

**BIRD HAZARD REDUCTION PROGRAM:
JOHN F. KENNEDY INTERNATIONAL AIRPORT**

SUPPLEMENT TO THE ENVIRONMENTAL IMPACT STATEMENT

**GULL HAZARD REDUCTION PROGRAM:
JOHN F. KENNEDY INTERNATIONAL AIRPORT**



Lead Agency:

Cooperating Agencies:

USDA, APHIS, Wildlife Services

USDI Fish and Wildlife Service

USDI National Park Service

USDOT Federal Aviation Administration

City of New York

Port Authority of New York and New Jersey

Lead Agency (SEQR)

NYSDEC Division of Fish, Wildlife and Marine Resources

April 2012

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**Bird Hazard Reduction Program:
John F. Kennedy International Airport**

**Supplement to the Environmental Impact Statement
Gull Hazard Reduction Program
John F. Kennedy International Airport**

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Project Location: **John F. Kennedy International Airport,**
Queens County, New York
Jamaica Bay, Gateway National Recreation Area,
Kings and Queens Counties, New York
7-mile Radius around John F. Kennedy International
Airport, including portions of Kings and Queens Counties,
New York

Submitted by: **Animal and Plant Health Inspection Service – Wildlife**
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EXECUTIVE SUMMARY

Bird strikes, bird collisions with aircraft, are a hazard to human health and safety and can cause major financial losses due to aircraft destruction, equipment damage, runway closure, personnel costs, and passenger accommodations. U.S. Department of Transportation, Federal Aviation Administration (FAA) regulations (14 CFR 139.337) require airports to assess wildlife hazards and, as needed, develop and implement wildlife hazard management plans. At John F. Kennedy International Airport (JFK), two strikes are particularly noteworthy. The first occurred in 1975, when Herring Gulls¹ were ingested into an engine of a departing DC-10. The engine exploded and separated from the aircraft and the takeoff was aborted; the aircraft caught fire and was destroyed. Fortunately, no fatalities occurred. The second occurred in 1995 when an Air France Concorde ingested a pair of Canada Geese into an engine. The aircraft was able to land safely but sustained major damage. The French Aviation Authority sued the Port Authority of New York and New Jersey (PANYNJ) and the case was eventually settled out of court for over \$5 million.

Increasing gull strike problems and public concern regarding the environmental impacts of management alternatives resulted in the development of an Environmental Impact Statement (EIS) on bird strike management at JFK which was completed in 1994 (hereafter 1994 FEIS; USDA 1994). At the time the 1994 FEIS was prepared, gulls (Ring-Billed, Laughing, Herring and Greater Black-Backed Gulls) comprised the majority of bird strike hazards at JFK. Consequently, the 1994 FEIS emphasized alternatives for gull hazard management, but the JFK Wildlife Management Unit (JFKWMU) also worked to address risks to aircraft from other bird species.

Bird strikes decreased substantially after the implementation of the integrated bird hazard management program, and on-airport shooting program analyzed in the 1994 FEIS. However, bird strikes continue to be an issue at JFK. Land uses and bird populations have changed since the completion of the 1994 FEIS, and so have bird strike hazards for aircraft using JFK. For the period of 1994-2009, there have been 1,759 bird strikes involving 98 bird species at JFK. This supplement to the 1994 FEIS has been prepared to address changes in bird strike hazards at JFK and within a 7-mile radius of the airport, and to provide updated information on the implementation of the bird hazard management program at JFK.

Background

After the 1975 Herring Gull strike, JFK placed increased emphasis on management of bird strikes to aircraft. JFK began recording all bird strikes at the airport in 1975 and currently has the most extensive bird strike database of any airport in the world (PANYNJ 2004). A Bird Hazard Task Force (BHTF) was created in 1985 to serve as a clearinghouse for information relative to JFK's bird strike hazards. The BHTF continues to provide an opportunity for agencies and other parties to exchange ideas and discuss initiatives to address JFK's bird strike hazards.

¹ Latin names of species mentioned in the text are provided in Appedix B.

Bird strikes, especially Laughing Gull strikes, continued to increase at JFK. During 1988-90, there was an average of 261 gull strikes per year. Laughing Gulls constituted 52% of the bird strikes at JFK. Herring, Great Black-backed and Ring-billed Gulls collectively constituted an additional 34% of the total bird strikes (Washburn et al. 2009). The proportion of all bird strikes involving Laughing Gulls increased in correlation with the growth of the Jamaica Bay Laughing Gull colony (from 15 pairs in 1979 to 7,629 pairs in 1990).

