cropland (NY Agricultural Statistics Service 2002). Cash receipts for 2001 totaled \$3.41 billion. Cash receipts for livestock and poultry totaled \$2.22 billion, dairy totaled \$1.84 billion, and crop sales totaled \$1.19 billion. New York ranks 3rd in the nation in dairy production and 6th in the nation in value of fresh market vegetables (NY Agricultural Statistics Service 2002).

Gulls, especially ring-billed gulls, cause damage by feeding and defecating on vegetable crops and dairy silage, and leaving droppings at dairies and livestock feed lots. Williams et al. (1977) and Johnston et al. (1979) reported that gulls can transmit salmonella to livestock through droppings and contaminated drinking water.

1.2.5 Need for BDM to Protect Wildlife and Native Vegetation, Including T&E Species

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 are preyed upon or otherwise adversely affected by certain bird species. Double-crested cormorants are known to have a negative impact on wetland habitats (Jarvie et al. 1999, Shieldcastle and Martin 1999) and wildlife, including threatened and endangered species (Korfanty et al. 1999). Concentrations of gulls often impact the productivity and survivorship of rare or endangered colonial species such as terns (USDI 1996) and prey upon the chicks of colonial waterbirds. Some examples of WS assistance with protecting endangered species include protection of piping plover nests from gulls in New Jersey (J. Bucknall, WS, Pers. Comm. 2001), protection of adult and least terns and snowy plovers in California from predation by gulls, terns, ravens, and raptors (J. Turman, M. Jensen, WS, Pers. Comm. 2001), protection of desert tortoises from raven predation in California and Utah (J. Turman, WS, Pers. Comm. 2001), and the protection of juvenile salmonids (steelhead and salmon) in Washington from heron, gull, tern, and cormorant predation (K. Gruver, WS, Pers. Comm. 2001).

In New York, gulls and double-crested cormorants have displaced other species of colonial nesting birds such as black-crowned night herons, common terns, and Caspian terns mainly through the degradation of habitat and competition for nest sites (Harper 1993, NYSDEC 2000). Accumulation of cormorant droppings (which contribute excessive ammonium nitrogen), stripping leaves for nesting material, and the combined weight of the birds and their nests can break branches and ultimately kill many trees within 3 to 10 years (Bedard et al. 1995, Korfanty et al. 1999, Lemmon et al. 1994, Lewis 1929, Weseloh et al.1995, Weseloh and Ewins 1994, Weseloh and Collier 1995). Lewis (1929) considers the killing of trees by nesting cormorants to be very local and limited, with most trees he observed to have no commercial timber value. However, tree damage may be perceived as a problem if these trees are rare species, or aesthetically valued (Hatch and Weseloh 1999). Colonial waterbirds can be displaced by vegetation damage caused by cormorants.

1.2.6 Need for BDM to Protect Aquaculture and Fishery Resources

The rapid increase in double-crested cormorant populations over the last 25 years has led to an increase in conflicts between humans and cormorants. As the population of double-crested cormorants has increased, so has concern for the sport fishery population. Lake Ontario sustains the largest sport fishery in New York State (Kretser and Klatt 1981, Connely et al. 1988, 1997, McCullough and Einhouse 1998). The decrease in the smallmouth bass fishery of the Lake Ontario Eastern Basin has been attributed to the increasing population of cormorants (Schneider et al. 1999, Lantry et al. 1999, NYDEC 2000). Ross and Johnson (1999) reported that, following a single stocking event of lake trout in the eastern basin of Lake Ontario, 13.7% of the stock was consumed by cormorants over a 4-day period. Almost half of this predation occurred within 1 day of release.

The decline in both walleye and yellow perch populations in Oneida Lake is most likely attributed to increased cormorant population size and predation (Rudstam et al, in press). Both species are important for anglers and decreases in the sportfish populations could lead to a decline in the local economy (USFWS 2001). Rudstam et al. (In press) states that increasing sub-adult mortality due to cormorant predation is the cause of the decline in these fish populations, not other ecosystem-wide changes such as the introduction of zebra mussels or the decrease in alternate prey sources in Oneida Lake.

Aquaculture, the cultivation of finfish and invertebrates in captivity, has grown exponentially in the past several decades (Price and Nickum 1995). Double-crested cormorants can feed heavily on small fish being raised commercially on minnow farms for bait, or for human consumption at fish farms or aquaculture sites. In New York State, there are thirteen state operated fish hatcheries and the New York State Department of Environmental Conservation lists forty-one private and commercial fish hatcheries. The NSYDEC requires licensing for facilities that rear salmonid and/or bass species, only. There are few to no meaningful cormorant predation issues at state operated facilities, and very limited effects by gulls at these locations (Phil Hulbert, NYSDEC, Pers. Comm. 2003).

It is possible that gulls and cormorants function as vectors for the spread of disease at aquaculture facilities. The threat of disease transmission through gulls and cormorants is unknown at this time, but there remains a need to protect fishery resources from this possibility (Phil Hulbert, NYSDEC, Pers. Comm. 2003).

In the past, New York WS has received requests for assistance to help reduce damage caused by gull and cormorant activity and it is likely that these requests will increase in the future. Under the proposed action, WS could agree to assist in resolving these types of problems.

1.3 WS RECORD KEEPING REGARDING REQUESTS FOR GULL AND CORMORANT BIRD DAMAGE MANAGEMENT ASSISTANCE

WS maintains a Management Information System (MIS) database to document assistance that the agency provides in addressing wildlife damage conflicts. MIS data is limited to information that is collected from people who have requested services or information from Wildlife Services. It does not include requests received or responded to by local, State or other Federal agencies, and it is not a complete database for all wildlife damage occurrences. The number of requests for assistance does not necessarily reflect the extent of need for action, but this data does provide an indication that needs exists.

The database includes, but is not limited to, the following information: species of wildlife involved; the number of individuals involved in a damage situation; tools and methods used or recommended to alleviate the conflict; and the resource that is in need of protection. Table 1-1 provides a summary of Technical Assistance projects completed by the New York WS program for Fiscal Year 1998-2002. A description of the WS Direct Control and Technical Assistance programs are described in Chapter 3 of this EA.

Table 1-1. Number of incidents for gull and cormorant technical assistance for New York Wildlife Services by Fiscal Year.

Fiscal Year	Species	Agriculture	Property	Health & Safety	Natural Resources	Other
1998	Gull	2	18	4	0	0
	Cormorant	0	0	0	1	0
1999	Gull	0	11	6	1	1
	Cormorant	0	0	0	8	4
2000	Gull	0	20	15	2	0
	Cormorant	0	0	0	3	0
2001	Gull	0	15	16	1	0
	Cormorant	0	0	0	2	0
2002	Gull	2	4	40	2	0
	Cormorant	0	0	1	11	0
Total		4	68	82	28	5

1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS has issued a Final EIS on the national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

John F. Kennedy International Airport Environmental Impact Statement. WS has issued a Final EIS on the Gull Hazard Reduction Program at the JFK International Airport (USDA 1994). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

Final Environmental Impact Statement: Double-crested Cormorant Management. The USFWS has issued a Final EIS on the management of double-crested cormorants (USFWS 2003). This EA is tiered to that EIS. Pertinent and current information available in the EIS has been incorporated by reference into this EA.

1.5 DECISION TO BE MADE

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

- Should BDM as currently implemented by the New York WS program be continued in the State?
- If not, how should gull and cormorant damage in the State be managed and what role should WS play in this?
- Might the continuing of WS's current program of BDM have significant effects requiring preparation of an EIS?

1.6 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.6.1 Actions Analyzed

This EA evaluates ring-billed gull, herring gull, great black-backed gull and double-crested cormorant damage management by WS to protect human health and safety, property, agriculture, threatened and endangered species, other wildlife, natural resources, and aquaculture on private and public land or facilities within the State wherever such management is requested from the WS program.

1.6.2 Period for Which this EA is Valid

This EA would remain valid until New York WS and other appropriate agencies determine that new needs for action, changed conditions, and/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 is sufficient

1.6.3 American Indian Tribes and Land

Currently, New York WS does not have any MOUs with any American Indian tribes. If WS enters into an agreement with a tribe for BDM, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOU's, agreements and NEPA compliance would be conducted as appropriate before conducting BDM on tribal lands.

1.6.4 Site Specificity

This EA analyzes potential effects of WS's BDM activities that will occur or could occur at private and public property sites or facilities within any of the 62 New York counties. It also addresses the impacts of BDM in areas where additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional BDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of bird damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where bird damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. The EA emphasizes important issues as they relate to specific areas whenever possible. However, the issues that pertain to the various types of bird damage and resulting management are the same, for the most part, wherever they occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the State (See USDA 1997 and Chapter 2 for a more complete description of the WS Decision Model as well as examples of its application). Decisions made using this thought process will be in accordance with any mitigation measures and standard operating procedures described herein and adopted or established as part of the decision.

The analyses in this EA are intended to apply to any action that may occur *in any locale* and at *any time* within New York. In this way, APHIS-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.

1.6.5 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS. Issues were defined and preliminary alternatives were identified. 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 of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.7 AUTHORITY AND COMPLIANCE

1.7.1 Authority of Federal and State Agencies in Migratory bird Damage Management in New York[1]

Wildlife Services Legislative Authority. The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of 1931 (7 U.S.C. 426-426c; 46 Stat. 1468), as amended in the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001,

[1]See Chapter 1 of USDA (1994) for a complete discussion of Federal laws pertaining to WS.

Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767), which provides that:

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

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

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

U.S. Fish and Wildlife Service (USFWS). The USFWS is responsible for managing and regulating the take of bird species that are listed as migratory under the Migratory Bird Treaty Act (MBTA) and those that are listed as threatened or endangered under the Endangered Species Act (ESA).

New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources. The mission of the NYSDEC, as stated in Section 1-0101 of the New York State Environmental Conservation Law (ECL), is to "conserve, improve, and protect its natural resources and environment, and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the State and their overall economic and social well being". Among many other duties, the NYSDEC is also responsible for administering fish and wildlife laws, carrying out sound fish and wildlife management practices, and conducting fish and wildlife research and managing the State's marine and coastal resources.

The NYSDEC is the agency responsible for administering and enforcing New York State Pesticide laws. Article 33 of the ECL provides the general framework for the distribution, sale, use and transportation of pesticides in New York. New York State pesticide regulations are found in Title 6 of the New York State Code of Rules and Regulations (6 NYCRR) Parts 320-329. Part 325 contains regulations on the application of pesticides, including commercial and private pesticide applicator certification requirements and pesticide business registration. Pesticide restrictions are listed in Part 326; some pesticides that the EPA considers to be general use are classified as restricted use in New York State by the DEC.

Memoranda of Understanding (MOUs) Between Various Agencies and WS in New York. New York WS has a MOU with Cornell Cooperative Extension (CCE), New York Department of Agriculture and Markets (NYDAM), New York State Department of Environmental Conservation (NYSDEC), and the New York State Department of Health (NYSDOH) (Appendix D). These MOUs were established to develop a cooperative relationship for planning, coordinating, and implementing animal damage control policies and to facilitate exchange of information.

1.7.2 Compliance with Other Federal Laws

Several other Federal laws authorize, regulate, or otherwise affect WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. WS prepares analyses of the environmental effects of program activities to meet procedural requirements of this law. This EA meets the NEPA requirement for the proposed action in New York. When WS operational assistance is requested by another Federal agency, NEPA compliance is the responsibility of the other Federal agency. However, WS could agree to complete NEPA documentation at the request of the other Federal agency.

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve threatened and endangered (T&E) species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service (USFWS) to use 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 . . . Each agency shall use the best scientific and commercial data available" (Sec.7 (a)(2)). WS obtained a Biological Opinion (B.O.) from USFWS in 1992 describing potential effects on T & E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F).

Migratory Bird Treaty Act of 1918 (16 U.S.C. 03-711; 40 Stat. 755), as Amended. The Migratory Bird Treaty Act (MBTA) 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 by the USFWS; therefore, the USFWS issues permits to requesters for reducing migratory bird damage.

WS provides on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of 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.

Executive Order 13186 of January 10, 2001 "Responsibilities of Federal Agencies to Protect Migratory Birds." This Order states that each federal agency, taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations, is directed to develop and implement, a MOU with the USFWS that shall promote the conservation of migratory bird populations. WS has developed a draft MOU with the USFWS as required by this Order and is currently waiting for USFWS approval. WS will abide by the MOU once it is finalized and signed by both parties.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA.

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

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

National Historic 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. WS activities as described under the proposed action do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA. WS has determined BDM actions are not undertakings as defined by the NHPA because such actions do not have the potential to result in changes in the character or use of historic properties. A copy of this EA is being provided to Indian tribes in the State to allow them the opportunity to express any concerns that might need to be addressed prior to a decision.

The Clean Water Act (33 U.S.C. 1344)

The Clean Water Act provides regulatory authority and guidelines for the EPA and the U.S. Army Corps of Engineers related to wetlands. Several Sections of the Clean Water Act pertain to regulating effects to wetlands. Section 101 specifies the objectives of this Act, which are implemented largely through Subchapter III (Standards and Enforcement), Section 301 (Prohibitions). The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Subchapter IV (Permits and Licenses) of this Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the State level. WS consults with appropriate regulatory authorities when wetlands exist in proximity to proposed activities or when such activities might impact wetland areas. Such consultations are designed to determine if any wetlands will be affected by proposed actions.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice (EJ) is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. EJ is a priority within APHIS and WS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. 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 (Executive Order 13045).

Children may suffer disproportionately from environmental health and safety risks for many reasons. BDM as proposed in this EA would only involve legally available and approved damage management methods in situations or under circumstances where it is highly unlikely that children would be adversely affected. Therefore, implementation of the proposed action would not increase environmental health or safety risks to children. BDM activities that may be undertaken by WS may improve the health and safety of environments that children use.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of mitigation measures and/or standard operating procedures, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional descriptions of affected environments will be incorporated into the discussion of the environmental effects in Chapter 4.

2.1 SUMMARY OF ISSUES

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target bird species
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Effects on socio-economics of the human environment
- Humaneness and animal welfare concerns of the methods used

2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

2.2.1 Effects on Wildlife

2.2.1.1 Effects on Target Bird Species Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are ring-billed gulls (*Larus delawarensis*), herring gulls (*Larus argentatus*), great black-backed gulls (*Larus marinus*), and double-crested cormorants (*Phalacrocorax auritus*).

Impacts of West Nile virus on bird populations

West Nile (WN) virus has 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 (MMWR 2002, Rappole et al. 2000). Since 1999 the virus has spread across the United States and was reported to occur in 44 states and the District of Columbia in 2002 (MMWR 2002). West Nile virus 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 WN virus is fatal encephalitis in humans, horses, and birds. West Nile virus has been detected in dead bird species of at least 138 species (CDC 2003). Although birds infected with WN virus can die or become ill, most infected birds do survive and may subsequently develop immunity to the virus (CDC 2003, Cornell University 2003). In some bird species, particularly Corvids (crows, blue jays, ravens, magpies), the virus causes disease (often fatal) in a large percentage of infected birds (Audubon 2003, CDC 2003, Cornell University 2003, MMWR 2002). In 2002, WN virus 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 WV virus in a specific area (Cornell

University 2003, Audubon 2003). According to US Geological Survey (USGS), National Wildlife Health Center (2003), information is not currently available to know whether or not WN virus is having an impact on bird populations in North America. USGS states that it is not unusual for a new disease to cause high rates of infection or death because birds do not have the natural immunity to the infection. Furthermore, it is not known how long it will take for specific bird population to develop sufficient immunity to the virus. Surveys of wild birds completed in the last three years have shown that some birds have already acquired antibodies to the virus (USGS-WHC 2003). Based upon available Christmas Bird Counts and Breeding Bird Surveys, USGS-WHC (2003) 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 WN virus or to some other cause. A review of available crow population data by Audubon (2003) reveals that at least some local crow populations are suffering high WN virus 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 virus to the point that these bird species will disappear from the U.S. (USGS-WHC 2003).

2.2.1.2 Effects on Nontarget Species Populations, Including T&E Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the impact of damage control methods and activities on nontarget species, particularly T&E species. WS's standard operating procedures (SOPs) include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3. To reduce the risks of adverse effects to nontarget species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing nontarget species.

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the Endangered Species Act (ESA) concerning potential effects of BDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997, Appendix F). WS is also in the process of reinitiating Section 7 consultation at the program level to assure that potential effects on T&E species have been adequately addressed.

Some nontarget species may actually benefit from BDM. Federal and state listed T&E colonial waterbirds can benefit from reductions in cormorant and gull populations, which may compete for nesting space and predate on nests.

2.2.2 Effects on Human Health and Safety

2.2.2.1 Safety and Efficacy of Chemical Control Methods

The public is sometimes concerned about the chemicals used in bird control programs because of potential adverse effects on people from being exposed either to the chemicals directly or to birds that have been treated with chemicals.

Avitrol, a restricted use pesticide, is a chemical that is classified as an avian distressing agent and is registered for use in New York. This chemical is normally used to deter target bird species from using certain problem areas. The use of Avitrol is regulated by the EPA through FIFRA and by New York State Pesticide Control Laws.

DRC-1339 (Starlicide), a toxicant not currently registered for use in New York, may be considered for use if it becomes registered in New York in the future. As part of the planning process, analysis of potential impacts of this toxicant are being addressed in this EA to determine potential impacts if and when DRC-1339 becomes registered for use in NY. This chemical is primarily used to remove target birds in damage situations.

Methyl anthranilate (MA) (Rejex-it, Goose Chase, etc.), a non-lethal repellant registered for use in New York, might be applied as a repellent in a bird control program. MA causes a negative response to feeding in the treated area.

Anthraquinone (Flight Control™), a non-lethal repellent not currently registered for use on gulls or cormorants in New York, may be considered for use if it becomes registered in New York in the future. As part of the planning process, analyses of potential impacts of this repellant are being addressed in this EA to determine potential impacts if and when Anthraquinone becomes registered for use in NY. Similar to MA, this chemical could be used to cause a negative response to feeding in treated areas.

Alpha-Chloralose (AC), an avian tranquilizer not currently registered for use in New York, may be considered for use if it becomes registered in the future. As part of the planning process, analyses of potential impacts of this tranquilizer are being addressed in this EA to determine potential impacts if and when AC becomes registered for use in NY. AC could be used for live-capturing nuisance waterfowl such as gulls and cormorants.

2.2.2.2 Effects on Human Health and Safety from Non-Chemical BDM Methods

Some people may be concerned that WS's use of firearms and pyrotechnic bird scaring devices could cause injuries to people. WS personnel occasionally use small caliber firearms, air guns (air rifles and air pistols), and shotguns to remove or scare birds that are causing damage. Shotguns may also be used on airports to scare or remove birds which pose a threat to aircraft or air passenger safety. WS frequently uses pyrotechnics in noise harassment programs to disperse or move birds. Between 1999 and 2002, 45,724 rounds of pyrotechnics were used by the New York WS Program for gull and cormorant management. During this time, there has not been a single pyrotechnic accident in conjunction with these programs. There is some potential fire hazard to private property from pyrotechnic use. There has never been a fire due to pyrotechnic use by New York WS personnel.

Firearm use is very sensitive and a public concern because of safety relating to the public, and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards. WS 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.

2.2.2.3 Effects on Human Health and Safety from Not Conducting BDM to Reduce Disease Threats or Outbreaks and Bird Strike Hazards at Airports

The absence of WS BDM in New York would 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 WS BDM activities would lead to accumulation of gull droppings and feathers near rooftop ventilation systems which may increase the risk of disease transmission to humans. Building maintenance workers are also at risk for being attacked by gulls nesting on rooftops.

WS assists airport management who seek to resolve wildlife hazards to aviation in New York. Airport managers and air safety officials are concerned that the absence of a WS BDM program could lead to a failure 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 or loss of life due to gull and cormorant bird strikes to aircraft.

