DECISION
AND
FINDING OF NO SIGNIFICANT IMPACT

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

United State Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

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I. INTRODUCTION

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program prepared an environmental assessment (EA) to evaluate potential impacts to the quality of the human environment from the implementation of a management program to address damage to property, agricultural resources, natural resources, and threats to human safety caused by herring gulls (*Larus argentatus*), ring-billed gulls (*Larus delawarensis*), great black-backed gulls (*Larus marinus*), and double-crested cormorants (*Phalacrocorax auritus*) in the State of New York (USDA 2003)[1]. The EA evaluates the need for gull and cormorant damage management and assesses potential impacts on the human environment of four alternatives to address that need. WS' proposed action in the EA implements an integrated wildlife damage management program in New York to fully address the need for bird damage management while minimizing impacts to the human environment.

The pre-decisional EA[2] was made available to the public for review and comment during a 30-day public comment period by a legal notice published in *Newsday*, *The Post-Standard*, *Buffalo News*, and *The Albany Times Union*. The pre-decisional EA was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. WS received seven comment letters during the public involvement process. Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. After consideration of the analysis contained in the EA and review of public comments, a Decision and Finding of No Significant Impact (FONSI) for the EA was issued on October 9, 2003. The Decision and FONSI selected the proposed action which implemented an integrated damage management program in New York using multiple methods to adequately address the need to manage damage caused by gulls and cormorants.

II. PURPOSE

This new Decision and summary report will analyze WS' gull and cormorant damage management activities in New York since the 2003 Decision/FONSI was signed for the EA to: 1) facilitate planning and interagency coordination, 2) streamline program management, 3) ensure WS' activities remain within

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[1]Copies of the EA are available for review from the State Director, USDA/APHIS/WS, 1930 Route 9, Castleton, New York 12033 or by visiting the APHIS website at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml.

[2]After the development of the pre-decisional EA by WS and consulting agencies and after public involvement in identifying new issues and alternatives, WS issues a Decision on the EA. Based on the analyses in the pre-decisional EA after public involvement, a decision is made to either publish a Notice of Intent to prepare an Environmental Impact Statement or to publish a public notice of a Finding of No Significant Impact for the EA in accordance with the NEPA and the Council of Environmental Quality regulations.

the scope of analyses contained in the EA, and 4) clearly communicate to the public the analysis of individual and cumulative impacts of the proposed action since 2003. This new Decision/FONSI ensures WS' actions comply with the National Environmental Policy Act (NEPA), with the Council on Environmental Quality (40 CFR 1500), and with APHIS' NEPA implementing regulations (7 CFR 372). All damage management activities, including disposal requirements, are conducted consistent with: 1) the Endangered Species Act of 1973, 2) the Migratory Bird Treaty Act, 3) Executive Order (EO) 12898[3], 4) EO 13045[4], 5) EO 13186[5], and 6) federal, state, and local laws, regulations, and policies.

III. PUBLIC INVOLVEMENT

This summary report and new Decision along with the EA and the 2003 Decision/FONSI will be made available for public review and comment through a legal notice announcing a minimum of a 30-day comment period. The legal notice will be published in *The Times Union* and posted on the APHIS website located at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml according to WS' public notification requirements (72 FR 13237-13238). This new Decision will also be directly mailed to agencies, organizations, and individuals with probable interest in the proposed program. Comments received during the public involvement process will be fully considered for new substantive issues and alternatives. Unless new substantive issues and/or new alternatives are brought to WS' attention, this new Decision will take effect upon the close of the comment period.

IV. RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS' Programmatic Final Environmental Impact Statement: WS has developed a programmatic Final Environmental Impact Statement (FEIS)[6] that addresses the need for wildlife damage management in the United States (USDA 1997). The FEIS contains detailed discussions of potential impacts to the human environment from wildlife damage management methods used by WS. Pertinent information available in the FEIS has been incorporated by reference into the EA and this Decision.

Double-crested Cormorant Management in the United States Final Environmental Impact Statement: The United States Fish and Wildlife Service (USFWS) has issued a FEIS on the management of double-crested cormorants (USFWS 2003)[7]. WS was a formal cooperating agency in the preparation of the FEIS and has adopted the FEIS to support WS' program decisions for its involvement in the management of cormorant damage. WS completed a Record of Decision (ROD) on November 18, 2003 (68 FR 68020). Pertinent and current information available in the FEIS has been incorporated by reference into the EA and this document.

***John F. Kennedy International Airport Final Environmental Impact Statement*:** WS has issued a FEIS on the Gull Hazard Reduction Program at John F. Kennedy International Airport (USDA 1994)[8]. Gulls from a nesting colony near the airport and the associated risks that gulls flying over the airport pose to

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[3]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.

[4]Executive Order 13045 ensures the protection of children from environmental health and safety risks since children may suffer disproportionately from those risks.

[5]Executive Order 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration.

[6]Copies of WS' programmatic FEIS are available from USDA/APHIS/WS-Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

[7]The FEIS may be obtained by contacting the Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, MBSP-4107, Arlington, Virginia 22203 or by downloading it from the USFWS website at http://migratorybirds.fws.gov/issues/cormorant/cormorant.html. WS' ROD may be viewed at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml.

[8]Copies of the FEIS are available for review from the State Director, USDA/APHIS/WS, 1930 Route 9, Castleton, New York 12033.

aircraft from strikes with gulls were analyzed in the FEIS. Information available in the FEIS was incorporated by reference into the EA and this document.

V. AFFECTED ENVIRONMENT

Upon receiving a request for assistance, the proposed action could be conducted on private, federal, state, tribal, and municipal lands in New York to reduce damages and threats associated with gulls and cormorants to agricultural commodities, natural resources, property, and public health and safety. The affected environment of the proposed action could include areas in and around public and private facilities and properties and at other sites where gulls and cormorants may roost, loaf, feed, nest, or otherwise occur. Examples of areas where gull and cormorant damage management activities could be conducted are, but are not necessarily limited to: commercial aquaculture facilities, fish hatcheries, landfills, industrial sites, rooftops of buildings, communally-owned homeowner/property owner association properties, boat marinas, natural areas, wildlife refuges, wildlife management areas, coastal and tidal beaches and inlets, and airports and surrounding areas.

WS has reviewed the affected environment during evaluations of programs activities under the proposed action through annual monitoring reports and this summary report. The affected environment has not changed since the implementation of the proposed action and continues to be as addressed in the EA (USDA 2003) and as addressed in the cormorant management FEIS developed by the USFWS (USFWS 2003).

VI. MONITORING

The WS program in New York annually reviews program activities to determine impacts on issues identified and to ensure that program activities are within the scope of analysis contained in the EA. The annual monitoring reports document WS' activities while discussing any new information that becomes available since the completion of the EA and the last monitoring report. If WS' activities, as identified in the annual monitoring reports, are outside the scope of the analyses in the EA or if new issues are identified from available information, further analysis would occur and the EA would be supplemented to the degree as identified by those processes pursuant to the NEPA or a notice of intent to prepare an Environmental Impact Statement (EIS) would occur.

This summary report and new Decision will evaluate WS' activities to resolve and prevent damage caused by gulls and cormorants in the State under the proposed action described in the EA since the 2003 Decision and FONSI were signed. WS will continue to coordinate activities to alleviate or prevent bird damage with the USFWS and the New York State Department of Environmental Conservation (NYSDEC) to ensure WS' activities are considered as part of the management objectives for those species in the State.

VII. WS' ACTIVITIES TO MANAGE DAMAGE CAUSED BY GULLS AND CORMORANTS

WS continued to provide both technical assistance and direct management activities to cooperators requesting assistance with damage caused by gulls and cormorants in New York from the federal fiscal year (FY)[9] 2004 through FY 2008. Technical assistance provides those interested with information and recommendations on preventing wildlife damage and effective methods for resolving damage which are legally available for use. This information can then be employed by those persons experiencing wildlife damage to effectively resolve damage without WS' direct involvement.

[9]The federal fiscal year begins on October 1 and ends on September 30 the following year.

Operational assistance occurs when WS is directly involved with employing methods to resolve, alleviate, or reduce threats associated with wildlife. As directed by the selected alternative, WS applies multiple methods as part of an integrated damage management program to resolve requests for assistance using the WS Decision Model (Slate et al. 1992, USDA 1997, USDA 2003). WS' technical assistance and direct operational programs are discussed in detail in the EA (USDA 2003) and also in WS' programmatic FEIS (USDA 1997). WS' gull and cormorant damage management activities conducted in New York from FY 2004 through FY 2008 as addressed in the EA are summarized below.

WS' Gull and Cormorant Damage Management Activities in New York during FY 2004

WS continued to implement and employ an integrated damage management approach to reducing threats and damage caused by gulls and cormorants in FY 2004 through the recommendation and use of multiple methods to resolve requests for assistance. Technical assistance was provided to those seeking recommendation of methods to alleviate or prevent damage from occurring. In FY 2004, WS conducted 40 technical assistance projects in New York involving gull and cormorant damage (see Table 1). No technical assistance projects were conducted involving great black-backed gulls in FY 2004. Nearly 78% of the technical assistance projects conducted in FY 2004 involved threats to human safety, primarily from gulls at airports and from disease threats associated with gulls removing refuse from landfills. WS conducted 30 technical assistance projects involving ring-billed gulls which was the highest number of projects conducted in FY 2004.