In 1991, an experimental shooting program was initiated to reduce hazards created by gulls, especially Laughing Gulls. Laughing Gull strikes declined 62% in 1991 compared to the 1988-1990 annual average of 157 gull strikes per year. Strikes for the other 3 gull species were reduced 48% from the 1988-1990 annual mean of 104 strikes per year (Washburn et al. 2009). From 1991-1993, U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS)² biologists shot 14,191, 11,847 and 6,500 Laughing Gulls per year, respectively. By the third year of the program, the number of strikes involving Laughing Gulls was reduced by over 90% from levels observed in the late 1980s (Dolbeer et al. 2002).

Concerns about the ethics and long-term cumulative impacts of shooting gulls prompted an animal advocacy group to sue the PANYNJ and the U.S. Department of the Interior (USDI), Fish and Wildlife Service (USFWS; PANYNJ 2004). The lawsuit resulted in the preparation of an Environmental Impact Statement (EIS) examining the environmental impacts of alternative strategies for reducing bird strikes at JFK (USDA 1994). Herring, Great Black-backed, Laughing and Ring-billed Gulls were the focus of the EIS because they comprised the majority of strikes and posed the greatest safety risk. The Jamaica Bay Laughing Gull colony located on the USDI National Park Service's Gateway National Recreation Area (Gateway NRA) was of particular concern. Non-gull bird species also occurred in JFK's bird strike record, and information on their biology, and behavior was presented in the EIS.

The EIS was completed in 1994. The USFWS, NPS and WS agreed that an Integrated Gull Hazard Control (IGHC) program would best address bird hazards at JFK. However, the agencies did not agree on all the methods that should be used. Wildlife Services concluded that relocation of the Laughing Gull colony was the environmentally-preferred long term approach in order to reduce the long-term mortality of gulls and the potential for gull-aircraft collisions. The USFWS and NPS were concerned about the impacts of disrupting/attempting to relocate the only known Laughing Gull colony in the State of New York on state and regional Laughing Gull populations. The USFWS stated that relocation of the Laughing Gull colony would only be warranted if continued development of JFK's on-airport hazard management program, reduction of off-airport attractants, and on-airport shooting of gulls (e.g., Category 1 actions) were implemented and proven inadequate. The on-airport hazard management program has been effective in reducing gull strikes, and, to date, management of aircraft hazards associated with the Laughing Gulls has not included efforts to relocate the Laughing Gull colony. However, the question of whether attempting to relocate the colony would be preferable to the current strategy which results in the death of thousands of Laughing Gulls each year remains (Brown et al. 2001a).

² Until 1997, the name of the WS program was the Animal Damage Control Program.

Current Bird Strike Hazards at JFK

Laughing Gull strikes have decreased from an average of 157 Laughing Gull strikes per year during 1988-1990, to 2.3 strikes per year for 2007-2009 (Washburn et al. 2009, WS unpublished data). In 2008, Laughing Gull strikes (1) were the lowest recorded since 1979. Strikes by the other three gull species were reduced 48-88% annually over the same period. Since approximately 1998, Herring Gulls have replaced Laughing Gulls as the most commonly struck gull species at JFK. The decrease in gull strikes has occurred despite the fact that the average annual aircraft movements for 1994-2009 were higher than for 1979-1993.

Despite the reductions in strike rates, bird strikes continue to be a serious issue for JFK. The list of species of management concern has increased to include species other than gulls. The proportion of bird strikes attributable to gulls has comprised less than half of all known bird strikes since 1996. The list of species of primary interest has been expanded and includes Herring Gulls, Ring-billed Gulls, Great Black-backed Gulls, Laughing Gulls, Canada Geese, Double-crested Cormorants, Atlantic Brant, Mute Swans, European Starlings and Rock Pigeons. The list is based on criteria that include local abundance (based on survey data), body weight, flocking behavior, number of strikes at JFK, and number of damaging strikes at JFK. As discussed in the 1994 FEIS, gulls are important due to size, local abundance, and the number of wildlife-aircraft strikes over the years. Canada Geese are the second most damaging species with 15 strikes at JFK during the period of 1994-2009 causing a reported \$10,500,200 million in damage. Cormorants are less abundant than Canada Geese, but their large body size and tendency to fly low make them particularly hazardous to aircraft approaching and leaving JFK. Atlantic Brant are of concern due to their high seasonal abundance, flocking behavior, body size, low flying altitude, and poor response to hazing. Mute Swans, the largest bird at nearly 25 pounds, could cause significant and possibly catastrophic damage during a wildlife-aircraft strike. Lastly, pigeons and starlings are flocking species, locally abundant and have a high body density. While other species may have caused damaging strikes, or incurred more strikes, they are of secondary management concern because of lower risks of damaging strikes. Many of the actions proposed for species of primary concern would also help reduce risks from species of secondary concern. Several of the alternatives proposed also include actions to address risks from species other than those of primary management concern (e.g., ducks, crows, blackbirds, raptors). Species-specific information on strike hazards at JFK is provided in Section 1.7 of this supplement and in 1994 FEIS Section 1.3.

