



NEW YORK CITY AUDUBON
CELEBRATING 30 YEARS OF CONSERVATION

NEW YORK CITY AUDUBON'S HARBOR HERONS PROJECT:

2010 NESTING SURVEY – 25th Annual Report

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Abstract

New York City Audubon's Harbor Herons Project Nesting Survey of the New York Harbor and surrounding waterways was conducted between 18 and 27 May 2010, with additional observations in June and July. This report summarizes long-legged wading bird, cormorant, and gull nesting activity observed on selected islands, aids to navigation and at one mainland colony.

Species summaries: Nine species of long-legged wading birds nested on nine islands in New York Harbor. These species, hereafter collectively referred to as waders, included Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Yellow-crowned Night-Heron, Little Blue Heron, Tricolored Heron, Cattle Egret, and Green Heron. Since the previous comprehensive nesting survey in 2007, varying degrees of population increase were observed for the Black-crowned Night-Heron, Yellow-crowned Night-Heron, Great Egret, Snowy Egret, and Glossy Ibis populations. The Tricolored Herons, Little Blue Herons, Green Herons, and Cattle Egrets continued to nest at low numbers. Black-crowned Night-Herons continue to be the numerically dominant nesting species in most mixed-species colonies. A total of 1,372 Double-crested Cormorant nests were observed, representing an increase from the 2007 total of 1,046 nests and the 2009 total of 1,183 nests. Gull nesting activity was observed on all surveyed islands using both adult and nest counts in 2010.

Island summaries: The largest species diversity was observed on Canarsie Pol (eight species) as in previous years. The greatest total number of nests was observed on Hoffman Island (624 nests), surpassing South Brother Island, which had been the largest wader colony in previous years, and continued to support a large portion of the wader community in 2010 (456 nests). No active wader nests were observed on the three islands in the Arthur Kill and Kill Van Kull. Following an eight-year decline, this year marks the third consecutive year in which no waders were observed nesting on North Brother Island. Wader nesting activity on Huckleberry Island continued to persist at low levels. Mainland nesting of Yellow-crowned Night-Herons was observed at the Redfern Houses colony in Far Rockaway, where 65 nests were observed. Double-crested Cormorants nested on eight islands, including Canarsie Pol (for the first time in the history of these surveys). Additional cormorant nests were observed on aids to navigation in the Kill Van Kull, Arthur Kill and northwestern Raritan Bay.

Introduction

New York City Audubon's 2010 Harbor Herons nesting survey marks the 25th consecutive year of this project. The primary objective of the surveys is to monitor the population status of wading birds (i.e. herons, egrets, ibis) and cormorants on select islands in New York/New Jersey (NY/NJ) Harbor and surrounding waterways, while also noting the presence of other nesting bird species and current nesting habitat.

In Fall 2004, New York City Audubon made a decision to shift the Harbor Herons Nesting Survey from an annual to a triennial schedule, and in intervening years to conduct interim surveys on islands where nesting occurred in the prior year. A comprehensive nesting survey was conducted in May 2010.

The US Army Corps of Engineers and The Port Authority of New York & New Jersey draft "Comprehensive Restoration Plan for the Hudson-Raritan Estuary" and the Harbor Herons Subcommittee of the Harbor Estuary Program's draft "Harbor Herons Conservation Plan" are each slated for publication in 2010. Taken together, these two documents provide historical perspective of Harbor Herons and their breeding and foraging habitat, identify threats to the persistence of these species in the harbor, and lay out a plan of action for protecting these birds in the future.

This report summarizes nesting activity of long-legged wading birds, cormorants, and gulls observed on selected islands, aids to navigation and at one mainland colony documented during the 2010 field season, between 18 and 27 May, with additional nesting observations later in June and July. The objectives of the 2010 survey were to: (1) monitor the population status of long-legged wading birds (i.e. herons, egrets and ibis) cormorants, and gulls on selected islands; (2) document nesting habitat used by long-legged wading birds and cormorants; and (3) record the presence of other important nesting or migratory bird species.

Monitoring long-term trends and short-term conditions in long-legged wading bird and cormorant nesting populations in NY/NJ Harbor provides both an estimate of the relative health and stability of local colonial waterbird populations, and a valuable indicator of the overall health of the region's natural resources.

Methods

The 2010 survey followed field methods designed for previous Harbor Herons Project nesting surveys [Katherine Parsons (1986-1995), Paul Kerlinger (1996-2004)] and the standard protocol of the New York State Department of Environmental Conservation's Long Island Colonial Waterbird and Piping Plover Survey (Litwin et al. 1993). All counts were conducted between 6:00AM and 4:00PM, and under clear conditions without rainfall, high winds (>8 knots), or temperatures above 80°F. Counts were conducted once from 18-30 May; additional observations were made between early June and July (see Table 1 for dates).

Islands surveyed in 2010 (Table 1, Figure 1) included three in the Arthur Kill-Kill Van Kull complex (Shooter's and Prall's islands, and Isle of Meadows); two in Lower New York Harbor (Hoffman and Swinburne islands); four in the East River/Western Long Island Sound area (U Thant, Mill Rock, and North and South Brother islands); and two in the Hutchinson River/Long Island Sound area (Goose and Huckleberry islands). Partial colonial waterbird estimates were conducted at three islands in Jamaica Bay: Canarsie Pol, Elders Point Marsh East, and Subway Island. Additionally, observations of (1) Double-crested Cormorant nests on aids to navigation (i.e., channel markers and beacons) in the Kill Van Kull, Arthur Kill and northwestern Raritan Bay and (2) Yellow-crowned Night-Heron nesting at a mainland colony are also presented in this report.

Each island was surveyed by a research team consisting of the author, volunteers from New York City Audubon and other organizations, and staff from New York City Department of Parks and Recreation (NYCDPR) and the National Park Service (NPS). Double-crested Cormorant counts were conducted by the author with Susan Elbin and numerous volunteers (see island accounts for details) as part of an ongoing study of cormorant population dynamics, habitat use, and foraging ecology in NY Harbor. Surveys at Goose and Huckleberry islands were conducted jointly with David Künstler (NYCDPR, Van Cortlandt & Pelham Bay Parks Administrators' Office). Don Riepe of the American Littoral Society/Jamaica Bay Guardian provided additional information on colonial waterbird activity in Jamaica Bay.

Surveys were conducted by one or two teams of researchers lead by the author and trained volunteers. Groups quickly and systematically searched for nests on each island, initially focusing effort on areas occupied by nesting birds in previous years. Depending on the colony size, each team was composed of two counters (i.e. one person using a telescopic mirror pole to examine contents of nests up to five meters from the ground, and another to record data), and from one to three spotters, who moved slightly ahead to direct the counters to nests and keep multiple teams from re-sampling the same nests. A nest was deemed active if it contained eggs or young, if there was evidence of recent construction (e.g. fresh twigs or vegetation in nest) or use (e.g. a layer of fresh feces underneath a nest), or by direct observation of adults on or within one meter of a nest with the above characteristics. Whenever possible, nests were identified to species by the presence of young, eggs and clearly discernable nest structure. Nests beyond the reach of the mirror pole were examined with binoculars. If nest contents could still not be confirmed, but other evidence suggested recent activity (e.g. feces, new nest construction), nesting species was noted as 'unknown'. Old or unused nests were noted in the count as 'inactive, but not included in the final tally of active nests. Nesting vegetation (i.e., tree, shrub, or vine species) was recorded for all species whenever possible by observers skilled in plant identification.

Double-crested Cormorant surveys were conducted by direct observation within colonies (as detailed above), with the exception of Shooter's and U Thant islands, where nests were counted with binoculars from a boat no more than 20 meters away from the colony. In addition, observations of nesting activity on aids to navigation were made from distances of 10 to 20 meters.

Nest counts as well as adult estimates of Great Black-backed Gulls and Herring Gulls were conducted at all surveyed colonies in 2010. Both adult counts and nest counts are presented in this report. When adults were counted in the vicinity of selected colonies, a nest was assumed present for each adult observed, as one-half of adults are assumed to be foraging away from the nesting colony during daytime (see Litwin et al. 1993; Kerlinger 2004).

Transportation and Permits

Boat access to islands was provided by Nate McVay of the NYCDPR, Don Riepe of the American Littoral Society/Jamaica Bay Guardian, and New York City Audubon.

Permits were issued by the NYCDPR and the NPS to conduct surveys on protected islands under city and federal jurisdiction, and permission to access the privately-owned Huckleberry Island was offered by the Huckleberry Indians..

Acknowledgements

We sincerely thank all volunteers (noted by name in the island profiles), organizations and agencies who participated in the 2010 surveys.

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Results

Overview:

In 2010, nine species of long-legged wading birds were observed nesting on nine islands (Table 2). These nine species, hereafter collectively referred to as waders, included Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Yellow-crowned Night-Heron, Little Blue Heron, Green Heron, Tricolored Heron, and Cattle Egret. The three most active nesting colonies, with the greatest number of nests and diversity of nesting species, were Hoffman Island, South Brother Island, and Canarsie Pol. Islands with declining trends in recent years (i.e., Huckleberry Island and North Brother Island) continued to exhibit little to no nesting activity. Several small islands in Jamaica Bay (including Subway Island and the newly restored Elder's Point Marsh East) exhibited increases in wader nesting activity. The Arthur Kill/Kill van Kull complex (Isle of Meadows, Prall's Island, and Shooter's Island), which was the core of NY/NJ Harbor's breeding wader community from the 1970s until the late 1990s, continues to show no sign of wader nesting activity in 2010.