Table 1 – WS' technical assistance projects by resource type in New York during FY 2004

SPECIES	RESOURCES				TOTAL
	Agriculture	Natural Resources	Property	Human Safety	
Herring Gull	0	2	1	4	**7**
Ring-billed Gull	1	1	4	24	**30**
Double-crested Cormorant	0	0	0	3	**3**

WS employed through direct operational assistance non-lethal techniques to harass and disperse birds identified as causing damage or threats in the State. Dispersal occurred through the use of those non-lethal methods describe in Appendix C of the EA, primarily from the use of pyrotechnics and other noise producing methods (USDA 2003). A total of 221,080 gulls and cormorants were addressed using non-lethal dispersal techniques in FY 2004. WS also employed lethal methods to take 235 ring-billed gulls, 761 herring gulls, 162 great black-backed gulls, and 212 cormorants in FY 2004. Lethal take occurred primarily from the use of a firearm which is selective for target species. Lethal methods were employed to reinforce the use of non-lethal methods which decreases the likelihood of target wildlife habituating to methods. When compared to the total number of birds addressed by WS in FY 2004, WS employed non-lethal methods to disperse over 99% of the gulls and cormorants addressed to resolve damage or threats to human safety.

WS' Gull and Cormorant Damage Management Activities in New York during FY 2005

WS' activities to alleviate and prevent gull and cormorant damage in New York continued in FY 2005 with the use of an integrated approach to managing damage and threats. WS provided technical assistance and direct operational management at the request of those seeking assistance with damage caused by gulls and cormorants. WS conducted a total of 54 technical assistance projects during FY 2005, primarily to assist with threats to human safety and to prevent damage caused by gulls attempting to nest on buildings (see Table 2). No technical assistance projects were conducted by WS involving great black-backed gulls during FY 2005.

Table 2 – WS' technical assistance projects by resource type in New York during FY 2005

SPECIES	RESOURCES				TOTAL
	Agriculture	Natural Resources	Property	Human Safety	
Herring Gull	0	2	20	3	**25**
Ring-billed Gull	0	1	23	1	**25**
Double-crested Cormorant	0	2	2	0	**4**

WS continued to provide direct assistance to resolve gull and cormorant damage in FY 2005 through the use of lethal and non-lethal methods. WS used pyrotechnics and other noise producing devices to address a total of 219,245 gulls and 103,486 cormorants in FY 2005. WS conducted four projects in FY 2005 to resolve damage caused by gulls to property in New York and four projects to reduce threats to human safety. WS also provided direct assistance to resolve damages occurring to natural resources in FY 2005. As part of an integrated approach to addressing requests for assistance and to reinforce non-lethal methods, WS used lethal methods, primarily shooting, to take 257 ring-billed gulls, 781 herring gulls, 254 great black-backed gulls, and 64 cormorants in FY 2005. Over 99% of the gulls and cormorants addressed by WS in FY 2005 were non-lethally harassed and dispersed from areas where damage or threats were occurring.

WS' Gull and Cormorant Damage Management Activities in New York during FY 2006

In FY 2006, WS conducted 31 technical assistance projects involving damage or threats associated with ring-billed gulls, 30 projects involving herring gulls, and 13 projects to address damages and threats associated with great black-backed gulls (see Table 3). WS also conducted four technical assistance projects involving damage or threats associated with double-crested cormorants.

Table 3 – WS' technical assistance projects by resource type in New York during FY 2006

SPECIES	RESOURCES				TOTAL
	Agriculture	Natural Resources	Property	Human Safety	
Herring Gull	1	2	19	8	**30**
Ring-billed Gull	0	0	21	10	**31**
Great black-backed Gull	0	1	7	5	**13**
Double-crested Cormorant	0	2	2	0	**4**

WS received one request for direct assistance to manage damage associated with cormorants during FY 2006. WS was requested to assist with reducing damages and threats associated with a walleye (*Sander vitreus vitreus*) fishery on a lake in New York. As part of the request, WS also reduced nesting competition between cormorants and other colonial nesting birds on the lake. WS dispersed 116,970 cormorants and destroyed 118 nests containing 311 eggs to discourage cormorant from nesting on the lake. WS also used lethal methods to take a total of 106 cormorants during FY 2006 in New York. WS received no requests for direct operational assistance to manage damage associated with gulls and cormorants to property during FY 2006, although management of gulls in proximity to landfills does provide damage abatement measures to surrounding properties.

WS received five requests for direct assistance to manage damage associated with gulls and cormorants during FY 2006. A total of 107,832 gulls were dispersed and 799 killed at two landfills to ensure compliance with state environmental law 6NYCRR Part 360-1.14(1) that requires solid waste management facilities to "*...prevent or control on-site populations of vectors...*". Killing of cormorants and gulls flying or loafing in close proximity to airport runways and aircraft took place at three locations in FY 2006. WS used lethal methods to take 1,265 gulls and 75 cormorants to reduced threats of aircraft strikes at airports in New York.

WS continued to address requests for assistance to resolve damage or threats associated gulls and cormorants in FY 2006 using non-lethal methods. Over 98% of the gulls addresses and over 99% of the cormorants addressed in FY 2006 were addressed using non-lethal dispersal methods.

WS' Gull and Cormorant Damage Management Activities in New York during FY 2007

In FY 2007, WS provided technical assistance to two agricultural producers seeking information on double-crested cormorant damage abatement methods to resolve and prevent further losses of fish stock at aquaculture facilities (see Table 4). WS conducted a total of 26 technical assistance projects in FY 2007 addressing damage caused by gulls and cormorants in the State. Nearly 62% of the projects involved gull and cormorant damage to property. WS conducted 13 projects addressing herring gull damage, primarily damage to property. WS conducted six technical assistance projects in FY 2007 involving damage or threats associated with cormorants in the State.

Table 4 – WS' technical assistance projects by resource type in New York during FY 2007

SPECIES	RESOURCES				TOTAL
	Agriculture	Natural Resources	Property	Human Safety	
Herring Gull	0	0	10	3	**13**
Ring-billed Gull	0	0	4	1	**5**
Great black-backed Gull	0	1	1	0	**2**
Double-crested Cormorant	2	2	2	0	**6**

WS received four requests for direct assistance to manage damage associated with ring-billed gulls and herring gulls during FY 2007. At total of 13,070 gulls were dispersed from a rooftop loafing site adjacent to a landfill, and the destruction of 730 nests containing 1,890 eggs occurred at three locations where gulls were causing damage by nesting on rooftops. Accumulations of nesting materials were interfering with rooftop drainage systems and created a fire hazard. Frequent visitation of gulls to nesting sites on the rooftops of commercial buildings also generates complaints due to fecal droppings on vehicles parked nearby.

WS received three requests for assistance to manage damage associated with cormorants during FY 2007. A total of 26,427 cormorants were dispersed and 99 killed by WS in the State to reduce damage occurring at a walleye fishery and to reduce competition with other colonial nesting birds on a lake in New York. In addition, 15 nests containing 38 eggs were destroyed to discourage nesting by cormorants at the location. Damage abatement was also performed at an environmental contaminants monitoring site. At this location, 18,838 cormorants were dispersed and 78 were killed to reduce predation on fish which are monitored and used as part of the environmental contaminant sampling that occurs at the site. Cormorants were also taken at a nature preserve where they were competing for nesting sites with a great blue heron (*Ardea herodias*) rookery. At this location, 26 cormorants were killed and 33 dispersed to limit competition and to discourage cormorants from nesting at the location.

WS received a total of seven requests for assistance to manage damage associated with gulls and cormorants during FY 2007. A total of 120,624 gulls were dispersed and 645 killed at four landfills to ensure compliance with state environmental law 6NYCRR Part 360-1.14(1) that requires solid waste management facilities to "*...prevent or control on-site populations of vectors....*". Killing of cormorants and gulls flying or loafing in close proximity to airport runways and aircraft took place at one location and 1,100 gulls and 88 cormorants were taken to protect the flying public and aircraft. Gulls and cormorants were also harassed from a capped landfill located within the approach route of aircraft to a large urban airport. At this location, 7,119 gulls and one cormorant were dispersed to protect the flying public and aircraft. Additionally, as part of disease monitoring during FY 2007, WS used a cannon net to

capture 42 herring gulls to test for Avian Influenza as part of a state monitoring program. WS gathered cloacal swab samples and released the gulls on site.

WS' Gull and Cormorant Damage Management Activities in New York during FY 2008

In FY 2008, WS conducted seven technical assistance projects involving damage or threats associated with ring-billed gulls, three projects involving herring gulls, and two projects to address damages and threats associated with great black-backed gulls (see Table 5). WS also conducted four technical assistance projects involving damage or threats associated with double-crested cormorants. Similar to previous years, technical assistance requests primarily involved damage to property caused by gulls and cormorant in FY 2008. Only two technical assistance projects were conducted in FY 2008 that did not involve gull or cormorant damage to property. One project was conducted in FY 2008 that involved damage to agricultural resources caused by cormorants and one project involving damage to natural resources also caused by cormorants.

Table 5 – WS' technical assistance projects by resource type in New York during FY 2008

SPECIES	RESOURCES				TOTAL
	Agriculture	Natural Resources	Property	Human Safety	
Herring Gull	0	0	3	0	**3**
Ring-billed Gull	0	0	7	0	**7**
Great black-backed Gull	0	0	2	0	**2**
Double-crested Cormorant	1	1	2	0	**4**

WS received four requests for assistance to manage damage associated with ring-billed gulls and herring gulls during FY 2008. At total of 90 gulls were dispersed from a rooftop loafing site adjacent to a landfill after the destruction of 1,693 nests containing 771 eggs took place at three locations where gulls were causing damage by nesting on rooftops.

