

## 6.0 COMPARISON OF ALTERNATIVES AND SELECTION OF THE PREFERRED ALTERNATIVE

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## **6.0 COMPARISON OF ALTERNATIVES AND SELECTION OF THE PREFERRED ALTERNATIVE**

### **6.1 No-Action Alternative**

The No-Action Alternative includes the continuation of JFKIA's on-airport program, without further expansion, and does not include the intensive on-airport shooting program that was conducted in 1991-93. The No-Action Alternative will not sufficiently reduce the gull hazard or address the issue of public safety for the 28 million passengers that use JFKIA each year (Table 6-1). Because it is not adequately effective, the No-Action Alternative alone is not considered for implementation.

### **6.2 Nonlethal Alternatives**

#### **6.2.1 Off-Airport Nonlethal Alternatives**

##### **■ Nesting Habitat Modification**

Of the nonlethal, on-colony habitat modification alternatives, substantial adverse environmental impacts result from mowing (compaction of marsh sediments with adverse effects on plant and animal community structure), treatment with herbicide (severe erosion resulting in the destruction of the entire marsh system) and excavating (similar severe impacts to community structure) (Table 6-1). Devegetating the marsh by burning would generate undesirable air pollution, would be difficult to accomplish exactly as desired without severe impacts to the marsh ecosystem, and could have an adverse effect on aircraft operations safety. All these alternatives were considered to present unacceptable environmental impacts which cannot be substantially mitigated and are therefore not considered for selection as preferred alternatives.

##### **■ Harassment on the Colony Site**

Although the nonlethal, on-colony harassment alternatives would not create substantial adverse ecological environmental impacts, they are only moderately effective in reducing the gull hazard, and all except the display of gull models would involve putting the birds to flight for long periods of time and would thus create at least a temporary increase in the birdstrike hazard (Table 6-1). The potential for increased birdstrikes can affect human and aviation safety, and therefore can impact the sociocultural environment. In light of their limited effectiveness and potential for increasing the possibility of bird-aircraft interactions, most of these alternatives were not further advanced for consideration as a preferred alternative. The display of gull models to harass gulls away from the colony site is advanced for further consideration.

The element that is forwarded for inclusion in the IMP under "Harassment on the Colony Site" may include, but is not necessarily limited to:

- Display of gull models to harass gulls

Table 6-1  
Comparison of Feasible Alternatives

NON-LETHAL GULL STRIKE REDUCTION ALTERNATIVES

CRITERIA	MOWING	BURNING	HERBICIDE	EXCAVATION	GULL MODELS	EXPANSION OF EXISTING PROGRAM	REDUCE OFF-AIRPORT ATTRACTANTS (See Note)
TECHNICAL FEASIBILITY	<b>LOW</b> Inaccessibility	<b>MODERATE</b> Dependent on flood conditions. Uneven burns due to terrain	<b>MODERATE</b> -Easy with aerial spraying -Manual application labor intensive	<b>LOW</b> Soil disposal difficult due to soil volume, salinity, & contamination	<b>HIGH</b>	<b>HIGH</b>	<b>MODERATE</b> Provided that outside agency cooperation can be obtained. Identification of all off-airport attractants difficult.
OPERATIONAL EFFECTIVENESS	<b>LOW-MODERATE</b> Suboptimal conditions tolerable due to: 1) No contrast with existing short grass condition 2) Dependent on availability of relocation habitat	<b>MODERATE-HIGH</b> Same as mowing Additional deterrent effect of visual and tactile burn conditions	<b>MODERATE</b> Same as mowing	<b>HIGH</b> -Long term habitat unsuitability without need for annual interference	<b>MODERATE</b> Habituation	<b>MODERATE</b> Most attractants have already been eliminated substantially and marginal increase in effectiveness can be achieved	<b>MODERATE</b> Measures at Aqueduct and Treatment Plant would be effective but effectiveness cannot be determined
ULTIMATE EFFECTIVENESS	<b>LOW-MODERATE</b> Habitat remains attractive for roosting; hazard remains	<b>LOW-MODERATE</b> Same as mowing	<b>LOW-MODERATE</b> Same as mowing	<b>HIGH</b>	<b>LOW-MODERATE</b> Not shown to be highly effective	<b>LOW-MODERATE</b> Effective only for birds for air attracted for airport	<b>LOW-MODERATE</b> Northerly Gull movement patterns in general may be related to the greater variety of feeding opportunities present in the northerly (sub)urban environment compared to those of the coastal-marine environment to the east, west and south of the colony site. Management of two attractants alone may not be effective
ENVIRONMENTAL COMPATIBILITY	<b>LOW</b> Loss of long-term marsh productivity due to compaction	<b>LOW</b> -Marsh erosion and loss of productivity -Impacts to Non-target Species -Air quality impacts -Interference with aviation safety (flight visibility)	<b>LOW</b> -Marsh erosion and loss of productivity -Impacts to Non-target Species	<b>LOW</b> -Impacts to NT-Species -Aviation Safety: Displacement of Laughing Gull by other gulls may increase strike hazard	<b>HIGH</b>	<b>HIGH</b>	<b>HIGH</b>

Note: Includes Aqueduct Racetrack and the Jamaica Bay Sewage Treatment Plant.

Table 6-1  
(cont'd)  
Comparison of Feasible Alternatives

LETHAL GULL STRIKE REDUCTION ALTERNATIVES

CRITERIA	NEST/EGG DESTRUCTION	EGG OILING	TOXICANT APPLICATION	SHOOTING ON COLONY	ON-AIRPORT SHOOTING	NO ACTION	INTEGRATED MANAGEMENT
TECHNICAL FEASIBILITY	MODERATE Labor intensive, Requires repeated implementation for several years until colony is abandoned	MODERATE Labor intensive, repeated oiling indefinite implementation	MODERATE Labor intensive, repeated baiting maybe necessary	Feasible HIGH	Feasible HIGH	Feasible HIGH	Feasible HIGH
OPERATIONAL EFFECTIVENESS	HIGH Harassive aspect may deter nesting	MODERATE Does not effect adult behavior	MODERATE	MODERATE Low number of birds effected	HIGH Effectiveness is demonstrated by intensive shooting program	HIGH	HIGH
ULTIMATE EFFECTIVENESS	MODERATE Removal/destruction has been effective in several cases in inducing abandonment	LOW Oiling has not shown to induce abandonment in the literature	MODERATE No inducement of colony abandonment	MODERATE No inducement of colony abandonment	VERY HIGH Shooting focuses directly and only on gulls entering JFKIA air space. Shooting may have a deterrent effect on other birds entering JFKIA air space	LOW Continuing bird strike hazard affects human safety	VERY HIGH Combination of components
ENVIRONMENTAL COMPATIBILITY	MODERATE Trampling effects possible to Common Tern	MODERATE Trampling impacts to NT Species from oil	MODERATE Trampling: Possibility of ingestion by NT Species. Possibility of scavengers	MODERATE Trampling effects disturbance of NT Species	HIGH Minor effect on regional gull population	HIGH Occasional fuel dumping	MODERATE Combination of impacts of components

### ■ Reduction of Off-Airport Attractants

Reduction of off-airport attractants involves no major constraints provided cooperation of outside agencies can be obtained. The effectiveness in reducing gull-aircraft interactions at JFKIA is moderate to low and the environmental impacts of this alternative are very low (Table 6-1). Because of its low effectiveness, this alternative will not be considered for selection as a preferred alternative by itself. However, considering the absence of substantial environmental impacts, it may be considered in support of other alternatives.

The elements for inclusion in the IMP under "Reduction of Off-Airport Attractants" may include, but are not necessarily limited to:

- Survey of off-airport attractants
- Issuance of bird control recommendations to landowners
- Negotiations with landowners to modify facilities

## 6.2.2 On-Airport Nonlethal Alternatives

### ■ Expansion of the Existing On-Airport Program

Most birds involved in bird-aircraft interactions fly over the airport on their way to other destinations rather than to the airport itself. Site visits conducted in 1992 and 1993 (Appendices C.5.1, C.5.2 and C.5.3) indicated that JFKIA does not provide abundant habitat resources for Laughing Gulls. Furthermore, on-airport measures are already in effect; therefore, expansion of the existing on-airport program is likely to result in a marginal reduction in gull-aircraft interactions. The expansion of the existing on-airport, mostly non-lethal program, is considered to have a low level of effectiveness if conducted by itself (Table 6-1). The feasibility of this alternative is high and its environmental impacts are very low. Because of its low effectiveness, this alternative will not be considered for selection as a preferred alternative by itself. However, considering the relative absence of substantial environmental impacts, it may be considered in support of other alternatives.