The JFK Bird Hazard Management Program

The bird hazard management program at JFK is directed by the JFKWMU). The JFKWMU conducts daily on-airport wildlife hazard management activities including monitoring and management of bird attractants, use of nonlethal and lethal wildlife control measures to reduce bird presence, collecting data on bird strikes, and educating contractors and other personnel working at JFK in techniques needed to help reduce bird strikes (e.g., waste/debris management and eliminating animal feeding). On-airport bird attractants are managed with a combination of vegetation, water, insect, sanitation and building management. Nonlethal and

lethal wildlife control measures include frightening devices, nest and egg destruction, shooting, and capture and euthanasia.

The work of the JFKWMU has been augmented by the supplemental on-airport shooting program and, until 2011, work by a falconry company. In the supplemental on-airport shooting program, 2-5 trained specialists stationed along the southern perimeter of the airport use shotguns with non-toxic shot to shoot gulls attempting to fly over the airport. In 2001, the JFKWMU authorized the supplemental on-airport shooting program to take additional bird species posing an imminent hazard to aircraft at JFK (Canada Geese, Mute Swans, Double-crested Cormorants, Atlantic Brant and Rock Pigeons). From 1996-2010, a contractor flew falcons and other raptors and using pyrotechnics to scare birds away from the Aircraft Operations Area during three months in the summer when bird strike risks are greatest.

Efficacy and impacts of the bird hazard management program are reviewed in Performance Management Reports prepared by the PANYNJ, annual monitoring reports prepared for the PANYNJ by USDA/APHIS/WS (Washburn et al. 2009, Washburn and Tyson 2010), and review/issuance of permit applications by the USFWS and NYSDEC. The BHTF also meets twice per year to review JFK's bird hazard management efforts, exchange ideas, discuss new initiatives to address bird strike hazards, and collaborate on research projects. Since the completion of the 1994 FEIS, the PANYNJ has also continued to fund research on wildlife hazard management at JFK.

Off-Airport Bird Hazards

Effective bird hazard management programs require consideration of factors off airport property (Martin et al. 2011, Dolbeer 2011). Conditions off-airport can impact the return rate of harassed birds and bird movements over airports and through departure and arrival airspace. The need to manage off-airport wildlife attractants is codified in FAA Advisory Circular 150/5200-33A. Ponds and large expanses of grass in parks, golf courses, rights-of-way, medians and around developments provide feeding and loafing sites for many species of concern for JFK including gulls and geese. Man-made habitat and food sources, including handouts from well-meaning citizens, have led to populations of some bird species in excess of what can readily be tolerated in close contact with human activities. Removal or reduction of off-airport bird attractants can decrease the number of birds crossing JFK airspace. However, it should be noted that although FAA regulations impose requirements on airports for wildlife hazard management, FAA authority does not extend to requiring off-airport landowners and managers to implement airport recommendations. The JFKWMU and their agents (e.g., WS) can, however, consult with these landowners to coordinate wildlife management efforts, and the property owners and managers of some the primary wildlife attractants in the vicinity of JFK have been included on the BHTF. Gateway National Recreation Area, the New York City Department of Parks and Recreation, and the New York City Department of Environmental Protection manage lands near JFK and were cooperating agencies in the preparation of the SEIS. Off airport property managers may choose to implement the recommendations of the JFKWMU, implement other measures to address the issues identified by the JFKWMU or take no action. Information in this analysis will be used

by the cooperating agencies in making management decisions, but each agency retains independent authority for its decisions.

The FAA Advisory Circular 150/5200-33A directs airports which handle air traffic like JFK to consider hazardous wildlife within a 5-mile radius of the airport. This decision is consistent with the International Bird Strike Committee Best Practice Standards for bird hazard control at airports. Standard 9 directs airports to reduce bird attractants and associated bird hazards within a 13 km (7.8 mile) bird circle around the airport (IBC 2006). Resident Canada Geese are the species of greatest concern relative to off-airport hazards to aircraft. An evaluation of movement patterns of resident Canada Geese banded within 5 miles of JFK indicates that management of hazards from resident Canada Geese within the 5-mile radius of JFK may require work outside the 5-mile radius (Seamans et al. 2009). During the study, researchers monitored the area in a 7.2 mile radius around JFK for banded birds. Geese were observed within 3 miles of their banding location 95% of the time. Geese which remained within the study area were resighted at an average straight-line distance of the original banding site of 2.2 miles. Therefore, birds which spend time within the 4-5 mile radius of JFK may also be using sites the 5-7 mile radius of the airport. Based on this information, the area for resident Canada Goose hazard management included in this plan has been expanded to a 7-mile radius around JFK. Work in the 5 to 7-mile radius around JFK would be conducted as needed to augment resident Canada Goose population reduction efforts in the 5-mile radius around JFK. This area includes sections of Gateway NRA. Specific areas within Gateway NRA where bird management has been proposed are (Fountain Avenue and Pennsylvania Avenue Landfills and Rulers Bar Hassock).