In comparison to the last comprehensive nesting survey conducted in 2007 (Figure 2), population increases were observed for Great Egret (+24%), Black-crowned Nigh-Heron (+6%), Glossy Ibis (+4%), and Yellow-crowned Night-Heron populations (+107%). Snowy Egret population numbers have declined slightly (-10%), and Cattle Egret, Little Blue Heron, Tricolored Heron, and Green Heron populations have persisted at relatively constant, low population numbers. Black-crowned Night-Herons remain the numerically dominant nesting species on nearly all islands colonies. Cattle Egrets and Tricolored Herons were confirmed as nesters on Canarsie Pol only. Green Herons were rarely observed, and because this species often nests in mainland habitats, the harbor-wide population of Green Herons is not well estimated by these surveys.

Data on wader nesting vegetation and nest contents for South Brother and Hoffman islands are provided in Tables 6-9. Incidental bird observations are provided in the island accounts below. It is clear that numerous neotropical migrants and breeding birds continue to use islands in the Arthur Kill and Kill Van Kull; plans for habitat restoration projects should take this into account.

Island Accounts:

Hutchinson River/Long Island Sound:

Huckleberry Island (10 acres)

26 May 2010, 9:00-11:15 AM.

By the author, David Künstler (NYCDPR), Susan Elbin (New York City Audubon), Susan Stanley (NYCDPR), Tod Winston (New York City Audubon), and John Burke (Huckleberry Indians, LLC).

The Huckleberry Island nesting survey revealed 21 Black-crowned Night-Heron adults and one active Black-crowned Night-Heron nest. Each bird was assumed to represent one nesting pair (Table 2). This is a slight increase from the last several years (not exceeding 5 nesting pairs since 2007). No other wader adults or active nests were observed in 2010, despite observations of

small numbers of Great Egrets on this island in recent years. Double-crested Cormorants (358 nests) exhibited a 38% increase from 2007. 39 Herring Gull and 28 Great Black-backed Gull adults were observed. Five adult American Oystercatchers were observed, and one young was confirmed during the survey (Figure 3). One mallard nest and 12 Canada Goose nests were observed. Other bird species observed on the island included Common Grackle, American Crow, Fish Crow, Red-winged Blackbird, American Robin, Grey Catbird, Song Sparrow, Yellow Warbler, European Starling, Brant, Willet, Spotted Sandpiper (2 individuals), and Killdeer (2 individuals).

Wader activity was concentrated on the northern peninsula of the island. The one active nest was observed in Multiflora Rose. Appropriate nesting habitat appears to be present within the central and western sections of the island as well, so observed declines may be caused by the presence of nest predators (i.e., raccoon tracks were observed on the island) and/or human activity during the breeding season. Authorized use of the island by the property owners appears to be limited (J. Burke, Huckleberry Indians, personal communication), while unauthorized visitation remains a source of human disturbance that may escape detection. Double-crested Cormorants continued to nest in the eastern section of the island, which was formerly populated by herons and egrets. Competition for nesting sites between waders and cormorants may be a factor in the observed wader declines.

Wader nesting activity on Huckleberry Island has continued to decline over the past decade and continued monitoring of this colony is imperative. New York City Audubon and NYCDPR will work closely with the Huckleberry Indians to insure necessary researcher access to this island, and to understand and address any potential factors contributing to the continued decline. Huckleberry Island has been a critical nesting site for both waders and cormorants in the New York City area. Nearby David's Island may also provide suitable nesting habitat for waders, and this island should be monitored for future nesting activity. No nesting activity was apparent in 2010.

Goose Island (1 acre)

26 May 2010, 12:30-2:15 PM.

By the author, Dave Künstler, Susan Elbin, Susan Stanley, and Tod Winston.

Goose Island supported 111 wader nests, a 29% increase from 2007. Nesting by Black-crowned Night-Heron, Great Egret, and Snowy Egret nests was confirmed. Two Great Black-backed Gull adults were observed on the island as in previous years. Nine Canada Goose nests were observed during the survey. Other bird species observed on the island included American Robin, Grey Catbird, Common Grackle, Cedar Waxwing, Red-winged Blackbird, Barn Swallow, Northern Rough-winged Swallow, Killdeer and European Starling. Künstler (2007) presented a detailed treatment of Goose Island bird populations and vegetation from 1996-2006.

Mammals have been noted on Goose Island in past seasons (Raccoon and Virginia Opossum); a lawn chair was noted on the east side of the island as in previous years, suggesting continued, unauthorized, human disturbance.

A 'HeronCam' was placed on the island in 2007 in a joint project between New York City Audubon and NYCDPR. The HeronCam is available for public viewing via New York City Audubon's Harbor Herons website (Figure 4).

East River:

North Brother Island (19 acres)

24 May 2010, 10:00-10:45 AM.

By the author, Michael Feller (NYCDPR), Alexander Summers (NYCDPR), and Bey Devletian (New York City Audubon)

No active Black-crowned Night-Heron nests were located on the island. Gull nesting appeared to be reduced from previous years, and likely occurred on the roofs of various hospital buildings on the island, although this was not confirmed during the survey. Six Great Black-backed Gull and 25 Herring Gull adults were observed. No gull or waterfowl nests were observed during the survey as in previous years. Waterfowl observed and possibly nesting on the island included four Mallards, one American Black Ducks, and two Canada Geese. A Mute Swan was observed on the North West shore of the island, although no nesting activity was observed. Other species encountered included Song Sparrow, Mourning Dove, Northern Cardinal, Northern Flicker, Common Grackle, Grey Catbird, Yellow Warbler, Barn Swallow, Fish Crow, American Crow, Killdeer, and European Starling.

No evidence of Great-horned Owl activity was observed during the survey, however owls were observed on adjacent South Brother Island in 2010 (see South Brother Island account below), and owl activity may be one factor in the continued absence of wader nesting activity on North Brother Island. Evidence of human disturbance was also evident this year, including numerous online reports of unpermitted visits to the island by the public.

A major habitat restoration project was undertaken by NYCDPR in winter and early spring of 2005 and 2006, which involved the removal of mature stands of Norway Maples, planting of native tree and shrub species favored by nesting wading birds, and the eradication of a kudzu population present on the island. Tim Wenskus (NYCDPR) reported on restoration activities on North Brother Island in 2009 and 2010. In 2009 NYCDPR conducted inspections of the two original plantings, and follow-up treatments were applied to both plantings. The planting by Riverside Hospital performed well in 2009 but was weedy. Adjacent invasive vines were not treated as part of the original clearing and planting, which allowed them to seed into the planting. Approximately half of the planting was weeded thoroughly for vines, ailanthus and mulberry. Completion of this weeding is all that will be required in 2011. The second planting, by the former church, did not perform as well. Mortality of the planted stock was above what NYCDPR anticipated, and vines from adjacent areas had colonized the site. Upon completion of a course of vine removal, it became apparent that additional planting would be needed at this site to meet the goals of the project. In addition, the area surrounding the former church succumbed almost completely to invasive vines, and no longer provided suitable nesting habitat in 2009. In conjunction with the reinstallation of the original plantings, this site should also be planted with an appropriate mix of trees and shrubs. Vine removal occurred in 2009 as well, primarily in the

north half of the island. Treatment of the kudzu infestation surrounding the coal dock continued at a lower intensity than in 2008. All existing plantings were thoroughly weeded in fall 2009 and spring 2010, and there may be additional weedings in fall 2010.

South Brother Island (12 acres)

21 May 2010 from 10:30AM - 1:45PM

By the author, Susan Elbin, Michael Feller, Tod Winston, and Edward Owens (USDA)

A total of 456 nests of five wader species (Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, and Yellow-crowned Night-Heron; see Table 2) was noted throughout the island. This represents only a very slight decrease (-1%) from 2007. This colony was the second largest wader colony in the NY Harbor in the 2010 breeding season. Double-crested Cormorants (264 nests) exhibited a 3% decrease in nest numbers from 2007, and primarily occupied the center and northeastern areas of the colony. Based on adults present, an estimated 14 Herring Gull pairs and 82 Great Black-backed Gull pairs nested on the Island.

Waders nested in 12 species of trees and shrubs on South Brother, as well as tree/shrub/vine arrangements (Table 6). Black-crowned Night-Herons nested predominantly in Box Elder, Black Cherry, and Mullberry species, often in the presence of Oriental Bittersweet vines. Snowy Egrets nested most often in tangles of Oriental Bittersweet and Multiflora Rose than any other tree or shrub, although nests were found in species including Box Elder, Black Cherry, and Hackberry. Great Egrets (Figure 5) nested mainly in vine-encumbered trees (most often Oriental Bittersweet and Wild Grape) generally using the vines as a platform on which to construct nests. Nesting habitat for cormorants on South Brother Island included a stand of locust trees in the center of the colony, where the majority of nests were located, as well as Mulberry species, Black Cherry, and other tree species covered with Oriental Bittersweet. Cormorants therefore exhibit nest-site preferences in common with wader species, and may compete with waders for these nest-sites in some instances. Nest content data were collected on South Brother Island (Table 7).