The elements for inclusion in the IMP, for "Expansion of the Existing On-Airport Program" may include, but are not necessarily limited to:

- Enhance professional capability of JFKIA's bird management program, especially, hiring of one full-time wildlife biologist to coordinate all aspects of program.
- Improve role and responsibilities of the Bird Hazard Task Force as specifically itemized in Section 3.4.1.6. In addition to these roles, attention would be given evaluation of JFKIA's Wildlife Management Plan (accepted by the FAA in 1989).
- Establish written plans for all major aspects of the JFKIA bird hazard management program, and provide for, at least, annual review of these plans through the Port Authority management and the Bird Hazard Task Force.
- Initiate improvements to the on-airport programs for the management of: insects (Section 3.4.1.3), water (Section 3.4.1.2), sanitation (Section 3.4.1.4), and vegetation (Section 3.4.1.1).

## 6.3 Lethal Alternatives

### 6.3.1 Off-Airport Lethal Alternatives

Several on-colony, lethal management methods have been considered. Shooting on the colony from blinds is anticipated to be effective, and this technique is not expected to result in panic flights that could create aircraft safety hazards. Nest reduction measures consisting of egg oiling (approved and conducted in 1990 by the National Park Service for research purposes on the Jamaica Bay Laughing Gull colony) and destruction of nests and eggs (conducted by USDA in 1993 and by the NPS in 1994 at Breezy Point on Gateway National Recreation Area to protect federally-threatened Piping Plovers from impacts of Herring Gulls and Great Black-backed Gulls) have moderate adverse environmental impacts and could produce a more substantial permanent abandonment of the nesting site than toxicant application (Table 6-1). Among nest reduction alternatives, egg and nest destruction has been documented to be more effective than egg oiling in inducing colony abandonment, and consequently could be more effective in reducing gull-aircraft interactions at JFKIA. Among the off-airport alternatives, none are considered effective enough to warrant consideration as a preferred alternative to be conducted alone. However, shooting of adult gulls and egg and nest destruction are the most effective among off-airport lethal alternatives, and warrant consideration in support of other alternatives.

Shooting of adult gulls from blinds and physical destruction of nests and eggs could affect local and New York State Laughing Gull populations unless another Laughing Gull nesting colony is established in New York State (Table 6-1). These activities would not affect local, state or regional Herring, Great Black-backed, and Ring-billed gull populations.

The elements for inclusion in the IMP for "Off-Airport Lethal Alternatives" may include, but are not necessarily limited to:

- Laughing Gull egg/nest destruction on Jamaica Bay Laughing Gull colony.
- Shooting of Laughing Gulls on the Jamaica Bay Laughing Gull colony.

### 6.3.2 On-Airport Lethal Alternatives

Among on-airport lethal alternatives, only shooting is considered a feasible and effective option. As its environmental impacts are relatively low—as long as not more than approximately 14,500 Laughing Gulls are shot annually—this alternative is advanced for consideration as a part of the preferred program (Table 6-1).

The intensive shooting program could affect local and New York State Laughing Gull populations unless another Laughing Gull nesting colony is established in New York State. The regional Laughing Gull population could be eliminated if the intensive on-airport shooting program were conducted for at least 50 years, and resulted in the annual take of more than 14,500 Laughing Gulls.

Populations of Herring, Great Black-backed, and Ring-billed gulls would be unaffected by the intensive on-airport shooting program as long as negligible numbers (as in 1991-93) were taken pursuant to the program. Local, regional, and national populations of these gull species would not be adversely impacted by on-airport shooting.

The element for inclusion in the IMP under "On-Airport Lethal Alternatives" may include, but is not necessarily limited to:

- Conduct of on-airport shooting program directed at Herring Gulls, Laughing Gulls, Ring-billed Gulls, and Great Black-backed Gulls.

## 6.4 Integrated Management Program (IMP)

### 6.4.1 Proposed IMP

Several alternatives remain, both lethal and nonlethal, that are feasible and involve relatively low environmental impacts (Table 6-1). However, none of these approaches would by itself match the demonstrated success of the on-airport shooting program in reducing the gull hazard. Although on-airport shooting is the most effective measure and has relatively low environmental impacts—population simulation indicates that it could be sustained indefinitely at current shooting rates without affecting the regional Laughing Gull population—it is considered preferable to implement controls that are as effective, but do not involve killing large numbers of birds on a long-term basis.

The proposed IMP would consist of the following elements:

- 1) Continued development of JFKIA's on-airport program
- 2) Reduction of off-airport attractants
- 3) On-airport shooting of gulls
- 4) Laughing Gull nest/egg destruction in Jamaica Bay
- 5) On-colony shooting of adult Laughing Gulls
- 6) Display of gull models to harass gulls

Conduct of all six of these components could accomplish the following:

- Provide for an immediate reduction of the gull-aircraft strike hazard at JFKIA.
- Enhance and utilize all possible effective non-lethal components (reduce on- and off-airport attractants, harass gulls away through use of models, BCU activities, etc.).
- Effect the eventual abandonment of the Jamaica Bay Laughing Gull nesting colony that will then eliminate the need to conduct the intensive on-airport shooting program. This would reduce mortality of gulls over the long term.
- Provide for the long-term reduction in birdstrikes at JFKIA.
- Provide for mitigation measures to retain Laughing Gulls as a breeding bird species in New York State and on Long Island.

To address the issue of public safety on an immediate and continued basis, on-airport shooting would be continued until other actions effectively reduce the gull hazard to an acceptable level as determined by the PA and the FAA. The PA would pursue all possible means of reducing the attractants that result in gull overflights of JFKIA; improvements would probably also reduce the number of aircraft interactions

involving other bird species. In the long term, if all six components were to be conducted, there would be a reasonable potential for inducing the Laughing Gull colony to abandon Jamaica Bay.

Components of the IMP—both nonlethal and lethal—that seek to interrupt site fidelity and induce abandonment of the site by Laughing Gulls would in the long term reduce the number of gull overflights at JFKIA and hence the mortality of gulls as a result of on-airport shooting. This could ultimately reduce the need to implement lethal measures such as on-airport shooting altogether in the long term.

Each component of the proposed IMP could be accomplished independently of the other five, and would be subject to review, authorization, and permitting by the managing and permitting agencies with jurisdiction. All alternatives involving lethal control would require DEC and FWS permits. Alternatives with proposed activities on the Laughing Gull colony site at GNRA would require the authorization and support of the NPS. Alternatives involving off-airport properties such as the Jamaica Bay Sewage Treatment Plant and the Aqueduct Racetrack would similarly require authorization and support of the managing agency or landowner.

The proposed IMP consists of the six components listed above. The final IMP that is conducted would consist of as many components as are permitted and authorized from among the proposed IMP.

The analysis contained herein suggests that the most effective program, and the one with the fewest negative impacts over the long term, could be achieved through conduct of all six components together.

#### **6.4.2 USDI Policy Regarding the IMP**

The U.S. Department of the Interior's Fish and Wildlife Service (FWS) and National Park Service (NPS) have significant regulatory and decision-making authority for IMP components that would occur on the NPS-administered property at Gateway National Recreation Area. (It is also recognized that the U.S. FWS has regulatory authority over issuance of permits for intensive on-airport shooting and BCU on-airport shooting.)

A statement of policy issued by the USDI states:

The National Park Service (NPS) will initiate steps to satisfy their legislative and procedural requirements, as well as management review for these on-colony elements, when it is demonstrated that these off-park elements are ineffective. Therefore, the first category of action that will begin implementation of the IMP is as follows:

##### Category 1

- 1) Continued development of JFKIA's on-airport program, with emphasis upon improvements to the Bird Control Unit (BCU) and the Bird Hazard Task Force (BHTF)
  - a) Enhance the professional capability of the Bird Control Unit.
  - b) Establish in-house capability within the BCU to assess and monitor effectiveness of control programs on target species.

