NEW YORK CITY AUDUBON'S HARBOR HERONS PROJECT

2022 NESTING SURVEY REPORT

December 20, 2022

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Report Highlights

New York City Audubon's Harbor Herons Project Nesting Survey of the New York / New Jersey Harbor (hereby Harbor Herons Survey) and surrounding waterways was conducted between 17 May and 30 May, 2022. This report summarizes nest counts of wading birds and associated species on selected harbor islands. Highlights of our 2022 survey include the following:

- A total count of 1,116 island-nesting wader pairs were recorded in 2022, compared to 1,195 in 2021, representing a 6.6% decrease from the previous year.
- Nine species of long-legged wading birds were found nesting on six of the nineteen islands surveyed in New York Harbor, as well as at several mainland sites.
- The most recent years of the Harbor Herons Survey (excluding 2020 when the survey was not conducted due to Covid-19) represent the lowest counts since 1993 where 2,234 nesting pairs of birds were recorded.
- Observed wading bird species included (in order of decreasing abundance on island colonies) Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Yellow-crowned Night-Heron, Little Blue Heron, Cattle Egret, Green Heron and Great Blue Heron.
- The large wading bird colony on Subway Island in Jamaica bay was completely abandoned this year. Evidence of mammalian predators (raccoons) was noted.
- A pair of Great Blue Herons were found nesting on Mill Rock Island in New York County, representing the first breeding pair documented in the county.
- Two pairs of Cattle Egrets were confirmed breeding on Hoffman Island, the first time they have been documented as breeders since 2019.
- Double-crested Cormorants continue to increase in the NYC Harbor Islands. In total 2,989 were recorded, representing a 2.78% increase from 2021. The rapid population expansion in the NYC Harbor should be closely monitored for detrimental effects on vegetation and wading birds communities.
- Recommendations for the future include improvements to survey methodology for quantification of mammalian predator presence and implementing a grid system for large islands and rapid vegetation assessments.
- In 2021 on Hoffman Island 10 Glossy Ibis nests were recorded and several dead adults were also found, this was the lowest count of this species on the islands until this year, where no nests were recorded. This is the first time this species has not been recorded on Hoffman Island.

Executive Summary

This year's New York City Audubon's Harbor Herons Project Nesting Survey of the New York/New Jersey Harbor and surrounding waterways was conducted between 17 May and 27, 2022. This report principally summarizes long-legged wading birds on selected harbor islands plus four mainland sites. Double-crested Cormorant, Herring Gull and Great Black-backed Gull nests are reported on individual island accounts but are not included in subsequent figures or tables.

Overall Summary: This year we recorded 1,116 pairs of wading birds across the Harbor Heron Islands (excluding mainland islands). The most recent years of the Harbor Herons Survey (2019–2022, excluding the year 2020 when the survey was not conducted due to Covid-19) represent the lowest counts of wading birds since 1993. Wading bird populations are steadily declining across the surveyed islands.

Species summaries: Nine species of long-legged wading birds nested on six of nineteen islands surveyed in New York Harbor in 2022, as well as four mainland sites. This year, observed wading bird species, hereafter collectively referred to as waders, include (in order of decreasing abundance on island colonies) Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Yellow-crowned Night-Heron, Cattle Egret, Little Blue Heron, Green Heron, and Great Blue Heron.

The most significant species population changes of wading birds on Harbor Heron Islands (excluding mainland locations) from 2021 included a 21.6% decline of Black-crowned Night Heron and an 18.9% decrease of Great Egret. Snowy Egrets increased 19.3% and Glossy Ibis increased 14.2% although it should be noted that many Glossy Ibis were counted as adults flying this year above the islands, with far fewer nests being located than in 2021. Six pairs of Yellow-crowned Night-Heron were located on South Brother Island, which is an increase from last year with only 1 nest being detected on the Harbor Heron Islands, the other 72 nests were from mainland locations, also representing a decline from previous years. Little Blue Herons continued to nest in low numbers. Tricolored Heron has not been observed nesting since 2018. Great Blue Heron, only observed nesting twice on the harbor islands in past years, was observed breeding on Mill Rock Island this year 2022. Only one Green Heron was observed on Subway Island in 2022. Cattle Egret, observed in 2019 for the first time since 2010, was again observed in 2022, but was absent in 2021.

A total of 2,989 Double-crested Cormorant nests were observed on 7 of 20 islands, a 2% increase from 2021. This species has increased across the harbor since 2005. Herring and Great Black-backed Gull nesting activity was observed on 6 of 20 islands surveyed for gull breeding, including Elders Point West Marsh, Little Egg Marsh Island, Hoffman Island, Swinburne Island, South Brother Island, and Mill Rock Island.

Island and selected mainland colony summaries: Hoffman Island was the largest colony in 2022, with a total of 422 breeding pairs of waders recorded, representing 35.5% of the total waders recorded in 2022. Hoffman Island surpassed South Brother Island which was the largest colony in 2021. South Brother recorded 316 breeding pairs, 26.5% of the Harbor Heron population. In

Jamaica Bay, Elders Point East Marsh Island and Elder's Point West Marsh Island and Little Egg Island hosted significant nesting wader populations. These 3 colonies together hosted 31.2% of the total island-nesting wader population in the harbor in 2022.