Other bird species observed included Great Horned Owl (one fledgling), Fish Crow, Grey Catbird, Song Sparrow, Mallard and three American Oystercatcher adults.

The purchase of South Brother Island was coordinated in 2007 by Trust for Public Land, Wildlife Conservation Society, The Point Community Development Corporation, and Congressman Serrano (16th Congressional District, Bronx, NY). The island was officially transferred to NYC DPR in November 2007. New York City Audubon will continue to advocate for maintaining the island as a refuge for nesting colonial waterbirds.

A potential concern is that one of the prevalent tree species used by nesting waders, Box Elder, is also a host tree preferred by Asian Longhorned Beetles (ALBs). If ALBs were detected on South Brother, the current management plan calls for the complete removal of all potential ALB host trees within the area. This could have a devastating effect on the persistence of the colony; it is important to establish preventative measures to reduce the chance of this occurring (i.e., early detection surveys, training of Harbor Herons volunteer teams, chemical treatment) with USDA-APHIS and other organizations within the ALB Cooperative Eradication Team.

Mill Rock (3 acres)

24 May 2010, 11:15AM - 12:30PM

By the author and Bey Devletian.

112 wader nests were observed on Mill Rock Island, a 160% increase from 2007. Four species of waders (Black-crowned Night-Heron, Great Egret, Snowy Egret, and Yellow-crowned Night-Heron) were observed nesting on this Island. 17 Herring Gull and 9 Great Black-backed Gull nests were confirmed, along with 50 Herring Gull and 15 Great Black-backed Gull adults. One Mallard nest and 13 Canada Goose nests were confirmed.

Other bird species observed on the island included Fish Crow, Barn Swallow, and Gadwall.

U Thant (1/4 acre)

24 May 2010, 12:45-12:50 PM

By the author and Bey Devletian.

U Thant was surveyed from a boat with binoculars, approximately 10 meters from shore. Thirty-one Double-crested Cormorant nests were observed on the island both on the metal arch sculpture and in trees, approximately the same number observed annually on this island since the colony established in 2008. Based on adults present, an estimated 22 pairs of Great Black-backed Gulls and 7 pairs of Herring Gulls nested on the island.

Staten Island – Arthur Kill and Kill Van Kull

Isle of Meadows (101 acres)

25 May 2010, 9:10-10:30 AM

By the author, Nate McVay (NYCDPR), Alexander Summers, Michael Feller, and Andrew Turk (New York City Audubon)

No nesting waders, cormorants, or gulls were observed, nor were there any nests that looked recently active at the time of the survey.

White-tailed Deer trails were observed on Isle of Meadows. Populations of White-tailed Deer have been noted on Staten Island for many years, but breeding activity on islands in the Arthur Kill is likely a more recent development. Raccoon tracks were also observed along the shore of the island. Additional bird species observed included American Robin, House Wren, Tree Swallow, Song Sparrow, Common Yellowthroat, American Redstart, Yellow Warbler, Canada Warbler, Grey Catbird, Eastern Towhee, Willow Flycatcher, Brown-headed Cowbird, American Woodcock, Barn Swallow, Downy Woodpecker, Great Black-backed Gull, Wild Turkey, American Crow, and Red-tailed Hawk.

Based on the forest communities present on the island (gray birch and maple) and its proximity to an area known to support ALBs, the island is at risk for possible ALB infestation. The island should be carefully monitored in future years.

Prall's Island (88 acres)

25 May 2010, 11:00AM - 12:20PM

By the author, Nate McVay, Alexander Summers, Michael Feller, and Andrew Turk

Prall's Island, the site of the most recent Black-crowned and Yellow-crowned Night-Heron nesting attempts off western Staten Island, has continued to be inactive since 2005. Efforts to control an ALB infestation on the island in March-April 2007 resulted in the removal of most suitable nesting trees (approximately 3,000 trees in total). Several invasive woody plant species, including Glossy Buckthorn (*Frangula alnus*) and Callery Pear (*Pyrus calleryana*), have colonized many of the cleared areas on Prall's Island; a long-term restoration strategy is warranted in the interest of restoring native plant communities to the island.

Continued use of the island by White-tailed Deer was apparent. Raccoon tracks were also observed on this island. Confirmed nests on the island included one Wild Turkey nest (with 22 eggs; Figure 6), and one American Black Duck nest (with nine eggs). Additional bird species observed on or flying over the island included Grey Catbird, Yellow Warbler, House Wren, American Goldfinch, Northern Cardinal, American Robin, Song Sparrow, Brown Thrasher, Northern Mockingbird, Boat-tailed Grackle, Common Grackle, Common Yellowthroat, Mourning Dove, Red-winged Blackbird, Cedar Waxwing, Tree Swallow, Willow Flycatcher, Warbling Vireo, Fish Crow, European Starling, Northern Harrier (male and female), American woodcock, Herring Gull, Osprey, Mallard, and Canada Goose.

Shooter's Island (48 acres)

25 May 2010, 12:45-1:30 PM

By the author, Nate McVay, Alexander Summers, Michael Feller, and Andrew Turk

No waders were observed on, or in the vicinity of, Shooter's Island, which appears to have habitat suitable for waders. There continues to be no sign of recent human activity at the former encampment near the south side of Shooter's Island. Common terns and Laughing Gulls were observed in the island's vicinity.

The Double-crested Cormorant colony situated on dry docks and other wreckage west of Shooter's Island (Figure 7) decreased to 35 nests from the 41 active nests observed in 2007. Additional species observed on or flying over the island included Song Sparrow, Yellow Warbler, Barn Swallow, Tree Swallow, Grey Catbird, House Wren, American Robin, Northern Cardinal, Cedar Waxwing, Eastern Towhee, Turkey Vulture, Fish Crow, Herring Gull, and Canada Goose.

Hoffman Island (10 acres)

20 May 2010, 10:00AM - 3:30PM

By the author, Susan Elbin, Nate McVay, Colin Grubel (CUNY Queens), Tod Winston, and Mark Hauber (Hunter College).

Hoffman Island had the largest number of wader nests in the NY Harbor in 2010 as in the previous year. There were 624 nests of six wader species observed, including Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Yellow-crowned Night-Heron, and Little

Blue Heron. Vegetation containing wader nests included Black Cherry, Mulberry species, Multiflora Rose, Privet, Box Elder, Hackberry, and large masses of Oriental Bittersweet; waders also nested in various tree/bittersweet and tree/rose arrangements (Table 8). Wader nest content data were collected on Hoffman Island (Table 9).

There were 216 Double-crested Cormorant nests observed on Hoffman Island in 2010; a 39% decrease from the full survey in 2007. Cormorant nests on Hoffman Island were located approximately 10 to 20 meters up in Black Locust trees, locations that, for the most part, have not been used previously as nesting trees by waders. From 2003 to 2006, Double-crested Cormorant nesting expanded across the southern end of the island, into areas formerly used by waders. In 2008, the first nests were noted on the north side of the island. Cormorant nests were in close proximity to wader nests in some locations, and wader nests appeared to be more concentrated in the center of Hoffman Island than in previous years. Cormorants maintained the same general nesting locations in 2010.

Both adults and nests of Herring and Great Black-backed gulls were counted during the survey. Sixty-seven adults and 36 nests of Herring Gulls were observed. 146 adults and 101 nests of Great Black-backed Gulls were observed. Twelve Canada Goose nests and one Mallard nest were observed. Additional species observed included American Robin, Northern Parula, Common Yellowthroat, Common Grackle, Grey Catbird, Song Sparrow, Red-winged Blackbird, and Fish Crow.

Swinburne Island (4 acres)
19 May 2010, 1:30-3:40 PM

By the author, Susan Elbin, and Beth DeCelles (NPS volunteer).

A total of 320 cormorant nests was observed, a 21% increase from 2007. Nests were located on the remains of buildings, and in several Hackberry, Black Locust, and Mulberry trees. One Black-crowned Night-Heron was observed on the island in June and July.

Both adults and nests of Herring and Great Black-backed gulls were counted during the survey. 75 adults and 117 nests of Herring Gulls were observed. Sixty-two adults and 33 nests of Great Black-backed Gulls were observed. Additional species observed included Fish Crow, Spotted Sandpiper, and Red-winged Blackbird.

Jamaica Bay

Elder's Point Marsh (21 acres)
27 May 2010, 11:00-11:10 AM

By the author and Saleen Tennis (USDA)

Elder's Point Marsh East was recently restored as part of a marsh restoration project undertaken in Jamaica Bay by the U.S. Army Corps of Engineers (USACE). 2010 was the first year since the commencement of restoration activities in which colonial waterbirds had the opportunity to nest on Elder's Point Marsh East. A total of 21 wader nests were observed on this island from three wader species, including Black-crowned Night-Herons, Great Egrets and Snowy Egrets. In addition, four Double-crested cormorant nests and four American Oystercatcher nests (Figure 9)

were observed on the island. 60 adults and 49 nests of Herring Gulls were observed. Two Great Black-backed Gull nests were also observed.