- c) Prepare written plans for vegetation manipulation, insect control, solid waste management, water management and other on-airport attractant issues.
- 2) Reduction of off-airport attractants
- 3) Continue on-airport shooting of gulls

These Category 1 activities would be continued until the annual review of these programs by the Bird Control Unit (BCU) and the BHTF demonstrate that additional management is required. The NPS would then begin to investigate activities that could become the Category 2 program. The following kinds of activities may be the subject of this NPS investigation:

Category 2

- 1) Laughing Gull nest/egg destruction in Jamaica Bay
- 2) On-colony shooting of adult Laughing Gulls
- 3) Display of synthetic gull models to harass gulls

Implementation of Category 1 components would begin immediately, with all components monitored continuously by the BCU and evaluated at least annually by the BHTF. The BHTF will suggest improvements to this program, recommend additional research and monitoring needs, and establish criteria to be used for initiation of Category 2 control measures.

If the potential risk to the flying public has been shown not to be reduced to acceptable levels as determined by the BHTF, the NPS will implement Category 2 control measures within the colony. On-colony actions will be proposed only after it has been judged that Category 1 actions have not been effective in reducing bird-aircraft interactions at JFKIA. If initiation of Category 2 actions are justified, the NPS must define those actions, analyze those impacts and document its decision in the context of its legal authorities and its management policies. Certain permits and concurrence will be required by various federal and state agencies.

Additionally, the USDI has stated that:

The following activities would have to be completed to the satisfaction of the United States Department of the Interior before decisions to undertake Category 2 activities would be adopted:

- a) The Bird Hazard Task Force will establish criteria to be used in the initiation of Category 2 measures.
- b) State-of-the-art harassment methods and habitat management techniques must be adopted by JFKIA and utilized by the BCU.
- c) Mandatory birdstrike reporting to include mandatory reporting by airlines, pilots, and ground personnel of observed and experienced strikes must be adopted.
- d) All strike data must be reported to FAA for inclusion in their database on birdstrikes.

- e) The BCU will collect and assess biological data on bird species determined to be hazardous to aircraft at JFKIA, and will monitor effectiveness of control programs on target species.
- f) The Bird Hazard Task Force should be empowered to function as a body independent of airport management and operations with the responsibility to regularly review the work of and make recommendations to airport management on the management and monitoring programs of the BCU.

### **6.4.3 Estimated Cost and Projected Time Frame**

During 1991-93, many elements of Category 1 actions were conducted at JFKIA. During those years, gull-aircraft strikes at JFKIA were reduced by as much as 90%. These activities were effective in reducing strikes, and in enhancing human safety at JFKIA, and were shown to have relatively low environmental impacts. Activities were conducted pursuant to New York and U.S. FWS permits, and were attended by mitigation and monitoring measures to permit agency review and evaluation. Conduct of these three components in 1994 and in subsequent years may similarly prove effective in reducing birdstrikes at JFKIA.

The analysis contained in this EIS indicates the feasibility, effectiveness and environmental impacts of the 6 components of the Integrated Management Program. In light of the recent USDI policy, the components of the IMP that may be implemented to reduce gull-aircraft strikes at JFKIA in 1994 and in subsequent years are the Category 1 components, and are as follows:

- 1) Continued Development of JFKIA's On-Airport Program (Managing Agency: Port Authority of NY & NJ)
- 2) Reduction of Off-airport Attractants (Managing Agency/landowner: Various)
- 3) On-Airport Shooting of Gulls (Managing Agency: Port Authority of NY and NJ, and USDA APHIS ADC)

The details of the program to be conducted in 1994 would be those set forth in Section 3.4.1 (Expansion of JFKIA's On-Airport Bird Control Program), Section 3.3.3 (Reduction of Off-Airport Attractants), and Section 6.1.2 (Intensive On-Airport Shooting Program). All listed and necessary authorizations, permits, licenses, and reviews would be pursued and obtained as appropriate to conduct these three components. Records of Decision will reflect each agency's decisions regarding exact actions that will be taken.

For the three Category 1 components, estimated material costs and time frames are set forth below.

#### **6.4.3.1 Estimated Costs of Conducting Category 1 Actions**

The total estimated costs for conducting Category 1 activities during 1994 is approximately \$582,800. Costs in future years would vary, depending on exact activities conducted, start-up costs, cost of living increases, developing technologies, and other undetermined factors. The estimated costs for conducting the three Category 1 components in 1994 would be as follows:

Enhancement of JFKIA's On-Airport Program	\$ 392,700
Reduction of Off-Airport Attractants	\$ 75,300
Conduct of On-Airport Shooting Program	\$ 114,800

#### 6.4.3.1.1 Estimated costs to enhance JFKIA's on-airport program

Estimated costs of enhancing JFKIA's on-airport program are identified below, and represent costs above and beyond those already associated with the program that occurs to date (Section 9.1.1).

A.	Vegetation Management	
	Salaries and Benefits	\$ 10,500
	Materials	\$ 4,500
B.	Water Management	
	Salaries and benefits	\$ 7,500
	Materials	\$ 6,500
C.	Insect Monitoring and Control	
	Salaries and benefits	\$ 5,500
	Materials	\$ 4,000
D.	Sanitation	
	Salaries and Benefits	\$ 5,000
	Materials	\$ 4,000
E.	Bird Control Unit	
	1) Increase BCU staffing by 50%	\$ 200,000
	2) Place Wildlife Biologist in BCU	\$ 77,000
	3) Improve/Replace Equipment	\$ 68,200

Total estimated costs to enhance JFKIA's on-airport bird hazard control program would be \$392,700.

#### 6.4.3.1.2 Estimated costs to reduce off-airport attractants

A.	Conduct survey of off-airport attractants	
	Salaries and Benefits	\$ 39,000
	Materials	\$ 6,300
B.	Modify Aqueduct Racetrack	
	Salaries and Benefits	\$ 4,000
	Materials (wire, handbills)	\$ 16,000
C.	Modify Jamaica Bay Sewage Treatment Plant	
	Salaries and Benefits	\$ 2,000
	Materials	\$ 8,000
D.	Modify Other Sites Unknown	

Total estimated costs to reduce off-airport attractants would be \$75,300.

#### 6.4.3.1.3 Estimated costs to conduct the on-airport shooting program

A.	On-Airport Shooting	
	Salaries and Benefits	\$ 74,500
	Materials/services	\$ 22,100
B.	Survey of Nesting Colony	
	Salaries and Benefits	\$ 8,500
	Materials/Services	\$ 9,700

Total estimated costs to conduct on-airport shooting program would be \$114,800.

#### 6.4.3.2 Projected Time Frame for Initiation of Category 1 Actions

Overall, initiation of Category 1 actions would begin in May 1994. The on-airport shooting program would begin in late May-early June, depending on the timing of escalation of the hazards posed by gulls, completion of NEPA/SEQR requirements, issuance of permits from authorizing agencies, and other factors. Monitoring reports would be submitted to the state and federal natural resource management agencies every two weeks after the initiation of the program. The on-airport shooting program would most likely continue through the first week of August 1994. Annual reviews of the results and impacts of the on-airport shooting program would occur in November 1994. The on-airport shooting program could be conducted each year, pursuant to permitting and review requirements.

Enhancement of JFKIA's on-airport bird hazard reduction program would begin immediately after completion of NEPA/SEQR requirements. These activities would be conducted on an ongoing basis. Priorities would be placed on accomplishing the following activities: 1) hiring of a wildlife biologist (prior to January, 1995); 2) development of written plans for vegetation, insect, water, sanitation, and BCU plans, activities, results, and proposals (by 1996); 3) enhancement of the Bird Hazard Task Force's role (May, 1994); and 4) use of methyl anthranilate to reduce bird use of water (immediately upon commercial availability of the product). These and other specific components of the program to enhance JFKIA's on-airport bird hazard control operations would be conducted on an ongoing basis.

Regarding the reduction of off-airport attractants, the first step would be to initiate conduct of a survey to identify attractants (initiated in 1994 or 1995). Management recommendations would be submitted to the attractant owner or administrator after completion of the survey. Timing of implementation of recommendations cannot be estimated at this time. In general, however, handbills and public information campaigns would begin as soon as is practical after development of recommendations. Implementation of nonlethal control options (grids, sanitation, etc.) would begin as appropriate.

The conduct of Category 2 activities that would occur on the Gateway National Recreation Area would not be initiated until after Category 1 activities were no longer effective in reducing the gull-aircraft hazard. Category 1 activities would have to be conducted for at least one year (1994) before they could be evaluated for their effectiveness. If Category 1 activities are determined to be ineffective, initiation of Category 2 activities would begin with NEPA/SEQR reviews and compliance, which would require at least one year to complete. Category 2 activities could not (in all likelihood) be conducted prior to April 1996.