Public Involvement

The draft SEIS was made available for public review and comment from January 14, 2011 – February 28, 2011. The agencies received 10 comments from organizations and private individuals on the SEIS. Responses to issues raised in the comment letters are provided in Appendix H of the SEIS. The Environmental Protection Agency (EPA) also reviewed the SEIS in accordance with their responsibilities under Section 102(2)(C) of the NEPA and Section 309 of the Clean Air Act. The EPA rated alternatives 1, 3, 5, and 6 as LO indicating they had a lack of objection. Alternatives 2 and 4 were rated LO-2 indicating that they had a lack of objection but were requesting additional information regarding off-airport bird hazard management. Specifically, the EPA requested clarification of the authority of the PANYNJ for bird hazard management off-airport and asked for information on stress to birds in the review of the perceived humaneness of each alternative. Agency responses to the issues raised in the EPA letter are provided in Appendix H.

Management Alternatives

An extensive literature review, discussions with individuals involved in the problem at JFK, data from research conducted at JFK, and alternatives suggested in public comments on the 1994 FEIS were used to identify individual methods which could be used to address bird hazards. Methods were combined into groups based on general management approaches

(e.g., on- and off-airport management) and agency experience regarding public perceptions and desires pertaining to wildlife hazard management (e.g., nonlethal or lethal methods).

All methods were subjected to an assessment of the technical feasibility, applicability and effectiveness in reducing the bird-aircraft strike hazard at JFK. The methods within each alternative that were determined to be feasible and effective were subsequently assessed regarding their potential environmental impacts. This evaluation considered the methods' impacts on the following factors:

- Ecological Resources:
 - Target Wildlife Species Populations
 - Nontarget Wildlife Species Populations
 - Threatened and Endangered Species
 - Wildlife Habitat
 - Water Quality
- Parks and Recreation
- Socioeconomics
- Air Quality
- Ambient Noise
- Airport Operations and Safety
- Coastal Zone Management
- Historic and Cultural Resources
- Humaneness and Animal Welfare Concerns - The issue of individual perceptions of the humaneness of individual bird strike hazard management methods is not precisely an environmental impact and was not addressed in the 1994 FEIS on bird hazard management at JFK. However, the lead and cooperating agencies acknowledge that humaneness of individual methods is an important issue to the public and have added this factor to the evaluation of alternatives.

Six management alternatives were developed and analyzed in detail in this supplement based on the process above. The alternatives consist of a "No Action" alternative which continues the current bird hazard management program at JFK and 4 additional alternatives which could be used to supplement the current damage management program. In the draft SEIS, a final alternative combined the current program and all possible supplements to the existing program. After reviewing public comments on the SEIS, consultation with Gateway NRA and lead and cooperating agency review of the data, Alternative 6, the proposed action, was modified to include all possible actions except efforts to reduce/relocate the Laughing Gull Colony (Alternative 5).

Alternative 1: Continue Current Bird Hazard Management Activities (No-action Alternative)

This alternative involves continuing the current bird hazard management program at JFK. The No-action alternative consists of all gull hazard management methods described in the Integrated Gull Hazard Management Alternative of the 1994 FEIS (except off-airport activities to reduce the Laughing Gull colony); on-airport use of nonlethal and lethal methods to reduce hazards to aircraft by all bird species, and technical advice and outreach to off-

airport landowners and property managers regarding ways to reduce bird attractants. It also includes the continuation of the BHTF. It does not include conducting off-airport bird hazard management for JFK.

The 1994 FEIS limited its analysis to evaluating options for managing gull hazards to aircraft because, during the period of 1988-90, gull strikes comprised approximately 86% of all bird strikes at JFK. However, the 1994 FEIS and the USFWS Record of Decision acknowledged that the JFKWMU also conducted activities to reduce bird strike hazards and property damage associated with other bird species. These actions have been permitted based on separate environmental reviews. For purposes of this analysis, it is the combined multi-species bird hazard management program, including the gull hazard management program selected in the 1994 FEIS that is the No-action Alternative. Combining the analyses of all bird hazard management activities in one document enables the agencies to more clearly communicate the nature of the bird hazard and bird hazard management activities at JFK to the public and enhances interagency coordination and communication regarding bird hazard management at JFK. Including all bird hazard management activities in the EIS enables WS, at the request of the JFKWMU, to participate in all facets of bird hazard management allowed under this alternative.