Other bird species observed on this island included Atlantic Brant, Laughing Gull, Willet, and Sanderling.

Elder's Point Marsh West is currently under construction for a marsh restoration program through USACE. In December 2009 all of the vegetation and trees were removed from the island, and sand was deposited on the island as substrate for the future marsh. Colonial waterbird nesting activity was therefore discontinued on this island while. Waders are unlikely to re-colonize this island due to the removal of potential nesting habitat. The restored marsh will hopefully provide productive foraging habitat for waders in the future. This island should be monitored for other colonial waterbird activity once restoration activities have been completed. Restoration is scheduled for completion in February or March 2010. USACE completed initial construction of a similar marsh island restoration project at Elders Point East in 2006-2007, which used dredged material from Rockaway Inlet. Projects aimed at restoring salt marsh acreage within the Bay are certainly justified by the substantial marsh island losses observed in recent decades. As anticipated, we believe the removal of nesting habitat for cormorants and waders on Elder's Point Marsh West has encouraged these birds to move to nearby nesting colony on Elder's Point Marsh East, Subway Island, and Canarsie Pol. Colonization of Canarsie Pol by cormorants (as occurred in 2010) was an undesirable outcome of USACE activities, as nesting cormorants have the potential to threaten the valuable and diverse wader colony currently thriving on Canarsie Pol. New York City Audubon will continue to carefully monitor cormorant nesting activity in Jamaica Bay.

Subway Island (40 acres)

27 May 2009, 11:30AM - 12:15PM

By the author, Don Riepe (American Littoral Society), Saleen Tennis, Charlie Clarkson (University of Virginia), Beth DeCelles, Emilio Tobon (New York City Audubon), and Dandelion Dilluvio (American Littoral Society).

This year was the first in the history of these nesting surveys in which a large group of waders was found nesting on Subway Island. A total of 142 wader nests were observed, representing five species of waders including Black-crowned Night-Herons, Great Egrets, Snowy Egrets, Glossy Ibis, Yellow-crowned Night-Heron, and Green Heron. In addition, 245 Herring Gull adults and 69 Herring Gull nests were observed, as well as 13 Great Black-backed Gull adults and 1 Great Black-backed Gull nest. Eighteen American Oystercatchers were observed on the island, including one color banded individual. Other species present included 20 Double-crested Cormorants, approximately 70 Brant, Ruddy Turnstone, Spotted Sandpiper, and Willet.

This unprecedented influx of birds on Subway Island coincided with USACE restoration activities and the colonization of adjacent Canarsie Pol by cormorants.

Canarsie Pol (220 acres)

27 May 2010, 8:30-10:45 AM

By the author, Don Riepe, Saleen Tennis, Charlie Clarkson, Beth DeCelles, Emilio Tobon, and Dandelion Dilluvio.

Due to the impenetrable vegetation in which the majority of waders nest on Canarsie Pol, the nesting population on this island was estimated again this year by a combination of ground counts taken at centers of nesting activity across the island. Based on adult waders encountered during this ground survey, there were an estimated 497 total wader nesting pairs on Canarsie Pol this year, consisting of eight species including Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Little Blue Heron, Yellow-crowned Night-Heron, Tricolored Heron, and Cattle Egret. This was the only island in 2010 on which Tricolored Heron and Cattle Egret nests were observed. Seven hundred and twenty adults and 236 nests of Herring Gulls were observed, in addition to 49 adults and seven nests of Great Black-backed Gulls. Gulls nested in several large open areas throughout Canarsie Pol. Forty-nine American Oystercatcher were observed on the island.

As a predicted result of habitat loss on Elder's Point Marsh West (with 83 cormorant nests present in 2009), Double-crested Cormorants were observed nesting on the northwestern shore of Canarsie Pol. 144 cormorant nests were observed, primarily nesting in Tree of Heaven.

Other bird species observed included Common Yellowthroat, Yellow Warbler, Song Sparrow, Red-winged Blackbird, American Crow, Fish Crow, Common Grackle, Boat-tailed Grackle, Common Tern, Sanderling, Ruddy Turnstone, Mallard, Atlantic Brant, and Osprey.

Other Jamaica Bay islands

May-June 2010

By representatives of NPS, USDA, and NYNJPA.

No heron nesting activity was observed on other Jamaica Bay islands and marshes including Little Egg Marsh, Broad Creek Marsh, Duck Point Marsh, Ruffle Bar, Yellow Bar, Joco Marsh, East High Meadow, Silver Hole Marsh, Big Egg Marsh, Rulers Bar Hassock, Blank Bank Marsh, South Marsh, Goose Pond Marsh, Pumpkin Patch Marsh, Stony Creek Marsh, and Black Wall Marsh (surveyed by NPS, USDA, and NYNJPA). These islands were surveyed as part of a multi-agency effort to estimate gull populations in Jamaica Bay in 2010. The data collected by this effort are presented in Table 5.

Mainland Accounts:

The New York City Audubon's Harbor Herons Project has traditionally reported nesting activity on island colonies only. Two species of waders are known to nest in mainland areas: Yellow-crowned Night-Heron and Green Heron.

The nesting colony of Yellow-crowned Night-Herons located at the Redfern Houses in Far Rockaway was visited on 18 May 2010 (10:00-10:30AM) by the author, Bey Devletian, Saleen

Tennis, and Dandelion Dilluvio. A total of 65 nests was observed (Table 2) constituting a 150% increase from the number observed in 2007. This is the seventh year the colony has been confirmed and is the largest aggregation of Yellow-crowned Night-Herons in New York City. Unfortunately, despite the large number of nests, very few attentive adults were present on the colony during the survey period. Several residents of the Redfern Houses approached the survey crew to share their observation of recent nest predation by hawks. It is unclear how many of the 65 nests present during the survey were successful in fledging young during the 2010 season.

Several smaller incidences of Yellow-crowned Night-Heron nesting have been reported on Staten Island and several sites in Nassau County in recent years.

Hugh Carola (program director, Hackensack Riverkeeper) has presented information on Yellow-crowned Night-Heron nesting activity in the Meadowlands and northern New Jersey at Harbor Estuary Program Harbor Herons Subcommittee meetings. Known nesting sites for this species include: Laurel Hill County Park, Schmidt's Woods Park and Harmon Cove in Secaucus, nests in the vicinity of Waldwick and Allendale in central Bergen County, and in a suburban neighborhood in Roselle, NJ. In 2010 the Schmidt's Woods Park site had two Yellow-crowned Night-Heron nests, cumulatively producing six fledgeling young (two and four young respectively per nest). The Harmon Cove site had five Yellow-crowned Night-Heron nests, cumulatively producing 12 fledgling young (two, three, three, and four young respectively per nest, in addition to one failed nest). One fledgeling mortality (hit by car) was also confirmed at this site.

Aids to Navigation:

Thirty-nine nesting pairs of Double-crested Cormorants were observed by the author, Susan Elbin, Greg Elbin (New York City Audubon), and Anna Hermes (Rutgers University) on aids to navigation in the Kill Van Kull, Arthur Kill and northwestern Raritan Bay on 30 July 2010 (Figure 10). Cormorants nested on five markers: nine nests on marker 1, six nest on marker 14, 15 nests on marker 52, seven nests on an unlabeled channel marker, and two nests on marker 2 (observed on 25 May during survey of the official Arthur Kill and Kill van Kull). Observations were made at a distance of 10-20 meters from channel markers.

Species Accounts:

The following species accounts offer general observations and trends summarized in Table 2. Trends discussed in the text refer to 2007/2010 population comparisons based on observations at colonies surveyed during these two comprehensive survey years.

Black-crowned Night-Heron: Black-crowned Night-Herons were observed on nine colonies in 2010 and were the numerically dominant species in larger, mixed-species colonies such as Hoffman and South Brother Islands. This species no longer nests on North Brother Island, a wader nesting colony active since the mid-1980s; the reason for this decline is unclear. Observed nesting activity increased by approximately 6% harbor-wide.

Yellow-crowned Night-Heron: Increases in population size occurred at both island and mainland colony sites for this species. The mainland nesting colony at Redfern Houses has increased 150% since 2007. The total population size has more than doubled since 2007.

Great Egret: Great Egrets were observed on seven islands in NY/NJ Harbor. This species exhibited growth at each of the three largest breeding colonies: Hoffman Island, South Brother Island, and Canarsie Pol. Observed nesting activity increased by 24% harbor-wide.

Snowy Egret: Snowy Egrets nested on seven islands in NY/NJ Harbor. While an overall decrease of approximately 10% was observed harbor-wide, this decline was limited to the Hoffman and South Brother island colonies; all other colony sites exhibited local increases in nesting activity.

Little Blue Heron: Little Blue Herons were observed on two islands in 2010. This species approaches the northern extent of its range in the NY/NJ Harbor area, and it maintains a consistent, low-level presence in the NY/NJ Harbor breeding community. The observed nesting activity for this species was comparable in 2007 and 2010 (14 and 13 nests respectively).