## 7.0 MITIGATION AND MONITORING

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## 7.0 MITIGATION AND MONITORING

### 7.1 Mitigation

As defined in Section 1508.20 of the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508), mitigation includes: a) avoiding the impact altogether by not taking a certain action or parts of any action; b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and e) compensating for the impact by replacing or providing substitute resources or environments. According to the Implementing Regulations, mitigation measures may be enumerated in the Alternatives Section (Chapter 3 in this document)(1502.14 f), in the Impacts Section (Chapter 5 in this document)(1502.16 h), and in the Record of Decision (ROD)(1505.2 c), or they may be presented together in a separate section (common practice).

Potential mitigation measures are included here for the six components of the proposed Integrated Management Program (IMP) to reduce the potential for gull-aircraft collisions at JFKIA. The majority of these measures are directed at minimizing adverse impacts or compensating for the impact by providing for substitute resources or environments.

#### 7.1.1 Mitigation of Effects of Three On-NPS Components of the Proposed IMP

This section describes the mitigation of effects of the following on-NPS components of the proposed IMP:

- Display of gull models
- Shooting gulls on the colony from blinds
- Laughing Gull egg/nest destruction

##### 7.1.1.1 Mitigation for Loss of Laughing Gulls as Breeding Birds In Jamaica Bay

The mitigation measure proposed below would provide for the substitution of resources to compensate for the loss of the Laughing Gull colony from Jamaica Bay. The overall goal of this mitigation measure would be to provide for the establishment of a Laughing Gull colony elsewhere on Long Island so that this species remains as a breeding bird within the state of New York. It is important to note that this mitigation measure is directly tied to the proposed program components that would directly affect the Jamaica Bay Laughing Gull colony: display of gull models, shooting on the colony from blinds, and egg/nest destruction of Laughing Gulls in the nesting colony. The mitigation measures would be conducted in concert with the conduct of these three components.

Although the reduction or elimination of the Laughing Gull colony as part of the IMP would not result in substantial impacts to the regional Laughing Gull population, it could result in the loss of the species from New York State's breeding birds. Measures to mitigate this potentially adverse effect are proposed in the form of the establishment of an alternative Laughing Gull nesting colony site within New York State, but sufficiently far enough from JFKIA or other airports to pose no hazards to airport operations.

Identifying the appropriate habitat is essential to beginning this process. Once an appropriate alternative site is found and permission is obtained from the landowners, Laughing Gulls would be attracted to the site by the playing of taped colony sounds and by the placement of decoys. The colony would be monitored to determine viability, continued occupancy, and potential impacts of Laughing Gulls on other bird species.

#### ■ **Habitat Requirements**

Characteristics of habitats utilized by breeding Laughing Gulls are described in detail in Section 4.1.2.2. In brief, Laughing Gulls in this region nest on salt-marsh islands. On the colony site (which must include both *Spartina alterniflora* and *S. patens*—that is, a mixture of high and low salt marsh—see Section 4.2.2), the preferred location for the nest is in tall *S. alterniflora*, just above the mean high-tide level, although the gulls will nest on *S. patens*. Mats of dead vegetation are preferred as a nesting substrate.

#### ■ **Availability of Suitable Relocation Sites**

There are few other sites in Jamaica Bay that consist of islands with high salt-marsh habitat suitable for nesting by Laughing Gulls, and it is therefore unlikely that Laughing Gulls would relocate to areas within Jamaica Bay, if they were discouraged from nesting at the current colony site. The Laughing Gulls would have to find a suitable habitat elsewhere within the state in order not to permanently be eliminated as a breeding species within New York State.

**Laughing Gull Habitats Within Jamaica Bay:** The local East High Meadow/Silver Hole/JoCo marsh complex contains by far the largest area of high salt marsh in Jamaica Bay suitable for nesting by Laughing Gulls. Of the marsh complex's total area of approximately 166.5 hectares (411 acres), 66 hectares is classified as high salt marsh.<sup>1</sup> Most recent aerial surveys (Belant and Dolbeer, 1992) indicate that approximately 114 hectares (281 acres) of the marsh complex is utilized by Laughing Gulls for nesting. According to Bridges (1976), the only other sizable areas of high salt marsh in Jamaica Bay are on Big Egg Marsh (9.7 hectares/24 acres), Ruffle Bar (13.4 hectares/33 acres), Rulers Bar Hassock (13.2 hectares/32.5 acres), and Yellow Bar Hassock (18.6 hectares/46 acres). The New York State Department of Environmental Conservation Tidal Wetlands Maps indicate a somewhat different distribution of high salt marsh in the bay: 1.5 hectares/3.7 acres) on Broad Creek Marsh, 9 hectares (22.3 acres) on Ruffle Bar, and 1 hectare (2.4 acres) on Elders Point Marsh.

The narrow strip of high marsh on Ruffle Bar is inhabited by nesting Herring Gulls (Litwin et al. 1993); Laughing Gulls attempting to nest in proximity to this colony would have to occupy suboptimal habitats with greater risk of flooding and greater exposure to predation by the Herring Gulls (Burger 1979). Since Big Egg Marsh is connected to an upland developed area along Cross Bay Boulevard, a colony on that site would likely be subject to high rates of predation from rats and feral cats and dogs, as well as to possible human disturbance.

Moving to any of these sites would involve exposure to hazards such as predation by larger gulls (Herring Gull and Great Black-backed Gull nest on Ruffle Bar, Canarsie Pol, and Subway Island). Yellow Bar Hassock, unoccupied by other gulls in 1991 (Litwin et al. 1993), is a possibility for spontaneous relocation if it indeed includes high marsh as indicated by Bridges (1976).

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<sup>1</sup> NYSDEC Tidal Wetlands Maps, Table 7-1.

As indicated above, the spontaneous relocation of the present Laughing Gull colony population to another site within Jamaica Bay is unlikely. However, more importantly, although the establishment of a new Laughing Gull colony within Jamaica Bay—if it happens—would be desirable from a perspective of mitigating ecological impacts, it would be undesirable at this location from the perspective of the purpose and need of this project, as it would essentially maintain a major hazard source within close proximity of the airport.

**Laughing Gull Habitat East of Jamaica Bay:** In the bays east of Jamaica Bay, ample salt-marsh habitat exists to which the colony might relocate. The New York Department of Environmental Conservation Tidal Wetlands Maps indicate that 38 variously-sized salt-marsh islands from Lawrence Marsh (just inside Rockaway Inlet) east to East Fire Island (a short distance east of Fire Island Inlet) include a total of about 679 hectares (1677 acres) of high salt marsh that is unoccupied by gulls or terns (Table 7-1, Figure 7-1). This total does not include another 11 islands occupied by Herring Gulls or common terns and totaling 112 hectares (277 acres) of high salt marsh, or numerous other islands smaller than the 10-hectare (26-acre) minimum used as one selection criterion. This minimum size was used because in 1990 and 1991 a few pairs of Laughing Gulls did nest on 10-hectare North Cinder Island in Middle Bay, 13.4 km (8.3 mi) east of JoCo, in association with Herring Gulls (Litwin et al. 1993). However, no Laughing Gulls were reported from the site (or from anywhere else except the Jamaica Bay colony) in 1993 (New York State Department of Environmental Conservation, unpublished data).

#### 7.1.1.1.1 Measures to Attract Laughing Gulls to New Colony Sites

If one or more appropriate unoccupied salt marsh islands can be located, the techniques of Kress (1983), involving placement of decoys and playing of taped colony sounds, could be utilized to attract displaced birds to the replacement sites. It is critical that such a system be in place in early April at the same time that the dispersal efforts begin at the Jamaica Bay colony, since birds prospecting for a colony appear to be attracted to others of the same species. After studying colony-site selection among Laughing Gulls in Virginia and North Carolina, Klopfer and Hailman (1965) suggested that, where colony sites are numerous, the earliest arriving birds colonize a particular island incidentally, and social stimulation draws the later arrivals. Burger and Shisler (1980) noted the tendency of Laughing Gulls to nest in clusters within the colony.

Within a Laughing Gull colony, Bongiorno (1970) was able to influence nest-site selection by raking dead vegetation into mats. The gulls selected these mats in preference to living *Spartina*, probably because the additional height offered added protection against flooding. Stone (1937) also notes that chicks hide from intruders in this often loosely-aggregated material. A potential colony site might be made even more attractive by manipulating the substrate to create similar mats. Since common terns similarly prefer nesting on windrows of dead vegetation (Storey 1978, F.G. Buckley 1979, Safina et al. 1989), such mats could also be utilized by terns that might be displaced by the activities on the Jamaica Bay colony site.