Alternative 2: Add Additional Nonlethal Methods On and Off-Airport to Current Bird Hazard Management Program

Under this alternative, existing on-airport bird hazard management efforts would be augmented by establishing a regular bird hazard monitoring program and improving reporting of nonlethal management actions. It also enables the agencies to permit, recommend and use nonlethal bird hazard management methods (e.g., harassment, habitat modification, exclusion, capture and relocation, modification of human behavior) at off-airport sites to reduce bird hazards at JFK with the permission of the landowner/manager. This alternative also includes the use of nonlethal methods to reduce hazards to aircraft from birds at Gateway NRA, particularly at Rulers Bar Hassock, and Pennsylvania and Fountain Avenue Landfills³. Species which may be targeted for off-airport management actions include gulls (except relocation of the Laughing Gull colony), geese, ducks, Mute Swans, Double-crested Cormorants, blackbirds, crows, Rock Pigeons, and European Starlings.

Alternative 3: Add Additional On-Airport Lethal Bird Hazard Management Activities to Current Bird Hazard Management Program

This alternative would increase the duration of the annual supplemental on-airport shooting program from May through August to May through November which would include more of the peak period for hazards from large-bodied gulls (e.g., Herring Gulls). Personnel at the gull shooting stations would be authorized to assist the JFKWMU efforts by using lethal methods to keep large-bodied birds which pose particular risks to aircraft (i.e., Canada Geese, Atlantic Brant, Mute Swans, Double-crested Cormorants, ducks) from entering JFK airspace using the same criteria and methods as the on-airport gull shooting program. Supplemental on-airport shooting program personnel would also be authorized to take individuals from

³ Any action proposed for Gateway NRA would require authorization/approval from the NPS.

flocks of Rock Pigeons, European Starlings, crows and blackbirds to prevent birds from entering JFK airspace and to frighten remaining flock members from the site.

Black-tailed jackrabbits, Eastern cottontail rabbits and small rodents (mice, rats, voles) are a food source for raptors and can attract these species to JFK. This alternative could also include use of lethal rabbit and rodent control measures to reduce attractants for raptors.

Alternative 4: Add Off-Airport Lethal Bird Hazard Management to Current Bird Hazard Management Program

This alternative would enable WS to recommend and conduct lethal bird hazard management projects at off-airport sites. It does not include activities to reduce or relocate the Laughing Gull colony. Species which may be targeted for off-airport lethal management actions within a 5-mile radius of JFK under this alternative include Canada Geese, Mute Swans, Double-crested Cormorants, blackbirds, crows, Rock Pigeons, and European Starlings. This alternative would include efforts to reduce the resident Canada Goose population within 7 miles of the airport. Work in the 5-7 mile radius around JFK would be conducted as needed to augment resident Canada Goose population reduction efforts in the 5-mile radius around JFK. Efforts to reduce the resident Canada Goose population could include the use of lethal methods at Rulers Bar Haddock, Pennsylvania Avenue and Fountain Avenue Landfills in Gateway NRA. Egg oiling/addling/puncturing could also be used on Mute Swan nests in Gateway NRA.

Alternative 5: Add Reduction/Relocation of the Laughing Gull Colony to the Current Bird Hazard Management Program

Reduction or relocation of the Laughing Gull colony was included as a damage management alternative in the 1994 FEIS. Although the current program has been effective in reducing Laughing Gull strikes, this alternative is being reconsidered as an alternate means of reducing Laughing Gull strikes. Relocation of the Laughing Gull colony may substantially reduce the number of Laughing Gulls which are shot each year at JFK.

Alternative 6: Increase Integrated Bird Hazard Management – Proposed Action.

This alternative would be a combination of Alternatives 1-4 above. This alternative has been modified from that presented in the draft SEIS so that it does not include actions proposed in Alternative 5 for reducing/relocating the Laughing Gull colony. The decision to omit the provisions of Alternative 5 was based on public comments, consultation with Gateway NRA which manages the site with the gull colony, and a review of the efficacy and environmental impacts of Alternative 5.

This alternative would enable the agencies to use and recommend a range of nonlethal and lethal bird hazard reduction techniques on and off-airport. An Integrated Wildlife Damage Management approach would be implemented which would allow use of management methods, singly or in combination, to resolve conflicts with wildlife affecting the use of the airfield and safe airport operations. When making recommendations for bird hazard

management preference would be given to practical and effective non-lethal methods, but non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy.