WS received two requests for assistance to manage damage associated with cormorants during FY 2008. WS continued to provide assistance with reducing predation on walleye and reducing competition at a nesting site on a lake in New York. To reduce predation and competition, WS dispersed 18,103 cormorants and used lethal methods to take 140 cormorants at the lake. WS also continued to reduce the predation of fish at a site where environmental contaminants were being monitored in FY 2008 by dispersing 15,572 cormorants and using lethal methods to take 49 cormorants.

WS received a total of five requests for assistance to manage damage associated with gulls and cormorants during FY 2008. A total of 7,622 gulls were dispersed and 543 killed at three landfills to ensure compliance with state environmental laws. Killing of cormorants and gulls flying or loafing in close proximity to airport runways and aircraft took place at one location where 1,081 gulls and 213 cormorants were lethally taken to protect the flying public and aircraft. Gulls and cormorants were also harassed from a capped landfill located within the approach route of aircraft to a large urban airport. At this location, 33,723 gulls and two cormorants were dispersed and three gulls were killed to protect the flying public and aircraft. Additionally, as part of disease monitoring during FY 2008, WS used a cannon net to capture 97 herring gulls and nine black-backed gulls which were sampled for Avian Influenza as part of a state monitoring program. WS gathered cloacal swab samples and released the gulls on site. Similar to previous years, lethal take occurs primarily from the use of firearms while harassment occurs primarily from pyrotechnics and other noise producing methods. Methods employed in FY 2008 were discussed in the EA (USDA 2003).

VIII. ISSUES ANALYZED IN DETAIL

Issues are concerns raised regarding potential environmental problems that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues related to the reduction of wildlife damage were raised during the scoping process for WS' programmatic FEIS (USDA 1997) and were considered in the preparation of the EA. Issues related to managing damage associated with gulls and cormorants were developed by WS in consultation with the USFWS, the NYSDEC, and the New York Department of Agriculture and Markets. Issues related to cormorant management were also raised during the development of the cormorant management FEIS (USFWS 2003).

The EA fully describes the issues identified during the scoping process for WS' programmatic FEIS, during the cormorant management FEIS developed by the USFWS, and during the development of the EA. The following issues were identified as important to the scope of the analysis (40 CFR 1508.25):

Issue 1 - Effects on Wildlife

A common issue when addressing damage caused by wildlife are the potential impacts of damage management actions on the population of target species and to non-targets. Methods used to resolve damage can involve altering the behavior of target species and may require the use of lethal methods when appropriate. Under the proposed action, WS provides technical and direct assistance using methods described in Appendix C of the EA in an integrated approach in which all or a combination of methods may be employed to resolve a request for assistance.

Of primary concern is the magnitude of take on a species' population from the use of lethal methods. Lethal methods are employed to remove an individual or those individuals responsible for causing damage and only after requests for such assistance are received by WS. The use of lethal methods would therefore result in local population reductions in the area where damage or threats were occurring. The number of target species removed from the population using lethal methods under the proposed action would be dependent on the number of requests for assistance received, the number of individuals involved with the associated damage or threat, and the efficacy of methods employed.

The analysis for magnitude of impact generally follows the process described in Chapter 4 of WS' programmatic FEIS (USDA 1997). Magnitude is described in WS' programmatic FEIS 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 involving species whose population densities are high and only after they have caused damage.

Assessment of Authorized Take Through Quantitative Determinations

Herring gulls, ring-billed gulls, great black-backed gulls, and double-crested cormorants were identified as target species in the EA (USDA 2003). The EA evaluated the take of up to 10% of the estimated statewide population annually of each target species under the proposed action. The population impact analyses for each of the target species from WS' annual take to resolve damage and reduce threats is addressed below.

Biological assessments for identifying the potential impact of harvest and/or removal programs on bird populations have a long history of application in the United States. Population modeling and extensive monitoring programs form the basis of an adaptive decision-making process used each year for setting migratory game bird harvest regulations, while ensuring that levels of take are sustainable. Increasing

human-wildlife conflicts caused by migratory bird species (both game and nongame), and their potential impacts on sensitive species and their habitats, has resulted in greater use of analytical tools to evaluate the effects of authorized take to achieve population objectives (Runge et al. 2009). One such tool is referred to as Potential Biological Removal (PBR) (Wade 1998, Runge et al. 2004).

To use the PBR method to determine levels of allowable take, or cumulative impacts over a large geographic area, the information required includes a minimum estimate of the population size using science-based monitoring programs (e.g., Breeding Bird Survey, Christmas Bird Count, coordinated colony surveys), and the intrinsic rate of population growth. The formula for PBR is:

$$\text{PBR} = \tfrac{1}{2} R_{max} N_{min} F_R$$

where R_{max} is the maximum population growth rate at low densities, and in the absence of removal (Runge et al. 2004), N_{min} is the minimum population size, and F_R is a recovery factor ranging from 0.1 to 2.0. The recovery factor is a qualitative assessment that is typically set at low levels for endangered (F_R = 0.1) or threatened species (F_R = 0.5; Taylor et al. 2000), or if the status of the population is poorly known (Runge et al. 2004). However, using a recovery factor above 1.0 has been discussed for species in which the management objective is to hold the population at a smaller fraction of its carrying capacity (Runge et al. 2009).

To estimate R_{max} for great black-backed gulls, herring gulls, and ring-billed gulls, the Slade formula (Slade et al. 1998) was used:

$$1 = p\lambda^{-1} + 1_{\alpha}\, b\lambda^{-\alpha} - l_{\alpha} b p^{(\omega-\alpha+1)} \lambda^{-(\omega+1)}$$

where p is adult annual survival rate, $l\alpha$ is the survival rate from birth to age at first reproduction, b is the number of female offspring per female of reproductive age per year, α is the age at first reproduction, ω is the age at last reproduction, and λ is the intrinsic rate of population change. After solving the above equation for λ, R_{max} was estimated as $\ln(\lambda)$. Population parameter estimates were taken from the literature for each gull species (see Table 6), or in cases where estimates were not available, surrogate estimates from closely-related species were used (Seamans et al. 2007). Because there was uncertainty associated with demographic parameter estimates, allowable take levels were calculated using a simulation approach to estimate a range of R_{max} values with parameter estimates randomly drawn from normal distributions based on reported standard errors (see Table 6; Seamans et al. 2007).

Table 6 - Demographic parameter estimates (θ) used for estimating R_{max} and PBR of gulls in BCR 14 and 30 (Seamans et al. 2007)

		Great black-backed gull[1]		Herring gull[2]		Ring-billed gull[3]	
Parameter	Age class	(θ)	SE (θ)	(θ)	SE (θ)	(θ)	SE (θ)
p	Adult	0.87	0.03	0.87	0.03	0.87	0.03
$l\alpha$	Adult	0.42		0.42		0.56	
	Hatch Year	0.729	0.035	0.729	0.035	0.729	0.035
	Second Year	0.886	0.024	0.886	0.024	0.886	0.024
b		0.784	0.018	0.752	0.022	0.752	0.022
α		5		5		3	
ω		19		20		19	
N_{min}		250,000		390,000		54,000	
R_{max}		0.09	0.027	0.086	0.027	0.113	0.036

[1]Good 1998, [2]Pierotti and Good 1994, [3]Ryder 1993, Seamans et al. 2007

Population estimates (N_{min}) for each gull species were based on the number of gulls at known breeding colonies in Bird Conservation Regions (BCRs) 14 and 30 during the mid-1990's (USFWS 2008b), and adjusted using a conservative estimate of 0.75 non-breeding gulls per breeder to estimate the total population (Seamans et al. 2007). BCR 14 and BCR 30 encompass parts of the northeastern United States and are inclusive of most known breeding colonies of herring gulls, ring-billed gulls, and great black-backed gulls. Since breeding and non-breeding gulls are known to occur throughout the northeastern United States and given the transitory behavior of gulls in the region, the populations of gulls in BCR 14 and BCR 30 were evaluated to determine potential cumulative impacts of take from all known entities occurring in those regions since birds causing damage or posing threats in New York could originate from colonies outside of the State. Allowable take levels (± 95 CI) for each of the three gull species under three recovery factors (0.5, 1.0, 1.5) in BCRs 14 and 30 were developed and analyzed by the USFWS (Seamans et al. 2007) and are presented in Table 7. Currently, information on the allowable take levels for cormorants based on the PBR model is not available.

Table 7 - PBR (± 95% CI) of herring gulls, great black-backed gulls, and ring-billed gulls in BCRs 14 and 30 under 3 recovery factors (Seamans et al. 2007)

Species	$F_R = 0.5$	$F_R = 1.0$	$F_R = 1.5$
Herring Gull	8,360 (3,892 – 12,656)	16,725 (7,788 – 25,397)	25,048 (11,716 – 37,875)
Great Black-backed Gull	5,614 (2,764 – 8,358)	11,234 (5,561 – 16,670)	16,853 (8,364 – 25,086)
Ring-billed Gull	1,532 (713 – 2,318)	3,065 (1,455 – 4,634)	4,588 (2,161 – 6,951)

Herring Gull Population Impact Analysis

Herring gulls are the most widely distributed gulls in the Northern Hemisphere. Herring gulls breed in colonies near oceans, lakes, or rivers (Bent 1921). In the northeastern United States, herring gulls nest along the Great Lakes and along the Atlantic Coast from Maine to northern South Carolina. Herring gulls are common breeders on Long Island in New York, and colonies can be found in the Adirondacks and west to Lake Ontario. Herring gulls are considered a very abundant resident in New York with populations found near large water bodies and landfills (Levine 1998). Herring gulls will nest in natural or man-made sites, such as rooftops and breakwalls (Blokpoel and Scharf 1991).