Ideally, the new potential colony site would begin at least one year prior to displacement from the Jamaica Bay Wildlife Refuge (JBWR). Because of the importance of group adherence and social stimulus in the formation of seabird colonies (Klopfer and Hailman 1965, Greer et al. 1988), having at least the nucleus of a colony already in place at an alternate site would greatly facilitate the desired shift. Prior to the Laughing Gulls' return in early April, possible sites for relocation would have to be identified and, if desired, the attractants described above (tapes/decoys and/or vegetation mats) put in place. As soon as the gulls return for the breeding season, these sites (and other suitable sites that may not be manipulated) should be monitored regularly to determine the gulls' response.

Table 7-1  
Size and Characteristics of Potential Laughing Gull Nesting Colony Sites on Long Island

Site	TOTAL SITE AREA		HIGH MARSH AREA		PERCENT HIGH MARS	OWNER
	HA	ACRES	HA	ACRES		
4 - Silver Hole Marsh (12-3)	28.8	71.2	0.0	0.0	0.0	NPS
5 - East High Meadow (9-3)	44.7	110.5	4.1	10.1	9.1	NPS
6 - Jo Co Marsh (11-3)	121.8	300.9	62.1	153.3	51.0	NPS
Total	166.5	411.5	66.2	163.4	39.8	

Site	TOTAL AREA		HIGH MARSH AREA		PERCENT HIGH MARS	OWNER
	HA	ACRES	HA	ACRES		
8 - North Green Sedge (25-3)	55.7	137.5	3.6	8.9	6.5	HEMPSTEAD
11 - Black Banks Hasscock (29-3)	40.4	99.8	3.6	9.0	9.0	HEMPSTEAD
13 - North Meadow	21.4	53.0	2.9	7.1	13.4	HEMPSTEAD
14 - East Meadow	14.7	36.4	4.3	10.7	29.4	HEMPSTEAD
15 - East Channel Island (24-3)	41.9	103.4	9.0	22.2	21.5	HEMPSTEAD
16 - Ingraham Hasscock	24.2	59.8	1.7	4.3	7.2	HEMPSTEAD
17 - Parsonage Island	57.4	141.8	21.9	54.0	38.1	HEMPSTEAD
18 - Cinder Island	45.5	112.4	4.0	9.9	8.8	HEMPSTEAD
20 - Middle Island	25.0	61.8	8.6	21.3	34.5	HEMPSTEAD
21 - High Meadow	48.8	120.5	4.0	9.9	8.2	HEMPSTEAD
22 - Smith Meadow (39-3)	66.2	163.7	6.0	14.8	9.0	HEMPSTEAD
23 - Pine Marsh	59.8	147.7	11.9	29.3	19.8	HEMPSTEAD
24 - False Channel Meadow	29.9	73.8	10.4	25.6	34.7	HEMPSTEAD
25 - Ned's Meadow	13.3	32.8	1.1	2.8	8.5	HEMPSTEAD
26 - Big Crow Island	104.5	258.1	38.8	95.9	37.1	HEMPSTEAD
27 - East Crow Island (31-3)	56.1	138.7	27.0	66.7	48.1	HEMPSTEAD
28 - Jones Island	53.1	131.1	12.3	30.4	23.2	
29 - Middle Crow Island	28.2	69.8	3.5	8.6	12.3	
32 - South Line Island	54.3	134.2	20.7	51.2	38.1	
34 - Black Banks Island	25.7	63.4	23.6	58.3	91.9	
35 - Sanford Island	18.9	46.6	5.2	12.8	27.5	
37 - Goose Island	18.7	46.2	14.4	35.6	77.0	
38 - Great Island (Great South Bay)	16.3	40.2	10.9	27.0	67.3	HEMPSTEAD
39 - Seamans Island	69.6	172.0	26.9	66.4	38.6	HEMPSTEAD
40 - Diamond Shoals	14.1	34.8	2.3	5.6	16.1	
41 - Townsend Island	14.9	36.9	1.5	3.6	9.8	
42 - Wansers Island	12.3	30.3	4.0	9.9	32.7	
43 - Jonas Creek	263.0	649.9	59.6	147.2	22.6	
44 - Gilgo Island (11-6)	78.3	193.4	45.2	111.6	57.7	BABYLON
46 - Thatch Island	27.8	68.7	24.2	59.8	87.1	
47 - Cedar Island (Great South Bay)	232.0	573.3	159.5	394.2	68.8	
48 - Oak Island	44.6	110.3	30.5	75.4	68.3	
49 - Grass Island (17-6)	13.3	32.8	1.7	4.3	13.1	BABYLON
50 - Seganus Thatch Island (18-6)	31.0	76.5	23.0	56.7	74.2	
51 - Sexton Island (8-7)	15.9	39.2	10.8	26.6	67.8	ISLIP
52 - East Fire Island (7-7)	41.6	102.7	37.7	93.1	90.7	NPS
TOTAL AREA	1840.7	4538.4	678.6	1676.8	36.9	

Sources: NYSDEC Tidal Wetland Maps 1974 and NYSDEC 1980-1991 Long Island Colonial Waterbird and Piping Plover Survey, Volume I and II.

Note: Numbers in parentheses following site names are site number and map number from Colonial Waterbird Survey.

Study Area: Long Island South Shore from Rockaway Inlet to East Fire Island

Suitability Criteria For Relocation of Laughing Gulls:

- Presence of a combination of high and low salt marsh (with 50% or more consisting of high marsh)
- Absence of nesting colonies of common terns or herring gulls
- Minimum area size: 28 acres (RE: Size of North Cinder Island which until 1993 supported a small laughing gull colony)
- Areas separated from mainland, barrier islands, or highways

Site	TOTAL SITE AREA		HIGH MARSH AREA		PERCENT HIGH MARS	SPECIES PRESENT	OWNER
	HA	ACRES	HA	ACRES			
7 - Lawrence Marsh	189.9	469.3	23.7	63.6	13.6	3	
9 - South Green Sedge (28-3)	37.7	93.2	1.9	4.8	5.1	2,3	HEMPSTEAD
10 - Cedar Island (Hempstead)	25.8	63.7	1.0	2.4	3.8	3	
12 - Pearsalls Hasscock (27-3)	41.2	101.9	14.4	35.6	35.0	3	HEMPSTEAD
19 - North Cinder Island (22-3)	10.7	26.5	6.3	20.4	77.0	1,2,3	HEMPSTEAD
30 - Cuba Island (2-6)	37.0	91.4	7.5	18.4	20.1	3	HEMPSTEAD
31 - Deep Creek Meadow (1-6)	44.6	110.2	7.5	18.5	16.8	3	HEMPSTEAD
33 - Middle Line Island (9-6)	23.8	58.8	6.9	17.0	28.9	2,3	HEMPSTEAD
36 - North Line Island (8-6)	67.0	165.5	15.5	38.4	23.2	2,3	HEMPSTEAD
45 - Elder Island	28.2	69.7	14.4	35.6	51.1	3	
TOTAL	548.6	1355.7	112.1	277.0	20.4		

Sources: NYSDEC Tidal Wetland Maps, 1974 and NYSDEC 1980-91 Long Island

Colonial Waterbird and Piping Plover Survey, Volume I and II.

Legend: 1 = Laughing Gulls; 2 = Herring Gulls; 3 = Common Tern; Numbers in

parentheses following site names are site numbers and map numbers from

the Colonial Waterbird Survey. \* Owned in conjunction with Long Island Parks Commission.