Tricolored Heron: Tricolored Heron adults were observed only on Canarsie Pol. This is a species more typical of southern colonies, and no increasing trends in NY Harbor have been observed. The first record of Tricolored Herons nesting in NY/NJ Harbor occurred in 1955 on Ruler's Bar Hassock in Jamaica Bay, and nesting for this species has also been observed in colonies in Long Island's Great South Bay (McGowan and Corwin 2008).

Cattle Egret: Cattle Egrets were observed during partial surveys of Canarsie Pol. No nesting was observed on South Brother Island, the only other site where nesting had been confirmed in recent years. Overall, the population has declined from a high of 266 nests on two islands (Prall's and Shooter's islands) in 1985 to two and three nests on Canarsie Pol in 2007 and 2010 respectively.

Green Heron: One Green Heron nest was observed on Subway Island. This species often nests in mainland habitats, and it is therefore not well represented by the Harbor Herons Project. It is likely that, as in other parts of its range, this species may be declining due to habitat development. An effort to assess the population in NY/NJ Harbor would be a worthwhile endeavor.

Glossy Ibis: An increase in Glossy Ibis nesting activity was noted in Jamaica Bay (Subway Island), accounting for the 7% increase in population size despite declines on major colony sites including Hoffman Island and Canarsie Pol (-8% and -23% respectively).

Double-crested Cormorant: A total of 1,372 Double-crested Cormorant nests was observed on eight islands (Huckleberry, South Brother, U Thant, Hoffman, Swinburne, and Shooter's islands, Elder's Point Marsh East, and Canarsie Pol; Tables 2 & 3). An additional 39 nests were observed on aids to navigation in Raritan Bay and western Staten Island. Increases from 2007 population numbers were observed at most colony sites including Hoffman Island (+39%), Swinburne Island (+21%), U Thant (+29%) and Huckleberry Island (+38%). Slight declines were observed at several large colonies including South Brother Island (-3%) and Shooter's Island (-15%). We observed a 31% increase in cormorant nests harbor-wide. Cormorants

colonized two new island habitats in Jamaica Bay in 2010 (Elder's Point Marsh East and Canarsie Pol), and these colonies must continue to be carefully monitored to determine the potential impact of cormorant nesting activity on wader nesting populations within the Jamaica Bay Wildlife Refuge. An analysis of Double-crested Cormorant population trends in NY/NJ Harbor is pending.

Herring and Great Black-backed gulls: This year, a comprehensive survey of both Herring and Great Black-backed gulls was conducted, including counts of nests and adults of each species on all surveyed islands (Figure 11). In collaboration with NPS and USDA, a comprehensive survey of gull nesting activity throughout Jamaica Bay was also conducted, including islands not surveyed under the Harbor Herons nesting surveys. Estimates for the number of gull nests for selected colonies are presented in Tables 2 & 4. Laughing Gull surveys are conducted annually in Jamaica Bay, though they have are not included in the Harbor Herons Project report. More information on these survey may be obtained from Laura Francoeur of the Port Authority of New York and New Jersey and Don Riepe of the American Littoral Society/Jamaica Bay Guardian.

Conclusions and Recommendations

Continued monitoring of wader populations through nesting surveys and banding is a necessary step to comprehend species status, population trends, and overall health and persistence of the system.

At least three areas of the Harbor Herons Project survey protocol need further improvement.

1. A repeatable method to survey islands with dense vegetation is required. This somewhat intractable problem is faced by many researchers that survey islands heavily colonized by invasive species, and further efforts to design a reasonable survey technique will be explored. Implementing a grid system on larger islands with dense undergrowth would improve the quality of systematic surveys. This could be accomplished by blazing or tagging select trees along gridlines throughout the island. This system would improve the qualitative and quantitative data collected in these surveys by allowing surveyors to more accurately describe changes in the nesting community and vegetation of a specific colony segment from one year to the next. This would add a valuable spatial component to the dataset.
2. A method of quantifying productivity is necessary and should be implemented. Although some productivity data were collected (i.e., nest counts and contents), the most effective technique would likely be to mark and monitor a subset of nests within selected colonies over the breeding season; both the method and funding necessary to carry out productivity studies will be explored for the 2010 nesting survey.
3. An improved habitat assessment protocol should be developed, including a rapid assessment technique, collaborating with additional botanists during breeding season vegetation surveys and conducting a non-breeding season vegetation survey.

Several major conservation challenges have been observed in recent years. The discovery of ALBs on Prall's Island in 2007 and subsequent tree removal eliminated valuable nesting habitat for colonial waterbirds. Further, observations in the 2008 season confirmed that Prall's Island is being heavily colonized by invasive woody plant species (i.e., Glossy Buckthorn, Callery Pear).

Future habitat restoration at Prall's will need to take the vigorous growth of invasive species into account. Further, management of ALBs detected on island colonies may cause a similar degradation in native plant communities, which could have detrimental effects on biodiversity, as well as suitable habitat for birds and other wildlife. Tree removal and treatment is the standard ALB management approach, where all potential ALB host trees are cut within a 0.5 mile area surrounding infested trees. A clear conservation concern of this management protocol is the potential for loss of colonial waterbird nesting habitat in NY Harbor. Waders require trees for nest-building and nest material; unfortunately, the list of preferred nesting trees overlaps widely with preferred ALB host trees (USDA-APHIS 2005). For instance, gray birch has been an important tree species for nesting waders on Prall's Island and other colonies, and their removal greatly reduces the chance that waders will nest there in the near future. If ALBs are discovered on other nesting islands, the present management strategy could have serious impacts on wader breeding populations in NY Harbor.

Various organizations, including the NY/NJ Harbor Estuary Program's Harbor Herons Subcommittee, are working closely with the management team to develop workable plans for habitat restoration and preventative management strategies to reduce impacts on nesting waders at island-colonies where ALB has not been identified. In February 2008, Joan Mahoney and Ed Bressel of the NYS Department of Agriculture and Markets provided training on recognizing ALB presence (i.e., oviposition sites, exit holes) at the National Park Service's Fort Wadsworth. Several Harbor Herons Project volunteers and field workers from several governmental agencies were in attendance.

Another conservation issue is the presence of mammalian predators, particularly raccoons, on current and former nesting islands. Mammalian predators can have severe impacts on nesting colonial waterbird populations, and evidence of predation on waders and gulls has been observed on Ruffle Bar, Goose Island, South Brother Island and others. Efforts to quantify mammalian presence throughout the year should be conducted on all nesting islands, and methods to control the impacts on colonial waterbirds should be considered for island colonies found to support mammalian predators. For instance, raccoons present on active and potential nesting islands could be live-trapped and released in appropriate mainland habitats early in the spring before nesting activity commences.

Human disturbance on island colonies is difficult to manage in a highly urban setting. As mentioned in Bernick (2007), articles and websites that document unauthorized visitation of colonial waterbird nesting island have appeared in recent years. While an increase in waterfront activities by the public is a positive sign of a growing interest in the urban environment, any unauthorized visitation of nesting colonies requires attention and thoughtful solutions.

The first step to addressing unauthorized visitation of islands is through clear signage. Additional signs must be posted on city-owned and federally-owned islands, clearly stating the restricted status of the islands and the protected status of colonial waterbirds. In addition to signage, managing agencies and stakeholders should establish a dialogue with law enforcement entities that patrol NY Harbor waters (US Park Police, New York City Police Department's Harbor Unit, and the US Coast Guard) and inform them of the security and safety threats that this type of activity poses, in addition to the ecological impacts.

Any communication concerning press coverage of NY/NJ Harbor islands should stress that these issues be thoughtfully considered and incorporated in the press coverage. This would reinforce to the public that these islands are unique, lively places that often support large bird populations, and that these birds are sensitive to human disturbance.

Not only does the conservation community need to effectively, publicly express the conservation issues that unauthorized visitation to nesting islands can create for bird populations; we also need to offer programs for the public to learn about, appreciate and participate in the study of these interesting islands and their birds. New York City Audubon currently runs eco-tours that offer views and narratives on islands and nesting wildlife. Additional collaborations with ACTION, Rocking the Boat and other community organizations will create opportunities for community and educational outreach through participate in observational wader studies and other conservation projects. Additionally, direct contact with individuals or organizations that have made unauthorized visits to nesting colonies may often be productive and easily remedied, without resorting to regulatory enforcement.

The Harbor Herons Conservation Plan was published in 2010 (Elbin and Tsipoura, Eds. 2010). Efforts need to be made to prioritize and implement recommended actions outlined in this plan. In particular, emphasis needs to be placed on the protection of important foraging areas in addition to nesting habitats.

The New York City Audubon Harbor Herons Project Nesting Surveys are complemented by a suite of research programs (outlined in Appendix A), many of which include banding initiatives of multiple species at nesting islands throughout the NY Harbor. In recent years, color bands have been affixed to young of the year Double-crested Cormorants (Figure 8), Herring Gulls, Great Black-backed Gulls, Great Egrets, Glossy Ibis, and Black-crowned Night-Herons. Color band sightings of any of these species should be communicated to the author or to New York City Audubon (bands@nycaudubon.org) giving leg band code, color, location, date, and name of observed. All band sightings should be reported to the Bird Banding Laboratory.