According to trend data available from the Breeding Bird Survey (BBS), the number of herring gulls observed during the breeding season are showing an increasing trend in New York estimated at 0.3% annually since the BBS was initiated in 1966 (Sauer et al. 2008). Herring gulls observed on BBS routes in the eastern U.S. are showing a statistically significant decline estimated at -5.6% with a smaller decline occurring since 1980 estimated at -3.3% annually (Sauer et al. 2008). In the northeastern United States, herring gulls are showing a decline estimated at -0.5% annually since 1966 (Sauer et al. 2008).

Trend data available from the Christmas Bird Count (CBC) also indicates a decline in the number of herring gulls observed wintering in New York since 1966 (National Audubon Society 2002). According to the Mid-Atlantic/New England/Maritimes Waterbird Conservation Plan, herring gulls are considered a species of low concern in North America and of moderate concern in BCR 14 which encompasses a part of northern New York (USFWS 2008b). In BCR 30, which includes Long Island, New York and the extreme southeast coastal areas of New York where breeding colonies are known to occur, the herring gull is considered a species of low concern (USFWS 2008b). Over 196,000 herring gulls are believed to breed in BCR 14. Of those, over 36,000 occur in Southern New England, which includes Long Island and the coastal areas of southeastern New York. In addition, over 90,000 herring gulls are believed to breed in the neighboring BCR 30, which includes parts of northern New York (USFWS 2008b).

Herring gulls are protected from lethal take under the Migratory Bird Treaty Act. However, take of gulls can occur when authorized by the USFWS pursuant to the Act through the issuance of depredation permits. 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. Currently, there are an estimated 25,000 breeding pairs in 36 colonies throughout New York (McGowan and Corwin 2008).

WS' take of herring gulls in New York has ranged from 761 taken in 2004 to a high of 1,424 gulls taken in 2006 (see Table 8). Take occurs primarily to reduce threats of aircraft striking gulls at John F. Kennedy International Airport (JFKIA) in New York which was evaluated in a separate analysis (USDA 1994). From 2003 through 2007, 684 to 1,095 herring gulls per year have been taken at JFKIA to reduce threats associated with gulls crossing the runways at the airport. As part of an integrated approach to reducing damage and threats associated with herring gulls, WS continues to use non-lethal harassment methods to disperse gulls. The highest annual herring gull take by WS in New York occurred in FY 2006 with 1,424 gulls lethally taken while nearly 98% of the gulls addressed by WS were non-lethally harassed.

Table 8 – Herring gull take by WS in New York authorized from FY 2004 through FY 2008

Year[1]	Dispersed	Released	Take[2]
2004	78,278	0	761
2005	107,606	0	781
2006	62,310	0	1,424
2007	76,783	42	1,169
2008	83,332	97	927

[1] Reported by federal fiscal year

[2] Take of all gulls by WS in New York, including take analyzed in the John F. Kennedy International Airport FEIS (USDA 1994).

As previously discussed, the USFWS has developed a PBR model to estimate the allowable take of herring gulls in BCR 14 and BCR 30 which includes New York. Based on the model, an allowable harvest of up to 16,725 herring gulls in BCR 14 and BCR 30 would maintain current population levels in those two regions. The take of herring gulls also occurs by other entities (e.g., airports, landfills) through depredation permits issued by the USFWS.

Table 9 lists the number of depredation permits issued by the USFWS since 2003 for the take of herring gulls and the reported take of herring gulls in New York authorized by a permit by entities other than WS. The number of depredation permits issued by the USFWS to non-WS entities as ranged from 22 to 25 permits annually with an authorized take ranging from 3,460 gulls annually to 3,700 gulls annually. The highest level of herring gull take occurred in 2006 when 1,781 gulls were taken in New York. Herring gull nests were also authorized to be destroyed by the USFWS through the issuance of depredation permits. The number of herring gull nests destroyed annually has ranged from 36 nests in 2003 to a high of 299 nests in 2007.

Impacts due to nest and egg removal and destruction should have little adverse impact on the herring gull population regionally and in New York. Nest and egg destruction methods are considered non-lethal when conducted before the development of an embryo. Additionally, herring gulls are a long lived species and have the ability to identify areas with regular human disturbance and low reproductive success which causes them to relocate and nest elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected, this activity has no long term effect on breeding adult herring gulls. Nest and egg removal is not used by WS as a population management

method. This method is used by WS to inhibit nesting in an area experiencing damage due to nesting activity and is intended to relocate a nesting pair or colony of herring gulls to an area where there are no conflicts. From FY 2003 to FY 2008, no nest and egg removal projects were implemented for herring gulls by WS.

Table 9 – Herring gull take by non-WS entities in New York authorized by the USFWS

Herring Gulls				
Year[1]	No. of Permits	Authorized Take	Reported Take	Nests Destroyed
2003	22	3,545	1,255	36
2004	25	3,700	500	144
2005	22	3,460	1,636	39
2006	25	3,460	1,781	247
2007	25	3,535	1,400	299

[1] Reported by calendar year

To maintain current population levels, the PBR model developed by the USFWS predicts that 16,725 herring gulls can be taken in BCR 14 and BCR 30 annually based on $F_R = 1.0$ (see Table 7). In the northeastern United States (USFWS Region 5)[10], the average annual reported take of herring gulls from 2003 through 2007 has been 3,171 herring gulls by all entities issued depredation permits by the USFWS. Herring gull take by all entities in the northeastern United States has ranged from 2,117 gulls to a high of 3,911 gulls taken under depredation permits issued by the USFWS between 2003 and 2007. Based upon the PBR model, the average annual take of herring gulls in USFWS Region 5 has been below the level of take that would lead to a population decline. To maintain current herring gull populations, the PBR model estimated the allowable harvest of herring gulls in BCR 14 and BCR 30 was over 16,000 gulls annually. With $F_R = 0.5$ (recovery factor), the PBR predicted 8,360 herring gulls could be harvested annually in BCR 14 and BCR 30 which would likely lead to a population increase. The average annual take of herring gulls in the northeastern United States by all entities has been below the level where a population decline would occur.

WS' take along with take by other entities is expected to continue to be insignificant to the overall viability and reproductive success of herring gull populations on a local, regional, and nationwide scale. Known take of herring gulls is below the level that the PBR model predicts will cause a decline in the population in the northeastern United States from take permitted by the USFWS. WS' take of herring gulls in New York under the proposed action in the EA since FY 2004 has not reached a level that would indicate an adverse impact has or will occur from WS' activities. WS' take of herring gulls along with take by other entities in New York will have no adverse impact on herring gull populations in the State. The permitting of take by the USFW provides outside evaluation to ensure WS' take occurs within the allowed limits to maintain viability and growing populations.

The USFWS, as the agency with migratory bird management responsibility, could impose restrictions on take 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.

[10] The USFWS is divided into nine regions in the United States. USFWS Region 5 includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia.

Ring-billed Gull Population Impact Analysis

Ring-billed gulls breed from the southern James Bay in Canada to the Great Lakes, northeast along the St. Lawrence Valley to Newfoundland, and south to central New York (Levine 1998). Nesting colonies can be located on islands, parklands, slag yards, rooftops, breakwalls, and landfills. Large gravel rooftops are becoming ideal nesting habitats for ring-billed gulls due to the lack of predators (Belant 1993). Currently, there are an estimated 53,000 breeding pairs and 28 colonies in New York (McGowan and Corwin 2008). 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).

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. In New York, BBS data indicates a statistically significant increasing trend in breeding populations of ring-billed gulls estimated at 4.4% annually since 1966 (Sauer et al. 2008). According to Sauer et al. (2008), the population of ring-billed gulls has increased throughout the United States, the northeastern United States, and across all routes in the eastern BBS region, at an annual rate of 2.6%, 4.4%, and 1.8%, respectively, from 1966-2007. Ring-billed gulls wintering in New York are also showing a general increasing trend since 1966 (National Audubon Society 2002).

According to the survey data and trends, ring-billed gulls are considered a species of least concern (USFWS 2008b). Almost 41,000 ring-billed gulls are believed to breed in BCR 14. There are no known breeding ring-billed gull colonies in BCR 30 (USFWS 2008b). The USFWS authorized take of ring-billed gulls by all entities in New York since 2003 other than WS are listed in Table 10. The highest level of reported take occurred in 2006 when 816 ring-billed gulls were taken by all non-WS entities in New York though it only represented 29% of the take allowed under the authorized take of ring-billed gulls. In 2007, the USFWS authorized take of up to 3,125 ring-billed gulls in New York by entities other than WS with a reported take of 760 ring-billed gulls.

The USFWS also authorized ring-billed gull nests to be destroyed as part of depredation permits to prevent and alleviate damage. The number of nests reported as being destroyed is also shown in Table 10. The number of nests destroyed in the State by entities other than WS ranged from a low of 721 nests in 2005 to 4,204 nests in 2007.

Table 10 – Ring-billed gull take by non-WS entities in New York authorized by the USFWS

Year[1]	No. of Permits	Authorized Take	Reported Take	Nests Destroyed
2003	25	2,720	463	930
2004	28	2,750	638	1,304
2005	26	2,500	611	721
2006	31	2,805	816	3,539
2007	30	3,125	760	4,204

[1] Reported by calendar year

As discussed in the EA, WS addressed damage and threats associated with ring-billed gulls in New York using methods in an integrated approach. WS employed lethal and non-lethal methods in an integrated approach to resolve damage and threats associated with gulls in New York from FY 2004 through FY 2008, primarily from threats associated with aircraft striking gulls at airports. Although lethal methods were used by WS to take ring-billed gulls, over 99% of the gulls addressed in New York by WS were dispersed using non-lethal harassment methods, such as pyrotechnics and other noise producing methods.

