

**SURVEY OF HERRING GULL (*Larus argentatus*),
GREAT BLACK-BACKED GULL (*Larus marinus*),
AND LAUGHING GULL (*Larus atricilla*) NESTING
COLONIES IN JAMAICA BAY, NEW YORK**

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Biologists from the U.S. Department of Agriculture, National Park Service, New York City Audubon, Port Authority of New York and New Jersey, The American Littoral Society, and other agencies documented and estimated the number of gull nesting colonies throughout the Jamaica Bay Unit of Gateway National Recreation Area in May and June of 2010.

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Survey of Herring Gull (*Larus argentatus*), Great Black-backed Gull (*Larus marinus*), and Laughing Gull (*Larus atricilla*) Nesting Colonies in Jamaica Bay, New York

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Abstract.-- During May and June 2010, a multi-agency survey effort was conducted to document the presence and estimate the size of nesting populations of Herring Gulls (*Larus argentatus*), Great Black-backed Gulls (*Larus marinus*), and Laughing Gulls (*Larus atricilla*) in the Jamaica Bay Unit of Gateway National Recreation Area (Jamaica Bay). A total of 20 locations (i.e., islands and salt marshes) were visited by field personnel and surveyed for the presence of nesting gulls. A total of 1,166 adult Herring Gulls, 184 adult Great-blacked Gulls, and 1,571 Laughing Gulls were observed on 9 separate marshes and islands. Assuming one adult gull observed represented one active nest, these numbers provide an estimate of the total nesting population for these three gull species in Jamaica Bay. Notably, a total of 375 Herring Gull nests and 130 Great Black-backed nests were found (or estimated) on these same islands and marshes during concurrent nest count surveys. Many of the observed adult gulls were likely non-breeding adult birds associated with those nesting colonies. As part of a long-term monitoring program, aerial photography was used to estimate the population of Laughing Gull nests in the Joco Marsh complex of Jamaica Bay in June of 2010. The estimated Laughing Gull nesting population in Jamaica Bay was 2,932 nests in 2010. The findings from this survey effort will provide an important baseline for future gull nesting colony survey efforts within Jamaica Bay.

INTRODUCTION

The Jamaica Bay Unit of Gateway National Recreation Area (Jamaica Bay) is an urban estuary managed by the U.S. National Park Service that provides nesting, migration stopover, and wintering habitats for a large diversity of birds and is an important location within the Atlantic Flyway (Burger 1983, Buckley and Buckley 1984, Brown et al. 2001). Herring Gulls (*Larus argentatus*), Great Black-backed Gulls (*Larus marinus*), and Laughing Gulls (*Larus atricilla*) have historically nested within Jamaica Bay (Buckley and Gurien 1986, Dolbeer et al. 1997, Sommers et al. 2001). Gull nesting colonies within Jamaica Bay are potentially influenced by a number of factors, including an integrated gull strike management program at John F. Kennedy International Airport (JFKIA; Dolbeer et al. 1993, Dolbeer et al. 2003, Washburn et al. 2009), the severe erosion of salt marshes (and consequently the loss of suitable nesting habitat) in Jamaica Bay (Hartig et al. 2002, Washburn and Tyson 2010), and the high levels of pollutants and contaminants that reduce the water quality of Jamaica Bay (Seidemann 1991, Botton et al. 2006). Furthermore, extreme weather events (e.g., hurricanes, N'oreasters) have the potential to completely degrade the salt marshes in Jamaica Bay (Gornitz et al. 2002) and remove nesting sites for gulls and other colonial waterbirds.

Although recent analyses of gulls collected during wildlife damage management activities at JFKIA have yielded information about Laughing Gull ecology (e.g., Dolbeer and Bernhardt 2003, Bernhardt et al. 2010) and documented that breeding Herring Gulls and Great Black-backed Gulls are utilizing the JFKIA airfield and pose safety risk to aircraft (Washburn et al. 2009), little information is available regarding the size and distribution of Herring Gull and Great black-backed Gull nesting colonies within Jamaica Bay (adjacent to JFKIA) during the last 13 years. Such information is essential to agencies involved in the reduction of gull-aircraft

collisions at JFKIA, important to the National Park Service as gulls are a natural resource within Jamaica Bay and have the potential to negatively impact other birds (e.g., plovers and terns; Olijnyk and Brown 1999, Booth and Morrison 2010), and needed to provide an understanding of gull ecology within the New York City metropolitan area.