2.2.3 Effects on Socio-Cultural and Economics of the Human Environment

2.2.3.1 Effects on Human Affectionate-Bonds With Individual Birds and on Aesthetic Values of Wild Bird Species

Some individual members or groups of wild bird species habituate and learn to live in close proximity to humans. Some people in these situations feed such birds and/or otherwise develop emotional attitudes toward such animals that result in aesthetic enjoyment. In addition, some people consider individual wild birds as "pets," or exhibit affection toward these animals. Examples are people who visit a city park or lakeshore to feed gulls. Many people do not develop emotional bonds with individual wild animals, but experience aesthetic enjoyment from observing them.

Public reaction to damage management actions is variable because individual members of the public can have widely different attitudes toward wildlife. Some individuals that are negatively affected by wildlife will support or encourage removal or relocation of damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual personal views and attitudes.

The public's ability to view wild birds in a particular area would be more limited if the birds are removed or relocated. However, immigration of birds from other areas could replace the animals removed or relocated during a damage management action. The opportunity to view or feed other wildlife would also be available if an individual makes the effort to visit other parks or areas with adequate habitat and local populations of the species of interest. In addition, WS BDM actions rarely remove all birds or even all birds of one species from a locale where actions occur.

Some people do not believe that wild birds should even be harassed to stop or reduce damage problems. Some of them are concerned that their ability to view birds is lessened by WS nonlethal harassment efforts.

Some individuals are offended by the presence of gulls and cormorants. These people may view gulls and cormorants as nuisances. Their overall enjoyment of other birds is diminished by what they view as a destructive presence of such species. They are offended that such birds proliferate in such numbers and appear to remain unchecked.

2.2.3.2 Effects on Aesthetics and Value of Property Damaged by Birds

Property owners that have gulls roosting or nesting on their buildings are generally concerned about the negative aesthetic appearance of bird droppings and the damage to their buildings. Business owners generally are particularly concerned because negative aesthetics can result in lost business. Costs associated with property damage include labor and supplies to clean and disinfect fecal droppings, implementation of nonlethal wildlife management methods, loss of aesthetic value of flowers, gardens, and lawns which may be covered by droppings, loss of personal use, loss of customers or visitors irritated by the odor of, or of having to walk on, fecal droppings, and loss of time contacting local health departments and wildlife management agencies to resolve the health and safety issues.

2.2.4 Humaneness and Animal Welfare Concerns of Methods Used by WS

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

Suffering is described as a *" . . . highly unpleasant emotional response usually associated with pain and distress."* However, suffering *" . . . can occur without pain . . . ,"* and *". . . pain can occur without suffering . . ."* (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for *" . . . little or no suffering where death comes immediately . . ."* (CDFG 1991), 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 considerable pain (CDFG 1991).

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 1991).

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 animal suffering within the constraints imposed by current technology and funding.

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

New York 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.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.3.1 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 New York would meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of Federal or other agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, insurance companies, etc. Although WS can predict some of the possible locations or *types* of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times at which affected resource owners will determine a bird damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and State agencies. Such broad scale population control would also be impractical, or impossible, to achieve.

If 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 effects, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones.

2.3.2 WS's Effect on Biodiversity

The WS program does not attempt to eradicate any species of wildlife in New York. WS operates in accordance with international, Federal and State laws, and regulations enacted to ensure species viability. Effects on target and nontarget species populations because of WS's lethal BDM activities are minor, as shown in Section 4.1.1 and 4.1.2. The effects of the current WS program on biodiversity are not significant nationwide or statewide (USDA 1997).

2.3.3 Wildlife Damage is a Cost of Doing Business — a "Threshold of Loss" Should Be Established Before Allowing Any Lethal BDM

WS is aware that some people feel Federal wildlife damage management should not be allowed until economic losses reach some arbitrary predetermined threshold level. Such policy, however, would be difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, resource owners and situations differ widely and a set wildlife damage threshold levels would be difficult to determine or justify. WS has the legal direction to respond to requests for assistance, and it is program policy to aid each requester to minimize losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a particular resource to justify the need for wildlife damage management actions.

2.3.4 Wildlife Damage Management Should Not Occur at Taxpayer Expense, But Should Be Fee- Based

WS is aware of concerns that wildlife damage management should not be provided at the expense of the taxpayer, or that it should be fee-based. WS was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Funding for WS comes from a variety of sources in addition to Federal appropriations. Such non-Federal sources include State general appropriations, Local government funds (county or city), livestock associations, Indian tribes, and private funds which are all applied toward program operations. Federal, State, and Local officials have decided that some BDM by WS should be conducted by appropriating funds. Additionally, wildlife damage management is appropriate for government programs, since wildlife management is a government responsibility. A commonly voiced argument for publicly funded wildlife damage management is that the public should bear responsibility for damage to private property caused by public wildlife.

A minimal Federal appropriation is allotted for the maintenance and implementation of a WS program in New York. The remainder of the WS program is entirely fee-based. Technical assistance is provided to requesters as part of the Federally-funded activities. The direct assistance in which WS employees perform damage management activities is primarily funded through cooperative agreements between the requester and WS. Thus, BDM by WS in New York is fee-based to a high degree.

2.3.5 Cost Effectiveness of BDM

Perhaps a better way to state this issue is by the question "Does the value of damage avoided equal or exceed the cost of providing BDM?" Regulations of the Council on Environmental Quality (CEQ) (40 CFR 1502.23) do not require a formal, monetized cost-benefit analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. The ADC EIS, Appendix L, p. 32 (USDA 1997) stated:

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

Another example is the control of some wildlife species in order to protect other wildlife species, such as T&E species. There are no monetary values placed on these wildlife species, yet their existence is important in conserving biodiversity.

2.3.6 Bird Damage Management should be Conducted by Private Nuisance Wildlife Control Agents

Private nuisance wildlife control agents could be contacted to reduce bird damage for property owners or property owners could attempt to reduce their own damage problems. Some property owners would prefer to use a private nuisance wildlife control agent because the nuisance wildlife agent is located in closer proximity and thus could provide the service at less expense, they are not required to comply with NEPA, or because they prefer to use a private business rather than a government agency. However, some property owners would prefer to contract with a government agency. In particular, large industrial businesses 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

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), Appendix J ("*Methods of Control*"), Appendix N ("*Examples of WS Decision Model*"), and Appendix P ("*Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program*") of the ADC FEIS (USDA 1997).

3.0 ALTERNATIVES ANALYZED IN DETAIL

Alternatives analyzed in detail are:

1) Alternative 1 - Integrated BDM Program. This is the Proposed Action as described in Chapter 1 and is the "No Action" alternative as defined by the Council on Environmental Quality for analysis of ongoing programs or activities.
2) Alternative 2 - Nonlethal BDM Only By WS
3) Alternative 3 - Technical Assistance Only. Under this alternative, WS would not conduct any direct operational BDM activities in New York. If requested, affected requesters would be provided with technical assistance information only.
4) Alternative 4 - No Federal WS BDM. This alternative consists of no Federal BDM program by WS.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

The proposed action is to continue the current WS ring-billed gull, herring gull, great black-backed gull, and double-crested cormorant damage management program in the State of New York. An Integrated Wildlife Damage Management (IWDM) approach would be implemented to reduce damage activities to property, agriculture, threatened and endangered species, other wildlife, natural resources, aquaculture, and human health and safety. Damage management would be conducted on public and private property in New York when the resource owner (property owner) or manager requests WS assistance. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and nontarget species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including nonlethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification, repellants, or harassment would be recommended and utilized to reduce damage. In other situations, birds would be removed as humanely as possible using: shooting, registered pesticides, trapping, egg addling/destruction, nest destruction, or euthanasia following live capture by trapping. In determining the damage management strategy, preference would be given to practical and effective nonlethal methods. However, nonlethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of nonlethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Appendix C provides a more detailed description of the methods that could be used under the proposed action. Wildlife damage management activities would be conducted in the State, when requested and funded, on private or public property, including airport facilities and adjacent or nearby properties, after an *Agreement for Control* or other comparable document has been completed. All management activities would comply with appropriate Federal, State, and Local laws, including applicable laws and regulations authorizing take of gulls and double-crested cormorants, and their nest and eggs.

3.1.2 Alternative 2 - Nonlethal BDM Only By WS

Under this alternative, WS would be restricted to implementing only non-lethal methods in providing assistance with bird damage problems. Entities requesting BDM assistance for damage concerns would only be provided information on non-lethal barriers or exclusionary devices, habitat alteration, or other non-lethal methods such as harassment for most species. However, it is possible that persons receiving WS' non-lethal technical and direct control assistance could still resort to lethal methods that were available to them. Information on lethal BDM methods would still be available to producers and property owners through such sources as USDA Agricultural Extension Service offices, NYSDEC, universities, or pest control organizations. Appendix C describes a number of nonlethal methods available for use by WS under this alternative.

3.1.3 Alternative 3 - Technical Assistance Only

This alternative would not allow for WS operational BDM in New York. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct BDM using traps, shooting, Avitrol, or any nonlethal method that is legal. Avitrol could only be used by State certified pesticide applicators. Appendix C describes a number of nonlethal methods available for use by WS under this alternative.

3.1.4 Alternative 4 - No Federal WS BDM

This alternative would eliminate Federal WS involvement in BDM in New York. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own BDM without WS input. Information on BDM methods would still be available to producers and property owners through such sources as USDA Agricultural Extension Service offices, NYSDEC, universities, or pest control organizations. Avitrol could be used by State certified restricted-use pesticide applicators.

3.2 BDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN NEW YORK

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both WS technical assistance and operational BDM by WS. Appendix C is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective[2] manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion, vegetation management), animal behavior modification (e.g., scaring, repellents), and removal of individual offending animals (e.g., trapping, shooting, and avicides), local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies That WS Employs

3.2.2.1 Technical Assistance Recommendations

"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of

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

damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be provided through a personal or telephone consultation, or during 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 the practicality of their application.

Under APHIS NEPA Implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving bird damage problems.

3.2.2.2 Direct Damage Management Assistance

This is the implementation or supervision of damage management activities by WS personnel. Direct damage management assistance 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 direct damage management by WS. 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 chemicals are necessary, or if the problems are complex.

3.2.2.3 Examples of WS Direct Operational and Technical Assistance in BDM in New York

<u>Management of Wildlife Hazards to Aircraft and Air Passengers in New York</u>

WS participates with the Federal Aviation Administration (FAA) under a MOU to provide wildlife damage management information or services, upon request, to airport managers in New York. Sometimes WS evaluates wildlife hazards at airports and then provides Wildlife Hazard Assessments which outline the detected wildlife hazards, and assists 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 gulls and cormorants. WS also sometimes assists airport managers in obtaining USFWS depredation permits for the purpose of managing hazard threats posed by migratory birds, including gulls and cormorants. IWDM strategies are employed and recommended for these facilities.

WS's current program in New York utilizes 1 full-time employee and 4 part-time employees to conduct IWDM programs and to monitor wildlife hazards at airports to ensure the protection of human lives and aircraft. New York WS has completed an annual management program at John F. Kennedy International Airport (JFKIA) for the past twelve years (USDA 1994). As a result of this IWDM program at JFKIA, the number of gull strikes have been dramatically reduced along with an overall decline in the number of bird strikes (all species of birds) occurring at JFKIA (Dolbeer et al. 2003).

In addition to direct operational activities consisting of various harassment and lethal removal techniques aimed at potentially injurious wildlife, WS personnel provide ongoing technical advice to airport managers about how to reduce the presence of wildlife in airport environs. Since 1998, three Wildlife Hazard Assessments have been completed for airports in New York State and five are currently underway. WS may also participate in various habitat management projects implemented by airport personnel in order to provide technical expertise about specific wildlife damage management strategies and methods. In addition, WS promotes improved bird strike record keeping and maintains a program of bird identification and monitoring of bird numbers at participating airports.

WS may receive requests for assistance in resolving wildlife hazards to aviation in the future from airport management previously discussed, or any other airports in New York. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use in airport environments.

Management of Damage Caused by Gulls

Landfills. WS currently provides information or services, upon request, to landfills in New York. WS assists with reducing the number of gulls, particularly ring-billed gulls, herring gulls, and great black-backed gulls, feeding and loafing at the landfills. WS also may assist landfill operators in obtaining USFWS depredation permits for managing migratory bird damage. WS uses and recommends IWDM strategies for these facilities.

Currently, New York WS utilizes 2 full-time employees and 1 part-time employee for controlling gulls at landfills. Since 1998, gull control programs have been completed annually for three landfills. Direct control activities used at landfills include harassment with pyrotechnics, propane exploders, flags, and distress tapes. The shooting of a limited number of birds is also used to increase the effectiveness of nonlethal harassment. As part of the IWDM strategy, WS provides landfill operators with recommendations concerning habitat modifications and alteration of cultural practices.

WS may receive requests for assistance in resolving wildlife hazards in the future from landfill operators previously discussed, or any other landfill in New York. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use at landfills.

Urban Nesting Gull Colonies. WS provides information or services, upon request, to property owners in New York to reduce the number of nesting gulls, particularly ring-billed gulls and herring gulls, in urban environments. WS may assist property owners with obtaining a USFWS depredation permit for managing these urban nesting colonies. IWDM strategies are recommended and used for these situations.

New York WS utilizes 2 part-time employees for managing gulls in urban environments. Since 1998, twenty-two roof-top gull nest management programs have been completed. The main direct control activity used to manage these urban nesting colonies, particularly those located on rooftops, is nest and egg removal. As part of the IWDM strategy, WS also recommends harassment with distress tapes and scare tactics prior to the nesting season or construction of a rooftop grid wire system to exclude birds from the roof.

WS may receive requests for assistance in resolving conflicts with gulls in the future from properties previously discussed, or any other property owners in New York. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use in urban environments.

Management of Damage Caused by Cormorants

New York WS is currently cooperating with NYSDEC, the Oneida Lake Association, and Cornell University in a pilot study to determine the most effective methods and strategies for reducing predation on yellow perch and walleye on Oneida Lake during the fall by migrating cormorants. An integrated nonlethal BDM program was conducted from 1998-2001 using pyrotechnics, mylar tape, human effigies, propane exploders and boats to disperse roosting cormorants. During the month of September each year of the study, surveys showed a 61%-98% reduction in the local cormorant population. This reduction of the cormorant population on Oneida Lake led to an estimated 30% reduction in annual fish consumption by cormorants.

New York WS currently utilizes 2 part time employees to assist in responding to cormorant damage and predation issues. WS currently only uses an integrated nonlethal program for cormorant damage management activities. In 2002, New York WS received fewer than three requests for help with and information on cormorants from fish hatcheries. Also in 2002, New York WS provided assistance to the Altmar fish hatchery with regards to cormorant damage and/or nuisance.

WS may receive requests for assistance in resolving conflicts with cormorants in the future from entities previously discussed, or other agencies or property owners in New York. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use in these situations.

Management of Damage to Colonial Waterbirds

Colonial nesting waterbirds share the feature of habitually breeding and nesting in close association with other members of their own, and sometimes other, species. Gulls, cormorants, herons, egrets, ibises, terns, and skimmers are included in this grouping of waterbirds. Waterbird colonies are typically concentrated in small areas and the survival of these colonies is vulnerable to threats of human disturbance, habitat degradation, and predation. Shorebirds, such as the piping plover (*Charadrius melodus*), may not nest in distinct colonies but share the same habitats as many of the colonial nesters and are included as species of concern. Colonial waterbirds and shorebirds that are listed as threatened, endangered, and/or of special concern on both the federal and state level are included in Appendices E and F, respectively.

Gulls and cormorants are normally very aggressive as nesting area colonizers and will force other colonial nesting waterbirds from prime nesting habitats. In addition to out-competing for nest space, gulls commonly prey upon the young and threaten the survivorship of other colonial species, including T&E species such as terns (USDI 1996). Double-crested cormorants are known to have a negative impact on wetland habitats (Jarvie et al. 1999, Shieldcastle and Martin 1999). Accumulation of the cormorants' acidic feces, the proclivity of stripping of leaves for nests and the weight of both birds and nests in trees can destroy vegetation and render a nesting area unsuitable for rapid colony restoration (Bedard et al. 1995, Korfanty et al. 1999, Lemmon et al. 1994, Lewis 1929, Weseloh et al.1995, Weseloh and Ewins 1994, Weseloh and Collier 1995). Some colonial waterbirds, including long-legged waders such as great-blue herons, prefer to form nest colonies in shrubs or trees and are subsequently excluded from nesting habitats where vegetation has been ruined. The increase of both gulls and cormorants in recent years (Section 4.1.1.1) has led to concern over associated threats to colonial waterbird populations.

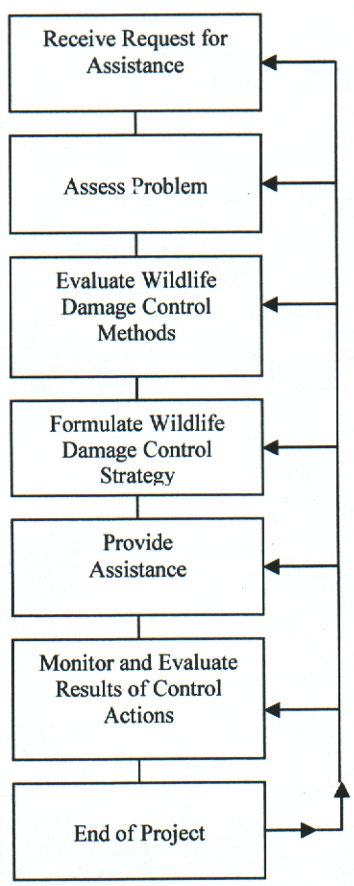
In NY, both gulls and double-crested cormorants have displaced colonial species such as black-crowned night herons, common terns, and Caspian terns through habitat degradation and nest site competition (Harper 1993, NYSDEC 2000).

Programs to control gull and cormorant damage may benefit other colonial nesting waterbird species that are impacted by their predation and/or competition for habitat and nesting space. In the future, WS may receive requests for assistance in managing the damage to colonial waterbirds from gulls and cormorants. WS may provide technical assistance and/or direct operational assistance using any combination of approved methods discussed in this EA which are appropriate for use in these situations (refer to section 4.1.2.1 for further discussion of BDM effects on nontarget species).

3.2.3 WS Decision Making

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

Figure 3-1. APHIS, WS Decision Model



3.2.4 Bird Damage Management Methods Available for Use (Appendix C)

3.2.4.1 Nonchemical, Nonlethal Methods (Appendix C)

Agricultural producer and property owner practices consist primarily of nonlethal preventative methods such as **cultural methods**[3] and **habitat modification**.

Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some, but not all, of these tactics include the following:

- Exclusion methods such as netting,
- Propane exploders (to scare birds),
- Pyrotechnics (to scare birds),
- Distress calls and sound producing devices (to scare birds),
- Visual repellents and scaring tactics (to scare birds), and
- Lasers (to scare birds).

Dispersal of damaging birds to other areas.

Nest destruction of the target species before eggs or young are in the nest.

Egg addling/destruction is the practice of destroying the embryo in the egg prior to hatching; physically breaking eggs; or directly removing eggs from a nest and destroying them.

Habitat/environmental modification to attract or repel certain bird species.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

3.2.4.2 Chemical, Nonlethal Methods (Appendix C)

Egg oiling is a method for suppressing reproduction of nuisance birds by spraying a small quantity of food grade vegetable oil or mineral oil on eggs in nests.

Avitrol is a chemical frightening agent registered for use on pigeons, crows, gulls, blackbirds, European starlings, and English sparrows in various situations. This chemical works by causing distress behavior in the birds that consume treated baits from a mixture of treated and untreated bait, which generally frightens the other birds from the site. Generally, birds that eat the treated bait will die (Johnson and Glahn 1994).