WS addressed 93,175 ring-billed gulls using non-lethally methods in FY 2005 which was the highest number of ring-billed gulls addressed in any year from FY 2004 through FY 2008. Take of ring-billed gulls using lethal methods also occurred from FY 2004 through FY 2008, primarily from the use of a firearm. WS' take of ring-billed gulls ranged from 235 taken in FY 2004 to 529 gulls taken in FY 2007. Of those ring-billed gulls addressed in FY 2007, nearly 99% were dispersed using non-lethal methods. WS employed nest and egg removal as a method to address damage by ring-billed gulls. Nest and egg removal is not used by WS as a population control method. This method is used by WS to inhibit nesting in an area where damage or threats are occurring due to nesting activity and is intended to relocate a nesting pair or colony of ring-billed gulls to an area where there are no conflicts. The number of nests destroyed in the State by WS ranged from a low of 698 nests in 2006 to 3,081 nests in 2004.

From 2003 through 2007, the number of ring-billed gulls taken annually in the northeastern United States (USFWS Region 5) has ranged from 678 to 1,289 ring-billed gulls with an average annual take of 980 ring-billed gulls. Of those ring-billed gulls taken in the northeastern United States, 50 to 162 gulls have been taken per year at JFKIA to reduce threats associated with aircraft striking gulls which were analyzed in a separate analysis (USDA 1994). The PBR model developed by the USFWS currently predicts that 3,065 ring-billed gulls could be taken annually to maintain the current breeding population levels in BCR 14 and BCR 30 (USFWS 2008b). Non-breeding ring-billed gulls are known to occur throughout BCR 14 and BCR 30 during the breeding season. Based on the known take of ring-billed gulls occurring annually in BCR 14 and BCR 30, the take level from all known sources is below the estimated level that would result in a breeding population decline.

Table 11 – Ring-billed gull take by WS in New York authorized from FY 2004 through FY 2008

Year[1]	Dispersed	Take[2]	Nests Destroyed
2004	50,071	235	3,081
2005	93,175	257	1,447
2006	28,656	377	698
2007	43,905	529	730
2008	21,980	428	1,693

[1] Report by federal fiscal year

[2] Take of all gulls by WS in New York, including take analyzed in the John F. Kennedy International Airport FEIS.

Based on the best available information described above, 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 ring-billed gull populations on a local, regional, and nationwide scale. This determination is based on the increasing regional trends of ring-billed gull populations as derived from BBS data and PBR data for BCR 14 and BCR 30. The PBR model predicts ring-billed gulls in BCR 14 and BCR 30 could sustain a harvest of 3,065 individuals and maintain current population levels. WS' take and all known take in the northeastern United States since 2003 has not reached a level that indicates an adverse impact to ring-billed gull populations is occurring. With management authority over migratory birds, the USFWS could impose stricter take limits if warranted based on population data. 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.

Great Black-backed Gull Population Impact Analysis

Great Black-Gulls nest along the coast from southern Greenland to North Carolina, also, in increasing numbers on Lake Ontario and Lake Huron. An 11-year study on Long Island, New York found a mean of

7,158 pairs per year spread among 52 colonies (Sommers et al. 1996). As reported by the BBS, populations of great black-backed gulls in the Eastern BBS Region and USFWS Region 5 have decreased annually at rates of -2.9%, and -2.7%, respectively, from 1966-2007 (Sauer et al. 2008). In New York, the number of great black-backed gulls observed during the breeding season has increased annually since 1966 estimated at 4.9% (Sauer et al. 2008). The number of great black-backed gulls observed overwintering in New York since 1966 has been stable to slightly declining (National Audubon Society 2002).

According to the USFWS (2008b), great black-backed gulls are considered a species of lowest concern in BCR 30 and of low concern in BCR 14. Over 37,000 great black-backed gulls are believed to breed in BCR 30 with over 115,000 great black-backed gulls nesting in BCR 14. Of these, over 25,500 occur in Southern New England, which includes New York. To maintain the current population levels in BCR 14 and BCR 30, the PBR model developed by the USFWS predicts take of 11,234 great black-backed gulls would not cause a decline in gull populations in BCR 14 or BCR 30 (see Table 7).

Table 12 – Great black-backed gull take by WS in New York from FY 2004 through FY 2008

Year[1]	Dispersed	Take[2]
2004	16,487	162
2005	771	254
2006	0	263
2007	20,125	222
2008	8,442	272

[1] Report by federal fiscal year

[2] Take of all gulls by WS in New York, including take analyzed in the John F. Kennedy International Airport FEIS.

As shown in Table 12, WS' take of great black-back gulls from FY 2004 through FY 2008 has ranged from 162 gulls taken in FY 2004 to 272 gulls taken in FY 2008. No great black-backed gull nests or eggs were destroyed by WS from FY 2004 through FY 2008. Great black-backed gulls taken by non-WS entities from 2003 through 2007 including nests and eggs destroyed are shown in Table 13. From 2003 through 2007, the number of great black-backed gulls taken in the northeastern United States (USFWS Region 5) has ranged from 404 to 1,203 gulls with an average of 814 great black-backed gulls taken annually by all entities. Of those gulls taken from 2003 through 2007, the number of great black-backed gulls taken at JFKIA has ranged from 131 to 297 gulls.

Table 13 – Great black-backed gull take by non-WS entities in New York from 2003 through 2007

Great Black-backed Gulls				
Year[1]	No. of Permits	Authorized Take	Reported Take	Nests Destroyed
2003	15	1,012	244	1
2004	16	1,157	133	0
2005	13	867	361	3
2006	16	937	225	2
2007	16	1,012	209	4

[1] Report by calendar year

The average annual take of great black-backed gulls in USFWS Region 5 by all entities authorized to take gulls through depredation permits is below the level of annual take required to maintain current population levels. To cause a population decline, the PBR model estimates that nearly 17,000 great black-backed gulls would have to be taken annually in the region. According to the PBR model, the

average annual take by all entities in USFWS Region 5 is below the allowable harvest for great black-backed gull populations to increase.

Based on the best available information, WS' take of great black-backed gulls in New York is not adversely affecting the statewide population nor are WS' activities to alleviate damage caused by great black-backed gulls having a cumulative impact on populations. The permitting of take by the USFWS provides outside evaluation to ensure WS' take occurs within the allowed limits to maintain viability and growing populations. The USFWS, as the agency with migratory bird management responsibility, could impose restrictions on take as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on great black-back gull populations would have no significant adverse impact on the quality of the human environment.

Double-crested Cormorants Population Impact Analysis

Double-crested cormorants are large fish-eating colonial waterbirds that can be found breeding at several large colonies in New York that include colonies on Lakes Champlain, Erie, Oneida, and eastern Lake Ontario (Levine 1998, Swift 2004). A coordinated survey of the Great Lakes in 2007 recorded 115,006 cormorant nests, yielding an estimated Great Lakes population (including non-breeders) of 345,000-460,000 individuals (USFWS 2008a). Although cormorants are migrants, some birds overwinter locally in New York, especially along the coastal areas of the State (Hatch and Weseloh 1999). The New York population has grown to more than 10,000 nesting pairs statewide, with an estimated summer population of more than 40,000 birds (NYSDEC 2004). Tobin (1999) estimated there were 85,510 breeding pairs in the Atlantic Regional double-crested cormorant population.

The number of cormorants observed in the State during the breeding season has shown an increasing trend since 1966 estimated at 20.6% in New York (Sauer et al. 2008). In the northeastern United States (USFWS Region 5), the number of cormorants observed on BBS routes has increased an estimated 1.6% annually since 1966 while cormorant population in the United States have shown a statistically significant increase estimated at 5.1% annually since 1966 (Sauer et al. 2008). The number of cormorants observed wintering in New York has also shown a general increasing trend since 1966 (National Audubon Society 2002). In BCR 14 and BCR 30, breeding populations of cormorants have been assigned a conservation ranking of lowest concern (USFWS 2008b).

The EA evaluated take of up to 10% of the estimated cormorant population in New York annually by WS (USDA 2003) which was evaluated within the framework of analyses that occurred within the cormorant management FEIS developed by the USFWS (USFWS 2003). WS' take of cormorants from FY 2004 through FY 2008 are shown in Table 14. Since FY 2004, WS has lethally taken 967 cormorants in New York to alleviated damage or threats. In addition, WS has destroyed 687 cormorant nests since FY 2004 in the State. The highest level of take occurred in FY 2008 when 402 cormorants were lethally taken, primarily with firearms. Of those cormorants addressed by WS in FY 2008, nearly 99% were dispersed from areas where damage or threats were occurring using harassment methods. Since FY 2004, WS has dispersed 374,964 cormorants in the State using non-lethal harassment methods. Of those cormorants addressed since FY 2004, over 99% have been addressed by WS using non-lethal dispersal methods.

In addition to the take occurring by WS, the USFWS has also authorized take by other entities in the State. Take by other entities since 2003 are shown in Table 15 including the number of nests/eggs destroyed. In 2007, the USFWS authorized the take of up to 465 cormorants by other entities in the State with those entities reporting a total take of 98 cormorants. The highest level of take by non-WS entities occurred in 2003 when 143 cormorants were lethally taken in the State.

Table 14 – Double-crested cormorant take by WS in New York from FY 2004 through FY 2008

Year[1]	Dispersed	Released	Take	Nests Destroyed
2004	75,242	0	105	449
2005	103,486	50	63	85
2006	116,973	3	106	118
2007	45,266	29	291	35
2008	33,997	0	402	0

[1] Report by federal fiscal year

The cormorant management FEIS developed by the USFWS predicted the number of cormorants taken by authorized entities under the selected alternative would increase by 4,140 cormorants per State, including New York (USFWS 2003). The FEIS predicted the increased take per State evaluated under the selected alternative would result in the authorized lethal take of up to 8.0% of the continental cormorant population (USFWS 2003). The total take of cormorants by all entities in New York has not exceeded the predicted increased take evaluated and authorized under the selected alternative in the cormorant management FEIS.