Although counting nests from the ground is considered the most reliable technique for estimating or censusing many colonial nesting waterbirds, the method can be labor intensive, difficult to implement in tidal marshes interspersed with creeks, and can cause disturbance in nesting colonies (Wilkinson 1991, Green et al. 2008). Aerial surveys have been used frequently to estimate populations of nesting birds (Frederick et al. 1996, Rodgers et al. 2005, Green et al. 2010). Therefore, during 2010 the inter-agency research and inventory team used a combination of visual ground surveys and aerial photography to document that presence and estimate the population size of gull nesting colonies within Jamaica Bay (Dolbeer et al. 1997, Sommers et al. 2001, Green et al. 2008). In addition, information on gull nesting will be incorporated into the 2010 Long Island Colonial Waterbird and Piping Plover Survey (coordinated by the New York State Department of Environmental Conservation).

METHODS

Jamaica Bay is an estuary with a diversity of terrestrial and aquatic habitats, including open water, coastal shoals, sand bars, mudflat, intertidal salt marshes, and upland areas (Burger 1983, Hartig et al. 2002). Some islands within Jamaica Bay were created from dredge spoil materials and consist of upland habitats, whereas the intertidal salt marshes are interspersed with tidal creeks and mosquito-control ditches. Dominant vegetation within most of the islands and salt marshes includes smooth cordgrass (*Spartina alterniflora* Loisel.), saltmeadow cordgrass

(*Spartina patens* (Aiton) Muhl.), and saltgrass (*Distichlis spicata* (L.) Greene) (Burger 1983, Buckley and Buckley 1984, Hartig et al. 2002).

Utilizing a coordinated effort with field personnel from various agencies and entities (e.g., USDA/APHIS/Wildlife Services, National Park Service, New York City Audubon, The American Littoral Society), 20 islands and marshes within the Jamaica Bay Unit of Gateway National Recreation Area were surveyed during 27 May – 8 June 2010. The timing of these surveys is consistent with peak incubation and initial hatching of eggs for Herring Gulls and Great Black-backed Gulls (Pierotti and Good, 1994, Good 1998, Timms 1999). Due to their location, access to most of these areas was by boat.

During each visual ground survey (adult count), the total number of adult Herring Gulls, Great Black-backed Gulls, and Laughing Gulls present on an individual island or marsh was recorded and the general locations of any gull nesting activity or colonies mapped. Consistent with standard protocols for the Long Island Colonial Waterbird and Piping Plover Survey, it is assumed that one nest is present for each adult gull observed during the survey and that the other member of the breeding pair is foraging away from the colony (Sommers et al. 2001). Visual ground surveys were conducted utilizing optics (e.g., binoculars, spotting scopes) and other efforts to minimize disturbance to actively nesting gulls and other birds. Concurrently, nest count survey efforts were conducted on three of the islands and marshes where nesting Herring Gulls and Great Black-backed Gulls were observed (Canarsie Pol, Subway Island, and Elder's Point East Marsh). The number of Herring Gull and Great Black-backed Gull nests were counted and recorded by field personnel during these visual ground surveys (nest counts). All surveys were conducted during daylight hours (between 07:00 and 17:00 hours) on days without rainfall, with winds < 24 kph, and air temperatures below 29° C.

As part of a long-term monitoring program, the Laughing Gull nesting colony located in Jo Co Marsh, Silver Hole Marsh, and East High Meadow within Jamaica Bay Wildlife Refuge, Gateway National Recreation Area was censused using aerial photography census methods (Dolbeer et al. 2007, Washburn and Tyson 2010). The date of this aerial survey (7 June 2010) coincided with peak incubation and initial hatching of eggs for Laughing Gulls on these marshes (Buckley and Gurien 1986, Griffin and Hoopes 1991, Burger 1996, Dolbeer and Bernhardt 2003).

RESULTS

Based on the adult counts of Herring Gulls, a total of 1,166 nests represents the estimated nesting population for this species within Jamaica Bay during 2010 (Table 1). Adult Herring Gulls were observed on 6 islands and marshes, including Canarsie Pol, Subway Island, Little Egg Island, Elder's Point Marsh East, Broad Creek Marsh, and Duck Point Marsh. A total of 375 Herring Gull nests was counted (or estimated) during ground nest surveys (Table 2). When both types of ground surveys were conducted, the ratio of actual Herring Gull nests to the number of adult Herring Gulls observed was 1:5.8 on Canarsie Pol, 1:3.6 on Subway Island, and 1:1.2 on Elder's Point East.