Methyl anthranilate and **Di-methyl anthranilate** (artificial grape flavoring food additive) has been shown to be an effective repellent for many bird species, including waterfowl. It can be applied to turf or surface water or as a fog to repel birds from small areas. MA may also become available for use as a livestock feed additive that has bird repellent value.

Other repellents: Other bird repellents that might become available for use in NY include charcoal particles (e.g., adhered to livestock feed), anthraquinone (Flight Control™) (Avery et al. 1997), and Alpha-Chloralose. Flight Control™ is a non-lethal bio-pesticide that could be used to reduce feeding activity in treated areas. Alpha-Chloralose is an immobilizing agent, used to capture waterfowl or other birds. It is

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[3]Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife

generally used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts. Alpha-Chloralose is typically delivered as well-contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds.

3.2.4.3 Mechanical, Lethal Methods (Appendix C)

Live traps are various types of traps designed to capture birds alive. Gulls and cormorants captured in live traps would be humanely euthanized. Some examples are decoy traps, nest box traps, mist nets, cannon nets, etc.

Shooting is more effective as a dispersal technique than as a way to reduce bird numbers. The number that can be killed by shooting is generally very small in relation to the number involved in damage situations. Usually only a few dozen birds can be shot from individual flocks that can number anywhere from a few hundred to many thousands or hundreds of thousands before the rest of the birds become gun shy. Shooting, however, can be helpful in some situations to supplement and reinforce other dispersal techniques. It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting with rifles, shotguns, or pellet guns (rifles or pistols) 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.

Cervical dislocation is an American Veterinary Medical Association (AVMA) approved euthanasia method (Beaver et al. 2001) which is sometimes used to euthanize birds which are captured by hand or in live traps.

3.2.4.4 Chemical, Lethal Methods (Appendix C)

Carbon dioxide (CO_2) gas is an American Veterinary Medical Association (AVMA) approved euthanasia method (Beaver et al. 2001) which is sometimes used to euthanize birds which are captured in live traps, by hand, or by chemical immobilization. Live birds are placed in a container or chamber into which CO_2 gas is released. The birds quickly expire after inhaling the gas.

Other Lethal Chemicals: Other chemical lethal methods that might become available for use in NY include DRC-1339. DRC-1339 is a chemical for reducing damage from several species of birds, including gulls. This chemical is highly toxic to sensitive species but only slightly toxic to non-sensitive birds, including predatory birds and mammals.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.3.1 Lethal BDM Only By WS

Under this alternative, WS would not conduct any nonlethal control of gulls and cormorants for BDM purposes in the State, but would only conduct lethal BDM. This alternative was eliminated from further analysis because some bird damage problems can be resolved effectively through nonlethal means and at times lethal methods may not be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms. For example, a number of damage problems involving the encroachment of injurious birds into buildings can be resolved by installing barriers or repairing of structural damage to the buildings, thus excluding the birds. Further, such damage situations as immediately clearing a runway of a large flock of injurious birds could not be implemented immediately, while scaring them away through noise harassment might resolve the air passengers' threat at once.

3.3.2 Compensation for Bird Damage Losses

The compensation alternative would require the establishment of a system to reimburse persons impacted by gull and cormorant damage. This alternative was eliminated from further analysis because no Federal or State laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely cost several times as much as the current program.
- Compensation would most likely be below full market value. It is difficult to make timely responses to all requests to assess and confirm damage, and certain types of damage could not be conclusively verified. For example, it would be impossible to prove conclusively in individual situations that birds were responsible for disease outbreaks even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by State law.
- Compensation would not be practical for reducing threats to human health and safety.

3.3.3 Short Term Eradication and Long Term Population Suppression

An eradication alternative would direct all WS program efforts toward total long term elimination of gull and cormorant populations on private, State, Local and Federal government land wherever a cooperative program was initiated in the State. In New York, eradication of native bird species is not a desired population management goal of State agencies or WS. Eradication as a general strategy for managing bird damage will not be considered in detail because:

- All State and Federal agencies with interest in, or jurisdiction over, wildlife oppose eradication of any native wildlife species.
- Eradication is not acceptable to most people.

Suppression would direct WS program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to localized populations of birds, WS can decide to implement local population suppression as a result of using the WS Decision Model.

It is not realistic or practical to consider large-scale population suppression as the basis of the WS program. Typically, WS activities in the State would be conducted on a very small portion of the sites or areas inhabited or frequented by problem species.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR BIRD DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Mitigation in Standard Operating Procedures (SOPs)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for effects that otherwise might result from that action. The current WS program, nationwide and in

New York, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's Standard Operating Procedures include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.
- All WS Specialists in the State who use restricted chemicals are trained and certified by, or else operate under the direct supervision of, program personnel or others who are experts in the safe and effective use of chemical BDM materials.
- Research is being conducted to improve BDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental effects.

Some additional mitigating factors specific to the current program include:

- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the State, would not be conducted.
- WS uses BDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazards to the public is even further reduced.

3.4.2 Additional Mitigation Specific to the Issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effects on Target Species Populations

- BDM activities are directed to resolving bird damage problems by taking action against individual problem birds, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
- WS take is monitored by comparing numbers of birds killed by species or species group with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse effects to the viability of native species populations (See Chapter 4).

3.4.2.2 Effects on Nontarget Species Populations Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets.
- Observations of birds in areas that are associated with gull or cormorant concentrations are made to determine if nontarget or T&E species would be at risk from BDM activities.
- Management actions taken in mixed-species waterbird colonies would be conducted in such a manner to minimize impacts to non-target species (i.e.

visiting sites at times of the day that would avoid thermal stress to eggs/nestlings, conducting actions as early as possible in the nesting season to reduce nestling abandonment, etc.).

- WS has consulted with the USFWS and NYSDEC regarding potential effects of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). Further consultation on species not covered by or included in that formal consultation process will be initiated with the USFWS and the NYSDEC; WS will abide by any RPAs, RPMs, and terms and conditions that result from that process to avoid jeopardizing any listed species.
- WS uses chemical methods for BDM that have undergone rigorous research to prove their safety and lack of serious effects on nontarget animals and the environment.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and nontarget species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS BDM actions are not undertakings that could adversely affect historic resources (See Section 1.6.2)

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

4.1.1 Effects on Target Species Populations

4.1.1.1 Alternative 1 – Integrated BDM Program (Proposed Action/No Action)

Analysis of this issue is limited to those species killed during WS BDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as *". . . a measure of the number of animals killed in relation to their abundance."* Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage.

Ring-billed Gull Population Effects

Ring-billed gulls are migratory birds which prefer to nest on islands with sparse vegetation. The breeding population of ring-billed gulls is divided into two populations; the western population and the eastern population. The eastern breeding population of the United States includes New York, Vermont, Ohio, Illinois, Michigan, Wisconsin, and Minnesota (Blokpoel and Tessier 1986). The breeding population of ring-billed gulls in New York can be found on Lake Champlain, the St. Lawrence River, the lower Great Lakes, and Oneida Lake (Bull 1974, Peterson 1985). Ring-billed gulls nest in high densities and, in the Great Lakes region, nesting colonies may be located on islands, parklands, slag yards, rooftops, breakwalls, and landfills (Blokpoel and Tessier 1986).

In 1984, the population of ring-billed gulls in the Great Lakes region was estimated at approximately 648,000 pairs (Blokpoel and Tessier 1986). Blokpoel and Tessier (1992) found that the nesting population of ring-billed gulls in the Canadian portion of the lower Great Lakes system increased from 56,000 pairs to 283,000 pairs from 1976-1990. The NYSDEC (Pers. Comm. 2000) estimates the number of breeding pairs at approximately 75,028 for the state of New York. This estimate does not include an additional estimated 5,000 to 8,000 pairs of roof top nesting ring-billed gulls that occur throughout the state. According to Dolbeer (1998) the number of non-breeding gulls (sub-adults and non-breeding adults) is estimated to equal about 50% of the nesting population. Therefore the total ring-billed gull population (breeders and non-breeders) for the state of New York is estimated at approximately 240,000 gulls. According to Sauer et al. (2003) the population of ring-billed gulls has increased throughout the United States, the Eastern Breeding Bird Survey (BBS) region, and in the State of New York at an annual rate of 3.4%, 2.9%, and 7.0%, respectively, from 1966-2002.

Ring-billed gulls are protected by the USFWS under the MBTA. Therefore, gulls are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds, and their nests and eggs, including the USFWS and the NYDEC permitting processes. The USFWS, as the agency with migratory bird 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 ring-billed gull populations would have no significant adverse impact on the quality of the human environment. In 2001, the USFWS authorized take of 3,535 ring-billed gulls in NY, while 455 birds were reported taken by permitees. In 2002, the authorized take of this species was 3,085; the reported take has not yet been compiled (L. Gore, USFWS, Pers. Comm. 2003).

From FY 1999 through FY 2002, New York WS took 766 ring-billed gulls and destroyed 15,150 ring-billed gull nests at all project sites in the State in all damage situations under USFWS issued permits (MIS database). This number does not include renests. Based on past requests for WS assistance and a predicted increase in future requests for services, WS anticipates that no more than 10% of the state ring-billed gull population would likely be taken annually by WS in New York under the proposed action. Ongoing New York WS gull nest removal projects have shown that the number of nesting attempts decrease every year that nest removal projects continue. The birds have been found to move to other areas to nest.

Based upon the above information, New York WS potential impacts to populations of ring-billed gulls has been and is expected to continue to be insignificant to the overall viability and reproductive success of this bird species population on a local, regional, and nationwide scale.

Herring Gull Population Effects

Herring gulls are the most widely distributed gulls in the Northern Hemisphere. These gulls breed in colonies near oceans, lakes, or rivers (Bent 1921). Herring gulls nest in all of the Great Lakes and will nest in natural or man-made sites, such as rooftops and breakwalls (Blokpoel and Scharf 1991b).

Scharf et al. (1978) reported 29,406 herring gull nests after surveying all nesting areas of colonial waterbirds in the U.S. Great Lakes in 1977. Dolbeer et al. (1990) reported an average annual increase of 11.9% in the number of herring gull nests in Lake Erie's Sandusky Bay over a 13-year period. The NYSDEC (Pers. Comm. 2000) estimates the number of breeding pairs at approximately 7,863 for the state of New York. According to Dolbeer (1998) the number of non-breeding gulls (sub-adults and non-breeding adults) is estimated to equal about 50% of the nesting population. Therefore the total herring gull population (breeders and non-breeders) for the state of New York is estimated at approximately 23,500 gulls. BBS results from 1966-2002 show that the population of herring gulls throughout the United States and the Eastern BBS region has decreased at an annual rate of -1.6% and -3.5%, respectively. New York's population exhibited an annual rate increase of 2.7% during the same time period (Sauer et al. 2003).

Herring gulls are protected by the USFWS under the MBTA. Therefore, gulls are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds; and their nest and eggs, including the USFWS and the NYSDEC permitting processes. The USFWS, as the agency with migratory bird 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 herring gull populations would have no significant adverse impact on the quality of the human environment. In 2001, the USFWS authorized take of 4,490 herring gulls in NY, while 905 birds were reported taken by permitees. In 2002, the authorized take of this species was 4,125; the reported take has not yet been compiled (L. Gore, USFWS, Pers. Comm. 2003).

From FY 1999 through FY 2002, New York WS took 3,234 herring gulls and destroyed 1 herring gull nest at all project sites in the State in all damage situations under USFWS issued permits (MIS database). Based on past requests for WS assistance and a predicted increase in future requests for services, WS anticipates that no more than 10% of the state herring gull population would likely be taken annually by WS in New York under the proposed action.

Based upon the above information, New York WS potential impacts to populations of herring gulls has been and is expected to continue to be insignificant to the overall viability and reproductive success of this bird species population on a local, regional, and nationwide scale.

Great Black-backed Gull Population Effects

The great black-backed gull is basically a marine species, which breeds in the North Atlantic region. In the United States the great black-backed gull breeds south to Long Island (Bull 1974). During the winter these gulls can also be found along the Great Lakes and larger rivers, such as the St. Lawrence River (Angehrn et al. 1979, Bull 1974). The over-wintering population of great black-backed gull has been increasing along the Great Lakes, along with the expansion of their breeding range (Angehrn et al. 1979). According to Blokpoel and Scharf (1991b), there has probably never been more than a dozen nesting pairs of great black-backed gulls along the Great Lakes. Blokpoel and Scharf (1991b) report that if the breeding population along the Great Lakes does not continue to increase, it is likely due to the unsuitability of a fresh water environment.

The NYSDEC (Pers. Comm. 2000) estimates the number of breeding pairs at approximately 3,738 for the state of New York. According to Dolbeer (1998) the number of non-breeding gulls (sub-adults and non-breeding adults) is estimated to equal about 50% of the nesting population. Therefore the total great black-backed gull population (breeders and non-breeders) for the state of New York is estimated at approximately 11,200 gulls. Data from the BBS (1966-2002) shows that the great black-backed gull population throughout the United States and the Eastern BBS region has declined at an annual rate of -4.8% and -2.2%, respectively, but has increased at an annual rate of 10.0% in New York (Sauer et al. 2003). However, the overall population trend from 1980 to 2000 in New York, as reported by the BBS, has increased at annual rate of 134.6%. In addition, Canadian Wildlife Service reports that the population figures for the Great Black-backed Gull populations in the Northeast (i.e., along the St. Lawrence River) have soared in the last twenty years (Canadian Wildlife Service 2002).

Great black-backed gulls are protected by the USFWS under the MBTA. Therefore, gulls are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds; and their nest and eggs, including the USFWS and the NYDEC permitting processes. The USFWS, as the agency with migratory bird 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 great black-backed gull populations would have no significant adverse impact on the quality of the human environment. In 2001, the USFWS authorized take for 1,675 great black-backed gulls in NY, while 176 birds were reported taken by permits. In 2002, the authorized take number of this species was 1,295; the reported take has not yet been compiled (L. Gore, USFWS, Pers. Comm. 2003).

From FY 1999 through FY 2002, New York WS took 780 great black-backed gulls at all project sites in the State in all damage situations under USFWS issued permits (MIS database). No nests or eggs were destroyed at any project sites. Based on past requests for WS assistance and a predicted increase in future requests for services, WS anticipates that no more than 10% of the state great black-back gull population would likely be taken annually by WS in New York under the proposed action.

Based upon the above information, New York WS potential impacts to populations of great black-backed gulls has been and is expected to continue to be insignificant to the overall viability and reproductive success of this bird species population on a local, regional, and nationwide scale.

Double-crested Cormorant Population Effects

Double-crested cormorants range throughout North America, from the Atlantic coast to the Pacific coast. During the last 20 years, the cormorant population has expanded to an estimated 372,000 nesting pairs; with the U.S. population (breeding and non-breeding birds) conservatively estimated to be greater than 1 million birds (Tyson et al. 1999). Tyson et al. (1999) found that the cormorant population increased about 2.6% annually during the early 1990's. The greatest increase was in the Interior region which was the result of a 22% annual increase in the number of cormorants in Ontario and the U.S. States bordering the Great Lakes (Tyson et al. 1999). The number of breeding pairs of cormorants in the Atlantic and Interior population is estimated at over 85,510 and 256,212 nesting pairs, respectively (Tyson et al. 1999).

Data from the BBS (1966-2002) shows that the double-crested cormorant population throughout the United States, the Eastern BBS region and New York have increased at an annual rate of 8.0%, 8.7%, and 27.9%, respectively (Sauer et al. 2003). Tyson et al. (1999) estimated the number of nesting pairs at approximately 12,600 in New York (including the Atlantic and Interior population). This population estimate does not include subadults and nonbreeding birds. Estimates of 0.6 to 4.0 nonbreeding cormorants per breeding pair have been used for several populations (Tyson et al. 1999). Therefore, the cormorant population in New York is conservatively estimated at more than 32,700 birds.

Blackwell et al. (2000a) examined the relationship between numbers of piscivorous birds reported killed under USFWS permits at aquaculture facilities in New York, New Jersey, and Pennsylvania and species population trends within the respective states. The USFWS issued 26 permits to 9 facilities from 1985 through 1997. Eight species appeared on permits, but only six species were reported killed: black-crowned night-herons (*Nycticorax nycticorax)*, double crested cormorant (*Phalacrocorax auritus)*, great blue herons (*Ardea herodias)*, herring gulls (*Larus argentatus)*, ring-billed gulls (*L. delawarensis)*, and mallards (*Anas platyrhynchos)*. The number of birds reported killed, relative to systematic long-term population trends, is considered to have had negligible effects on the population status of the respective species.

Catfish farmers in the delta region of Mississippi reported taking more cormorants under the Cormorant Depredation Order than previously reported under past depredation permits issued to individual farmers. The reported take of 9,557 birds by Mississippi catfish farmers had no apparent impacts on wintering populations during 1998-99 (Glahn 2000).

Double-crested cormorants are protected by the USFWS under the MBTA. Therefore, cormorants are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds; and their nest and eggs, including the USFWS and the NYDEC permitting processes. The USFWS, as the agency with migratory bird 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 double-crested cormorant populations would have no significant adverse impact on the quality of the human environment.

The USFWS predicts that authorized take of cormorants and their eggs for the management of double-crested cormorant damage, including those taken in New York, is anticipated to have no significant impact on regional or continental double-crested cormorant populations (USFWS 2003). In 2001, the USFWS authorized take for 265 double-crested cormorants in NY, while only one bird was reported taken by permit. In 2002, the authorized take number of this species was 115; the reported take has not yet been compiled (L. Gore, USFWS, Pers. Comm. 2003). According to the USFWS (2001, 2003), the implementation of a state-wide program to reduce cormorant impacts to public resources would result in the lethal take of up to an additional 4,370 cormorants on an annual basis in New York. In recent years egg oiling activities have been conducted at Eastern Lake Ontario and Lake Oneida in NY, including a total of 63,577 eggs being oiled by the NYDEC from 1999 to 2002 (USFWS 2003). However, since DCCOs are a long-lived bird and egg addling programs will be conducted on a local scale; similar egg addling programs conducted in New York are anticipated to have minimal effects on regional or continental cormorant populations (USFWS 2003).

From FY 1999 through FY 2002, New York WS personnel did not take any cormorants or destroy any cormorant nests at all project sites in the State in all damage situations (MIS database). However, based on past requests for WS assistance and a predicted increase in future requests for services, WS anticipates that no more than 10% of the New York cormorant population will be taken annually by WS in New York under the proposed action.

Based upon the above information, New York WS potential impacts to populations of double-created cormorants has been and is expected to continue to be insignificant to the overall viability and reproductive success of this bird species population on a local, regional, and nationwide scale.

4.1.1.2 Alternative 2 - Nonlethal BDM Only By WS

Under this alternative, WS would not take any target species because no lethal methods would be used. Although WS lethal take of ring-billed gulls, herring gulls, great black-backed gulls, and cormorants would not occur, it is likely that without WS conducting some level of lethal BDM activities for these species, private or state BDM efforts would increase, leading to potentially similar or even greater effects on target species populations than those of the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.1, however, it is unlikely that target bird populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target bird populations. Effects and hypothetical risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 3, but less than Alternative 4.

4.1.1.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would have no impact on any gull species or cormorant populations in the State because the program would not conduct any operational BDM activities but would be limited to providing advice only. Private or state efforts to reduce or prevent bird damage and perceived disease transmission risks could increase which could result in similar or even greater effects on those populations than the current program alternative. For the same reasons shown in the population effects analysis in section 4.1.1.1, however, it is unlikely that target bird populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target bird populations. Effects on target species populations and hypothetical risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 2.

4.1.1.4 Alternative 4 - No Federal WS Bird Damage Management

Under this alternative, WS would have no impact on any gull species or cormorant populations in the State. Private or state efforts to reduce or prevent depredations could increase which could result in effects on target species populations to an unknown degree. Effects on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. For the same reasons shown in the population effects analysis in section 4.1.1.1 it is unlikely that target bird populations would be adversely impacted by implementation of this alternative. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of other chemicals which could lead to real but unknown effects on target bird populations.