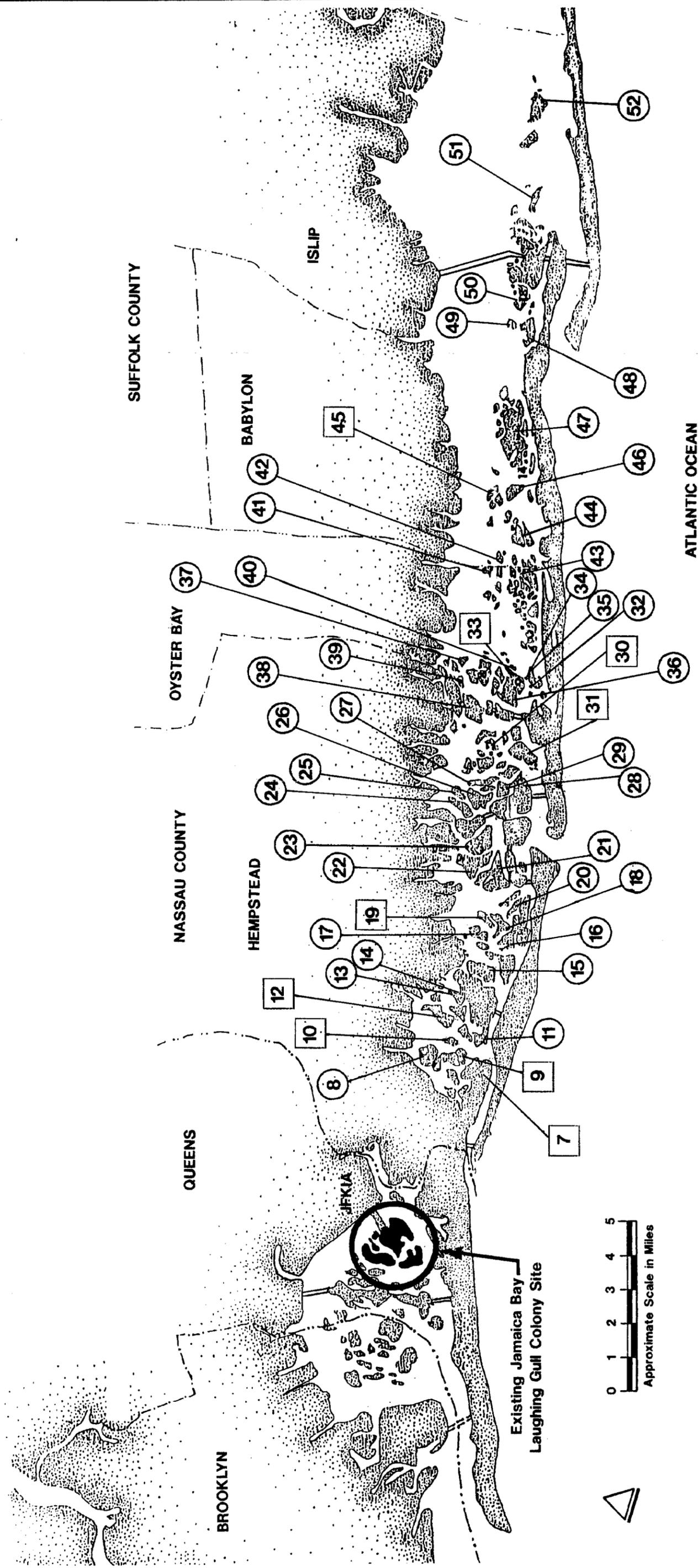
Note: High Marsh definition see NYS DEC Tidal Wetlands Map.

Note: Study Area: Long Island South Shore from East Rockaway

Inlet to East Fire Island.

Site Selection Criteria

- Areas with a combination of High and Low Salt Marsh (equal to or greater than 50% High Marsh)
- Areas 28 Acres and Larger (RE: Size of North Cinder Island Which Until 1993 Supported a Small Laughing Gull Colony)
- Areas Not Connected to Mainland, Barrier Islands, or Highway



LEGEND:

○ Potential Relocation Areas not Occupied by Common Terns or Herring Gull Colonies

□ Potential Relocation Areas Occupied by Common Terns and/or Herring Gull Colonies

FIGURE 7-1

Potential Relocation Sites  
for Displaced Laughing Gulls

#### 7.1.1.1.2 General Criteria for Selecting Preliminary Sites

In order to further develop the potential mitigation of the proposed IMP components directed at causing the abandonment of the Jamaica Bay Laughing Gull nesting colony, a set of criteria were developed to select a few likely alternative nest colony sites. These criteria are qualitative, and are used as a decision-making tool to assist in developing the mitigation proposal. The following criteria were used to select from among the 46 potential sites listed in Table 7-1:

- 1) Site must be sufficiently far (at least 5 miles) from JFKIA or any other airport so as to minimize the likelihood that the newly-established Laughing Gull colony would compromise safety at the airport.
- 2) Site should be near Jamaica Bay so as to maximize the possibility that Laughing Gulls from Jamaica Bay would exploit the alternative site.
- 3) Site must not have terns, piping plovers, or other gulls already occupying the habitat.
- 4) Preference would be given lands in public ownership, in the following diminishing order: federal, state, county, municipal. Privately-owned lands would be least preferred.
- 5) Preference would be given to sites that historically contained nesting Laughing Gulls.

A preliminary review of the potential sites pursuant to these criteria indicated that no single site satisfied all selection criteria. Four sites are described below, that have some potential for being selected as an alternative nesting Laughing Gull colony site.

#### 7.1.1.1.3 Four Sites with Potential for Being Developed as Alternative Laughing Gull Nesting Colonies

##### ■ Cedar Island

Bent (1986) reported that the last known breeding of Laughing Gulls on Long Island prior to their extirpation was on Cedar Island in 1888. This 573-acre marsh island contains 394 acres of high marsh, and is owned by the municipality of Babylon. It is located approximately 5 miles from Republic Airport, 20 miles from JFKIA, and does not contain terns, gulls, or plovers.

##### ■ East Fire Island

East Fire Island is part of the Fire Island National Seashore, which is managed by the National Park Service (NPS). It is a 103-acre marsh island, with 93 acres of high marsh. It is located approximately 10 miles from Long Island MacArthur Airport, and approximately 40 miles from JFKIA. This island does not contain nesting plovers, terns, or other gulls.

##### ■ Big Crow Island

Big Crow Island is owned by the township of Hempsted, totals 258 acres, and contains 96 acres of high marsh. The township's Department of Conservation and Waterways conducts a wide variety of activities and environmental programs, and could serve as a liaison between the agencies and Hempstead Township.

There are no terns, plovers, or other gulls nesting on the island. The island is located approximately 9 miles from Republic Airport, and 11 miles from JFKIA.

■ **Meadow Island**

Meadow Island (East and North Meadow Island) is owned by the township of Hempstead, and totals approximately 90 acres, including 17 acres of high marsh. Terns, gulls, or plovers do not nest on the site. It is located approximately 10 miles from Republic Airport and 10 miles from JFKIA.

**7.1.1.2 Action Approach for Establishing Alternative Laughing Gull Nesting Colony**

- 1) Ascertain ownership and develop a memorandum of understanding or contract with the property owner to provide for the necessary management activities to develop the site as an alternative Laughing Gull nesting colony.
- 2) Conduct a survey of the site to document biological resources present. Special attention would be given to identifying the species of birds and mammals (especially potential predators) present, and to document the extent of human access and use the site receives.
- 3) Work with the landowner to develop a program to limit and monitor human access to the site. If appropriate, develop informational materials to be distributed to the public, media, and interested citizens to apprise them of the program, its benefits, and potential limitations it would impose on their use of the site.
- 4) Confer with state and federal wildlife management agencies to develop the site-specific action plan to develop the site. Special attention would be given to the following:
  - **Threatened and Endangered (T&E) Species:** Confer with the USFWS Endangered Species Unit to determine presence of T&E plants and animals, and to infer potential impacts of Laughing Gulls and human activities associated with this mitigation on these resources. Discontinue work at the site if unacceptable adverse impacts would occur.
  - **Environmental Review:** Depending on the specific situation, the site, and involved agencies, appropriate environmental review procedures would be conducted.
  - **Predators:** State and federal wildlife biologists would be consulted and involved in determining the extent to which predators (large gulls, fox, skunks, raccoons, dogs, etc.) are present.
- 5) Once landowner permission and technical aspects are resolved, the operational aspects of the program would be initiated.
  - A. Beginning in April, the placement of decoy Laughing Gull models and the playing of recorded Laughing Gull colony sounds would commence. This would occur concurrently with colony dispersal activities in Jamaica Bay.
  - B. Wildlife biologists would monitor Laughing Gull presence, activities and nesting (if it occurs) throughout the nesting season.

- C. Appropriate signs would be posted to exclude humans from the area.
- D. If Laughing Gulls do occupy the site, the distribution and success of nesting attempts would be recorded, and a complete survey would be done to determine the number of nesting birds and their productivity.
- E. Impacts of Laughing Gulls on other birds would be inferred based on biological surveys and observations.
- F. Biweekly status reports would be written and submitted to the appropriate federal and state agencies: FWS, DEC, USDA, NPS, and others.
- G. Program results would be discussed at Bird Hazard Task Force Meetings conducted at JFKIA.