Table 15 – Double-crested cormorant take by non-WS entities in New York from 2003 through 2008

Year[1]	No. of Permits	Authorized Take	Reported Take	Nests Destroyed
2003	7	65	143	743
2004	6	285	61	100
2005	9	405	90	159
2006	9	395	90	93
2007	10	465	98	62

[1] Report by calendar year

The NYSDEC (2004) estimated 40,000 cormorants are present in the State during the breeding season. If populations of cormorants have been stable in the State, WS' highest level of take of 402 cormorants that occurred in FY 2008 would represent 1.0% of the estimated statewide population. As stated previously, the number of cormorants observed in the State during the BBS has shown an increasing trend estimated at 20.6% since 1966 and an estimated 10.1% since 1980 (Sauer et al. 2008). Therefore, WS' take of cormorants since FY 2004 has been within the analysis parameters evaluated in the EA (USDA 2003). The analyses in the cormorant management FEIS determined that egg oiling and nest destruction activities would not adversely affect regional cormorant populations (USFWS 2003). Based on current information and the analyses in the cormorant management FEIS, WS' take of cormorants, including the destruction of nests, since FY 2004 has not adversely affected cormorant populations in the State. Based on current information, the magnitude of WS' cormorant damage management activities in the State will continue to be low. WS will continue to address cormorants using lethal and non-lethal methods in an integrated approach to resolving requests for assistance as addressed under the proposed action in the EA.

Effects on other wildlife species, including T&E species

The issue of non-target species effects, including effects on threatened and endangered species arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS' minimization measures and SOPs are designed to reduce the effects of damage management activities on non-target species' populations. To reduce the risks of adverse affects to non-target wildlife, WS selects damage management methods that are as target-selective as possible or applies such methods in ways that

reduces the likelihood of capturing non-target species. Before initiating management activities, WS also selects locations which are extensively used by the target species and employs baits or lures which are preferred by those species. Despite WS' best efforts to minimize non-target take during program activities, the potential for adverse affects to non-targets exists when applying both non-lethal and lethal methods to manage damage or reduce threats to safety.

While every precaution is taken to safeguard against taking non-targets during operational use of methods and techniques for resolving damage and reducing threats caused by wildlife, the use of such methods can result in the incidental take of unintended species. Those occurrences are minimal and should not affect the overall populations of any species. Since FY 2004, no non-target wildlife has been taken by WS during gull and cormorant damage management activities in New York. No adverse affects to non-targets were observed or reported to WS during damage management activities. WS will continue to monitor annually the take of non-target species to ensure program activities or methodologies used in damage management do not adversely impact non-targets. WS' activities are not likely to adversely affect the viability of any wildlife populations from damage management activities.

Managing damage caused by gulls and cormorants can often benefit native wildlife species that are adversely affected by gulls and/or cormorants. High densities of gulls and cormorants can have a detrimental effect on forest regeneration and species composition at nesting locations. Cormorants and gulls can rapidly colonize new nesting sites competing for space with other colonial birds already inhabiting a location. In Ohio, the number of cormorant nests on West Sister Island in the Great Lakes increased from 0 to 1,500 in 5 years (Tobin 1999). As the number of cormorants nesting on the island increased, the number of herons nesting on the island dropped annually. Loss of mature trees due to the fecal droppings of nesting cormorants can affect crown nesting and subcanopy nesting birds (Tobin 1999).

Gulls have shown unprecedented population growth in the 20th century, primarily from consistent man-made food supplies from landfills and modern agriculture (Drury 1973, Verbeek 1977, Erwin 1979, Patton 1988, Belant and Dolbeer 1993). Herring, ring-billed, and great black-backed gulls prey on a variety of natural resources. Normally, predation would be considered part of the function of a healthy ecosystem. However, major changes have occurred in the ecosystem that encompasses the coastal region and inland lakes of New York. Urban development of coastal and island areas has reduced nesting habitat for several species of colonial birds, while species such as gulls have adapted to, and benefitted from, the availability of man-made food and structures. Historically, avian predators (e.g., large gulls) were probably much reduced in abundance or distribution compared to today. Herring and great black-backed gulls are a substantial threat to colonial waterbirds and shorebirds nesting in New York from predation, competition, and displacement. Gulls often take eggs and chicks of other species, often swallowing chicks whole, ejecting a pellet of feathers and bone from the mouth (Elphick et al. 2001). The impact of predatory gulls has a substantial effect on the nesting success of other colonial waterbirds and on the populations of their prey species, such as terns (Hatch 1970). Guillemette and Brousseau (2001) found that removal of gull predators substantially increased the life span of tern broods. Colonial waterbirds will often abandon nesting sites after repeated nesting failures, which can be induced by predation of eggs and nestlings by gulls.

Cormorants have also shown population increases since 1972 in the Eastern United States (Sauer et al. 2008). These population increases has led to an inevitable conflict between the sportfishing industry, fish hatcheries and stocking agencies, and bird enthusiasts. Tobin (1999) found that the annual consumption of panfish by cormorants over a 6-year period was about 27.7 million fish, with more than half of those being yellow perch. Cormorants were also found to consume 13.7 percent of stocked lake trout over a 4-day period in Eastern Lake Ontario (Tobin 1999). Rudstam et al. (2004) found that on Oneida Lake in New York, walleye and yellow perch were a major portion of cormorants diet from 1995-2000 (40-82%

by number) and concluded that the decline in both walleye and yellow perch populations was most likely caused by predation from an increasing cormorant population. Walleye are an important gamefish to sport anglers and drive local economies surrounding the Lake. Van DeValk et al. (2002) found that cormorant consumption of adult yellow perch was similar to angler harvest, but cormorants consumed almost 10 times more age-2 yellow perch, a trend that would reduce future angler harvest of this important panfish species.

The cessation or reduction of avian predation (gulls) and nest site competitors (cormorants and gulls) on nesting threatened and endangered species, colonial waterbirds and shorebirds and fish populations of management concern would result in increased chick survival and fledgling, increased year classes of fish, and eventually increased populations of those species. Management of gulls or cormorants would be beneficial and support increases of colonial waterbirds and shorebirds, and would have major societal and ecological benefits. Both colonial bird and game fish species are considered valuable to bird watchers, ecologists, anglers, environmentalists, hunters, outdoor recreationalists, and local governments.

A review of the T&E species listed by the USFWS showed that additional listings of T&E have occurred in the State. Since the completion of the EA, the Northeastern bulrush (*Scirpus ancistrochaetus*), American chaffseed (*Schwalbea americana*), eastern prairie fringed orchid (*Platanthera leucophaea*), swamp pink (*Helonias bullata*), and small whorled pogonia (*Isotria medeoloides*) have been listed in the State. Based on current information, those species are listed in New York but are not known to currently occur in the State. Based on the absence of those species from the State based on current information, WS' gull and cormorant damage management activities will have no effect on those species and their critical habitats that were listed since the completion of the EA. WS' determination that gull and cormorant damage management activities would have no adverse affect on those species addressed as part of the Biological Opinion issued by the USFWS on WS' programmatic activities is still valid for the proposed action for those species addressed in the Opinion (USDA 1997). After review of the current list of T&E species listed in the State, WS' determination that gull and cormorant damage management activities would have no effect on those T&E species and their critical habitat that were not addressed as part of the Biological Opinion issued by the USFWS on WS' programmatic activities but were evaluated in the EA is still valid for those species.

WS' activities were selective for target bird species. No non-target species were adversely affected by WS' actions. The EA concluded that the cumulative impact on non-target species is biologically insignificant to nonexistent and that WS has not adversely affected the viability of any wildlife species populations through damage management activities. Based on WS' activities conducted from FY 2003 through FY 2008, WS' gull and cormorant damage management activities will continue to have a minimal to nonexistent cumulative impact on non-target species.

Issue 2 - Effects on human health and safety

Populations of gulls have increased dramatically in the past several decades. An abundance of gulls in urban areas results in conflicts with people including: damage to buildings from nesting materials and droppings, contamination of water sources, possible transmission of pathogens from gulls feeding in putrecible waste, and hazards to aircraft. Whelan et al. (1998) found that 64% of gulls sampled by cloacal swabbing carried *Campylobacter* spp. bacteria. People who become infected with Campylobacteriosis have sudden gastrointestinal disease, diarrhea, abdominal pain, and fever (Curtis and Shultz 2008). Girdwood et al. (1985) suggested that gulls were not an important factor in the epidemiology of human illnesses, but large numbers of gulls roosting in one site may represent a health hazard, which is similar to findings by Whelan et al. (1998). Gulls that feed at inland landfills tend to use adjacent water sources as night roosts and can represent sources of possible contamination (Benton et al. 1983).

The EA concluded that WS' gull and cormorant damage management program would result in a reduction of threats to human health and safety such as an improvement in work place safety because of the elimination or reduction of hazardous work conditions such as accumulations of slippery bird droppings on stairways and catwalks; a reduction in disease threats because fewer fecal droppings would accumulate, therefore reducing the risk of inhaling or ingesting pathogens from fecal droppings; and a reduction in the potential risk of aircraft bird strikes at airports.

WS' activities did not cause any adverse impacts to human health and safety. Program activities and methods, and their potential impacts on human health and safety have not changed from those analyzed in the EA. Impacts of the program on this issue are expected to remain insignificant.