Environmental Impacts

Alternative 1: Continue Current Bird Hazard Management Activities (No-action Alternative)

Analysis in the 1994 FEIS indicates that implementation of the current bird hazard management program at JFK has not had a significant adverse cumulative impact on target bird species populations. Actions conducted to reduce gull hazards at JFK do appear to have contributed to a reduction in the Laughing Gull colony, but other factors including marsh erosion and periodic flooding also appear to have contributed substantially to the decline. Analysis of the regional Laughing Gull population indicates that, although there have been reductions in the local colony; the JFK bird hazard management program has not had a significant adverse impact on the regional Laughing Gull population.

Risks to nontarget species have been extremely low. For the period of 1994-2009, only six nontarget birds were lethally taken in the course of intentionally removing 69,937 gulls and additional target birds during the period of 1991 – 2009. Four of the nontarget birds were Common Terns which are a state-listed threatened species. No more than one Common Tern was taken in any year. This low level of unintentional take has not jeopardized the state Common Tern population. The other two nontarget birds were a Caspian Tern and Black-crowned Night-Heron.

Implementation of the proposed action has not had a significant individual cumulative adverse impact on water quality, parks and recreation, noise, or ambient air quality. Reductions in bird strikes have had beneficial economic impacts for air carriers and JFK. This alternative does include the use of lethal methods which some individuals consider inhumane. Some individuals opposed to the use of lethal methods may feel that the observation or knowledge of the supplemental on-airport shooting program or interaction with dead or injured birds would have an adverse impact on their aesthetic enjoyment of the bay. However, a substantial Laughing Gull colony remains at the site despite recent declines, so impacts on the value of the Jamaica Bay Laughing Gull colony as a bird watching opportunity are low. Others may feel that their enjoyment and sense of security in the area is compromised by the knowledge that all possible actions are not being implemented to reduce the risk of a significant bird strike at JFK.

Alternative 2: Expand Current Bird Hazard Management to Include Additional Nonlethal Methods On and Off-Airport

This method would not substantively increase the mortality in target or nontarget species above that expected for Alternative 1 although very limited unintentional mortality is possible. Use of reproductive inhibitors might eventually result in population reductions at

specific sites but is not expected to be of sufficient scope that it would adversely impact state Canada Goose or Rock Pigeon populations. On-airport implementation of improved monitoring and data collection procedures should result in more targeted bird hazard management efforts and a more effective and efficient bird hazard management program. Relocation of target birds may disrupt or displace nontarget bird species. Some nonlethal management methods such as prolonged harassment may have an adverse impact on vegetation and nontarget species. However, these disturbances should be minimal and short-term and are expected to only have a low level of impact on nontarget species. Off-airport habitat management activities to reduce target bird use of sites may have adverse impacts on species with similar habitat requirements but may be beneficial to other species.

Parks and recreational areas can be major off-airport attractants for target species. Some individuals would consider a reduction in the presence of birds at these locations to be an adverse impact on their enjoyment and use of the sites. Some individuals may also be displeased by increased emphasis on enforcement of bans on wildlife feeding at parks and recreational sites. However, at many of these locations, wildlife feeding is already prohibited. Others people would be pleased with the reduction in some over-abundant species that make it difficult to enjoy the intended use of the park (e.g., feces from resident Canada Geese). Use of nonlethal methods to resolve problems with waterfowl would result in the birds moving to new locations. It is possible that this may lead to unacceptably high concentrations of birds and damage at new sites. Some people may perceive nonlethal methods such as the use of repellents on grass as offensive and an impediment to their enjoyment of these areas.

Although implementation of this alternative would likely increase the efficacy of the bird hazard management program and decrease costs associated with bird strikes, it may also increase costs associated with other types of bird damage. Relocating birds may result in high concentrations of birds and new damage problems at the relocation sites.

Implementation of this alternative would not have a significant individual or cumulative adverse impact on water quality, noise, or ambient air quality. Reductions in bird strikes would have beneficial economic impacts for air carriers and JFK. Most individuals are likely to consider the methods proposed under this alternative to be humane. Addition of this alternative is likely to increase some individuals' acceptance of the program because of the additional commitment to the use of nonlethal methods where practical and effective. However, some members of the public may consider some of the nonlethal methods to be inhumane because the methods may be implemented daily over a period of months to achieve the desired results or because they interfere with the animals' ability to reproduce.

Alternative 3: Increase On-Airport Lethal Bird Hazard Management Activities

Analysis in Chapter 6 indicates that adding this alternative to Alternative 1 would not have a cumulative adverse impact on the viability of state and regional bird, cottontail rabbit and rodent populations although some local population reductions could occur. Reductions in the state Laughing Gull population have occurred under the no action alternative and may continue under this alternative, but would not jeopardize the viability of the state or regional

population. Efforts to remove non-native black-tailed jackrabbits could result in the elimination of this species from the state.