#### **7.1.1.3 Mitigation of Other Impacts for Three On-NPS Components of the IMP: Gull Models, Shooting From Blinds, and Nest/Egg Destruction**

Impacts to non-target species as a result of nest/egg destruction and on-colony shooting of adult gulls may not be avoided entirely. However, aerial photography will be utilized to develop nest density maps and—in combination with ground surveys—to identify the major nest locations of Laughing Gulls. Other areas should be avoided in implementing potentially disruptive measures. Belant and Dolbeer (1992) have developed an aerial photography and nest-density mapping procedure for use in evaluating the Jamaica Bay Laughing Gull colony. This technique would be used to assist in mitigating potential adverse environmental impacts of the IMP.

Furthermore, the specified activities would be conducted by wildlife biologists trained in proper techniques and in the identification, biology, and behavior of birds. Additionally, the expertise of the National Park Service and the New York State Department of Environmental Conservation will be utilized to identify more accurately the distribution of Laughing Gulls and other species. In this way, measures undertaken will be focused on areas primarily occupied by target species. Consequently, impacts to non-target species would be reduced. Also, nest/egg destruction would be conducted intensively for a short duration at the start of the Laughing Gull breeding season, and repeat visits would be reduced to the minimum necessary to maintain effectiveness.

Carcasses of killed adult gulls as well as destroyed eggs would be removed from the marsh environment at regular intervals, in order to avoid large-scale decomposition and any impacts to water quality that might occur as a result. Disposal would be conducted off site in accordance with federal and state regulations. The frequent removal of carcasses and eggs would also mitigate any impacts to the aesthetic experience of the marsh for recreational purposes. On-colony shooting will be scheduled to reduce impact on the recreational enjoyment of the marsh and Jamaica Bay to the greatest extent possible.

Impacts on airport operations and safety as a result of panic flights by birds at the colony would be reduced by coordinating disruptive colony management measures with the airport's operational schedule and runway usage patterns, in order to minimize impacts. Furthermore, measures that could induce towering will be conducted for a relatively short period of time at the beginning of the Laughing Gull breeding season, and would not affect airport operations during any other time of the year.

### **7.1.2 Mitigation of Impacts of the On-Airport Shooting Program**

The on-airport shooting program will be conducted under the supervision and with the direct participation of wildlife biologists; all program participants will have experience in both operation of the equipment and the visual and flight characteristics of target species as well as nontarget species potentially present. In this way, mortality of non-target species would be reduced to the greatest extent possible.

Shooting will occur at predetermined, safe shooting stations. All shots will be directed in a safe direction. Shooting will only occur at stations associated with active runways. Shooting will not occur over mud flats at low tides, to reduce the chance of nontarget bird impacts.

All federal and New York State permit conditions will be strictly adhered to; agencies will be informed of program activities as has been done in 1991-93, through biweekly program status reports.

All shot gulls will be collected as soon as possible, and as many will be retrieved as practicable. Shot gulls will be secured in collection bags and will be buried immediately at the end of each 3-4 hour shift. This will minimize any adverse socioeconomic impacts sustained by visitors to Jamaica Bay who observe the program being conducted.

Conduct of other, non-lethal activities, especially those conducted by the BCU on JFKIA, will mitigate on-airport shooting by slightly reducing the need to shoot gulls, by reducing the number of gulls that cross airport boundaries.

### **7.1.3 Mitigation of Impacts Associated with the Expansion of JFKIA's On-Airport Bird Hazard Control Program**

- Potential impacts of the use of insecticides would be minimized through monitoring if and when insecticide applications are necessary, and applying insecticides only when warranted based on sampling and surveys.
- Use of legal and registered pesticides only would occur.
- Conduct of on-airport BCU would be accomplished by trained, qualified Port Authority employees, pursuant to New York State and federal permits. All permit conditions would be adhered to.
- Shooting would be employed by the BCU only when necessary to protect aircraft safety; the number of birds shot pursuant to permits would be kept to the minimum necessary to accomplish the goals of the BCU program.
- Habitat management would be conducted to minimize the need to use shooting permits.

## **7.2 Monitoring**

### **7.2.1 Effectiveness of Relocation**

The effectiveness of the relocation effort as well as impacts to the environment are uncertain. Therefore, a monitoring program is proposed to determine the effectiveness of relocation of the colony population over time as well as to identify new impacts that might emerge over time. In addition to determining the establishment of a Laughing Gull colony on an alternative New York site, the monitoring program would include an assessment of Laughing Gull colony impacts on other native bird species already present on the relocation site. Of particular management concern are the various tern species. This information would provide the basis for changes in the operational components of the IMP in time and as necessary. It would allow continuous calibration of the IMP to maintain maximum effectiveness of the relocation effort.

Regional population trends for Laughing Gulls would be monitored over the long term to determine whether the program itself, or its interaction with some other phenomenon, might have adverse effects on the population.

Monitoring could include conferring with NYSDEC and the New Jersey Division of Fish, Game and Wildlife regarding regular aerial surveys of all Laughing Gull colonies on Long Island and New Jersey. Periodic productivity studies of sample Laughing Gull colonies would also be undertaken to understand more fully the population aspects of the gulls. Banding and color-marking programs would be considered to enhance scientific understanding of the specific effects of the program.

### **7.2.2 Effectiveness of IMP Components**

#### **7.2.2.1 Reduction of the Number of Birdstrikes**

The goal of the JFKIA Gull Hazard Reduction Program is to reduce the number of gull-aircraft interactions. As part of the IMP, the Bird Control Unit at JFKIA will continue to collect data regarding birdstrikes. These data will be reported to the Bird Hazard Task Force (BHTF) on a monthly basis. The BHTF will evaluate these data and recommend to APHIS changes to be considered in the implementation of the IMP. Additionally, throughout the conduct of the IMP program component of on-airport shooting, the management agencies will be provided with biweekly reports of program activities (numbers of birds taken and birdstrike data).

Annual surveys of the Jamaica Bay Laughing Gull colony would be accomplished through aerial photography and ground-truth plots. Surveys would be conducted cooperatively between the ADC and NPS programs, and would occur in June/July. Survey results would be used to infer aspects of the relationship between the colony and JFKIA's birdstrike record, and to evaluate impacts of gull hazard reduction programs on the local (Jamaica Bay) and New York State Laughing Gull breeding population.

#### **7.2.2.2 Abandonment of the Jamaica Bay Laughing Gull Nesting Colony**

One component of the IMP is to induce abandonment of the Jamaica Bay Laughing Gull nesting colony and to determine if species that replace the Laughing Gull do not present hazards to aviation safety. Annual surveys of JoCo and Silver Hole marshes and East High Meadow would be conducted to evaluate

the extent of abandonment of these areas by nesting Laughing Gulls. It would also be determined to what extent other species are using the habitat abandoned by the gulls and whether these species have the potential to be involved in bird-aircraft interactions. These data would be reported to the BHTF for their review. The BHTF would evaluate these data and recommend to the Port Authority possible changes to be considered in the implementation of the IMP.

## **8.0 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

## **8.0 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

During the implementation of the six-component Integrated Management Program (IMP), portions of the marsh complex consisting of JoCo Marsh, East High Meadow Marsh and Silver Hole Marsh in the Jamaica Bay Wildlife Refuge would be subject to varying types of disturbance, none of which would be permanent or irreversible.

The productivity of land and water, in terms of ecological productivity as a wildlife habitat, would be affected for the period of implementation. On-colony nest/egg destruction and shooting of adult gulls would result in some lethal impacts and disturbance of non-target species which could affect their reproductive capability. The productivity of the gull population in Jamaica Bay will be reduced; however, other species' productivity may increase at this location. The productivity of the regional gull population would initially be affected and may decrease by as much as 14 percent, dependent on the mortality as a result of on-airport shooting. No permanent decrease in productivity of the regional gull population is anticipated as long as annual shooting, if implemented indefinitely, results in gull mortality of less than approximately 14,500 gulls per year.

Mitigation of the adverse effects of the six-component IMP includes inducement of relocation of the Laughing Gull colony to an area where it would not be subject to frequent bird-aircraft interaction and lethal measures necessary to prevent this interaction. Relocation of the gull colony away from Jamaica Bay may reduce the nutrients associated with animal feces to the bay and land areas of the marsh. However, this would be compensated by new bird species which would occupy the former gull habitat.

Successful implementation of the IMP would result in a lower frequency of aircraft accidents, and would reduce the economic costs associated with these incidents.