4.1.2 Effects on Other Wildlife Species, Including T&E Species

4.1.2.1 Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

<u>Adverse Effects on Nontarget (non-T&E) Species.</u> Direct impacts on nontarget species occur when WS program personnel inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS's 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 BDM activities has been extremely low and should not increase substantially above current levels of take. The only two nontarget birds known to have been killed during BDM operations in New York from FY 1999-2002 include one black-crowned night heron and one Caspian tern (MIS database).

While every precaution is taken to safeguard against taking nontarget birds, at times changes in local flight patterns and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program.

Beneficial Effects on Nontarget Species. Programs to control gull and cormorant damage can benefit many other wildlife species that are impacted by their predation or competition for habitat. Gulls are generally very aggressive nesting area colonizers and will force other species such as terns and plovers from prime nesting areas. Greater black-backed gulls are especially aggressive and will kill young terns and other birds. The recent increase in the number of cormorants in the northeast 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 of successfully reducing gull and cormorant damage and conflicts to wildlife species since all BDM methods could possibly be implemented or recommended by WS.

T&E Species Effects. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. T&E species that are Federally listed by the USFWS for the State of New York are presented in Appendix D.

WS has reviewed the list of T&E species for NY and has determined that the proposed gull and cormorant BDM program will not adversely affect the following listed species in New York: Gray wolf (Canis lupis monstrabilis), Indiana bat (Myotis socalis), Eskimo curlew (Numenius boralis), piping plover (Charadrius melodus), Roseate tern (Sterna dougallii), Leatherback sea turtle (Dermochelys coriacea), Shortnose sturgeon (Acipenser brevirostrum), Fat pocketbook (Potamilus capax), Northern monk's hood (Aconitum noveboracense), and Small whorled pogonia (Isotria medeoloides). This determination is based on the conclusions made by the FWS during their 1992 programmatic consultation of WS activities and subsequent Biological Opinion (USDA 1997, Appendix F). The USFWS determined that the management activities being utilized for WS gull and cormorant damage management are not likely to adversely affect these listed species. In addition, the FWS has determined that the methods used for the management of double-crested cormorants will not likely advesely affect the bald eagle and piping plover (USFWS 2003). WS has determined that the use of gull and cormorant damage management methods will have no effect on those T&E species not included in the 1992 Biological Opinion or their critical habitats. Furthermore, WS has determined that the use of Alpha-Chloralose and lasers will have no effect on any listed T&E species.

The 1992 Biological Opinion from the USFWS also determined that the only BDM method that might adversely affect the bald eagle was above ground use of strychnine treated bait for "nuisance birds". Strychnine is no longer registered for above ground use and would not be used by WS for BDM in New York. Secondary hazards to raptors from Avitrol are low to nonexistent (see Appendix C). Should DRC-1339 become registered, there is no primary hazard to eagles because eagles do not eat grain or other bait materials on which this chemical might be applied during BDM and, further, because eagles are highly resistant to DRC-1339. Up to 100 mg doses were force fed to captive golden eagles with no mortality or adverse effects noted other than regurgitation and head-shaking (Larsen and Dietrich 1970). Secondary hazards to raptors from DRC-1339 are low to non-existent (see Appendix C). Therefore, WS BDM in the State is not likely to have adverse effects on eagles.

Furthermore, the 1992 Biological Opinion from the USFWS determined that no fish, clams, crustaceans, or plants would be adversely affected by any aspect of the WS program.

The USFWS published the final rule to list the Canada lynx on March 24, 2000 (Federal Register, 50 CFR Part 17). The Final Rule identifies the listed population as the "U.S. District Population Segment" which occurs or historically occurred in forested portions of the States of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, and Wisconsin. WS wildlife biologists consulted on the Canada lynx with USFWS in Regions 3 and 5 in March 2001. The USFWS (letter from L. Lewis, USFWS, Acting Assistant Regional Director to G. Larson, WS Eastern Regional Director, May 9, 2001) determined that, "Canada lynx are unlikely to be affected by using guard dogs, scare devices, oral rabies vaccine, and shooting." While the oral rabies vaccine is not a method identified by the NY WS program for use in gull and cormorant damage management, the other methods have been identified for potential use. This letter states that a "not likely to adversely affect" determination is appropriate for APHIS-WS operational programs, including those in New York.

In NY, WS has conferred with the NYSDEC, which has determined that the proposed WS action will not likely adversely affect NY State Endangered or Threatened species or their habitats and ecosystems (P. Nye, Pers. Comm. 2003). The NYSDEC has provided WS a list of Endangered, Threatened and Special Concern Species in New York State. WS will periodically consult with the NYSDEC Bureau of Wildlife Endangered Species Unit and Nongame and Habitat Unit to ensure that no actions taken under this plan will adversely affect NY listed species. In some situations, WS actions could benefit NY State listed species by reducing cormorant and gull conflicts with those species.

Mitigation measures to avoid T&E effects were described in Chapter 3 (Subsection 3.4.2).

4.1.2.2 Alternative 2 - Nonlethal BDM Only By WS

<u>Adverse Effects on Nontarget Species</u>
Under this alternative, WS take of nontarget animals would probably be less than that of the proposed action because no lethal control actions would be taken by WS. However, nontarget take would not differ substantially from the current program because the current program takes very few nontarget animals. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS 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.

People whose bird damage problems were not effectively resolved by nonlethal control methods would likely resort to other means of legal or illegal lethal control. This could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than the proposed action. For example, shooting by persons not proficient at bird identification could lead to killing of nontarget birds. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local nontarget species populations, including T&E species. Hazards to raptors, including bald eagles and falcons, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

<u>Beneficial Effects on Nontarget Species</u>
This alternative would reduce negative impacts caused by gulls and cormorants to wildlife species and their habitats, including T&E species, if non-lethal methods were effective in reducing such damage to acceptable levels. If non-lethal methods were ineffective at reducing damage to acceptable levels, WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that gull and cormorant damage to wildlife species and their habitats would likely remain the same or possibly increase dependent upon actions taken by the affected resource or landowner.

4.1.2.3 Alternative 3 - Technical Assistance Only

<u>Adverse Effects on Nontarget Species</u>
Alternative 3 would not allow any WS direct operational BDM in New York. There would be no impact on nontarget or T&E species by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support might lead to more selective use of control methods by private parties than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to greater take of nontarget wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 2, frustration could lead to illegal use of chemical toxicants which could lead to unknown effects on local nontarget species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

<u>Beneficial Effects on Nontarget Species</u>
The ability to reduce negative impacts caused by gulls and cormorants 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. It would be expected that this alternative would have a greater chance of reducing damage than Alternative 4 since WS would be available to provide information and advice.

4.1.2.4 Alternative 4 - No Federal WS Bird Damage Management

<u>Adverse Effects on Nontarget Species</u>
Alternative 4 would not allow any WS BDM in the State. There would be no impact on nontarget or T&E species by WS BDM activities from this alternative. However, private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could impact local nontarget species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

Beneficial Effects on Nontarget Species
The ability to reduce negative impacts caused by gulls and cormorants 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.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Safety and Efficacy of Chemical Control Methods

Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

Avitrol (4-Aminopyridine). Avitrol is a chemical method that might be used by WS in BDM. Appendix C provides more detailed information on this chemical.

Avitrol 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 members of the public from use of this product as an avicide are:

- It is readily broken down or metabolized into removable compounds that are excreted in urine in the target species (EXTOXNET 1996). Therefore, little of the chemical remains in killed birds to present a hazard to humans.
- A human would need to ingest the internal organs of birds found dead from Avitrol ingestion to have any chance of receiving even a minute amount of the chemical or its metabolites into his/her system. This is highly unlikely to occur. Furthermore, secondary hazard studies with mammals and birds have shown that there is virtually no hazard 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 (EPA 1997). 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 health risks from Avitrol use would be virtually nonexistent under any alternative.

DRC-1339 (3-chloro-p-toluidine hydrochloride). DRC-1339 is a lethal chemical method that could be used for bird control should it become registered in New York in the future. There has been some concern expressed by a few members of the public that unknown but significant risks to human health may exist from DRC-1339 used for BDM.

This chemical is one of the most extensively researched and evaluated pesticides ever developed. Over 30 years of studies have demonstrated the safety and efficacy of this compound. Appendix C provides more detailed information on this chemical and its possible future use in BDM. Factors that virtually eliminate any risk of public health problems from possible future use of this chemical are:

- Its use is prohibited within 50 feet of standing water and cannot be applied directly to food or feed crops (contrary to some misconceptions, DRC-1339 is not applied to feed materials that livestock can feed upon).
- DRC-1339 is highly unstable and degrades rapidly when exposed to sunlight, heat,

or ultraviolet radiation. The half-life is about 25 hours; in general, treated bait material is nearly 100% broken down within a week.

- It is more than 90% metabolized in target birds within the first few hours after they consume the bait. Therefore, little material is left in bird carcasses that may be found or retrieved by people.
- Application rates are extremely low (less than 0.1 lb. of active ingredient per acre) (EPA 1995).
- A human would need to ingest the internal organs of birds found dead from DRC-1339 to have any chance of receiving even a minute amount of the chemical or its metabolites into his/her system. This is highly unlikely to occur.
- The EPA has concluded that, based on mutagenicity (the tendency to cause gene mutations in cells) studies, this chemical is not a mutagen or a carcinogen (i.e., cancer-causing agent) (EPA 1995). 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 health risks from possible future use of DRC-1339 would be virtually nonexistent under any alternative.

Other BDM Chemicals. Other nonlethal BDM chemicals that might be used or recommended by WS would include repellents such as 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, anthraquinone (should it become registered in New York) which is presently marketed as Flight Control™, and the tranquilizer Alpha-Chloralose (should it become registered in New York). Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before EPA or FDA would register them. Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and State pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment.

Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human 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).

Alternative 2 - Nonlethal Bird Damage Management Only By WS

Alternative 2 would not allow for any lethal methods use by WS in the State. Similar to the proposed action, WS would only use or recommend non-lethal BDM chemicals. Therefore, WS impacts of this alternative would be similar to the proposed action.

Excessive cost or ineffectiveness of nonlethal techniques could result in some entities rejecting WS's assistance and resorting to other means of BDM. Such means could include illegal pesticide uses. Hazards to humans and pets could be greater under this alternative if 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 humans, pets, and to mammalian and avian scavengers; this could lead to higher risks of adverse effects than those under the proposed alternative.

Alternative 3 - Technical Assistance Only

Alternative 3 would not allow any direct operational BDM assistance by WS in the State. WS would only provide advice and, in some cases, equipment or materials (i.e., by loan or sale) to other persons who would then conduct their own damage management actions. Concerns about human health risks from WS's use of chemical BDM methods would be alleviated because no such use would occur. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing chemical damage management methods and leading to a greater risk than the Proposed Action alternative. However, because some of these private parties would be receiving advice and instruction from WS, concerns about human health risks from chemical BDM methods use should be less than under Alternative 4.

Commercial pest control services would be able to use Avitrol and such use would likely occur to a greater extent in the absence of WS's assistance. Use of Avitrol in accordance with label requirements should preclude any hazard to members of the public. However, hazards to humans and pets could be greater under this alternative if 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. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the proposed alternative.

Alternative 4 - No Federal WS Bird Damage Management

Alternative 4 would not allow any WS BDM in the State. Concerns about human health risks from WS's use of chemical BDM methods would be alleviated because no such use would occur. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risks to human health and safety than the proposed action alternative.

Commercial pest control services would be able to use Avitrol and such use would likely occur to a greater extent in the absence of WS's assistance. Use of Avitrol in accordance with label requirements should 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. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

4.1.3.2 Effects on Human Health and Safety from Non-Chemical BDM Methods

Alternative 1 - Integrated Bird Damage Management Program (Proposed Action/No Action)

Nonchemical BDM methods that might raise safety concerns include shooting with firearms and harassment with pyrotechnics. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The New York WS program has had no accidents involving the use of firearms or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P).

Therefore, no adverse effects on human safety from WS's use of these methods are expected.

Alternative 2 - Nonlethal Bird Damage Management Only By WS

Under this alternative, nonchemical BDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique and harassment with pyrotechnics. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The New York WS program has had no accidents involving the use of firearms or pyrotechnics in which a member of the public was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse effects on human safety from WS's use of these methods are expected. Impacts would be similar to the proposed action.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any nonchemical BDM methods. Risks to human safety from WS's use of firearms and pyrotechnics would hypothetically be lower than the current program alternative, but not significantly because New York WS's current program has an excellent safety record in which no accidents involving the use of these devices have occurred that have resulted in a member of the public being harmed.

Commercial pest control services would be able to use pyrotechnics or firearms in BDM programs and this activity would likely occur to a greater extent in the absence of WS's assistance. Hazards to humans and property could be greater under this alternative if personnel conducting BDM activities using nonchemical methods are poorly or improperly trained. Since WS would be available to provide advice and information on the safe and proper use of these methods adverse impacts should be less than Alternative 4.

Alternative 4 - No Federal WS Bird Damage Management

Alternative 4 would not allow any WS BDM in the State. Concerns about human health risks from WS's use of nonchemical BDM methods would be alleviated because no such use would occur. The use of firearms or pyrotechnics by WS would not occur in BDM activities in the State.

However, private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the proposed action alternative. Commercial pest control services would be able to use pyrotechnics or firearms in BDM programs and this activity would likely occur to a greater extent in the absence of WS's assistance. Hazards to humans and property could be greater under this alternative if personnel conducting BDM activities using nonchemical methods are poorly or improperly trained.

4.1.3.3 Effects on Human Health and Safety from Not Conducting BDM to Reduce Disease Threats or Outbreaks and Bird Strike Hazards at Airports

Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

This alternative has the greatest possibility of successfully reducing gull and cormorant damage and conflicts since all BDM methods could possibly be implemented or recommended by WS. An integrated BDM program reduces damage or threats to public health or safety to people who would have no relief from such damage or threats if nonlethal methods were ineffective or impractical. As discussed in Chapter 1, birds are a threat to aviation safety and can carry or be involved in the cycle of diseases that are transmittable to humans and that can adversely affect human health. In most cases, it is difficult to conclusively prove that the birds were responsible for transmission of individual human cases or outbreaks of bird-borne diseases. Nonetheless, certain requesters of BDM service may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, BDM, either by lethal or nonlethal means, would, if successful, reduce the risk of bird-borne disease transmission at the site for which BDM is requested.

In some situations the implementation of nonlethal controls such as electric or porcupine wires, netting barriers, and harassment could actually increase the risk of human health problems at other sites by causing the birds to move to other urban sites not previously affected. In such cases, lethal removal of the birds may be the best alternative from the standpoint of overall human health concerns in the local area. However, if WS is providing direct operational assistance in relocating 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.

Alternative 2 - Nonlethal BDM Only By WS

This alternative would reduce negative impacts caused by gulls and cormorants to human health and safety if non-lethal methods were effective in reducing such damage to acceptable levels. If non-lethal methods were ineffective WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that gull and cormorant impacts to human health and safety would likely remain the same or possibly increase dependent upon actions taken by the affected resource or land owner.

Under this alternative, WS would be restricted to implementing or recommending only nonlethal methods in providing assistance with gull and cormorant damage problems. Entities requesting BDM assistance for human health concerns would only be provided information on nonlethal barriers or exclusion devices, habitat alteration, nest and egg destruction, harassment methods, or other available nonlethal methods. Because some of these nonlethal methods would likely be effective at the individual sites where they are used, this alternative could create or increase human health risks at other locations to where the birds would then move. Some requesting entities such as city government officials would reject WS assistance for this reason and would likely seek to achieve bird control by other means. In such cases, human health risks may remain the same or become worse. Also, under this alternative, human health problems would probably increase if private individuals were unwilling to implement nonlethal control methods because of high cost or lack of faith in their effectiveness, or if nonlethal methods were ineffective at reducing damage to acceptable levels and they were unable to hire other entities to conduct lethal BDM for human health concerns.

Alternative 3 - Technical Assistance Only

With WS technical assistance but no direct operational assistance, entities requesting BDM for human health and safety concerns would either (1) not take any action which means the risk of human health problems would continue or would increase in each situation as the gull and cormorant populations are maintained or increased, (2) implement WS lethal and nonlethal recommendations which could result in birds relocating to other areas, and thereby creating or increasing human health risks at new sites, or (3) hire private pest control operators to conduct control activities. Under this alternative, human health problems could increase if private individuals were unable to achieve effective BDM with technical assistance alone, or if they were unable to hire other entities to conduct effective BDM for human health concerns. It would be expected that this alternative would have a greater chance of reducing human health and safety concerns than Alternative 4 since WS would be available to provide information and advice.

Alternative 4 - No Federal WS BDM

With no WS assistance, private individuals and community government officials would either (1) not take any action, which means the risk of human health problems would remain or would increase in each situation as gull and cormorant populations are maintained or increased, (2) implement their own lethal and nonlethal BDM program, which could result in birds relocating to other areas, and thereby creating or increasing human health risks at new sites, or (3) hire private pest control operators to conduct control activities. Under this alternative, human health problems could remain the same or increase if private individuals were unable to find and implement effective means of controlling gull and cormorant damage.

4.1.4 Effects on Socio-economics of the Human Environment

4.1.4.1 Effects on Human Affectionate-Bonds With Individual Birds and On Aesthetic Values of Wild Bird Species

Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

Some people who routinely view or feed individual birds, such as urban gulls, would likely be disturbed by removal of such birds under the current program. WS is aware of such concerns and has taken it into consideration in some cases to mitigate them.

Some people have been opposed to the killing of any birds during BDM activities. Under the current program, some lethal control of birds would continue and these persons would continue to be opposed. However, many persons who voice their opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS's 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, therefore continuing 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 abilities to view and interact with birds at these sites are usually either restricted to viewing from a location outside boundary fences or forbidden.

Alternative 2 - Nonlethal BDM Only By WS

Under this alternative, WS would not conduct any lethal BDM but would still conduct non-lethal BDM methods, such as nest and egg destruction and harassment of birds that were causing damage. Some people who oppose lethal control of wildlife by government but are tolerant of government involvement in nonlethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by the death of individual birds under this alternative, but might oppose dispersal or translocation of certain birds. The abundant populations of the target bird species in urban environments would enable people to continue to view them and to establish affectionate bonds with individual wild birds. Although WS would not perform any lethal activities under this alternative, other private entities would likely conduct BDM activities similar to those no longer conducted by WS; the effects would then be similar to the proposed action alternative.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational BDM but would still provide technical assistance or self-help advice to persons requesting assistance with bird damage. Some people who oppose direct operational assistance in wildlife damage management by the government but favor government technical assistance would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because the individual birds would not be killed by WS. However, other private entities would likely conduct BDM activities similar to those no longer conducted by WS; the effects would then be similar to the proposed action alternative.

Alternative 4 - No Federal WS BDM

Under this alternative, WS would not conduct any lethal removal of birds nor would the program conduct any nest and egg destruction or harassment of birds. Some people who oppose 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's activities under this alternative. However, other private entities would likely conduct BDM activities similar to those no longer conducted by WS; the effects would then be similar to the proposed action alternative.

4.1.4.2 Effects on Aesthetic and Value of Property Damaged by Birds

Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

This alternative has the greatest possibility of successfully reducing gull and cormorant damage and conflicts since all BDM methods could possibly be implemented or recommended by WS. Under this alternative, operational assistance in reducing bird problems, in which droppings from the birds cause unsightly messes, would improve aesthetic values of affected properties.

Relocation or dispersal of nuisance roosting or nesting populations of birds 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 who may assist in monitoring the birds' movements is generally conducted to assure they do not reestablish in other undesirable locations.