Additional recommendations and goals for 2010-2011 are as follows:

- Analyze and summarize data from the New York City Audubon Harbor Heron Surveys (1986-2009) as presented by Andrew Bernick at the 2009 American Ornithologist's Union Annual Meeting in Philadelphia, PA and by the author at the 2009 Colonial Waterbird's Meeting in Cape May, NJ; a summary report will be produced from these data.
- Continue dialogue with all agencies responsible for colonial waterbird surveys in New York, New Jersey, and Connecticut, in order to establish a working regional perspective on colonial wader and cormorant populations. Coordinating standardized methods to allow for regional comparisons and data analysis will be critical to the success of this effort.

- A report on Double-crested Cormorant population trends in the NY/NJ Harbor area (1986-2010) is pending from New York City Audubon.
- For privately-owned Huckleberry Island, continued communication and collaboration with the current owners should be pursued by parties interested in the persistence of wader and cormorant populations.
- Encourage the development of wader and cormorant research projects at NY/NJ universities, at high school, undergraduate, and graduate levels.
- Establish a list of research conducted each season on the Harbor Herons or their nesting colonies (see Appendix A).
- Examine relationships between or among metropolitan NY/NJ area colonies with southern New Jersey, Long Island, and Connecticut, including gene flow, post-fledging dispersal, and natal philopatry.
- Design a photographic guide of nests, eggs, and young to aid volunteers in identification during nesting surveys. A reference guide to identify nest trees, shrubs, and vines should also be developed. Guides should be available in PDF format for all volunteers.

New York City Audubon's Harbor Herons Project has included several additional programs in recent years (i.e. Harbor Herons Monitoring Program and Eco-tours) that allow for greater public participation and awareness of the 'Harbor Herons', and have strengthened New York City Audubon's role as an advocate for conserving NY/NJ Harbor's wader populations. New and vital collaborations between New York City Audubon and other organizations (i.e. NJ Audubon) have formed, and the open forum of NY/NJ Harbor Estuary Program's Harbor Herons Subcommittee has brought organizations and agencies from New York, New Jersey, and Connecticut to discuss issues of regional importance.

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TABLES, FIGURES, AND APPENDICES

Table 1. Survey schedule for wader, cormorant and gull counts, May-July 2009

| Location Surveyed | Date(s) | # of Observers | Ownership |
|-------------------------------------------|---------|----------------|---------------------------|
| <u>Long Island Sound</u> | | | |
| Goose Island | 26 May | 5 | NYC DPR |
| Huckleberry Island | 26 May | 5 | Huckleberry Indians, Inc. |
| <u>Easter River</u> | | | |
| North Brother Island | 24 May | 4 | NYC DPR |
| South Brother Island | 21 May | 6 | NYC DPR |
| Mill Rock | 24 May | 2 | NYC DPR |
| U Thant | 24 May | 2 | NYC DPR |
| <u>Arthur Kill-Kill Van Kull</u> | | | |
| Shooter's Island | 25 May | 5 | NYC DPR |
| Prall's Island | 25 May | 5 | NYC DPR |
| Isle of Meadows | 25 May | 5 | NYC DPR |
| <u>Lower New York Harbor</u> | | | |
| Swinburne Island | 19 May | 3 | NPS |
| Hoffman Island | 20 May | 6 | NPS |
| <u>Jamaica Bay*</u> | | | |
| Elders Point Marsh | 27 May | 2 | NPS |
| Canarsie Pol | 27 May | 7 | NPS |
| Subway Island | 27 May | 4 | NPS |
| <u>Mainland – Far Rockaway</u> | | | |
| Redfern Houses | 18 May | 4 | NYC Housing Authority |
| <u>Aids to Navigation</u> | | | |
| Raritan Bay / Arthur Kill / Kill Van Kull | 30 July | 4 | US Coast Guard |

*Sixteen additional islands and marshes were surveyed in Jamaica Bay as a collaborative effort between New York City Audubon, the National Parks Service, the U.S. Department of Agriculture, and the New York/New Jersey Port Authority in May and June of 2010 (see table 5 for details).

Table 2. Wader, cormorant, and gull nesting activity on selected islands in NY/NJ Harbor and surrounding waterways, 2010 Species include Black-crowned Night-Heron (BCNH), Great Egret (GREG), Snowy Egret (SNEG), Glossy Ibis (GLIB), Little Blue Heron (LBHE), Yellow-crowned Night-Heron (YCNH), Green Heron (GRHE), Tricolored Heron (TRHE), Cattle Egret (CAEG), Double-crested Cormorant (DCCO), Herring Gull (HERG), Great Black-backed Gull (GBBG), Canada Goose (CANG), Mallard (MALL), American Black Duck (ABDU), Gadwall (GADW), and Mute Swan (MUSW).

| | Hoffman Island | South Brother Island | Canarsie Pol* | Mill Rock | Goose Island | Huckleberry Island | Elders Point Marsh East | Subway Island | Swinburne Island | North Brother Island | U Thant Island | Shooters Island | Pralls Island | Isle of Meadows | Red Fern | Total (nesting pairs) |
|---------------------------------|-----------------------|----------------------|-----------------------|---------------------|--------------|--------------------|-------------------------|----------------------|----------------------|----------------------|----------------|-----------------|---------------|-----------------|----------|-------------------------|
| Survey Date | 20-May | 21-May | 27-May | 24-May | 26-May | 26-May | 27-May | 27-May | 19-May | 24-May | 24-May | 25-May | 25-May | 25-May | 18-May | |
| Waders | | | | | | | | | | | | | | | | |
| BCNH | 305 | 230 | 185 | 75 | 28 | 21 | 2 | 37 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 884 |
| GREG | 167 | 132 | 112 | 19 | 50 | 0 | 5 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 498 |
| SNEG | 65 | 74 | 53 | 15 | 33 | 0 | 11 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 276 |
| GLIB | 80 | 6 | 129 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 275 |
| LBHE | 1 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| YCNH | 3 | 6 | 2 | 3 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 85 |
| GRHE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TRHE | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| CAEG | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Unidentified | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Inactive | 3 | 6 | | 0 | 1 | 1 | 0 | | 0 | 3? | 0 | 0 | 0 | 0 | ? | 11 |
| Total Active Wader Nests | 624 | 456 | 497 | 112 | 111 | 21 | 18 | 142 | 1 | 0 | 0 | 0 | 0 | 0 | 65 | 2,047 |
| Cormorants | | | | | | | | | | | | | | | | |
| DCCO | 216 | 264 | 144 | 0 | 0 | 358 | 4 | 0 | 320 | 0 | 31 | 35 | 0 | 0 | 0 | 1,372 |
| Gulls | | | | | | | | | | | | | | | | |
| HERG | 36 nests, 67 adults | 14 adults | 126 nests, 730 adults | 17 nests, 60 adults | 0 | 2 nests, 39 adults | 49 nests, 60 adults | 69 nests, 245 adults | 117 nests, 75 adults | 25 adults | 7 adults | 0 | 0 | 0 | 0 | 416 nests, 1,322 adults |
| GBBG | 101 nests, 146 adults | 9 nests, 82 adults | 7 nests, 49 adults | 9 nests, 15 adults | 2 adults | 4 nests, 28 adults | 2 nests | 1 nest, 13 adults | 33 nests, 62 adults | 6 adults | 22 adults | 0 | 0 | 0 | 0 | 166 nests, 425 adults |
| Waterfowl | | | | | | | | | | | | | | | | |
| CANG | 10 | 5 | 12 | 13 | 9 | 36 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 87 |
| MALL | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 9 |
| ABDU | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| GADW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| MUSW | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

† - Visit occurred outside of the count period for NYSDEC's Long Island Colonial Waterbird and Piping Plover Survey (LICW). Islands were not systematically surveyed for colonial waterbirds.

†† - Visit occurred outside of the LICW count period, though area was systematically surveyed for colonial waterbirds.

* - Nest estimates for Canarsie Pol based on a combination of ground counts and adult observations in a limited section of the island – see text for details.