Most methods used to implement this alternative (shooting, live-capture and euthanasia, nest and egg destruction) are highly selective for target species. The increase in shooting by the WS program would result in a slight increase in the risks to nontarget species. However, given the extremely low rate of nontarget species take by the current program (Alternative 1), this type of risk is likely to be minimal. Analyses in this report indicate that the proposed use of rodenticides would have a low level of risk to nontarget species.

Adding this alternative to Alternative 1 would not have an adverse cumulative impact on noise, or water quality. Rodenticides would be stored, applied and disposed of in accordance with EPA label requirements for the protection of the environment. Impacts on parks and recreation and aesthetics would be similar to Alternative 1. Some individuals would be opposed to this alternative because they consider the increased use of lethal methods to be inhumane. Others would consider it inhumane to people to not do everything reasonably possible to reduce risks to aircraft at JFK.

Preventing large bodied and flocking birds from entering JFK airspace would effectively reduce bird strike hazards at JFK. Implementation of this alternative would also improve the efficacy of gull management efforts planned in the original EIS by expanding the shooting program to address ongoing risks from large-bodied gulls (e.g., Herring Gulls).

Alternative 4: Off-Airport Lethal Bird Hazard Management

Based on analysis in the EIS, the proposed action would not have a significant adverse impact on state or regional populations of Canada Geese, Mute Swans, blackbirds, European Starlings, Rock Pigeons or crows. However, this alternative would result in a substantial reduction in the number of resident Canada Geese in the 7-mile radius around JFK. While the proposed methods would not eradicate all geese in the 7 mile radius, it's possible that all birds may be temporarily removed from specific sites for periods of time. Limited numbers of new birds are likely to return to the site within days to a few months. In most situations, birds would be allowed to remain as long as the numbers remain low (less than 10 birds per site within the 5-mile radius, less than 20 birds per site in the 5 to 7-mile radius) unless they are known to be involved in specific hazards at JFK. These reductions would have an adverse impact on the aesthetic enjoyment of individuals who like watching and feeding waterfowl and who have formed attachments to individual birds. Opportunities to enjoy the large flocks of migrant Canada Geese that use Gateway NRA would also be available. This alternative may have beneficial impacts on recreational use of some sites for individuals who feel that their use of locations was adversely affected by over-abundant waterfowl populations (e.g., fecal contamination).

Shooting, live-capture and euthanasia and egg addling/oiling/puncturing are highly selective for target species and are expected to have little impact on nontarget species. No adverse effects on nontarget species are anticipated from the use of DRC-1339. Harassment with

limited lethal removal and egg and nest destruction would have impacts on nontarget species similar to those described for Alternative 2.

This alternative is not expected to have an adverse cumulative impact on air quality or noise. Reducing overabundant waterfowl numbers in some areas may reduce the amount of fecal material deposited in and/or running off the grass into nearby ponds and other bodies of water. In these instances, this alternative could have a beneficial impact on water quality in small areas.

Methods used under this alternative would be considered inhumane by some people. Individuals are likely to be most strongly opposed to this alternative because it would remove birds that people may have become accustomed to seeing or feeding at a particular location around JFK.

Adding this alternative to Alternative 1 should reduce bird hazards to aircraft at using JFK. Reducing bird strikes would have a positive economic impact on air carriers using JFK.

Alternative 5: Add Reduction/Relocation of the Laughing Gull Colony to the Current Management Program

This alternative is intended to reduce/relocate the Laughing Gull colony but is not anticipated to result in adverse impacts on the regional Laughing Gull population. Impacts on the state Laughing Gull population and recreational enjoyment of the gull colony would depend on the new location chosen by the gulls. Efforts would be made to encourage Laughing Gull use of new sites in the state, but birds may choose to use other established colonies outside New York. If effective, this alternative would likely substantially reduce the number of Laughing Gulls which are shot each year at JFK. Deterring Laughing Gulls from using traditional breeding sites can be extremely difficult. The intensity of effort required to substantially reduce the colony could result in adverse impacts on saltmarsh and co-nesting species. Gateway NRA also noted that eliminating a native breeding species from the refuge would be inconsistent with NPS management objectives for the site.

Individuals would have varying perceptions of the humaneness of this alternative. Depending upon the methods used, some individuals would consider actions which cause the Laughing Gulls to abandon a long-standing nesting area inhumane. For these individuals the potential loss of the only Laughing Gull breeding colony in New York State and potential impacts on saltmarsh and co-nesting species are less acceptable than the on-airport gull shooting program. Others would feel that the relocation of the gull colony and the corresponding decrease in the number of gulls likely to be shot at JFK to be a preferable long term solution to the Laughing Gull problem.

Alternative 6: Increase Integrated Bird Hazard Management –

This Alternative would have the greatest impact on bird strike hazards at JFK. Costs from bird strikes and risks to human safety would be lowest for this alternative. However, in

situations where birds were relocated by damage management efforts, there may be increased or new damage at the relocation sites.