In some instances, large roosting or nesting populations of birds (i.e., cormorants) can destroy habitat and displace other nesting birds, reducing the aesthetic value for many. This alternative has the greatest possibility of successfully reducing such damage and conflicts since all BDM methods could possibly be implemented or recommended by WS.

Alternative 2 - Nonlethal Bird Damage Management Only By WS

This alternative would reduce the negative impacts caused by gulls and cormorants to the aesthetic values of property if non-lethal methods were effective in reducing such damage to acceptable levels. If non-lethal methods were ineffective WS would not be available to conduct or provide advice on any other types of control methods. In these situations it would be expected that negative impacts caused by gulls and cormorants would likely remain the same or possibly increase dependent upon actions taken by the affected resource or land owner.

Under this alternative, WS would be restricted to nonlethal methods only. Assuming property owners would choose to allow and pay for the implementation of these non-lethal methods, 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.

Relocation or dispersal of nuisance roosting or nesting populations of birds by harassment or exclusion 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 who may assist in monitoring the birds' movements is generally conducted to assure they do not reestablish in other undesirable locations.

Alternative 3 - Technical Assistance Only

Under this alternative, the lack of operational assistance in reducing bird problems could result in an increase of potential adverse affects on aesthetic values. However, potential adverse affects would likely be less than as those under Alternative 4, since WS would be providing technical assistance.

Relocation of nuisance roosting or nesting population of birds through harassment, barriers, or habitat alteration can sometimes result in the birds causing the same problems at the new location. If WS has only provided technical assistance to local residents or municipal authorities, coordination with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations might not be conducted, therefore increasing the potential of adverse effects to nearby property owners.

Alternative 4 - No Federal WS Bird Damage Management

Under this alternative, the lack of any operational or technical assistance by WS in reducing bird problems would mean aesthetic values of some affected properties would continue to be adversely affected if the property owners were not able to achieve BDM some other way. In many cases, this type of aesthetic "damage" would worsen because property owners would not be able to resolve their problems and bird numbers would continue to increase.

Relocation of nuisance roosting or nesting population of birds 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 or municipal authorities with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations might not be conducted; therefore the potential of adverse effects to nearby property owners is increased.

4.1.5 Humaneness and Animal Welfare Concerns of the Methods Used

4.1.5.1 Alternative 1 - Integrated BDM Program (Proposed Action/No Action)

Under this alternative, methods viewed by some persons as inhumane would be used in BDM by WS. These methods would include shooting and chemicals such as Avitrol.

Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane.

The chemical Avitrol repels birds by poisoning a few members of a flock, causing them to become hyperactive (see discussion in Appendix C). Their distress calls generally alarm the other birds and cause them to leave the site. Only a small number of birds need to be affected to cause alarm in the rest of the flock. The affected birds generally die. In most cases where Avitrol is used, only a small percentage of the birds are affected and killed by the chemical with the rest being merely dispersed. In experiments to determine suffering, stress, or pain in affected animals Rowsell et al. (1979) tested Avitrol on pigeons and observed subjects for clinical, pathological, or neural changes indicative of pain or distress. None were observed. Conclusions of the study were that the chemical met the criteria for a humane pesticide. Notwithstanding, some persons would view Avitrol as inhumane treatment of the birds that are affected by it based on the birds' distress-like behavior.

If registered in the future in New York, DRC-1339 could be included in BDM. This chemical causes a quiet and apparently painless death which results from uremic poisoning and congestion of major organs (Decino et al. 1966). The birds become listless and lethargic, and a quiet death normally occurs in 24 to 72 hours following ingestion. This method appears to result in a less stressful death than which probably occurs by most natural causes; which are primarily disease, starvation, and predation. For these reasons, WS might consider DRC-1339 use, following registration in New York, to be a relatively humane method of lethal BDM. However, despite the apparent painlessness of the effects of this chemical, some persons will view any method that takes a number of hours to cause death as inhumane and unacceptable.

Occasionally, birds captured alive by use of cage traps or by hand or with nets would be euthanized. The most common method of euthanasia would be by decapitation, cervical dislocation or CO_2 gas which are described and approved by AVMA as humane euthanasia methods (Beaver et al. 2001). Most people would view AVMA approved euthanasia methods as humane.

4.1.5.2 Alternative 2 - Nonlethal BDM Only By WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. WS could use and recommend nonlethal chemicals such as Avitrol, which repels birds by poisoning a few members of a flock, causing them to become hyperactive (see discussion in Appendix C). Their distress calls generally alarm the other birds and cause them to leave the site. Only a small number of birds need to be affected to cause alarm in the rest of the flock. The affected birds generally die. In most cases where Avitrol is used, only a small percentage of the birds are affected and killed by the chemical with the rest being merely dispersed. In experiments to determine suffering, stress, or pain in affected animals Rowsell et al. (1979) tested Avitrol on pigeons and observed subjects for clinical, pathological, or neural changes indicative of pain or distress. None were observed. Conclusions of the study were that the chemical met the criteria for a humane pesticide. Notwithstanding, some persons would view Avitrol as inhumane treatment of the birds that are affected by it based on the birds' distress-like behavior.

Shooting, live trapping/capture and euthanization by decapitation, cervical dislocation or CO_2 gas could be used by non-WS entities and, similar to the current program alternative, would be viewed by some persons as inhumane.

4.1.5.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any lethal or nonlethal BDM, but would provide self-help advice only. Thus, lethal methods viewed as inhumane by some persons would not be used by WS. Without WS direct operational assistance, it is expected that many requesters of BDM would reject nonlethal recommendations or would not be willing to pay the extra cost of implementing and maintaining them and would seek alternative lethal means. Similar to Alternative 2, Avitrol, shooting, live trapping/capture and euthanization by decapitation, cervical dislocation or CO_2 gas would be available for private use and would be viewed by some persons as inhumane.

4.1.5.4 Alternative 4 - No Federal WS Bird Damage Management

Under this alternative, methods viewed as inhumane by some persons would not be used by WS. Similar to Alternative 2 and 3, shooting, Avitrol, live trapping/capture and euthanasia by decapitation, cervical dislocation or CO_2 gas could be used by these entities and would be viewed by some persons as inhumane.

4.2 CUMULATIVE IMPACTS

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

Under Alternatives 1, 2 and 3, WS would address damage associated with gulls and cormorants in a number of situations throughout the State. The WS BDM program would be the primary federal program with BDM responsibilities; however, some state and local government agencies may conduct BDM activities in New York as well. Through ongoing coordination with these agencies, WS is aware of such BDM activities and may provide technical assistance in such efforts. WS does not normally conduct direct damage management activities concurrently with such agencies in the same area, but may conduct BDM activities at adjacent sites within the same time frame. In addition, commercial pest control companies may conduct BDM activities in the same area. The potential cumulative impacts analyzed below could occur either as a result of WS BDM program activities over time, or as a result of the aggregate effects of those activities combined with the activities of other agencies and individuals.

Cumulative Impacts on Wildlife Populations

Bird Damage Management methods used or recommended by the WS program in New York will likely 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 for New York, the region and the U.S. When control 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

BDM programs which include the use of pesticides as a lethal population management component may have the greatest potential for cumulative impacts on the environment as such impacts relate to deposit of chemical residues in the physical environment and environmental toxicosis. The frightening agent, Avitrol, is the only chemical currently used or recommended by the New York WS BDM program for the purpose of obtaining lethal effects on birds. Another possible lethal chemical that may be used by WS in the future if it becomes registered for use in NY is the avicide, DRC-1339. Both of these chemicals have been evaluated for possible residual effects which might occur from buildup of the chemicals in soil, water, or other environmental sites.

> ***Avitrol*** may be used or recommended by the New York 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. Avitrol exhibits a high persistence in soil and water but, according to literature, does not bioaccumulate (USDA 1997 and EXTOXNET 2000). Because of the characteristic of Avitrol to bind to soils, it is not expected to be present in surface or ground water as a result of its use on land (EPA 1980). 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 (EPA 1980).
>
> ***DRC-1339*** exhibits a low persistence in soil or water, and bioaccumulation of the chemical is unlikely (USDA 1997). Additionally, the relatively small quantity of DRC-1339 that could potentially be used in BDM programs in New York, the chemical's instability which results in speedy degradation of the product, and application protocol used in WS programs further reduces the likelihood of any environmental accumulation.

Based on potential use patterns, the chemical and physical characteristics of DRC-1339 and 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 BDM program in New York.

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

Cumulative Impact Potential from Non-chemical Components

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

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

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 WS BDM shooting activities conform to federal, state and local laws. If activities are conducted near or over water, WS uses steel shot during activities. Consequently, no deposition of lead in nontoxic shot zones is likely to occur as a result of WS BDM actions in New York. Therefore, cumulative impacts are not likely to occur if toxic shot is used. Additionally, WS will evaluate other BDM 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 gulls 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 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.

SUMMARY

No significant cumulative environmental impacts are expected from any of the 4 alternatives. Under the Proposed Action, the lethal removal of birds by WS would not have a significant impact on overall gull and cormorant populations in New York, but some local reductions may occur. No risk to public safety is expected when WS' services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists/specialists would conduct and recommend BDM activities. There is a slight increased risk to public safety when persons who reject WS assistance and recommendations in Alternatives 1, 2 and 3 and conduct their own BDM activities, and when no WS assistance is provided in Alternative 4. In all 4 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 BDM activities on public and private lands within the state of New York, the analysis in this EA indicates that WS Integrated BDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-1 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-1. Summary of expected impacts of each of the alternatives on each of the issues related to BDM by WS in New York.

Issues	*Alternative 1* *Integrated Bird Damage Management Program (Proposed Action/No Action)*	*Alternative 2* *Nonlethal BDM Only by WS*	*Alternative 3* *Technical Assistance Only*	*Alternative 4* *No Federal WS BDM Program*
Target Species Effects	Low effect - reductions in local gull and cormorant numbers; would not significantly affect state and regional populations	Low effect - reductions in local gull and cormorant numbers by non-WS personnel likely; would not significantly affect state and regional populations.	No effect by WS. Low effect - reductions in local gull and cormorant numbers by non-WS personnel likely; would not significantly affect state and regional populations.	No effect by WS. Low effect - reductions in local gull and cormorant numbers by non-WS personnel likely; would not significantly affect state and regional populations
Effects on Other Wildlife Species, Including T&E Species	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	Low effect - methods used by WS would be highly selective with very little risk to non-target species.	No effect by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.
Effects on Human Health and Safety	The proposed action has the greatest potential of successfully reducing this risk. Low risk from methods used by WS.	Impacts could be greater under this alternative than the proposed action. Low risk from methods used by WS.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing bird damage than under the proposed action.	Efforts by non-WS personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing bird damage than under the proposed action.
Aesthetic Enjoyment of Birds	Low to moderate effect at local levels; Some local populations may be reduced; WS bird damage management activities do not adversely affect overall regional or state gull and cormorant populations.	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 and state gull and cormorant populations.	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 and state gull and cormorant populations.	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 and state gull and cormorant populations.
Aesthetic Damage Caused by Birds	Low effect - bird damage problems most likely to be resolved without creating or moving problems elsewhere.	Moderate to High effect - birds may move to other sites which can create aesthetic damage problems at new sites. Less likely than Alt. 1 and 4.	Moderate to High effect - birds may move to other sites which can create aesthetic damage problems at new sites.	High effect - bird problems less likely to be resolved without WS involvement. Birds may move to other sites which can create aesthetic damage problems at new sites

Issues	***Alternative 1*** ***Integrated Bird Damage Management Program (Proposed Action/No Action)***	***Alternative 2*** ***Nonlethal BDM Only by WS***	***Alternative 3*** ***Technical Assistance Only***	***Alternative 4*** ***No Federal WS BDM Program***
Humaneness and Animal Welfare Concerns of Methods Used	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 2 since only non-lethal methods would be used by WS	No effect by WS. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non-WS personnel would be variable.

CHAPTER 5: LIST OF PREPARERS, CONSULTANTS, AND REVIEWERS

5.0 LIST OF PREPARERS AND PERSONS CONSULTED

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APPENDIX A

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APPENDIX B

PERMITS FOR WS BDM PROGRAMS IN NEW YORK

APPENDIX C

BIRD DAMAGE MANAGEMENT (BDM) METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE NEW YORK WILDLIFE SERVICES PROGRAM

NONLETHAL METHODS - NONCHEMICAL

Agricultural producer and property owner practices. These consist primarily of nonlethal preventive methods such as changing cultural methods and implementing habitat modification. Cultural methods and other management techniques are implemented by the agricultural producer or property owners/managers. Resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. These methods include:

> **Cultural methods.** These may include altering planting dates so that crops are not young and more vulnerable to damage when the damage-causing species is present, or the planting of crops that are less attractive or less vulnerable to such species. Cultural methods also include locating resources damaged by birds away from roosting, nesting, feeding or loafing areas. At feedlots or dairies, cultural methods generally involve modifications to the level of care or attention given to livestock which may vary depending on the age and size of the livestock. Animal husbandry practices include but are not limited to techniques such as night feeding, indoor feeding, closed barns, removal of spilled grain or standing water, and use of bird proof feeders (Johnson and Glahn 1994).
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> **Environmental/Habitat modification** can be an integral part of BDM. Wildlife production and/or presence is directly related to the type, quality, and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain bird species or to repel certain birds. In most cases, the resource or property owner is responsible for implementing habitat modifications, and WS only provides advice on the type of modifications that have the best chance of achieving the desired effect. Habitat management is most often a primary component of BDM strategies at or near airports to reduce bird aircraft strike problems by eliminating bird nesting, roosting, loafing, or feeding sites. Generally, many bird problems on airport or other properties can be minimized through management of vegetation and water from areas adjacent to aircraft runways or the resource to be protected.

Animal behavior modification. This refers to tactics that alter the behavior of wildlife to reduce damage. Animal behavior modification may involve use of scare tactics or fencing to deter or repel animals that cause loss or damage (Twedt and Glahn 1982). Some but not all methods that are included by this category are:

- Bird-proof barriers
- Electronic guards
- Propane exploders
- Pyrotechnics
- Distress calls and sound producing devices
- Scare crows
- Mylar tape
- Eye-spot balloons
- Lasers

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, Graves and Andelt 1987, Mott 1985, Shirota and Misake 1983, Conover 1982, Arhart 1972). Mylar tape and flagging has produced mixed results in its effectiveness to frighten birds (Belant and Ickes 1997, Dolbeer et al. 1986, Tobin et al. 1988). Generally, scaring devices that affect more than one of the birds' senses are more effective. Mylar tape and flagging have both visual and auditory components that have better repellency.

Bird proof barriers can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which requires overhead barriers as well as peripheral fencing or netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993). Overhead wire grids can deter gulls from nesting, loafing, and feeding areas (Blokpoel and Tessier 1984, Belant and

Ickes 1996, Dolbeer et al. 1988). The birds apparently fear colliding with the wires and thus avoid flying into areas where the method has been employed.

Netting can be used to exclude birds from a specific area by the placement of bird proof netting over and around the specific resource to be protected. Exclusion may be impractical in some settings (e.g., commercial agriculture); however it can be practical in small areas (e.g., personal gardens) or for high-value crops (e.g., grapes). Although this alternative would provide short-term relief from damage, it may not completely deter birds from feeding, loafing, staging, or roosting at that site. A few people would find exclusionary devices such as netting unsightly, unappealing, and detrimental to the aesthetic value of the neighborhood when used over personal gardens.

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scare crows, and audio distress/predator vocalizations are effective in many situations for dispersing damage-causing bird species. These devices are sometimes effective but usually only for a short period of time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Rossbach 1975, Mott 1985, Shirota and Masake 1983, and Arhart 1972). Numbers of cormorants intensely harassed with pyrotechnics at roost sites in Mississippi were greatly reduced in comparison with numbers at roosts that were not harassed or less intensely harassed. Harassment of cormorant roosting sites resulted in a reduction in cormorant predation and less money spent on cormorant control compared with previous years with no roost harassment (Mott et al. 1998). Williams (1983) reported an approximate 50% reduction in blackbirds at two south Texas feedlots as a result of pyrotechnics and propane cannon use. However, they are often not practical in dairy or feedlot situations because of the disturbance to livestock, although livestock can generally be expected to 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.

Visual scaring techniques such as use of Mylar tape (highly reflective surface produces flashes of light that startles birds), eye-spot balloons (the large eyes supposedly give birds a visual cue that a large predator is present), flags, effigies (scarecrows), sometimes are effective in reducing bird damage. Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, Tobin et al. 1988, Belant and Ickes 1997). Pochop et al (2001) tested a visual barrier made of woven black polypropylene fabric in parallel rows 5 m apart to discourage gull nesting to protect salmon smolt along the Columbia River in Washington State. The zone with fencing had 84% fewer nests than the control zone. Silt fencing showed potential as a non lethal bird management technique. Generally, birds quickly learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics.

Lasers are a non-lethal technique recently evaluated by the USDA, APHIS, WS, National Wildlife Research Center (NWRC) (Blackwell et al. 2002, Glahn et al. 2000). The low-powered laser has proven to be effective in dispersing a variety of bird species in a number of different environments. The low-powered laser is most effective before dawn or after dusk when the red beam of the laser is clearly visible. Bright sunlight will "wash out" the laser light rendering it ineffective. Although researchers are not sure if birds see the same red spot as people, it is clear that certain bird species elicit an avoidance response in reaction to the laser. The birds view the light as a physical object or predator coming toward them and generally fly away to escape. Research, however, has shown that the effectiveness of low-powered lasers varies depending on the bird species and the context of the application.

Waterfowl, such as ducks and geese, have been successfully relocated using low-powered lasers (Blackwell et al. 2002). Long-legged wading birds, like great blue herons, have also been successfully dispersed using low-powered laser light. This discovery is especially important to aquaculture producers because it gives them another nonlethal tool for combating the heron, the double-crested cormorant, and other fish-eating birds (Glahn et al. 2000a).

In addition to these successes, low-powered lasers have proven effective against crows, gulls at landfills, and vultures. In Hawaii they have been tested as a potential means for moving endangered species out of industrial areas and airports where their foraging activities put the birds themselves at risk and pose a safety threat to air traffic.

It has been found that blackbirds, starlings, and pigeons generally don't readily respond to low-powered lasers (Blackwell et al. 2002). The reason for this distinction in response is likely due to the very different eye structure of bird species active at night or in low-light situations. Because these species are active during the day, traditional means of dispersal are still most effective with these species.

The low-powered lasers that have been developed safely and effectively disperse birds without harming them or people. At higher levels, lasers can burn tissue, causing injury to people and animals. Although low-powered lasers can be effective when used in combination with other nonlethal methods, they should not be considered a cure-all. As with any nonlethal measure, once enforcement stops, problem birds can return to cause conflict again. In certain situations, nonlethal management efforts must be continuous to have the desired impact.

Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. Nest destruction is generally only applied when dealing with a single bird 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. Nest destruction can be very time consuming because most birds will repeatedly rebuild nests. This method poses no imminent danger to pets or to the public.

Egg addling/destruction is a method of suppressing reproduction in local nuisance bird populations by destroying egg embryos 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 (see *Egg oiling* below). Although WS does not commonly use egg addling or destruction, it is a valuable damage management tool and has proven effective in some applications.

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.

NONLETHAL METHODS - CHEMICAL

Avitrol is a chemical frightening agent (repellent) that is effective in a single dose when mixed with untreated baits, normally in a ration of 1:9. Avitrol, however, is not completely nonlethal in that a small portion of the birds are generally killed (Johnson and Glahn 1994). This chemical is registered for use on pigeons, crows, gulls, blackbirds, starlings, and English sparrows in various situations. Pre-baiting is usually necessary to achieve effective bait acceptance by the target species. Avitrol treated bait is placed in an area where the targeted birds are feeding and usually a few birds will consume treated bait and become affected by the chemical. The affected birds then broadcast distress vocalizations and display abnormal flying behavior, thereby frightening the remaining flock away.