** - Inactive nests were not comprehensively recorded

Table 3. Summary of Double-crested Cormorant nesting in the New York/New Jersey Harbor, May to July 2005-2010 [†]

| <u>Island</u> | <u>Year – Number of Cormorant Nests</u> | | | | | |
|-------------------------|-----------------------------------------|------------------|------------------|------------------|------------------|------------------|
| | <u>2005</u> | <u>2006</u> | <u>2007</u> | <u>2008</u> | <u>2009</u> | <u>2010</u> |
| Shooter’s Island | 36 ^a | 54 | 41 | 23 | 20 | 35 |
| Huckleberry Island | 323 | 334 | 260 | 375 | 306 | 358 |
| South Brother Island | 281 | 326 | 271 | 297 | 231 | 264 |
| U Thant | 15 | 21 | 24 | 29 | 30 | 31 |
| Hoffman Island | 64 | 166 | 155 | 235 | 225 | 216 |
| Swinburne Island | 87 ^b | 264 ^c | 264 ^c | 295 ^c | 288 ^c | 320 ^c |
| Elder’s Point Marsh W | 0 | 0 | 31 | 79 | 83 | 0 |
| Elder’s Point Marsh E | 0 | 0 | 0 | 0 | 0 | 4 |
| Canarsie Pol | 0 | 0 | 0 | 0 | 0 | 144 |
| Aids to Navigation | 0 ^a | 0 ^a | 0 ^a | 51 ^a | 35 ^a | 39 ^a |
| Island Total | 906 | 1,175 | 1,046 | 1,333 | 1,183 | 1,372 |
| Cumulative Total | 906 | 1,175 | 1,046 | 1,384 | 1,218 | 1,411 |

[†] Data sources include New York City Audubon surveys (2005-2010), cormorant studies by Susan Elbin and the author (2006-2010), and nesting surveys by Paul Kerlinger (2004) and David Künstler (2004-2006).

^a Nests observed on aids to navigation in the Arthur Kill and Kill Van Kull between the Bayonne Bridge and Goethals Bridge were included in Shooter’s Island numbers in 2004-2005. No nesting on these structures was observed in 2006-2007. In 2008 through 2010, nests on these structures were recorded separately.

^b Counts at Swinburne Island conducted from a boat ~50-100 meters from shore.

^c Counts at Swinburne Island conducted on island.

Table 4. Summary of Herring Gull and Great Black-backed Gull nesting activity on selected islands of the New York Harbor from 2007 to 2010. Numbers presented are total adults observed on each island. Numbers in parentheses are total nests observed on each island, when available.

| | Herring Gull | | | | Great Black-backed Gull | | | |
|--------------------|---------------------------|------|------|-----------|--------------------------------|------|------|------------|
| | # nests (# nesting pairs) | | | | # nests (# nesting pairs) | | | |
| | 2007 | 2008 | 2009 | 2010 | 2007 | 2008 | 2009 | 2010 |
| Shooter's Island | 6 | 4 | 5 | 0 | 0 | 0 | 0 | 0 |
| Huckleberry Island | 14 | 9 | 9 | 39 (2)* | 31 | 16 | 7 | 28 (4)* |
| Goose island | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 |
| S. Brother Island | 123 | 131 | 12 | 14 | 93 | 88 | 49 | 82 (9)* |
| N. Brother Island | 72 | 48 | 8 | 25 | 9 | 5 | 2 | 6 |
| U Thant Island | 75 | 27 | 11 | 7 | 18 | N/A | 10 | 22 |
| Hoffman Island | 46 | 161 | 100 | 67 (36)* | 142 | 148 | 60 | 146 (101)* |
| Swinburne Island | 198 | N/A | 133 | 75 (117)* | 112 | N/A | 120 | 62 (33)* |

N/A = Not surveyed for gulls by New York City Audubon

* Number of nests, when observed, are presented in parentheses

Table 5: Summary of Herring Gull (HERG), Great Black-backed Gull (GBBG), and Laughing Gull (LAGU) nesting activity in Jamaica Bay, collected through a collaborative effort between New York City Audubon, the National Parks Service, the U.S. Department of Agriculture, and the New York/New Jersey Port Authority in 2010.

| ISLAND NAME | <u>Nests</u> | | | <u>Adults</u> | | |
|----------------------------------|--------------|------------|----------|---------------|------------|-------------|
| | HERG | GBBG | LAGU | HERG | GBBG | LAGU |
| Canarsie Pol | 126 | 7 | 0 | 730 | 49 | 0 |
| Subway Island | 69 | 1 | 0 | 245 | 13 | 0 |
| Elder's Point Marsh East | 49 | 2 | 0 | 60 | 0 | 0 |
| Little Egg Marsh ^a | 95 | 120 | 0 | 95 | 120 | 0 |
| Broad Creek Marsh ^b | 30 | 0 | 0 | 30 | 0 | 0 |
| Duck Point Marsh ^b | 6 | 0 | 0 | 6 | 0 | 0 |
| Ruffle Bar | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Bar | 0 | 0 | 0 | 0 | 0 | 0 |
| Joco Marsh ^c | 0 | 0 | ? *** | 0 | 0 | 1200 |
| East High Meadow ^c | 0 | 0 | ? *** | 0 | 0 | 330 |
| Silver Hole Marsh ^c | 0 | 0 | ? *** | 0 | 0 | 41 |
| Big Egg Marsh | 0 | 0 | 0 | 0 | 0 | 0 |
| Rulers Bar Hassock | 0 | 0 | 0 | 0 | 0 | 0 |
| Blank Bank Marsh | 0 | 0 | 0 | 0 | 0 | 0 |
| South Marsh | 0 | 0 | 0 | 0 | 0 | 0 |
| Goose Pond Marsh | 0 | 0 | 0 | 0 | 0 | 0 |
| Pumpkin Patch Marsh ^d | 0 | 0 | 0 | 0 | 0 | 0 |
| Stony Creek Marsh ^d | 0 | 0 | 0 | 0 | 0 | 0 |
| Black Wall Marsh ^d | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 375 | 130 | ? | 1166 | 182 | 1571 |

a. Estimated from adult counts.

b. Adults present but nesting is unlikely due to heavy erosion/flooding.

c. Estimated number of adult LAGU from field surveys.

d. Although not actually surveyed, nesting highly unlikely due to heavy erosion/flooding.

Table 6. Nesting trees, shrubs, and vines for Black-crowned Night-Herons (BCNH), Snowy Egrets (SNEG), Great Egrets (GREG), Glossy Ibis (GLIB), and Yellow-crowned Night-Herons (YCNH) at South Brother Island, 21 May 2010. Double-crested Cormorants nested predominantly in Black Locust in the center of the colony and Black Cherry/bittersweet in other areas.

South Brother Island - Nesting vegetation

| | <u>BCNH</u> | <u>SNEG</u> | <u>GREG</u> | <u>GLIB</u> | <u>YCNH</u> |
|----------------------|-------------|-------------|-------------|-------------|-------------|
| Black Cherry | 27 | 1 | | | 3 |
| Mulberry sp. | 12 | 1 | 4 | | |
| Box Elder | 67 | 1 | 2 | | |
| Oriental Bittersweet | 38 | 17 | 8 | 1 | |
| Multiflora Rose | 1 | 3 | 1 | | |
| Sycamore Maple | 1 | | 1 | | |
| Black Locust | 4 | | 2 | | |
| Ailanthus | 9 | | 1 | | |

Table 7. Nest contents for Black-crowned Night-Herons (BCNH), Snowy Egrets (SNEG), Great Egrets (GREG), and Glossy Ibis (GLIB) at South Brother Island, 21 May 2010.

South Brother Island – Nest contents

| | <u>BCNH</u> | <u>SNEG</u> | <u>GREG</u> | <u>GLIB</u> |
|----------------|-------------|-------------|-------------|-------------|
| Empty | 18 | 7 | 1 | |
| 1 Egg | 1 | 2 | | |
| 2 Eggs | 7 | 3 | 2 | |
| 3 Eggs | 29 | 5 | 6 | |
| 4 Eggs | 9 | 4 | | 3 |
| 5 Eggs | 2 | 4 | | 2 |
| 1 Young | 1 | | 2 | |
| 2 Young | | 1 | 3 | 1 |
| 3 Young | 1 | 1 | 6 | |
| 4 Young | | | 1 | |
| 1 Egg 1 Young | | | 1 | |
| 1 Egg 2 Young | | 2 | | |
| 1 Egg 3 Young | | | 1 | |
| 2 Eggs 1 Young | | 1 | | |
| 2 Eggs 2 Young | | 1 | | |
| 2 Eggs 3 Young | | | | |
| 3 Eggs 1 Young | 1 | | 1 | |
| 4 Eggs 1 Young | | 1 | | |

Table 8. Nesting trees, shrubs, and vines for Black-crowned Night-Herons (BCNH), Snowy Egrets (SNEG), Great Egrets (GREG), and Glossy Ibis (GLIB) at Hoffman Island, 20 May 2010. Double-crested Cormorants nested predominantly in Black Locust in the southern portion of the colony.

Hoffman Island - Nesting Vegetation

| | <u>BCNH</u> | <u>SNEG</u> | <u>GREG</u> | <u>GLIB</u> |
|----------------------|-------------|-------------|-------------|-------------|
| Black Cherry | 3 | 1 | | |
| Mulberry sp | 14 | 3 | | |
| Box Elder | 4 | | | 5 |
| Oriental Bittersweet | 6 | | 9 | 4 |
| Multiflora Rose | 3 | 4 | 1 | 4 |
| Privet sp. | 4 | | | |
| Lombardy Poplar | | | | 1 |

Table 9. Nest contents for Black-crowned Night-Herons (BCNH), Snowy Egrets (SNEG), Great Egrets (GREG), Glossy Ibis (GLIB), and Yellow-crowned Night-Herons (YCNH) at Hoffman Island, 20 May 2010.