Issue 3 - Effects on Socio-economics of the human environment

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. There is evidence that dogs and cats were domesticated around 3,000 BC (History World 2007). The American public is no exception and today a large percentage of households have pets. However, some people may consider individual wild animals as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife.

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

The EA concluded the effects on aesthetics would be variable depending on the damage situation, stakeholders' values towards wildlife, and their compassion for those who are experiencing bird damage. WS only conducts damage management activities at the request of the affected home/property owner or resource manager. Upon receiving a request for assistance, WS addresses issues/concerns and explanations are given for the reasons why a particular method or group of methods would be the most effective in reducing damage for the specific situation.

The ability to view and enjoy the aesthetic value of gulls and cormorants at a particular site would be somewhat limited if the birds were removed/harassed as part of an integrated bird damage management program. However, new birds would most likely use the site in the future, although the length of time until these birds arrive is variable, depending on the site, time of year, and population densities in the surrounding areas. The opportunity to view gulls and cormorants is available if a person makes the effort to visit sites outside of the damage management area.

Program activities and their potential impacts on the socio-economic environment have not changed from those analyzed in the EA. As discussed under Issue 1, when compared to the estimated gull and cormorant population in New York, WS' take has been minimal with the magnitude of take being low. WS will continue to address requests for assistance to manage damage caused by gulls and cormorants using non-lethal methods with lethal methods being employed when deemed appropriate by WS' Decision Model (USDA 2003). Bird populations remain high and are readily available for viewing if a reasonable effort is made to locate gulls and cormorants in New York. WS' take of gulls and cormorants in New York has not adversely affected the aesthetic value of gulls or cormorants. Program activities and

methods, and their potential impacts to stakeholders have not changed from those analyzed in the EA. Impacts of the program on this issue are expected to remain insignificant.

Issue 4 - Humaneness and animal welfare concerns of methods used

As discussed in the EA, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal. 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.

Some individuals believe any use of lethal methods to resolve damage associated with wildlife is inhumane because the resulting fate is the death of the animal. Others believe that certain lethal methods can lead to a humane death. Others believe most non-lethal methods of capturing wildlife to be humane because the animal is generally unharmed and alive. Still others believe that any disruption in the behavior of wildlife is inhumane. With the multitude of attitudes on the meaning of humaneness, the analyses must consider the most effective way to address damage and threats caused by wildlife in a humane manner. WS is challenged with conducting activities and employing methods that are perceived to be humane while assisting those persons requesting assistance to manage damage and threats associated with wildlife. The goal of WS is to use methods as humanely as possible to effectively resolve requests for assistance to reduce damage and threats to human safety. WS continues to evaluate methods and activities to minimize the potential pain and suffering of those methods addressed when attempting to resolve requests for assistance.

As mentioned previously, some methods have been stereotyped as "humane" or "inhumane". However, many "humane" methods can be inhumane if not used appropriately. For example, a cage trap is generally considered by most members of the public as "humane" since an animal in live-captured. Yet, without proper care, live-captured wildlife in a cage trap can be treated inhumanely if not attended to appropriately.

Therefore, WS' mission is to effectively address requests for assistance using methods in the most humane way possible that minimizes the stress and pain of the animal. WS' personnel are experienced and professional in their use of management methods. When employing methods to resolve damage to resources or threats to human safety, methods are applied as humanely as possible. Methods used in gull and cormorant damage management activities in New York since the completion of the EA and their potential impacts on humaneness and animal welfare have not changed from those analyzed in the EA. No new methods were identified in this report that would alter the analysis contained in the EA on the issue of method humaneness. Therefore, the analyses of the humaneness of methods used by WS to manage damage and threats caused by gulls and cormorants have not changed from those analyzed in the EA.

IX. ISSUES NOT CONSIDERED IN DETAIL

WS has reviewed the issues not considered in detail as described in the EA and has determined that the analysis provided in the EA has not changed and is still appropriate. Effects on those issues continue to be insignificant.

X. ALTERNATIVES ANALYZED IN DETAIL

The EA contains a detailed description and discussion of the alternatives and the effects of the alternatives on the issues identified (USDA 2003). Appendix C of the EA provides a description of the methods that

could be used or recommended by WS under each of the alternatives. WS has reviewed the alternatives analyzed and determined the analyses in the EA are still appropriate for those alternatives.

The following four alternatives were developed to respond to the issues:

Alternative 1 - Integrated Bird Damage Management Program (No Action/Proposed Action)
Alternative 2 – Non-lethal Bird Damage Management Only By WS
Alternative 3 - Technical Assistance Only
Alternative 4 - No Federal WS Bird Damage Management

XI. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Three additional alternatives were also considered to address the issues but were not analyzed in detail with the rationale discussed in the EA (USDA 2003). WS has reviewed the alternatives analyzed but not in detail and determined the analyses in the EA are still appropriate for those alternatives considered.

XII. ANALYSIS

WS has reviewed the potential environmental impacts and the scope of analysis contained in the EA. The EA and the 2003 Decision/FONSI determined that activities conducted pursuant to and within the scope of analyses would not have significant impacts on the quality of the human environment. After review of the EA, the associated Decision/FONSI, and information contained in this summary report, WS has determined that the environmental impacts on the quality of the human environment from those activities conducted pursuant to the EA and its Decision/FONSI will continue to be insignificant and that no substantive changes in the analyses are necessary.

WS' activities in New York, based on the information found within this report, fall within the scope of analysis in the EA. No substantive changes have occurred in activities conducted or methods used since implementing the EA decision during the reporting period. Program activities have not changed from those described and analyzed in the EA. WS will continue to conduct gull and cormorant damage management activities according to those program procedures, protection measures, and mitigation factors discussed in the EA (USDA 2003).

XIII. DECISION AND RATIONALE

I have carefully reviewed the EA, the comments received during the public involvement process for the pre-decisional EA, the 2003 Decision/FONSI, and the information provided in this summary and new Decision document. I find the proposed program to be environmentally acceptable, addressing the issues and needs while balancing the environmental concerns of management agencies, landowners, advocacy groups, and the public. The analyses in the EA adequately addresses the identified issues which reasonably confirm that no significant impact, individually or cumulatively, to wildlife populations or the quality of the human environment are likely to occur from the proposed action, nor does the proposed action constitute a major federal action that would warrant the development of an EIS. Therefore, the analysis in the EA remains valid and does not warrant the completion of an EIS.

Based on the EA, the issues identified are best addressed by continuing Alternative 1 (Proposed Action/No Action) and applying the associated mitigation measures discussed in Chapter 3 of the EA. Alternative 1 successfully addresses (1) gull and cormorant damage management using a combination of the most effective methods and does not adversely impact the environment, property, and/or non-target species, including T&E species; (2) it offers the greatest chance at maximizing effectiveness and benefits to resource owners and managers while minimizing cumulative impacts on the quality of the human

environment that might result from the program's effect on target and non-target species populations; (3) it presents the greatest chance of maximizing net benefits while minimizing adverse impacts to public health and safety; and (4) it offers a balanced approach to the issues of humaneness and aesthetics when all facets of those issues are considered. Further analysis would be triggered if changes occur that broaden the scope of damage management activities, that affect the natural or human environment, or from the issuance of new environmental regulations.

The rationale for my decision is based on several considerations. This decision takes into account public comments, social/political and economic concerns, public health and safety, the best available science, and program activities conducted since the selected alternative was implemented. The foremost considerations are that: 1) gull and cormorant damage management will only be conducted by WS at the request of landowners/managers, 2) management actions are consistent with applicable laws, regulations, policies and orders, and 3) no adverse impacts to the environment were identified in the analysis. As a part of this new Decision, the WS program in New York will continue to provide effective and practical technical assistance and direct management techniques that reduce damage.

The WS program in New York will implement the proposed action in compliance with all applicable standard operating procedures and minimization measures described in Chapter 3 of the EA. This new Decision will take effect upon the close of the public comment period after publication of a legal notice making the EA, the 2003 Decision/FONSI, and this Decision available to the public for review and comment if no substantive issues or alternatives are identified during the public comment period. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and this Decision should be revisited and, if appropriate, revised, or if a Notice of Intent to prepare an EIS should be issued.

FINDING OF NO SIGNIFICANT IMPACT

The analysis in the EA, the 2003 Decision/FONSI, and this summary report indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of this proposed action. I agree with this conclusion and therefore find that an EIS need not be prepared. This determination is based on the following factors:

1. Gull and double-crested cormorant damage management as conducted by WS in the State of New York is not regional or national in scope.

2. Based on the analysis documented in the EA, the impacts of the proposed action will not significantly affect public health or safety. Risks to the public from WS' methods were determined to be low in a formal risk assessment (USDA 1997).

3. The proposed action will not have a significant impact on unique characteristics such as park lands, wetlands, wild and scenic areas, or ecologically critical areas. Built-in mitigation measures that are part of WS' standard operating procedures and adherence to laws and regulations will further ensure that WS' activities do not harm the environment.

4. The effects on the quality of the human environment are not highly controversial. Although certain individuals may be opposed to managing gulls and double-crested cormorants, this action is not controversial in relation to size, nature, or effects.

5. Mitigation measures adopted and/or described as part of the proposed action minimize risks to the public, prevent adverse affects on the human environment, and reduce uncertainty and risks.

Effects of methods and activities, as proposed, are known and do not involve uncertain or unique risks.

6. The proposed action does not establish a precedent for future actions, including future gull and double-crested cormorant damage management that may be implemented or planned within the State.

7. No significant cumulative effects were identified through this assessment. The EA discussed cumulative effects of the proposed action on target and non-target species populations and concluded that such impacts were not significant for this or other anticipated actions to be implemented or planned within the State.