## 9.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

9.1	<b>Materials and Costs Associated with Continued Development of JFKIA's On-Airport Bird Hazard Reduction Program</b> . . . . .	9-1
9.1.1	Current Level of Resources . . . . .	9-1
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## **9.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

Irreversible and irretrievable commitments of resources are the materials and costs associated with conduct of the three Category 1 activities identified in Section 6.4.2. The materials and costs listed here are estimated expenditures of resources for each activity; real costs and materials may vary. Costs for conduct of activities beyond 1994 would be essentially similar, but would vary, depending on inflation, cost of living and salary increases, the exact nature of the program, developing technologies, and other factors. Agencies and organizations with authority to implement each activity will determine the exact nature of bird control programs that would be conducted, and will identify each component that will be accomplished.

### **9.1 Materials and Costs Associated with Continued Development of JFKIA's On-Airport Bird Hazard Reduction Program**

#### **9.1.1 Current Level of Resources**

Currently, expenditures for the conduct of JFKIA's on-airport bird hazard control program (not including the USDA-conducted on-airport shooting program) total approximately \$500,000 each year. General cost breakdowns are: 1) salary and benefits (including training costs) for members of the Bird Control Unit; 2) vehicle costs; 3) equipment, supplies and service; and 4) insecticide applicator contract. The costs and resources are broken down as follows:

1. Salary, benefits and training for the equivalent of seven full-time permanent employees (\$420,400)
2. Salary, benefits, and training of one employee to administer and manage bird control program (1.5 months) (\$ 10,000)
3. Vehicle costs (gasoline/maintenance) (\$ 39,000)
4. 1 new shotgun per year (\$ 400)
5. 450 rounds of 12 ga. shotgun ammunition per year (\$ 200)
6. Purchase of approximately 6,000 rounds of pyrotechnics and starter caps per year (includes cost of personal protective equipment) (\$ 10,000)
7. Purchase of annual average of 4 Bird Field Guides, and 1 additional pair of binoculars (\$ 600)
8. Insect Control Program Costs  
Employee salary, benefits, and training (1 month) (\$ 4,000)  
Contract with Insecticide Applicator (\$ 15,000)

Current on-airport bird control activities result in the taking of fewer than 300 gulls each year.

## 9.1.2 Increased Level of Resources For Continued Development of JFKIA's On-Airport Bird Hazard Reduction Program

The Port Authority of New York & New Jersey is the authorizing agency for activities associated with continued development of JFKIA's on-airport bird hazard reduction program. Certain aspects of the on-airport program involve specific authorizations from other agencies: FWS regarding depredation permits, etc. Estimated resources and costs associated with the continued development of JFKIA's on-airport bird hazard control program for 1994 would total \$392,700, and could consist of conduct of programs for vegetation, water, insect management, and improvements in sanitation and operation of the Bird Control Unit.

### 9.1.2.1 Vegetation Management

The bulk of the resources expended for an enhanced vegetation management program would be those associated with the development of written plans: salary and benefits of personnel and surveys of insect resources. Other costs would be equipment and supplies.

Salary and Benefits (\$ 10,500)

Equipment and Supplies (machinery maintenance, gasoline, turf and other plant seeds, etc.) (\$4,500)

SUBTOTAL (Vegetation) = \$ 15,000

Vegetation management to reduce attractants for birds may involve the taking of native vegetation and replacing it with other native plants or ornamental/exotic plant species.

### 9.1.2.2 Water Management

The bulk of the resources expended for water management improvements would be those associated with the development of written plans.

Salary and Benefits (\$ 7,500)

Purchase 50 lbs. of Methyl Anthranilate (\$ 1,500)

Gasoline, equipment charges (\$ 1,000)

Paving and resurfacing costs (pavement and labor) (\$ 4,000)

SUBTOTAL (Water Management) = \$ 14,000

### 9.1.2.3 Insect Management

Resources expended for improved insect management are as follows:

Salary and Benefits (\$ 5,500)

Materials (pesticides, gasoline, equipment charges, protective gear, etc.) (\$ 4,000)

Written insect management plans would be developed and employed.

SUBTOTAL (Insect Management) = \$ 9,500

#### 9.1.2.4 Sanitation

Most of the resources expended to conduct improved sanitation activities at JFKIA would be those associated with increased patrols of the public use areas of JFKIA, and for public education materials to communicate sanitation control objectives.

Salary and Benefits (\$ 5,000)

Leaflets and Signs (\$ 4,000)

SUBTOTAL (Sanitation) = \$ 9,000

#### 9.1.2.5 Bird Control Unit

Most costs associated with enhancement of the BCU are associated with increasing the level of personnel.

Increase BCU staff by 50% (\$ 200,000)

Place Wildlife Biologist at JFKIA (\$ 77,000)

Additional 2,100 gallons of gasoline (additional 51,000 miles per year) (\$ 2,100)

Additional mileage costs (\$ 11,000)

Additional 20,000 rounds of pyrotechnics (\$ 20,000)

Additional 1 4WD Vehicle (\$ 30,000)

Equipment (shotgun holders, tapes, audio systems) (\$ 4,000)

Additional 2 firearms (12 ga. shotguns) (\$ 900)

Additional 400 rounds of ammunition (\$ 200)

SUBTOTAL (Bird Control Unit) = \$ 345,200

Increased conduct of BCU activities could result in the additional taking of 200 gulls each year.

### 9.1.3 Increased Level of Resources For Reducing Off-Airport Attractants

The Port Authority or other agency could conduct and fund the off-airport attractants survey; the funding agency would have authority to determine the exact nature of the survey. If attractants are identified, landowners and administrators from each specific site would have final authority to determine the exact nature of modifications in structures or operations that would occur. Estimated resources and costs for surveying and reducing off-airport attractants for 1994 would total \$ 75,300, and would consist of the following items:

#### 9.1.3.1 Survey of Off-Airport Attractants

Salary and Benefits (\$ 39,000)

200 gallons of gasoline (\$ 200)

Mileage for Vehicle (\$ 1,100)

Binoculars, scope, etc, (\$ 5,000)

SUBTOTAL (Survey of Off-Airport Attractants) = \$ 45,300

**9.1.3.2 Aqueduct Racetrack**

Salary and Benefits (install grid wires) (\$ 4,000)  
40 posts and weights (\$ 7,000)  
2,000 handbills to stop public feeding (\$ 2,000)  
Kevlar or other cordage (\$ 7,000)

SUBTOTAL (Aqueduct Racetrack) = \$ 20,000

**9.1.3.3 Jamaica Bay Sewage Treatment Plant**

Salary and Benefits (install grid wires) (\$ 2,000)  
20 posts and weights (\$ 3,000)  
Kevlar or other cordage (\$ 5,000)

SUBTOTAL (Jamaica Bay Sewage Treatment Plant) = \$ 10,000

**9.1.4 Increased Level of Resources for Conducting On-Airport Shooting Program and Annual Laughing Gull Colony Survey**

The Port Authority of New York & New Jersey would have authority to determine whether the on-airport shooting program is conducted, and would determine the nature of the program. The Port Authority may request that another agency (e.g. USDA) conduct the shooting program and coordinate the nesting colony survey. The National Park Service (NPS) at Gateway National Recreation Area has authority to grant permission for access to the nesting colony. The survey could be funded either in part or in whole by the NPS and/or the Port Authority. Estimated resources associated with conduct of the on-airport shooting program and the survey of the Jamaica Bay Laughing Gull nesting colony total \$114,800, and would consist of the following items:

**9.1.4.1 On-Airport Shooting**

Salary and Benefits (4 Biologists, three months) (\$ 45,000)  
Salary and Benefits (program administration, planning, and evaluation) ( \$ 23,000)  
Salary and Benefits (necropsy and data entry) (\$ 4,000)  
Salary and Benefits (billings, etc.) (\$ 2,500)  
2, 12 ga. shotguns and repair/maintenance (\$ 2,000)  
Miscellaneous (vehicle, shipping, etc.) (\$ 4,000)  
Shotgun shells (#4 steel shot, 30,000 rounds) (\$ 8,000)  
100 gallons of gasoline (\$ 100)  
Incineration of Gulls (\$ 8,000)

SUBTOTAL (On-Airport Shooting) = \$ 96,600

**9.1.4.2 Laughing Gull Colony Survey**

Salary and Benefits (\$ 8,500)

Aerial Photography Services (\$ 9,000)

Flagging, cord, photo supplies (\$ 700)

SUBTOTAL (Survey) = \$ 18,200

Conduct of the on-airport shooting program has resulted in the taking of between 7,000 and 15,000 gulls each year, and could vary between these numbers in subsequent years.

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