Avitrol is a restricted use pesticide that can only be sold to certified applicators and is available in several bait formulations where only a small portion of the individual grains carry the chemical. It can be used anytime of the year, but is used most often during winter and spring. 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 availability for intake by organisms from water, is non-accumulative in tissues and rapidly metabolized by many species (Schafer 1991).

Avitrol is acutely toxic to avian and mammalian species, however, blackbirds are more sensitive to the chemical and there is little evidence of chronic toxicity. 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 that were fed contaminated blackbirds for seven to 45 days were not adversely affected. Some hazards may occur to predatory species consuming unabsorbed chemical in the GI tract of affected or dead birds (Holler and Shafer 1982, Schafer 1981). 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 nontarget indicator species tested on this compound (USDA 1997, Appendix P).

Methyl anthranilate (artificial grape flavoring used in foods and soft drinks for human consumption) could be used or recommended by WS as a bird repellent. Methyl anthranilate (MA) (artificial grape flavoring food additive) has been shown to be a promising repellent for many bird species, including gulls and waterfowl (Dolbeer et al. 1993, Belant et al. 1995b). Cummings et al. (1995) found effectiveness of MA declined significantly after 7 days. MA is also under investigation as a potential bird taste repellent. MA may become available for use as a livestock feed additive (Mason et al. 1984; Mason et al. 1989). It is registered for applications to turf or to surface water areas used by unwanted birds. The material has been shown to be nontoxic to bees ($LD_{50} > 25$ micrograms/bee[4]), nontoxic to rats in an inhalation study ($LC_{50} > 2.8$ mg/L[5]), and of relatively low toxicity to fish and other invertebrates. Methyl anthranilate is naturally occurring in concord grapes and in the blossoms of several species of flowers and is used as a food additive and perfume ingredient (Dolbeer et al. 1992; RJ Advantage, Inc. 1997). It has been listed as "Generally Recognized as Safe" (GRAS) by the U.S. Food and Drug Administration (FDA) (Dolbeer et al. 1992).

Water surface and turf applications of MA are generally considered expensive. For example, the least intensive application rate required by label directions is 20 lbs. of product (8 lbs. active ingredient) per acre of surface water at a cost of about $64/lb. with retreating required every 3-4 weeks (RJ Advantage, Inc. 1997). Cost of treating turf areas would be similar on a per acre basis. Also, MA completely degrades in about 3 days when applied to water (RJ Advantage, Inc. 1997) which indicates the repellent effect is short-lived.

A potentially more cost effective method of MA application is the use of a fog-producing machine (Vogt 1997). The fog drifts over the area to be treated and is irritating to the birds while being nonirritating to any humans that might be exposed. Fogging applications must generally be repeated 3-5 times after the initial treatment before the birds abandon a treatment site (Dr. P. Vogt, RJ Advantage, Inc., Pers. Comm. 1997). Applied at a rate of about .25 lb/acre of water surface, the cost is considerably less than when using the turf or water treatment methods.

MA is also being investigated as a livestock feed additive to reduce or prevent feed consumption by birds. Such chemicals undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by EPA or the FDA.

Alpha-Chloralose (AC) is a central nervous system depressant used as an immobilizing agent to capture and remove nuisance waterfowl and other birds. Alpha-Chloralose is not currently registered for use in New York but may be considered for use if it becomes registered in the future. It is labor intensive and in some cases, may not be cost effective (Wright 1973, Feare et al. 1981), but is typically used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, ore resorts. AC is typically delivered as well-contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds. WS personnel are present at the site of application during baiting to retrieve the immobilized birds. Unconsumed baits are removed from the site following each treatment. AC was eliminated from more detailed analysis in USDA (1997) based on critical element screening; therefore, environmental fate properties of this compound were not rigorously assessed. However, the solubility and mobility are believed to be moderate and environmental persistence is believed to be low. Bio-accumulation 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 fro immobilization is designed to be about two to 30 times lower than the LD_{50}.Mammalian data indicate higher LD_{50} values than birds. Toxicity to

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[4]An LD_{50} is the dosage in milligrams of material per kilogram of body weight, or, in this case in micrograms per individual bee, required to cause death in 50% of a test population of a species.
[5]An LC_{50} is the dosage in milligrams of material per liter of air required to cause death in 50% of a test population of a species through inhalation.

aquatic organisms is unknown (Woronecki 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. Other supporting rationale for this determination included relatively low total annual use and a limited number of potential exposure pathways. The agent is currently approved for use by WS in other states as an Investigative New Animal Drug by the FDA rather than a pesticide, but it is not currently registered for use in New York State.

Particulate feed additives have been investigated for their bird-repellent characteristics. In pen trials, European starlings rejected grain to which charcoal particles were adhered (L. Clark, NWRC, Pers. Comm. 1999). If further research finds this method to be effective and economical in field application, it might become available as a bird repellent on livestock feed. Charcoal feed additives have been explored for use in reducing methane production in livestock and should have no adverse effects on livestock, on meat or milk production, or on human consumers of meat or dairy products (L. Clark, NWRC, Pers. Comm. 1999).

Other chemical repellents. A number of other chemicals have shown bird repellent capabilities. 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 not currently registered for use in New York but may be considered for use if it becomes registered in the future. It has also shown effectiveness as a foraging repellent against Canada geese grazing on turf and as a seed repellent against brown-headed cowbirds (Dolbeer et al. 1998). Compounds extracted from common spices used in cooking and applied to perches in cage tests have been shown repellent characteristics against roosting European starlings (Clark 1997).

Tactile repellents. A number of tactile repellent products on the market reportedly deter birds from roosting on certain structural surfaces by presenting a tacky or sticky surface that the birds avoid. However, experimental data in support of this claim are sparse (Mason and Clark 1992). The repellency of tactile products is generally short-lived because dust and temperature extremes reduce their tackiness. They sometimes cause aesthetic problems and expensive clean-up by running down the sides of buildings in hot weather.

Egg oiling is a method for suppressing reproduction of nuisance birds by spraying a small quantity of food grade vegetable oil or mineral oil on eggs in nests. The oil prevents exchange of gases and causes asphyxiation of developing embryos and has been found to be 96-100% effective in reducing hatchability. (Pochop 1998, Pochop et al. 1998). The method has an advantage over nest or egg destruction in that the incubating birds generally continue incubation and do not re-nest. Blackwell et al (2000b) found that gull eggs oiled later (7-15 days before expected hatch date) in the incubation period were less likely to produce chicks (1% hatch versus 20% hatch) than eggs oiled early (21-27 days before EHD) in the incubation period. The EPA has ruled that use of corn oil for this purpose is exempt from registration requirements under FIFRA. To be most effective, the oil should be applied anytime between the fifth day after the laying of the last egg in a nest and at least five days before anticipated hatching. This method is extremely target specific and is less labor intensive than egg addling.

LETHAL METHODS - MECHANICAL

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large numbers of birds are present. In a comparison between the use of pyrotechnics and shooting as a method to disperse cormorants from their night roosts in Mississippi, shooting was found to be at least equally as effective as pyrotechnics for dispersing cormorants from their night roosts. It was also found to be unlikely to result in a large number of birds being killed (Glahn 2000, Glahn et al. 2000b). Normally shooting is conducted with shotguns, rifles or air rifles. Shooting is a very individual specific method and is normally used to remove a single offending bird. 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 nonlethal methods. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997). It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting with shotguns, air rifles, or rim and center fire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. All firearm safety precautions are followed by WS when conducting BDM activities and all laws and regulations governing the lawful use of firearms are strictly complied with.

Firearm use is a very sensitive public concern because of safety and misuse issues. 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.

Live-trap and euthanasia can be used to reduce local populations of birds. Birds captured in live traps are subsequently euthanized by AVMA approved methods of cervical dislocation or CO^2.

Live traps include:

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 traps are used to capture birds attracted to an area where nesting is occurring. The most common nest trap is a starling nest box trap. This consists of a box with a small opening for the bird to enter and a trigger on the inside that blocks the entrance opening when the bird rests on the bottom of the box (DeHaven and Guarino 1969). Nest traps for gulls are made of a wire mesh box with a funnel opening. The wire mesh box is placed over the nest. When the bird returns and enters the funnel to sit on the nest, it is trapped inside (Weaver and Kadlec 1970). Nest traps as applied and used by WS, pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Mist nets are more commonly used for capturing small-sized birds such as English sparrows, finches, etc. but can be used to capture larger birds such as ducks and ring-neck pheasants or even smaller nuisance hawks and owls. It was introduced into 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 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.

Cervical dislocation is sometimes used to euthanize birds which are captured by hand or in live traps. The bird is stretched and the neck is hyper extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and other small birds (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and can be quickly accomplished (Beaver et al. 2001).

LETHAL METHODS - CHEMICAL

All chemicals used by WS are registered as required by the FIFRA (administered by the EPA and the NYSDEC, Bureau of Pesticides). WS personnel that use restricted-use chemical methods are certified as pesticide applicators by the State of New York and are required to adhere to all certification requirements set forth in FIFRA and New York pesticide control laws and regulations. Chemicals are only used on private, public, or tribal property sites with authorization from the property owner/manager.

CO_2 is sometimes used to euthanize birds which are captured in live traps. Live birds are placed in a container such as a plastic 5-gallon bucket or chamber and sealed shut. CO_2 gas is released into the bucket or chamber and birds quickly die after inhaling the gas. This method is approved as a euthanizing agent by the AVMA (Beaver et al. 2001). CO_2 gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO_2 by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

DRC-1339 is not currently registered for use in New York but may be considered for use if it becomes registered in the future. For more than 30 years, DRC-1339 has been proven to be an effective method of bird control at feedlots, dairies, airports, and in urban areas (West et al. 1967, Besser et al. 1967, Decino et al. 1966). Studies continue to document the effectiveness of DRC-1339 in resolving bird damage problems at feedlots (West and Besser 1976, Glahn 1982, Glahn et al. 1987), and Blanton et al. (1992) reports that DRC-1339 appears to be a very effective, selective, and safe means of urban bird population reduction. 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 BDM project.

DRC-1339 is a slow acting avicide that is registered with the EPA for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 was developed as an avicide because of its differential toxicity to mammals. DRC-1339 is highly toxic to sensitive species but only slightly toxic to nonsensitive birds, predatory birds, and mammals. For example, starlings, a highly sensitive species, require a dose of only 0.3 mg/bird to cause death (Royall et al. 1967). Most bird species that are responsible for damage are highly sensitive to DRC-1339. Many other bird species, such as raptors, sparrows, and eagles, are classified as nonsensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to nontarget and T&E species (USDA 1997). Secondary poisoning has not been observed with DRC-1339 treated baits. During research studies, carcasses of birds which died from DRC-1339 were fed to raptors and scavenger mammals for 30 to 200 days with no symptoms of secondary poisoning observed (Cunningham et al. 1981). This can be attributed to relatively low toxicity to species that might scavenge on birds killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Secondary hazards of DRC-1339 are almost nonexistent. DRC-1339 acts in a humane manner producing a quiet and apparently painless death.

DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultra violet 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.

APPENDIX D

MEMORANDA OF UNDERSTANDING WITH AGENCIES COLLABORATING WITH WILDLIFE SERVICES IN THE BIRD DAMAGE MANAGEMENT PROGRAM IN NEW YORK

APPENDIX E

SPECIES THAT ARE FEDERALLY LISTED AS THREATENED OR ENDANGERED IN THE STATE OF NEW YORK

SPECIES THAT ARE FEDERALLY LISTED AS THREATENED OR ENDANGERED IN THE STATE OF NEW YORK

Endangered

Birds	
Roseate tern	*Sterna dougallii dougallii*
Eskimo curlew	*Numenius borealis*
Piping plover[1]	*Charadrius melodus*
Mammals	
Indiana bat	*Myotis sodalis*
Sperm whale	*Physeter catodon*
Sei whale	*Balaenoptera borealis*
Blue whale	*Balaenoptera musculus*
Finback whale	*Balaenoptera physalus*
Humpback whale	*Megaptera novaeangliae*
Right whale	*Eubalaena glacialis*
Gray wolf[2]	*Canis lupus*
Cougar[2]	*Felis concolor*
Reptiles	
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*
Atlantic ridley sea turtle	*Lepidochelys kempii*
Leatherback sea turtle	*Dermochelys coriacea*
Fishes	
Shortnose sturgeon	*Acipenser brevirostrum*
Insects	
Karner blue	*Lycaeides melissa samuelis*
American burying beetle[2]	*Nicrophorus americanus*+
Molluscs	
Dwarf wedgemussel	*Alasmidonta heterodon*
Pink mucket	*Lampsilis abrupta*
Clubshell	*Pleurobema clava*
Fat pocketbook	*Potamilus capax*
Plants	
Gerardia, sandplain	*Agalinis acuta*

Threatened

Birds	
Bald eagle	*Haliaeetus leucocephalus*
Piping plover[1]	*Charadrius melodus*
Mammals	
Canada lynx[2]	*Lynx canadensis*
Reptiles	
Green sea turtle	*Chelonia mydas*
Loggerhead sea turtle	*Caretta caretta*
Bog turtle	*Clemmys muhlenbergii*
Molluscs	
Chittenango ovate amber snail	*Novisuccinea chittenangoensis*
Insects	
Northeastern beach tiger beetle	*Cicindela dorsalis dorsalis*
Plants	
Monkshood, northern wild	*Aconitum noveboracense*
Amaranth, seabeach	*Amaranthus pumilus*
Fern, American hart's-tongue	*Asplenium scolopendrium* var. *americanum*
Roseroot, Leedy's	*Sedum integrifolium* ssp. *Leedy*
Goldenrod, Houghton's	*Solidago houghtonii*

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[1]The piping plover is listed as federally endangered in the Great Lakes Region, and as federally threatened in the Atlantic Coastal Region.
[2]Extirpated - species is not extinct, but no longer occurring in a wild state within New York, or no longer exhibiting patterns of use traditional for that species in New York.

APPENDIX F

SPECIES THAT ARE STATE LISTED AS THREATENED, ENDANGERED, OR OF SPECIAL CONCERN IN THE STATE OF NEW YORK

SPECIES THAT ARE STATE LISTED AS THREATENED, ENDANGERED, OR OF SPECIAL CONCERN IN THE STATE OF NEW YORK

Endangered

Birds	
Roseate tern	*Sterna dougallii*
Eskimo curlew	*Numenius borealis*
Piping plover	*Charadrius melodus*
Peregrine falcon	*Falco peregrinus*
Spruce grouse	*Falcipennis canadensis*
Black rail	*Laterallus jamaicensis*
Black tern	*Chlidonias niger*
Short-eared owl	*Asio flammeus*
Loggerhead shrike	*Lanius ludovicianus*
Golden eagle[1]	*Aquila chrysaetos*
Mammals	
Indiana bat	*Myotis sodalis*
Sperm whale	*Physeter catodon*
Sei whale	*Balaenoptera borealis*
Blue whale	*Balaenoptera musculus*
Finback whale	*Balaenoptera physalus*
Humpback whale	*Megaptera novaeangliae*
Right whale	*Eubalaena glacialis*
Gray wolf[1]	*Canis lupus*
Cougar[1]	*Felis concolor*
Allegheny woodrat[1]	*Neotoma magister*
Reptiles	
Atlantic hawksbill sea turtle	*Eretmochelys imbricata*
Atlantic ridley sea turtle	*Lepidochelys kempii*
Leatherback sea turtle	*Dermochelys coriacea*
Mud turtle	*Kinosternon subrubrum*
Bog turtle	*Clemmys muhlengergii*
Queen snake	*Regina septemvittata*
Massasauga	*Sistrurus catenatus*
Amphibians	
Tiger salamander	*Ambystoma tigrinum*
Northern cricket frog	*Acris crepitans*
Fishes	
Shortnose sturgeon	*Acipenser brevirostrum*
Pugnose shiner	*Notropis anogenus*
Round whitefish	*Prosopium cylindraceum*
Bluebreast darter	*Etheostoma camurum*
Deepwater sculpin	*Myoxocephalus thompsoni*
Silver chub[1]	*Macrhybopsis storeriana*
Gilt darter[1]	*Percina evides*
Spoonhead sculpin[1]	*Cottus ricei*
Insects	
Karner blue	*Lycaeides melissa samuelis*

Tomah mayfly	*Siphlonisca aerodromia*
Hessel's hairstreak	*Callophrys hesseli*
Regal fritillary	*Speyeria idalia*
Persius duskywing	*Erynnis persius*
Grizzled skipper	*Pyrgus centaureae wyandot*
Arogos skipper	*Atrytone arogos arogos*
Bog buckmoth	*Hemileuca species 1*
Pine pinion moth	*Lithophane lepida lepida*
American burying beetle[1]	*Nicrophorus americanus*
<u>Molluscs</u>	
Dwarf wedgemussel	*Alasmidonta heterodon*
Pink mucket	*Lampsilis abrupta*
Clubshell	*Pleurobema clava*
Fat pocketbook	*Potamilus capax*
Rayed bean	*Villosa fabalis*
Chittenango ovate amber snail	*Novisuccinea chittenangoensis*
<u>Plants</u>	
Virginia three-seeded mercury	*Acalypha virginica* var. *virginica*
Moschatel	*Adoxa moschatellina*
Sandplain gerardia	*Agalinis acuta*
Wild leek	*Allium burdickii*
Seabeach amaranth	*Amaranthus pumilus*
Nantucket juneberry	*Amelanchier nantucketensis*
Champlain beachgrass	*Ammophila champlainensis*
Peanut grass	*Amphicarpum purshii*
Angelica	*Angelica lucida*
Alpine sweetgrass	*Anthoxanthum monticolum* ssp. *orthanthum*
Puttyroot	*Aplectrum hyemale*
Drummond's rock cress	*Arabis drummondii*
Toothed rock-cress	*Arabis shortii*
Virginia snakeroot	*Aristolochia serpentaria*
Arnica	*Arnica lanceolata*
Wild sage	*Artemisia campestris* var. *borealis*
White milkweed	*Asclepias variegata*
Bradley's spleenwort	*Asplenium bradleyi*
Green spleenwort	*Asplenium trichomanes-ramosum*
Lindley's aster	*Aster ciliolatus*
Silvery aster	*Aster concolor*
Smooth blue aster	*Aster laevis* var. *concinnus*
Tall white aster	*Aster lanceolatus* var. *interior*
Calico aster	*Aster lateriflorus* var. *hirsuticaulis*
Sky-blue aster	*Aster oolentangiensis*
Cornel-leaved aster	*Aster puniceus* var. *firmus*
Swamp aster	*Aster radula*
Cooper's milkvetch	*Astragalus neglectus*
Seaside orach	*Atriplex glabriuscula*
Orache	*Atriplex subspicata*
Screw-stem	*Bartonia paniculata*
Tundra dwarf birch	*Betula glandulosa*
Dwarf white birch	*Betula minor*
Estuary beggar-ticks	*Bidens hyperborea*
Downy wood-mint	*Blephilia ciliata*