Although this alternative would result in decreases in some local bird populations, it would not have a significant adverse cumulative impact on state or regional populations of the other target birds, cottontail rabbits or rodents. The non-native black-tailed jackrabbit population might be substantially reduced or eliminated by the proposed action. Analyses in the SEIS indicate that implementation of the proposed action would have a low level of impact on nontarget species.

All pesticides would be used, stored and disposed of in accordance with product labels and would not have an adverse impact on water quality. Some nonlethal practices like improved waste management may have beneficial impacts on water quality. Similarly, reductions in the number of resident Canada Geese at specific sites within the 7-mile radius of JFK may also have beneficial impacts on water quality by reducing fecal contamination.

This alternative would not contribute significantly to existing noise and air quality impacts and conditions in the JFK area.

This alternative would result in a substantial reduction in the number of Canada Geese and other waterfowl within the 7-mile radius of JFK. Individuals who enjoy seeing birds at specific sites may be adversely impacted by this action. Individuals who feel their recreational enjoyment of a site is adversely affected by fecal accumulations may consider a reduction in the waterfowl a beneficial impact. Individuals whose aesthetic enjoyment of the area is impacted by the knowledge that all reasonable efforts are being made to decrease bird strike risks at JFK may also prefer this alternative.

This alternative includes lethal methods such as shooting, live-capture and euthanasia, toxicants, and egg oiling and destruction which some individuals would consider to be inhumane. This type of objection may be greatest for this alternative since, lethal take of target species would be greatest under this alternative. Other individuals may consider it inhumane not to do everything reasonable to address bird hazards to aircraft and people.

Proposed Action

Alternative 6 has been selected as the proposed action. This alternative provides a balance between the need to protect human safety and reduce damage to aircraft and the need to protect natural resources and the environment, aesthetic values and recreational opportunities. The proposed action is consistent with applicable state, federal and local laws and regulations. Cumulative impacts of the proposed action and ongoing marsh erosion might result in further reductions in the Laughing Gull colony. Long-term consequences are unclear but may ultimately depend on habitat conditions for Laughing Gulls. Even if lethal removal of Laughing Gulls is discontinued, ongoing erosion of marsh habitat may result in Laughing Gull abandonment of the site. Cumulative impacts of city and airport management efforts would result in substantial reductions in the resident Canada Goose population within 7 miles of JFK. However the likely reductions are consistent with established NYSDEC and USFWS

plans for resident Canada Goose management in the state and region and would not eliminate opportunities to enjoy Canada Geese. The proposed action takes into consideration the impact of goose removals on park visitors and the potential emotional impact of a serious bird strike on aircraft passengers, their families and the public. Analyses in the SEIS indicate that the proposed action would not have a significant adverse cumulative impact on the viability of nontarget wildlife populations or any other target species population.

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ACRONYMS

AGL	Above Ground Level
AOA	Aircraft Operations Area
APHIS	USDA, Animal and Plant Health Inspection Service
BBS	USDI, Geological Survey, Breeding Bird Survey
BMU	JFK Bird Management Unit (later changed to WMU – see below).
BHTF	Bird Hazard Task Force
CBC	National Audubon Society, Christmas Bird Count
CFR	Code of Federal Regulations
ECL	Environmental Conservation Law
EIS	Environmental Impact Statement
FAA	USDOT Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FIFRA	Federal Fungicide, Insecticide and Rodenticide Act
FR	Federal Register
Gateway NRA	USDI, NPS Gateway National Recreation Area
IBHC	Integrated Bird Hazard Control
IGHC	Integrated Gull Hazard Control
JBWR	Gateway NRA, Jamaica Bay Wildlife Refuge
JFK	John F. Kennedy International Airport
MBP	Migratory Bird Permit
MBTA	Migratory Bird Treaty Act
MOU	Memoranda of Understanding
NEPA	National Environmental Policy Act
NPS	USDI National Park Service
NYC	New York City
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NWRC	USDA, APHIS, WS, National Wildlife Research Center
PANYNJ	Port Authority of New York and New Jersey
PIF	Partners in Flight
ROD	Record of Decision
SEQR	[NY] State Environmental Quality Review
SEIS	Supplemental Environmental Impact Statement
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USDOT	United States Department of Transportation
USFWS	USDI, Fish and Wildlife Service
USGS	USDI, Geological Survey
VLJ	Very Light Jet
WHA	Wildlife Hazard Assessment
WHMP	Wildlife Hazard Management Plan
JFKWMU	JFK Wildlife Management Unit (Formerly known as BMU in EIS)
WS	USDA, APHIS, Wildlife Services