A total of 184 nests represents the nesting population of Great Black-backed Gulls within Jamaica Bay during 2010 (based on adult counts; Table 1). Adult Great Black-backed Gulls were observed on 4 islands and marshes, including Canarsie Pol, Subway Island, Little Egg Island, and Elder's Point Marsh East. A total of 130 Great Black-backed Gull nests was counted (or estimated) during ground nest surveys (Table 2). When both types of ground surveys were conducted, the ratio of actual Great Black-backed Gull nests to the number of adult Great Black-

backed Gulls observed was 1:7 on Canarsie Pol, 1:13 on Subway Island, and 1:1 on Elder's Point East.

During visual surveys conducted within Jamaica Bay, the estimated nesting population of Laughing Gulls for Jamaica Bay was a total of 1,571 for 2010 (based on adult counts; Table 1). Adult Laughing Gulls were observed on 3 marshes, including Jo Co Marsh, Silver Hole Marsh, and East High Meadow. The annual estimated nesting population of Laughing Gulls in Jamaica Bay for 2010 (based on aerial photography census methods and conducted by USDA Wildlife Services) was 2,932 nests with 95% Confidence Intervals = 2,303–3,978 for this estimate (Washburn and Tyson 2010). Although Laughing Gull nesting was confirmed within Jo Co Marsh and East High Meadow, there was no evidence of Laughing Gulls nesting in Silver Hole Marsh during 2010.

DISCUSSION

Overall, gull nesting activity within the Jamaica Bay Unit of Gateway National Recreation Area decreased during the last decade. When nesting population estimates for Herring Gulls and Great Black-backed Gulls in Jamaica Bay for 2010 are compared to nesting population estimates for these species conducted in 1997 (when similar methods were used to estimate nesting gull populations; Brown et al. 2001), Herring Gull nesting activity declined by 62% and Great Black-black Gull nesting activity declined by 57% (i.e., from 1997 to 2010). Additionally, information on gull nesting on some Jamaica Bay islands collected during 2007 (Bernick 2007) also suggests that gull nesting activity in Jamaica Bay by these two species was lower than during the 1990s (Brown et al. 2001, Sommers et al. 2001). Notably, the size of the Laughing Gull nesting colony in Jamaica Bay declined during this same time period (Dolbeer et

al. 1997, Washburn and Tyson 2010).

Changes in the distribution of gull nesting activity within Jamaica Bay have occurred during the last decade. Canarsie Pol, Little Egg Marsh, and Subway Island comprise the main locations for Herring Gull nesting, although the relatively new Elder's Point Marsh East nesting colony certainly warrants attention during future survey efforts. Great Black-backed Gull nesting colonies are present in only two locations, Canarsie Pol and Little Egg Marsh. Gull nesting activity is essentially absent from Ruffle Bar Island, the location of large Herring Gull and Great Black-backed Gull nesting colonies as recently as the late 1990s (Brown et al. 2001). Laughing Gull nesting activity is restricted to the Jo Co Marsh Complex, with the vast majority of Laughing Gull nests concentrated within Jo Co Marsh itself (Washburn and Tyson 2010).

A variety of factors could be influencing the size and distribution of gull nesting populations within the Jamaica Bay Unit of Gateway National Recreation Area, including increased tidal flooding and marsh erosion observed on many marshes and islands within Jamaica Bay during the 1990s (Gornitz et al. 2002, Hartig et al. 2002), egg / clutch losses due to avian and mammalian predators (Ellis et al. 2007), gull management efforts (Washburn et al. 2009), inter-specific competition for nest sites and direct mortality (Buckley and Buckley 1980, Ellis and Good 2006). For example, the lack of any successful gull nesting on Ruffle Bar Island during 2010 is likely the result of nest / egg predation by raccoons (*Procyon lotor*), as evidence of predated gulls nests and signs of raccoon presence has been documented (field efforts for this survey, Bernick 2007).

Estimating the size of gull nesting populations based on adult counts (and assuming one adult gull represented one nesting pair / nest) consistently overestimated gull nesting activity during this survey effort. Non-breeding adult birds, including intermittent breeders (i.e., non-

breeding individuals that previous bred) and sub-adults (e.g., those too young to breed) within nesting colonies are a facet of many colonially nesting birds, including several species of gulls (Thomas and MacDonald 1987, Ottaway et al. 1988, Calladine and Harris 1996, O'Connell et al. 1997), Kittiwake (*Rissa tridactyla*; Cam et al. 1998), and Great Cormorants (*Phalacrocorax carbo*; Aebischer and Wanless 1992). The presence of non-breeding adult gulls is the most plausible reason for the overestimation of gull nesting activity (when nesting population estimates are based on counts of adult gulls only).