Prairie dunewort	*Botrychium campestre*
Moonwort	*Botrychium lunaria*
Mingan moonwort	*Botrychium minganense*
Blunt-lobe grape fern	*Botrychium oneidense*
Rugulose grape fern	*Botrychium rugulosum*
Side-oats grama	*Bouteloua curtipendula*
Blue-hearts	*Buchnera americana*
Sweet-scented Indian-plantain	*Cacalia suaveolens*
Wood reedgrass	*Calamagrostis perplexa*
Porter's reedgrass	*Calamagrostis porteri* ssp. *porteri*
Northern reedgrass	*Calamagrostis stricta* ssp. *stricta*
Autumnal water-starwort	*Callitriche hermaphroditica*
Calypso	*Calypso bulbosa*
Mountain watercress	*Cardamine rotundifolia*
Glomerate sedge	*Carex aggregata*
Narrow-leaved sedge	*Carex amphibola* var. *amphibola*
Northern clustered sedge	*Carex arcta*
Awned sedge	*Carex atherodes*
Black sedge	*Carex atratiformis*
Barratt's sedge	*Carex barrattii*
Button sedge	*Carex bullata*
Hair-like sedge	*Carex capillaris*
Carolina sedge	*Carex caroliniana*
Collins' sedge	*Carex collinsii*
Soft fox sedge	*Carex conjuncta*
Cypress-knee sedge	*Carex decomposita*
Emory's sedge	*Carex emoryi*
Glaucous sedge	*Carex flaccosperma* var. *glaucodea*
Frank's sedge	*Carex frankii*
Elk sedge	*Carex garberi*
Northern bog sedge	*Carex gynocrates*
Cloud sedge	*Carex haydenii*
Loose-flowered sedge	*Carex laxiflora* var. *serrulata*
Livid sedge	*Carex livida* var. *radicaulis*
Mead's sedge	*Carex meadii*
Midland sedge	*Carex mesochorea*
Black sedge	*Carex nigra*
Black-edge sedge	*Carex nigromarginata*
Reflexed sedge	*Carex retroflexa*
Canadian single-spike sedge	*Carex scirpoidea*
Short's sedge	*Carex shortiana*
Straw sedge	*Carex straminea*
Lined sedge	*Carex striatula*
Bent sedge	*Carex styloflexa*
Many-head sedge	*Carex sychnocephala*
Sparse-flowered sedge	*Carex tenuiflora*
Tinged sedge	*Carex tincta*
Sheathed sedge	*Carex vaginata*
Graceful sedge	*Carex venusta* var. *minor*
Wiegand's sedge	*Carex wiegandii*
Scarlet Indian-paintbrush	*Castilleja coccinea*
Prairie redroot	*Ceanothus herbaceus*
Spreading chervil	*Chaerophyllum procumbens*
Slender spikegrass	*Chasmanthium laxum*

Wooly lip-fern	*Cheilanthes lanosa*
Missouri goosefoot	*Chenopodium album* var. *missouriense*
Large calyx goosefoot	*Chenopodium berlandieri* var. *macrocalycium*
Blue-eyed-Mary	*Collinsia verna*
Striped coralroot	*Corallorhiza striata*
Broom crowberry	*Corema conradii*
Rough-leaf dogwood	*Cornus drummondii*
Pigmyweed	*Crassula aquatica*
Hawthorn	*Crataegus berberifolia*
Compact hawthorn	*Crataegus compacta*
Downy hawthorn	*Crataegus mollis*
Dwarf hawthorn	*Crataegus uniflora*
Rattlebox	*Crotalaria sagittalis*
Button-bush dodder	*Cuscuta cephalanthi*
Southern dodder	*Cuscuta obtusiflora* var. *glandulosa*
Smartweed dodder	*Cuscuta polygonorum*
Northern wild comfrey	*Cynoglossum virginianum* var. *boreale*
Wild comfrey	*Cynoglossum virginianum* var. *virginianum*
Globose flatsedge	*Cyperus echinatus*
Yellow flatsedge	*Cyperus flavescens* var. *flavescens*
Coast flatsedge	*Cyperus polystachyos* var. *texensis*
Retrorse flatsedge	*Cyperus retrorsus*
Small white ladyslipper	*Cypripedium candidum*
Small yellow ladyslipper	*Cypripedium parviflorum* var. *parviflorum*
Lowland fragile fern	*Cystopteris protrusa*
Northern tansey-mustard	*Descurainia pinnata* ssp. *brachycarpa*
Spreading tick-clover	*Desmodium humifusum*
Smooth tick-clover	*Desmodium laevigatum*
Nuttall's tick-clover	*Desmodium nuttallii*
Beggar-lice	*Desmodium obtusum*
Small-flowered tick-clover	*Desmodium pauciflorum*
Beakgrass	*Diarrhena obovata*
Salt-meadow grass	*Diplachne maritimea*
Rock-cress	*Draba glabella*
American dragonhead	*Dracocephalum parviflorum*
Log fern	*Dryopteris celsa*
Fragrant cliff fern	*Dryopteris fragrans*
Yerba-de-tago	*Eclipta prostrata*
American waterwort	*Elatine americana*
Slender spikerush	*Eleocharis elliptica* var. *pseudoptera*
Engelmann's spikerush	*Eleocharis engelmannii*
Creeping spikerush	*Eleocharis fallax*
Blunt spikerush	*Eleocharis obtusa* var. *ovata*
Angled spikerush	*Eleocharis quadrangulata*
Three-ribbed spikerush	*Eleocharis tricostata*
Purple crowberry	*Empetrum eamesii* ssp. *atropurpureum*
Willow-herb	*Epilobium ciliatum* ssp. *glandulosum*
Alpine willow-herb	*Epilobium hornemannii*
Smooth scouring rush	*Equisetum laevigatum*
Fireweed	*Erechtites hieraciifolia* var. *megalocarpa*
Harbinger-of-spring	*Erigenia bulbosa*
Daisy fleabane	*Erigeron hyssopifolius*
Narrow-leaf cottongrass	*Eriophorum angustifolium* ssp. *scabriusculum*
American strawberry-bush	*Euonymus americana*

Small white snakeroot	*Eupatorium aromaticum*
White boneset	*Eupatorium leucolepis* var. *leucolepis*
Round-leaf boneset	*Eupatorium rotundifolium* var. *ovatum*
Round-leaf boneset	*Eupatorium rotundifolium* var. *rotundifolium*
Late boneset	*Eupatorium serotinum*
Ipecac spurge	*Euphorbia ipecacuanhae*
Sheep fescue	*Festuca saximontana*
Shining bedstraw	*Galium concinnum*
Northern wild-licorice	*Galium kamtschaticum*
Dwarf huckleberry	*Gaylussacia dumosa* var. *bigeloviana*
Soapwort gentian	*Gentiana saponaria*
Lesser fringed gentian	*Gentianopsis procera*
Purple comandra	*Geocaulon lividum*
Spring avens	*Geum vernum*
Rough avens	*Geum virginianum*
Catfoot	*Gnaphalium helleri* var. *micradenium*
Purple everlasting	*Gnaphalium purpureum*
Woodland cudweed	*Gnaphalium sylvaticum*
Kentucky coffee tree	*Gymnocladus dioica*
Northern stickseed	*Hackelia deflexa* var. *americana*
Spurred gentian	*Halenia deflexa*
Mare's-tail	*Hippuris vulgaris*
Purple bluets	*Houstonia purpurea* var. *calycosa*
Purple bluets	*Houstonia purpurea* var. *purpurea*
Fir clubmoss	*Huperzia selago*
Wild hydrangea	*Hydrangea arborescens*
Floating pennywort	*Hydrocotyle ranunculoides*
Water-pennywort	*Hydrocotyle verticillata*
Creeping St. John's-wort	*Hypericum adpressum*
Bushy St. John's-wort	*Hypericum densiflorum*
Coppery St. John's-wort	*Hypericum denticulatum*
St. Andrew's cross	*Hypericum hypercoides* ssp. *multicaule*
Wild potato-vine	*Ipomoea pandurata*
Southern blueflag	*Iris virginica* var. *schrevei*
Quillwort	*Isoetes riparia*
Small whorled pogonia	*Isotria medeoloides*
Doubtful toad-rush	*Juncus ambiguus*
Short-fruit rush	*Juncus brachycarpus*
Weak rush	*Juncus debilis*
Ensiform rush	*Juncus ensifolius*
Large grass-leaved rush	*Juncus marginatus* var. *biflorus*
Scirpus-like rush	*Juncus scirpoides*
Moor-rush	*Juncus stygius* ssp. *americanus*
Woods-rush	*Juncus subcaudatus*
Prostrate juniper	*Juniperus horizontalis*
Carolina redroot	*Lachnanthes caroliniana*
False lettuce	*Lactuca floridana*
Downy lettuce	*Lactuca hirsuta*
Rough veiny vetchling	*Lathyrus venosus*
Bead pinweed	*Lechea pulchella* var. *moniliformis*
Minute duckweed	*Lemna perpusilla*
Pale duckweed	*Lemna valdiviana*
Leucospora	*Leucospora multifida*
Slender blazing-star	*Liatris cylindracea*

Scotch lovage	*Ligusticum scothicum*
Michigan lily	*Lilium michiganense*
Wild flax	*Linum medium* var. *medium*
Large twayblade	*Liparis lilifolia*
Dwarf bulrush	*Lipocarpha micrantha*
Auricled twayblade	*Listera auriculata*
Southern twayblade	*Listera australis*
Broad-lipped twayblade	*Listera convallarioides*
Golden puccoon	*Lithospermum caroliniense* ssp. *croceum*
American shore-grass	*Littorella uniflora*
Alpine azalea	*Loiseleuria procumbens*
Spiked woodthrush	*Luzula spicata*
Carolina clubmoss	*Lycopodiella caroliniana*
Northern running-pine	*Lycopodium complanatum*
Sitka clubmoss	*Lycopodium sitchense*
Gypsy-wort	*Lycopus rubellus*
Climbing fern	*Lygodium palmatum*
Lance-leaved loosestrife	*Lysimachia hybrida*
Four-flowered loosestrife	*Lysimachia quadriflora*
Saltmarsh loosestrife	*Lythrum lineare*
Sweetbay magnolia	*Magnolia virginiana*
Bayard's malaxis	*Malaxis bayardii*
American crab	*Malus glaucescens*
Virginia bunchflower	*Melanthium virginicum*
Basil-balm	*Monarda clinopodia*
Green parrot's-feather	*Myriophyllum pinnatum*
Muenscher's naiad	*Najas guadalupensis* var. *muenscheri*
Southern naiad	*Najas guadalupensis* var. *olivacea*
Holly-leaved naiad	*Najas marina*
Cut-leaved evening-primrose	*Oenothera laciniata*
Clustered bluets	*Oldenlandia uniflora*
Virginia false gromwell	*Onosmodium virginianum*
Canada ricegrass	*Oryzopsis canadensis*
Stiff cowbane	*Oxypolis rigidior*
Leiberg's panic grass	*Panicum leibergii*
Few-flowered panic grass	*Panicum oligosanthes* var. *oligosanthes*
Panic grass	*Panicum scabriusculum*
Velvet panic grass	*Panicum scoparium*
Tall flat panic grass	*Panicum stipitatum*
Wright's panic grass	*Panicum wrightianum*
Round field beadgrass	*Paspalum laeve* var. *circulare*
Hairy field beadgrass	*Paspalum laeve* var. *pilosum*
Slender beadgrass	*Paspalum setaceum* var. *psammophilum*
Sweet coltsfoot	*Petasites frigidus* var. *palmatus*
Wild sweet-William	*Phlox maculata*
Downy phlox	*Phlox pilosa*
Ground-cherry	*Physalis pubescens* var. *integrifolia*
Virginia ground-cherry	*Physalis virginiana*
Ninebark	*Physocarpus opulifolius* var. *intermedius*
Virginia pine	*Pinus virginiana*
Orange fringed orchis	*Platanthera ciliaris*
Crested fringed orchis	*Platanthera cristata*
Hooker's orchid	*Platanthera hookeri*
Prairie fringed orchid	*Platanthera leucophaea*

Bluegrass	*Poa cuspidata*
Fernald bluegrass	*Poa fernaldiana*
White bluegrass	*Poa glauca*
Inland bluegrass	*Poa interior*
Slender marsh bluegrass	*Poa paludigena*
Woodland bluegrass	*Poa sylvestris*
Yellow milkwort	*Polygala lutea*
Small's knotweed	*Polygonum buxiforme*
Erect knotweed	*Polygonum erectum*
Swamp smartweed	*Polygonum setaceum* var. *interjectum*
Bear's-foot	*Polymnia uvedalia*
Northern holly-fern	*Polystichum lonchitis*
Water-thread pondweed	*Potamogeton diversifolius*
Slender pondweed	*Potamogeton filiformis* var. *alpinus*
Sheathed pondweed	*Potamogeton filiformis* var. *occidentalis*
Ogden's pondweed	*Potamogeton ogdenii*
Straight-leaf pondweed	*Potamogeton strictifolius*
Bushy cinquefoil	*Potentilla paradoxa*
Boott's rattlesnake-root	*Prenanthes boottii*
Nodding rattlesnake-root	*Prenanthes crepidinea*
Dwarf rattlesnake-root	*Prenanthes nana*
Low sand-cherry	*Prunus pumila* var. *pumila*
Wafer-ash	*Ptelea trifoliata*
Giant pine-drops	*Pterospora andromedea*
Mountain-mint	*Pycnanthemum clinopodioides*
Torrey's mountain-mint	*Pycnanthemum torrei*
Whorled mountain-mint	*Pycnanthemum verticillatum* var. *pilosum*
Mountain pyrola	*Pyrola minor*
Pixies	*Pyxidanthera barbulata*
Willow oak	*Quercus phellos*
Seaside crowfoot	*Ranunculus cymbalaria*
Swamp buttercup	*Ranunculus hispidus* var. *nitidus*
Lapland rosebay	*Rhododendron lapponicum*
Torrey's beakrush	*Rhynchospora torreyana*
Prickly rose	*Rosa acicularis* ssp. *sayi*
Shining rose	*Rosa nitida*
Sand blackberry	*Rubus cuneifolius*
Black-eyed-susan	*Rudbeckia hirta* var. *hirta*
Heart sorrel	*Rumex hastatulus*
Golden dock	*Rumex maritimus* var. *fueginus*
Rose-pink	*Sabatia angularis*
Slender marsh-pink	*Sabatia campanulata*
Small-flowered pearlwort	*Sagina decumbens*
Quill-leaf arrowhead	*Sagittaria teres*
Sand dune willow	*Salix cordata*
Dwarf willow	*Salix herbacea*
Lyre-leaf sage	*Salvia lyrata*
Purple mountain-saxifrage	*Saxifraga oppositifolia*
White mountain-saxifrage	*Saxifraga paniculata*
Curlygrass	*Schizaea pusilla*
Clinton's clubrush	*Scirpus clintonii*
Georgia bulrush	*Scirpus georgianus*
Slender bulrush	*Scirpus heterochaetus*
Seaside bulrush	*Scirpus maritimus*

Saltmarsh bulrush	*Scirpus novae-angliae*
Slender nutrush	*Scleria minor*
Fewflower nutrush	*Scleria pauciflora* var. *caroliniana*
Reticulate nutrush	*Scleria reticularis* var. *pubescens*
Low nutrush	*Scleria verticillata*
Hoary skullcap	*Scutellaria incana*
Hyssop-skullcap	*Scutellaria integrifolia*
Leedy's roseroot	*Sedum integrifolium* ssp. *leedyi*
Roseroot	*Sedum rosea*
Live-forever	*Sedum telephioides*
Sea purslane	*Sesuvium maritimum*
Michaux's blue-eyed-grass	*Sisyrinchium mucronatum*
False china-root	*Smilax pseudo-china*
Jacob's-ladder	*Smilax pulverulenta*
Coastal goldenrod	*Solidago elliottii*
Houghton's goldenrod	*Solidago houghtonii*
Rough goldenrod	*Solidago rugosa* ssp. *aspera*
Tall hairy goldenrod	*Solidago rugosa* var. *sphagnophila*
Seaside goldenrod	*Solidago sempervirens* var. *mexicana*
Mountain goldenrod	*Solidago simplex* var. *racemosa*
Prairie wedgegrass	*Sphenopholis obtusata* var. *obtusata*
Swamp oats	*Sphenopholis pensylvanica*
Mountain meadowsweet	*Spiraea septentrionalis*
Spring ladies'-tresses	*Spiranthes vernalis*
Rough rush-grass	*Sporobolus clandestinus*
Pink wild bean	*Strophostyles umbellata*
Narrow-leaf sea-blite	*Suaeda linearis*
Roland's sea-blite	*Suaeda rolandii*
Water awlwort	*Subularia aquatica* var. *americana*
Veiny meadow-rue	*Thalictrum venulosum*
Cranefly orchid	*Tipularia discolor*
Sticky false asphodel	*Tofieldia glutinosa*
Filmy fern	*Trichomanes intricatum*
Tiny blue-curls	*Trichostema setaceum*
Nodding trillium	*Trillium flexipes*
Toad-shade	*Trillium sessile*
Nodding pogonia	*Triphora trianthophora*
Melic-oats	*Trisetum melicoides*
Large floating bladderwort	*Utricularia inflata*
Mountain bellwort	*Uvularia puberula* var. *nitida*
Dwarf blueberry	*Vaccinium cespitosum*
Marsh valerian	*Valeriana uliginosa*
Goosefoot corn-salad	*Valerianella chenopodiifolia*
Corn-salad	*Valerianella umbilicata*
Tall ironweed	*Vernonia gigantea*
Possum-haw	*Viburnum nudum* var. *nudum*
Coastal violet	*Viola brittoniana* var. *brittoniana*
Southern wood violet	*Viola hirsutula*
Northern bog violet	*Viola nephrophylla*
New England violet	*Viola novae-angliae*
Winter grape	*Vitis vulpina*
Appalachian vittaria	*Vittaria appalachiana*
Alpine woodsia	*Woodsia alpina*
Smooth woodsia	*Woodsia glabella*

Threatened

Birds	
Bald eagle	*Haliaeetus leucocephalus*
Pied-billed grebe	*Podilymbus podiceps*
Least bittern	*Ixobrychus exilis*
Northern harrier	*Circus cyaneus*
King rail	*Rallus elegans*
Upland sandpiper	*Bartramia longicauda*
Common tern	*Sterna hirundo*
Least tern	*Sterna antillarum*
Sedge wren	*Cistothorus platensis*
Henslow's sparrow	*Ammodramus henslowii*
Mammals	
Canada lynx[1]	*Lynx canadensis*
Reptiles	
Green sea turtle	*Chelonia mydas*
Loggerhead sea turtle	*Caretta caretta*
Blanding's turtle	*Emydoidea blandingii*
Fence lizard	*Sceloporus undulatus*
Timber rattlesnake	*Crotalus horridus*
Fishes	
Lake sturgeon	*Acipenser fulvescens*
Mooneye	*Hiodon tergisus*
Gravel chub	*Erimyzon x-punctata*
Banded sunfish	*Enneacanthus obesus*
Longear sunfish	*Lepomis megalotis*
Longhead darter	*Percina macrocephala*
Eastern sand darter	*Ammocrypta pellucida*
Swamp darter	*Etheostoma fusiforme*
Spotted darter	*Etheostoma maculatum*
Lake chubsucker[1]	*Erimyzon sucetta*
Mud sunfish[1]	*Acantharchus pomotis*
Insects	
Northeastern beach tiger beetle	*Cicindela dorsalis dorsalis*
Pine barrens bluet	*Enallagma recurvatum*
Scarlet bluet	*Enallagma pictum*
Little bluet	*Enallagma minisculum*
Frosted elfin	*Callophrys irus*
Molluscs	
Brook floater	*Alasmidonta varicosa*
Wavy-rayed lampmussel	*Lampsilis fasciola*
Green floater	*Lasmigona subviridis*
Plants	
Northern monk's-hood	*Aconitum noveboracense*
Northern gerardia	*Agalinis paupercula var. borealis*
Yellow giant-hyssop	*Agastache nepetoides*
Wodland agrimony	*Agrimonia rostellata*