Hoffman Island – Nest contents

| | <u>BCNH</u> | <u>SNEG</u> | <u>GREG</u> | <u>GLIB</u> | <u>YCNH</u> |
|----------------|-------------|-------------|-------------|-------------|-------------|
| Empty | 31 | 4 | 4 | 15 | |
| 1 Egg | 8 | 2 | | 3 | |
| 2 Eggs | 14 | 6 | | 7 | |
| 3 Eggs | 27 | 10 | 5 | 9 | |
| 4 Eggs | 12 | 12 | 1 | 3 | |
| 5 Eggs | | 1 | | 1 | |
| 1 Young | 1 | | | 1 | |
| 2 Young | 10 | 1 | 2 | | |
| 3 Young | 15 | 1 | 4 | 2 | |
| 4 Young | 1 | 2 | 1 | 1 | |
| 1 Egg 1 Young | 4 | | | | |
| 1 Egg 2 Young | 1 | 1 | | 2 | |
| 1 Egg 3 Young | | 1 | 2 | | |
| 2 Eggs 1 Young | | | 1 | 1 | |
| 2 Eggs 2 Young | | | | | 1 |
| 2 Eggs 3 Young | | | | | |
| 3 Eggs 1 Young | | | 1 | | |



Figure 1: Current and former nest sites in NY/NJ Harbor for waders, cormorants, and gulls. Map modified by authors from OasisNYC.

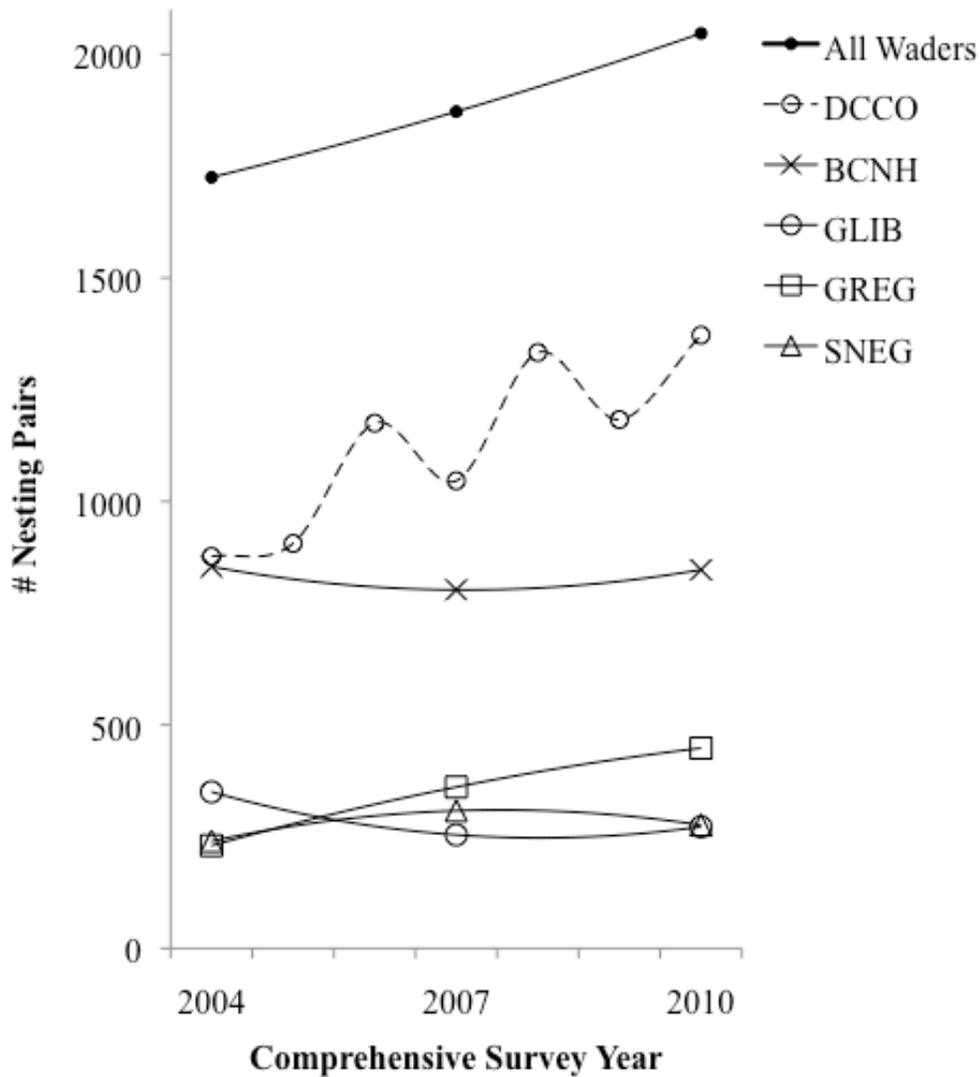


Figure 2: Harbor-wide trends in comprehensive survey data for all waders combined, highlighting the four most common wader species: Black-crowned Night-Heron (BCNH), Great Egret (GREG), Snowy Egret (SNEG), and Glossy Ibis (GLIB), as well as Double-crested Cormorants (DCCO). Cormorants were comprehensively surveyed every year, while wader species were only comprehensively surveyed in 2004, 2007, and 2010.



Figure 3: An American Oystercatcher chick observed on Huckleberry Island, 26 May 2010.
Photo: © E. Craig



Figure 4: Great Egret nests viewed during the 2010 breeding season from New York City Audubon's 'HeronCam,' placed on the island in 2007 in a joint project between New York City Audubon and New York City Department of Parks and Recreation. The HeronCam is available for public viewing via New York City Audubon's Harbor Herons website.



Figure 5: Great Egrets on South Brother Island, May-August 2010. Photo: © E. Craig



Figure 6: Wild Turkey nest with 22 eggs on Prall's Island, 25 May 2010. Photo: © E. Craig



Figure 7: Cormorants nesting on wreckage of boat-building docks off the shore of Shooter's Island, 25 May 2010. Photo: © E. Craig



Figure 8: Banded Double-crested Cormorants nesting on Swinburne Island in 2010. These adults were banded as pre-fledglings on Swinburne Island and are among the first banded individuals observed breeding at their natal colony. Photo: © E. Craig



Figure 9: American Oystercatcher nest on newly restored Elder's Point Marsh East, 27 May 2010. Photo: © E. Craig



Figure 10: Cormorants nesting on aids to navigation in the Arthur Kill, Kill van Kull, and northwestern Raritan Bay, 30 July 2010. Photo: © E. Craig



Figure 11: Surveying gull nests on Hoffman Island and Canarsie Pol, May 2010. Photo: © E. Craig

Appendix: Current Research on Wader and Cormorant Nesting Islands, NY/NJ Harbor

Below is a list of other known projects conducted from 2008 to 2010 either directly or indirectly related to the Harbor Herons or the islands on which they nest. Please contact ecraig@nycaudubon.org to report additional research projects.

Asian Longhorned Beetle identification training for NYC-area researchers, Fort Wadsworth, Staten Island, NY. 2008. Contact: Joan Mahoney, NYS Department of Ag. and Markets.

Arthur Kill Wildlife Refuge Concept, Sweetbay Magnolia Conservancy. Ongoing. Contact: Richard Lynch, Sweetbay Magnolia Conservancy.

Citizen science monitoring program of long-legged waders of NY and NJ, NYC/NJ Audubons. Ongoing. Contact: Susan Elbin, New York City Audubon and Nellie Tsipoura, NJ Audubon.

Colonial waterbird foraging ecology study: stable isotope analyses of wading bird and seabird feathers from NY Harbor and Westchester County, NY. Ongoing. Contact: Elizabeth Craig, New York City Audubon/ Cornell University.

Double-crested Cormorant diet study, CUNY-Queens College. Ongoing. Contact: Colin Grubel and John Waldman, CUNY-Queens College.

Double-crested Cormorant population dynamics. Ongoing. Contact: Susan Elbin, New York City Audubon.

Elders Point Marsh West Marsh Restoration Project, U.S. Army Corps of Engineers. Ongoing. Contact: Melissa D.A. Alvarez, U.S. Army Corps of Engineers

Great Egret radiotelemetry study, New York City Audubon/NJ Audubon. June-August 2008-2010. Contact: Susan Elbin, New York City Audubon.

Habitat Health, Ptilochronology and Waterbirds: A Tale of Two Estuaries. Ongoing. Contact: Charles Clarkson, University of Virginia.

Habitat restoration on North Brother Island, NYC Department of Parks and Recreation, Ongoing. Contact: Tim Wenskus, NYC Department of Parks and Recreation.

Habitat restoration and final capping activity for the proposed Fresh Kills Park (in the vicinity of Isle of Meadows), NYC Department of Parks and Recreation/NYC Department of Sanitation. Contact: Michael Feller, NYC Department of Parks and Recreation – Natural Resources Group.

HeronCam project on Goose Island, New York City Audubon and NYC Department of Parks and Recreation. Ongoing. Contact: Glenn Phillips, New York City Audubon.

White Island Habitat Restoration Project, NYC Department of Parks and Recreation. Ongoing. Contact: Michael Feller, NYC Department of Parks and Recreation – Natural Resources Group.