Information regarding the size and distribution of gull nesting colonies within Jamaica Bay is essential to several government agencies and other entities involved in the reduction of gull-aircraft collisions at JFKIA, managing natural resources within Jamaica Bay, reducing gull impacts to other birds (e.g., plovers and terns), and other important issues related to gulls within highly urbanized environments. The findings from this survey effort will provide an important baseline for future gull nesting colony survey efforts within Jamaica Bay. In addition, these data were provided to the New York State Department of Environmental Conservation for inclusion in the 2010 Long Island Colonial Waterbird and Piping Plover Survey.

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Figure 1. Islands and marshes ($n = 20$) within the Jamaica Bay Unit of Gateway National Recreation Area that were surveyed in 2010 to document and estimate the number of gull nesting colonies present.

Table 1. Total number of adult Herring Gulls, adult Great Black-backed Gulls, and adult Laughing Gulls observed and counted on 20 islands and marshes within the Jamaica Bay Unit of Gateway National Recreation Area, New York during visual ground surveys conducted in May and June of 2010.

Island / Marsh	Herring Gulls	Great Black-backed Gulls	Laughing Gulls
Canarsie Pol	730	49	0
Subway Island	246	13	0
Elder's Point East Marsh	60	2	0
Little Egg Marsh	95	120	0
Broad Creek Marsh ^a	30	0	0
Duck Point Marsh ^a	6	0	0
Ruffle Bar	0	0	0
Yellow Bar	0	0	0
Joco Marsh	0	0	1,200
East High Meadow	0	0	330
Silver Hole Marsh	0	0	41
Big Egg Marsh	0	0	0
Rulers Bar Hassock	0	0	0
Blank Bank Marsh	0	0	0
South Marsh	0	0	0
Goose Pond Marsh	0	0	0
Pumpkin Patch Marsh ^b	0	0	0
Stony Creek Marsh ^b	0	0	0
Black Wall Marsh ^b	0	0	0
Rulers Bar Island ^b	0	0	0
TOTAL	1,166	184	1,571

Table 1 (con't).

^a Adult gulls were present and counted during the survey, but we were unable to confirm the presence of actual gull nests. Gull nesting is highly unlikely due to heavy salt marsh erosion and flooding during high tides.

^b Although an intensive visual ground survey was not conducted, the presence of gull nesting is highly unlikely due to heavy salt marsh erosion and flooding during high tides.

Table 2. Estimated total number of Herring Gull, Great Black-backed Gull, and Laughing Gull nests observed and counted on 20 islands and marshes within the Jamaica Bay Unit of Gateway National Recreation Area, New York during visual ground surveys or an aerial photography census conducted in May and June of 2010.

Island / Marsh	Herring Gulls	Great Black-backed Gulls	Laughing Gulls
Canarsie Pol	126	7	0
Subway Island	69	1	0
Elder's Point East Marsh	49	2	0
Little Egg Marsh ^a	95	120	0
Broad Creek Marsh ^b	30	0	0
Duck Point Marsh ^b	6	0	0
Ruffle Bar	0	0	0
Yellow Bar	0	0	0
Joco Marsh ^c	0	0	2,815
East High Meadow ^c	0	0	117
Silver Hole Marsh ^c	0	0	0
Big Egg Marsh	0	0	0
Rulers Bar Hassock	0	0	0
Blank Bank Marsh	0	0	0
South Marsh	0	0	0
Goose Pond Marsh	0	0	0
Pumpkin Patch Marsh ^d	0	0	0
Stony Creek Marsh ^d	0	0	0
Black Wall Marsh ^d	0	0	0
Rulers Bar Island ^d	0	0	0
TOTAL	375	130	2,932

Table 2 (con't).

^a Estimate derived from the number of adult gulls present.

^b Adult gulls were present and counted during the survey, but we were unable to confirm the presence of actual gull nests. Gull nesting is highly unlikely due to heavy salt marsh erosion and flooding during high tides.

^c The number of Laughing Gull nests was estimated using aerial photography. Details on methodology and additional information regarding this Laughing Gull survey can be found in Washburn and Tyson (2010).

^d Although an intensive visual ground survey was not conducted, the presence of gull nesting is highly unlikely due to heavy salt marsh erosion and flooding during high tides.