Northern bentgrass	*Agrostis mertensii*
Stargrass	*Aletris farinosa*
Wild onion	*Allium cernuum*
Green rock-cress	*Arabis missouriensis*
Swamp pink	*Arethusa bulbosa*
Green milkweed	*Asclepias viridiflora*
Pawpaw	*Asimina triloba*
Mountain spleenwort	*Asplenium montanum*
Hart's-tongue fern	*Asplenium scolopendrium* var. *americanum*
Rush aster	*Aster borealis*
Heath aster	*Aster pilosis* var. *pringlei*
Flax-leaf whitetop	*Aster solidagineus*
Showy aster	*Aster spectabilis*
Saltmarsh aster	*Aster subulatus*
Swamp birch	*Betula pumila*
Smooth bur-marigold	*Bidens laevis*
Northern reedgrass	*Calamagrostis stricta* ssp. *inexpansa*
Terrestrial starwort	*Callitriche terrestris*
Long's bittercress	*Cardamine longii*
Thicket sedge	*Carex abscondita*
Rocky mountain sedge	*Carex backii*
Bicknell's sedge	*Carex bicknellii*
Bigelow's sedge	*Carex bigelowii*
Brown bog sedge	*Carex buxbaumii*
Creeping sedge	*Carex chordorrhiza*
Crawe's sedge	*Carex crawei*
Clustered sedge	*Carex cumulata*
Davis' sedge	*Carex davisii*
Handsome sedge	*Carex formosa*
Hitchcock's sedge	*Carex hitchcockiana*
Marsh straw sedge	*Carex hormathodes*
Houghton's sedge	*Carex houghtoniana*
Nebraska sedge	*Carex jamesii*
Fernald's sedge	*Carex merritt-fernaldii*
Mitchell's sedge	*Carex mitchelliana*
Troublesome sedge	*Carex molesta*
Sartwell's sedge	*Carex sartwellii*
Sedge	*Carex schweinitzii*
Weak stellate sedge	*Carex seorsa*
Cat-tail sedge	*Carex typhina*
Willdenow's sedge	*Carex willdenowii*
Big shellbark hickory	*Carya laciniosa*
Dune sandspur	*Cenchrus tribuloides*
Prickly hornwort	*Ceratophyllum echinatum*
Blazing-star	*Chamaelirium luteum*
Red pigweed	*Chenopodium rubrum*
Golden corydalis	*Corydalis aurea*
Hop sedge	*Cyperus lupulinus* ssp. *lupulinus*
Ram's-head ladyslipper	*Cypripedium arietinum*
Little-leaf tick-trefoil	*Desmodium ciliare*
Diapensia	*Diapensia lapponica*
Slender crabgrass	*Digitaria filiformis*
Persimmon	*Diospyros virginiana*
Rock-cress	*Draba arabisans*

Carolina whitlow-grass	*Draba reptans*
Knotted spikerush	*Eleocharis equisetoides*
Salt-marsh spikerush	*Eleocharis halophila*
Long-tubercled spikerush	*Eleocharis tuberculosa*
Meadow horsetail	*Equisetum pratense*
Marsh horsetail	*Equisetum palustre*
White boneset	*Eupatorium album* var. *subvenosum*
Fringed boneset	*Eupatorium hyssopifolium* var. *laciniatum*
Marsh fimbry	*Fimbristylis castanea*
Green gentian	*Frasera caroliniensis*
Carolina cranesbill	*Geranium carolinianum* var. *sphaerospermum*
Prairie-smoke	*Geum triflorum*
Mock-pennyroyal	*Hedeoma hispidum*
Bushy rockrose	*Helianthemum dumosum*
Swamp sunflower	*Helianthus angustifolius*
Featherfoil	*Hottonia inflata*
Appalachian firmoss	*Huperzia appalachiana*
Golden-seal	*Hydrastis canadensis*
Shrubby St. John's-wort	*Hypericum prolificum*
Slender blue flag	*Iris prismatica*
Twin-leaf	*Jeffersonia diphylla*
Arctic rush	*Juncus trifidus*
Slender pinweed	*Lechea tenuifolia*
Velvety lespedeza	*Lespedeza stuevei*
Northern blazing-star	*Liatris borealis*
Lilaeopsis	*Lilaeopsis chinensis*
Sandplain wild flax	*Linum intercursum*
Southern yellow flax	*Linum medium* var. *texanum*
Yellow wild flax	*Linum sulcatum*
Globe-fruited ludwigia	*Ludwigia sphaerocarpa*
Water-marigold	*Megalodonta beckii* var. *beckii*
Appalachian sandwort	*Minuartia glabra*
Water milfoil	*Myriophyllum alterniflorum*
Farwell's water milfoil	*Myriophyllum farwellii*
Evening primrose	*Oenothera parviflora* var. *oakesiana*
Golden club	*Orontium aquaticum*
Violet wood-sorrel	*Oxalis violacea*
Wiry panic grass	*Panicum flexile*
Slender beadgrass	*Paspalum setaceum* var. *setaceum*
Swamp lousewort	*Pedicularis lanceolata*
Smooth cliff brake	*Pellaea glabella*
Butterwort	*Pinguicula vulgaris*
Heartleaf plantain	*Plantago cordata*
Seaside plantain	*Plantago maritima* ssp. *juncoides*
Riverweed	*Podostemum ceratophyllum*
Carey's smartweed	*Polygonum careyi*
Douglas knotweed	*Polygonum douglassii*
Opelousa smartweed	*Polygonum hydropiperoides* var. *opelousanum*
Swamp cottonwood	*Populus heterophylla*
Northern pondweed	*Potamogeton alpinus*
Algae-like pondweed	*Potamogeton confervoides*
Hill's pondweed	*Potamogeton hillii*
Spotted pondweed	*Potamogeton pulcher*
Silverweed	*Potentilla anserina* ssp. *egedii*

Bird's-eye primrose	*Primula mistassinica*
Comb-leaved mermaid-weed	*Proserpinaca pectinata*
Dwarf sand-cherry	*Prunus pumila* var. *depressa*
Blunt mountain-mint	*Pycnanthemum muticum*
Whorled mountain-mint	*Pycnanthemum verticillatum* var. *verticillatum*
Pink wintergreen	*Pyrola asarifolia*
Small-flowered crowfoot	*Ranunculus micranthus*
Rhodora	*Rhododendron canadense*
Drowned horned bush	*Rhynchospora inundata*
Short-beaked bald-rush	*Rhynchospora nitens*
Lake-cress	*Rorippa aquatica*
Tooth-cup	*Rotala ramosior*
Sea-pink	*Sabatia stellaris*
Spongy arrowhead	*Sagittaria calycina* var. *spongiosa*
Dwarf glasswort	*Salicornia bigelovii*
Balsam willow	*Salix pyrifolia*
Bearberry willow	*Salix uva-ursi*
Yellow mountain-saxifrage	*Saxifraga aizoides*
Deer's hair sedge	*Scirpus cespitosus*
Whip nutrush	*Scleria triglomerata*
Alpine goldenrod	*Solidago multiradiata* var. *arctica*
Ohio goldenrod	*Solidago ohioensis*
Stiff-leaf goldenrod	*Solidago rigida*
Mountain goldenrod	*Solidago simplex* var. *randii*
Small bur-reed	*Sparganium nutans*
Northern dropseed	*Sporobolus heterolepis*
Rough hedge-nettle	*Stachys hyssopifolia*
Starwort	*Stellaria longipes*
Marsh arrow-grass	*Triglochin palustre*
Northern gamma grass	*Tripsacum dactyloides*
Cork elm	*Ulmus thomasii*
Rush bladderwort	*Utricularia juncea*
Lesser bladderwort	*Utricularia minor*
Small floating bladderwort	*Utricularia radiata*
Bladderwort	*Utricularia striata*
High-mountain blueberry	*Vaccinium boreale*
Wingstem	*Verbesina alternifolia*
Culver's root	*Veronicastrum virginicum*
Southern arrowwood	*Viburnum dentatum* var. *venosum*
Squashberry	*Viburnum edule*
Primrose violet	*Viola primulifolia*
White camas	*Zigadenus elegans* ssp. *glaucus*

Species of Special Concern

Birds	
Common loon	*Gavia immer*
American bittern	*Botaurus lentiginosus*
Osprey	*Pandion haliaetus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentilis*
Red-shouldered hawk	*Buteo lineatus*
Black skimmer	*Rynchops niger*
Common nighthawk	*Chordeilus minor*
Whip-poor-will	*Caprimulgus vociferus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Horned lark	*Eremophila alpestris*
Bicknell's thrush	*Catharus bicknelli*
Golden-winged warbler	*Vermivora chrysoptera*
Cerulean warbler	*Dendroica cerulea*
Yellow-breasted chat	*Icteria virens*
Vesper sparrow	*Pooecetes gramineus*
Grasshopper sparrow	*Ammodramus savannarum*
Seaside sparrow	*Ammodramus maritimus*
Mammals	
Small-footed bat	*Myotis leibii*
New England cottontail	*Sylvilagus transitionalis*
Harbor porpoise	*Phocoena phocoena*
Reptiles	
Spotted turtle	*Clemmys guttata*
Wood turtle	*Clemmys insculpta*
Eastern box turtle	*Terrapene carolina*
Eastern spiny softshell	*Apalone spinifera*
Eastern hognose snake	*Heterodon platyrhinos*
Worm snake	*Carphophis amoenus*
Amphibians	
Hellbender	*Cryptobranchus alleganiensis*
Marbled salamander	*Ambystoma opacum*
Jefferson salamander	*Ambystoma jeffersonianum*
Blue-spotted salamander	*Ambystoma laterale*
Longtail salamander	*Eurycea longicauda*
Eastern spadefoot toad	*Scaphiopus holbrookii*
Southern leopard frog	*Rana sphenocephala utricularius*
Fishes	
Mountain brook lamprey	*Ichthyomyzon greeleyi*
Black redhorse	*Moxostoma duquesnei*
Streamline chub	*Erymystax dissimilis*
Redfin shiner	*Lythrurus umbratilis*
Ironcolor shiner	*Notropis chalybaeus*
Insects	
Unnamed dragonfly species	*Gomphus spec. nov.*

Southern sprite	*Nehalennia integricollis*
Extra striped snaketail	*Ophiogomphus anomalus*
Pygmy snaketail	*Ophiogomphus howei*
Common sanddragon	*Progomphus obscurus*
Gray petaltail	*Tachopteryx thoreyi*
Checkered white	*Pontia protodice*
Olympia marble	*Euchloe olympia*
Henry's elfin	*Callophrys henrici*
Tawny crescent	*Phyciodes batesii*
Mottled duskywing	*Erynnis martialis*
Barrens buckmoth	*Hemileuca maia*
Herodias underwing	*Catocala herodias gerhardi*
Jair underwing	*Catocala jair*
A noctuid moth	*Heterocampa varia*
<u>Molluscs</u>	
Buffalo pebble snail	*Gillia altilis*
Fringed valvata	*Valvata lewisi*
Mossy valvata	*Valvata sincera*
<u>Plants</u>	
Fascicled gerardia	*Agalinis fasciculata*
Estuary beggar-ticks	*Bidens bidentoides*
False hop sedge	*Carex lupuliformis*
Atlantic white-cedar	*Chamaecyparis thyoides*
Rose coreopsis	*Coreopsis rosea*
Schweinitz's flatsedge	*Cyperus schweinitzii*
Dewthread	*Drosera filiformis*
Black crowberry	*Empetrum nigrum* ssp. *hermaphroditicum*
Dwarf umbrella-sedge	*Fuirena pumila*
Large-spored quillwort	*Isoetes lacustris*
Illinois pinweed	*Lechea racemulosa*
Bush clover	*Lespedeza angustifolia*
Trailing lespedeza	*Lespedeza repens*
Violet lespedeza	*Lespedeza violacea*
Mudwort	*Limosella australis*
Stiff yellow flax	*Linum striatum*
Nuttall's lobelia	*Lobelia nuttallii*
Winged monkeyflower	*Mimulus alatus*
Pine-barren sandwort	*Minuartia caroliniana*
Jack pine	*Pinus banksiana*
Jacob's-ladder	*Polemonium vanbruntiae*
Seabeach knotweed	*Polygonum glaucum*
Slender knotweed	*Polygonum tenue*
Long-beaked bald-rush	*Rhynchospora scirpoides*
Pod grass	*Scheuchzeria palustris*
Spreading globeflower	*Trollius laxus* ssp. *laxus*
Bog bilberry	*Vaccinium uliginosum*
White baneberry	*Actaea pachypoda*
Red baneberry	*Actaea spicata* ssp. *rubra*
Green dragon	*Arisaema dracontium*
Nutterfly-weed	*Asclepias tuberosa*
Harebell	*Campanula rotundifolia*
American bittersweet	*Celastrus scandens*

Turtle-heads	*Chelone glabra*
Spotted wintergreen	*Chimaphila maculata*
Pipsissewa	*Chimaphila umbellata*
Speckled woodlily	*Clintonia umbellulata*
Squawroot	*Conopholis americana*
Flowering dogwood	*Cornus florida*
Sundew	*Drosera intermedia*
Sundew	*Drosera rotundifolia*
Trailing arbutus	*Epigaea repens*
Running strawberry-bush	*Euonymus obovata*
Closed gentian	*Gentiana andrewsii*
Blind gentian	*Gentiana clausa*
Closed gentian	*Gentiana linearis*
Stiff gentian	*Gentianella quinquefolia*
Fringed gentian	*Gentianopsis crinita*
Gallberry	*Ilex glabra*
Smooth winterberry	*Ilex laevigata*
Mountain winterberry	*Ilex montana*
American holly	*Ilex opaca*
Black alder	*Ilex verticillata*
Butternut	*Juglans cinerea*
Sheep laurel	*Kalmia angustifolia*
Mountain laurel	*Kalmia latifolia*
Nog laurel	*Kalmia polifolia*
Canada lily	*Lilium canadense*
Woodlily	*Lilium philadelphicum*
Turk's-cap lily	*Lilium superbum*
Sea lavender	*Limonium carolinianum*
Cardinal-flower	*Lobelia cardinalis*
Water lobelia	*Lobelia dortmanna*
Great lobelia	*Lobelia siphilitica*
Virginia bluebells	*Mertensia virginica*
Bee-balm	*Monarda didyma*
Bayberry	*Myrica pensylvanica*
Eastern prickly pear	*Opuntia humifusa*
Ginseng	*Panax quinquefolius*
Grass-of-Parnassus	*Parnassia glauca*
Smooth azalea	*Rhododendron arborescens*
Great laurel	*Rhododendron maximum*
Pinkster	*Rhododendron periclymenoides*
Early azalea	*Rhododendron prinophyllum*
Swamp azalea	*Rhododendron viscosum*
Bloodroot	*Sanguinaria canadensis*
Pitcher-plant	*Sarracenia purpurea*
Wild pink	*Silene caroliniana*
Nodding trillium	*Trillium cernuum*
Purple trillium	*Trillium erectum*
White trillium	*Trillium grandiflorum*
Painted trillium	*Trillium undulatum*
Bird's-foot violet	*Viola pedata*
<u>Clubmosses</u>	
Shining firmoss	*Huperzia lucidula*
Foxtail clubmoss	*Lycopodiella alopecuroides*

Swamp clubmoss	*Lycopodiella appressa*
Northern bog clubmoss	*Lycopodiella inundata*
Bristly clubmoss	*Lycopodium annotinum*
Running cedar	*Lycopodium clavatum*
Northern tree clubmoss	*Lycopodium dendroideum*
Running-pine	*Lycopodium digitatum*
Ground pine	*Lycopodium obscurum*
Ground cedar	*Lycopodium tristachyum*

<u>Native Ferns</u>

Maidenhair fern	*Adiantum pedatum*
Ebony spleenwort	*Asplenium platyneuron*
Walking fern	*Asplenium rhizophyllum*
Wall-rue spleenwort	*Asplenium ruta-muraria*
Maidenhair spleenwort	*Asplenium trichomanes*
Lady fern	*Athyrium filix-femina*
Mosquito-fern	*Azolla caroliniana*
Cut-leaf grape fern	*Botrychium dissectum*
Lance-leaf grape fern	*Botrychium lanceolatum*
Matricary grape fern	*Botrychium matricariifolium*
Leathery grape fern	*Botrychium multifidum*
Least moonwort	*Botrychium simplex*
Rattlesnake fern	*Botrychium virginianum*
Slender cliff brake	*Cryptogramma stelleri*
Bulblet fern	*Cystopteris bulbifera*
Common fragile fern	*Cystopteris fragilis*
Fragile fern	*Cystopteris tenuis*
Silvery spleenwort	*Deparia acrostichoides*
Glade fern	*Diplazium pycnocarpon*
Mountain wood fern	*Dryopteris campyloptera*
Spinulose wood fern	*Dryopteris carthusiana*
Clinton's shield fern	*Dryopteris clintoniana*
Crested wood fern	*Dryopteris cristata*
Giant wood fern	*Dryopteris goldiana*
Common wood fern	*Dryopteris intermedia*
Marginal wood fern	*Dryopteris marginalis*
Oak fern	*Gymnocarpium dryopteris*
Ostrich fern	*Matteuccia struthiopteris*
Adder's-tongue	*Ophioglossum pusillum*
Cinnamon fern	*Osmunda cinnamomea*
Interrupted fern	*Osmunda claytoniana*
Royal fern	*Osmunda regalis*
Purple cliff brake	*Pellaea atropurpurea*
Northern beech fern	*Phegopteris connectilis*
Broad beech fern	*Phegopteris hexagonoptera*
Rock polypody	*Polypodium virginianum*
Christmas fern	*Polystichum acrostichoides*
Braun's holly fern	*Polystichum braunii*
Water-fern	*Salvinia minima*
New York fern	*Thelypteris noveboracensis*
Marsh fern	*Thelypteris palustris*
Massachusetts fern	*Thelypteris simulata*
Rusty woodsia	*Woodsia ilvensis*
Blunt-lobed woodsia	*Woodsia obtusa*

Netted chain fern	*Woodwardia areolata*
Virginia chain fern	*Woodwardia virginica*

<u>Native Orchids</u>

Grass pink	*Calopogon tuberosus*
Long-bracted orchid	*Coeloglossum viride*
Spotted coralroot	*Corallorhiza maculata*
Autumn coralroot	*Corallorhiza odontorhiza*
Pink ladyslipper	*Cypripedium acaule*
Small yellow ladyslipper	*Cypripedium parviflorium* var. *makasin*
Yellow ladyslipper	*Cypripedium parviflorium* var. *pubescens*
Showy ladyslipper	*Cypripedium reginae*
Showy orchis	*Galearis spectabilis*
Downy rattlesnake-plantain	*Goodyera pubescens*
Dwarf rattlesnake-plantain	*Goodyera repens*
Rattlesnake-plantain	*Goodyera tesselata*
Large whorled pogonia	*Isotria verticillata*
Bog twayblade	*Liparis loeselii*
Heartleaf twayblade	*Listera cordata*
White adder's-mouth	*Malaxis monophyllos*
Green adder's-mouth	*Malaxis unifolia*
Northern green orchid	*Platanthera aquilonis*
White fringed orchid	*Platanthera blephariglottis*
Green woodland orchid	*Platanthera clavellata*
Bog-candle	*Platanthera dilatata*
Tubercled orchid	*Platanthera flava*
Large purple fringed orchid	*Platanthera grandiflora*
Tall Northern green orchid	*Platanthera huronensis*
Ragged fringed orchid	*Platanthera lacera*
Blunt-leaved orchid	*Platanthera obtusata*
Large round-leaved orchid	*Platanthera orbiculata*
Small purple fringed orchid	*Platanthera psycodes*
Rose pogonia	*Pogonia ophioglossoides*
Lady's-tresses	*Spiranthes casei*
Nodding lady's-tresses	*Spiranthes cernua*
Slender lady's-tresses	*Spiranthes lacera*
Wide-leaved lady's-tresses	*Spiranthes lucida*
Creamy lady's-tresses	*Spiranthes ochroleuca*
Hooded lady's-tresses	*Spiranthes romanzoffiana*
Little lady's-tresses	*Spiranthes tuberosa*

[1] Extirpated – species is not extinct, but no longer occurring in a wild state within New York, or no longer exhibiting patterns of use traditional for that species in New York.