8. This action will not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places and will not cause loss or destruction of significant scientific, cultural, or historic resources. WS' gull and cormorant damage management would not disturb soils or any structures and, therefore, would not be considered a "Federal undertaking" as defined by the National Historic Preservation Act.

9. WS determined that the proposed project would not adversely affect federal or state listed threatened or endangered species in New York.

10. The proposed action is consistent with local, state, and federal laws that provide for or restrict WS' wildlife damage management activities. Therefore, WS concludes that this project is in compliance with federal, state and local laws for environmental protection.

Charles S. Brown, Director-Eastern Region
USDA/APHIS/WS
Raleigh, North Carolina

Date 5/28/09

LITERATURE CITED

Belant J. L. 1993. Nest-site selection and reproductive biology of roof – and island – nesting herring gulls. Trans. North Amer. Wildl. And Nat Resour. Conf. 58:78-86.

Belant, J. L., and R. A. Dolbeer. 1993. Population status of nesting laughing gulls in the United States, 1977-1991. American Birds 47:220-224.

Bent, A. C. 1921. Life histories of North American gulls and terns. U.S. National Museum Bulletin 113. 345pp.

Benton, C., F. Khan, P. Monaghan, W.N. Richards, and C.B. Shedden. 1983. The contamination of a major water supply by gulls *Larus* sp.; A study of the problem and remedial action taken. Water Research 17:789-798.

Blokpoel, H., and G. D. Tessier. 1986. The ring-billed gull in Ontario: a review of a new problem species. Occasional Paper Number 57. Canadian Wildlife Service. Ottawa, Ontario. 34pp.

Blokpoel, H., and G. D. Tessier. 1992. Control of ring-billed gulls and herring gulls nesting at urban and industrial sites in Ontario, 1987-1990. Proceedings of the Eastern Wildlife Damage Conference 5: 51-57.

Blokpoel, H. and W. C. Scharf. 1991. Status and conservation of seabirds nesting in the Great Lakes of North America. ICBP Technical Bulletin 11:17-41.

Bull, J. 1974. The birds of New York State. Doubleday/Natural History Press. Garden City, NY. 392pp.

Curtis, P. D., and J. Shultz. 2008. Best Practices for Wildlife Control Operators. Thomson Delmar Learning, Clifton Park, NY.

Decker, D. J. and G. R. Goff. 1987. Valuing Wildlife: Economic and Social Perspectives. Westview Press. Boulder, Colorado, 424 p.

Drury, W. H. 1973. Population changes in New England seabirds. Bird Banding 44:267-313.

Elphick, C., J. B., Duning Jr., D. A. Sibley. 2001. National Audubon Society. The Sibley Guide to Bird Life and Behavior. Alfred A. Knopf, Inc., New York, NY.

Erwin, R. M. 1979. Historical breeding records of colonial seabirds and wading birds, 1900 – 1977, Cape Elizabeth, Maine to Virginia. supplement to final report prepared for U.S. Fish and Wildlife Service, Coastal Ecosystems Project, Newton Corner, MA.

Girwood, R. W., C. R. Fricker, D. Munroe, C. B. Shedden, and P. Monaghan. 1985. The incidence and significance of *Salmonella* carriage by gulls (*Larus* spp.) in Scotland. Journal of Hygiene 95:229-241.

Good, T. P. 1998. Great Black-backed Gull (*Larus marinus*). *In* The Birds of North America, No. 330 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. http://bna.birds.cornell.edu/BNA/

Guillemette, M. and P. Brousseau. 2001. Does Culling Predatory Gulls enhance the productivity of Breeding Common Terns? Journal of Applied Ecology 38:1-8.

Hatch, J. J. 1970. Predation and priracy by gulls at a ternery in Maine. Auk, 87:244-254.

Hatch, J. J., and D. V. Weseloh. 1999. Double-crested Cormorant (Phalacrocorax auritus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/441doi:10.2173/bna.441. Accessed May 21, 2009.

History World. 2007. History of the domestication of animals. www.historyworld.net. Accessed December 11, 2008.

Levine, E. 1998. Bull's birds of New York State. Cornell University Press, Ithaca, NY.

McGowan, K. J., and K. Corwin. 2008. The Second Atlas of Breeding Birds in New York State. Cornell University Press, Ithaca, NY.

National Audubon Society. 2002. The Christmas Bird Count Historical Results [Online]. Available http://www.audubon.org/bird/cbc. Accessed on May 21, 2009.

NYSDEC. 2004. NYSDEC Special Report – April 1, 2004: DEC Announced Cormorant Management Plans, Comprehensive Program Seeks to Reduce Conflicts With Fish and Other Wildlife, NYS DEC, 625 Broadway, Albany, NY 12233

Patton, S.R. 1988. Abundance of gulls at Tampa Bay landfills. Wilson Bulletin 100:431-442.

Peterson, J.M.C. 1985. 1984 Colonial bird census. High Peaks Audubon News 13:10.

Pierotti, R. J. and T. P. Good. 1994. Herring Gull (*Larus argentatus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/124doi:10.2173/bna.124. Accessed May 21, 2009.

Rudstam, L. G., A. J. Van De Valk, C. M Adams, J. T. H. Coleman, J. L. Forney, and M. E. Richmond. 2004. Cormorant predation and the population dynamics of walleye and yellow perch in Oneida Lake. Ecological Applications 14:149-163.

Runge, M. C., W. L. Kendall, and J. D. Nichols. 2004. Exploitation. Pages 303-328 in W. J. Sutherland, I. Newton, and R. E. Green, eds. Bird Ecology and Conservation: A Handbook of Techniques. Oxford University Press, Oxford, UK.

Runge, M. C., J. R. Sauer, M. L. Avery, B. F. Blackwell, and M. D. Koneff. 2009. Assessing allowable take of migratory birds. The Journal of Wildlife Management 73:556-565.

Ryder, J. P. 1993. Ring-billed gull (*Larus delawarensis*). In The Birds of North America, No. 33 (A. Poole and F. Gill, eds). The Academy of Natural Sciences, Philadelphia, PA and the American Ornitholiogists Union, Washington, D.C.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD.

Seamans, M., F. Rivera-Milan, and M. Koneff. 2007. Estimation of potential biological removal of great black-backed, herring, laughing and ring-billed gulls from Bird Conservation Regions 14 and 30. U.S. Fish and Wildlife Service, Unpubl. Rep. 13 pp.

Slade, N.A., R. Gomulkiewicz, and H.M. Alexander. 1998. Alternatives to Robinson and Redford's method for assessing overharvest from incomplete demographic data. Conservation Biology 12:148-155.

Slate, D.A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. Transactions of the North American Wildlife Natural Resource Conference 57:51-62.

Sommers, L., K. Meskill, R. Miller, and M. Alfieri. 1996. 1995 Long Island colonial waterbird and Piping plover survey. A Research Report of NYSDEC. Stony Brook, NY.

Swift, B.L. 2004. Management of Double-crested Cormorants to protect public resources in New York: Statement of Findings. NYSDEC Division of Fish, Wildlife and Marine Resources, Albany, NY 12233.

Taylor, B. L., P. R. Wade, D. P. Master, and J. Barlow. 2000. Incorporating uncertainty into management models for marine mammals. Conservation Biology. 14:1243-1252.

Tobin, M. E., technical coordinator. 1999. Symposium on double-crested cormorants: population status and management issues in the Midwest (Dec. 9, 1997, Milwaukee, WI) USDA APHIS Technical Bulletin No. 1879. USDA, Animal and Plant Health Inspection Service. Washington, D.C.

USDA. 1994. Gull Hazard Reduction Program John F. Kennedy International Airport - Final Environmental Impact Statement. USDA, APHIS, WS, 1930 Rte 9, Castleton, NY 12033.

USDA. 1997. Animal Damage Control Program - Final Environmental Impact Statement (revised). USDA, APHIS, WS-Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

USDA. 2003. 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. USDA,APHIS,WS, 1930 Route 9, Castleton, New York 12033.

USFWS. 2003. Final Environmental Impact Statement: Double-crested Cormorant Management. U.S. Dept. of the Interior, USFWS, Div. of Migratory Bird Management, 4401 N. Fairfax Drive MS 634, Arlington, VA 22203.

USFWS. 2008a. Double-crested Cormorant Management, April 2008. Double-crested Cormorant management: Questions and Answers. U.S. Dept. of the Interior, USFWS, Div. of Migratory Bird Management, 4401 N. Fairfax Drive MS 634, Arlington, VA 22203.

USFWS. 2008b. Waterbird Conservation for the Americas, Waterbird Conservation Plan for the Mid-Atlantic/New England/Maritimes Region, Species Profiles http://www.fws.gov/birds/waterbirds/MANEM/Species%20Profiles.htm. Accessed May 21, 2009.

Van De Valk, A. J., C. M. Adams, L. G. Rudstram, J. L. Forney, T. E. Brooking, M. Gerken, B. Young, and J. Hooper. 2002. Comparison of angler and cormorant harvest of walleye and yellow perch in Oneida Lake, New York. Transactions of the American Fisheries Society. 131:27-39.

Verbeek, N.A.M. 1977. Comparative feeding ecology of herring gulls *Larus argentatus* and lesser black-backed gulls *Larus fiscus*. Ardea 65: 25-42.

Wade, P. R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammals Science 14:1-37.

Whelan, C. D., P. Monaghan, R. W. A. Girwood, and C. R. Fricker. 1998. The significance of wild birds (*Larus sp.*) in the epidemiology of *Campylobacter* infections in humans. Epidemiology and Infection 101:259-267.