In the East River and Long Island Sound, South Brother and Mill Rock Islands are the only currently active wader colonies; South Brother declined 19% from 2021, from 392 to 316 nesting pairs. Mill Rock Island, which declined sharply five years ago, hosted six wader pairs, however, a pair of Great Blue Heron were found nesting on this island, representing the first New York County nesting record of this species. All other colonies in this area have either declined or remained abandoned since 2016. In the Long Island Sound, Huckleberry Island has shown little wader nesting activity since 2016, and its previously sizable Double-crested Cormorant colony has also demonstrated no nesting activity since 2016. No wader nesting has been observed on Goose Island since its apparent predation and abandonment shortly before the 2013 survey.

Hoffman Island was the most productive wader colony in 2022. In 2021, the island recorded 372 nesting pairs, the lowest count since 2000, this year we recorded 422 but it is apparent that Hoffman Island is still experiencing a decline of waders since 2011. Double-crested Cormorant numbers slightly decreased from 2021 as well, from survey-period high of 1,407 nests to 1,128 nests in 2022. Nearby Swinburne Island's colony of Double-crested Cormorants continues to rapidly increase, from 530 nests in 2021 to 791 nests in 2022, a 49.2% increase. Isle of Meadows and Prall's Island, in the Arthur Kill, and Shooters Island, in the Kill Van Kull, together forming the core of the harbor's breeding wader population in the first 15 to 20 years of this survey, have shown no evidence of wading bird nesting since the early 2000s.

In Jamaica Bay, waders nested on three of the six islands surveyed: Elders Point East Marsh, Elders Point West Marsh, and Little Egg Marsh Islands. Subway Island, which formerly hosted the largest breeding colony of waders in Jamaica Bay, was completely abandoned this year. There was evidence to suggest that raccoons, or other mammalian predators had reached this colony. Prior to this abandonment, there was a 35% decline of nesting activity from 2019 to 2021. Elders Point East Marsh Island was the largest colony this year in Jamaica Bay. The island hosted 238 wading pairs, a 96.6% increase from 2021 and the largest number recorded since 2015. In 2019, no waders were recorded on this island, but the island has been recolonized for two consecutive years. The wader colony on Elders Point West Marsh Island, established in 2016, increased from 63 pairs to 93 pairs of waders, with Great Egrets increasing from 25 to 50 pairs. The Double-crested Cormorant colony continues to rapidly expand, from 428 nests in 2021 to 595 nests in 2022, a 39.0% increase. Double-crested Cormorants on this Island mainly nest on the ground and are steadily expanding towards the edges of the islands where Great Egrets, Snowy Egrets and Glossy Ibis nest in shallow vegetation. Little Egg Marsh Island, which has hosted a small, fluctuating population of waders since 2013, decreased from 46 to 40 nesting pairs, with Black-crowned Night-Heron declining the steepest from 42 pairs to 23 pairs in 2022. No breeding waders were detected on Canarsie Pol, which was abandoned in 2013 after more than a decade of nesting activity. Ruffle Bar, which has not hosted breeding waders during the survey period, also remains inactive.

The mainland nesting colony of Yellow-crowned Night-Herons at Redfern Houses in Far Rockaway, increased from 23 pairs in 2021 to 31 pairs in 2022. The Hammel Houses, also in Far Rockaway, hosted a total of 38 Yellow-crowned Night-Heron nests down from 42 in 2021. Almost all nests were concentrated directly over community pathways, which is causing conflict with residents; several individuals complained about the birds' droppings and smell during the survey, though others expressed interest and support. Several smaller Yellow-crowned Night-Heron colonies were reported in Queens, Staten Island, and Marine Park, Brooklyn, which was formally surveyed for the first time this year.

Mammalian Predators on Harbor Heron Islands

Raccoons are becoming a pressing issue on the Harbor Heron Islands, potentially causing wading birds to abandon formally established nesting islands. Racoons have been observed on 6 of the islands, with 5 of those nesting colonies abandoning shortly after the documentation of raccoons. To mitigate, NYCA is working on identifying island populations which may be most vulnerable to mammalian predators to provide steps to control raccoon populations on the islands.

Introduction

New York City Audubon's 2022 Harbor Herons Nesting Survey marks the 38th year of this project since annual surveys were begun in 1985. The primary objective of the surveys is to monitor the population status of wading birds (i.e., herons, egrets, and ibis) and other colonial waterbirds on select islands and mainland sites 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, NYC Audubon made a decision to shift the comprehensive 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. The last comprehensive (or "full") nesting survey previous to this year's survey was conducted in 2019.

The U.S. Army Corps of Engineers and The Port Authority of New York & New Jersey "Comprehensive Restoration Plan for the Hudson-Raritan Estuary" and the Harbor Herons Subcommittee of the Harbor Estuary Program's "Harbor Herons Conservation Plan" provide historical perspective on 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 ten species of long-legged wading birds, Double-crested Cormorants, Great Black-backed Gulls and Herring Gulls, observed on selected islands. The objectives of the 2022 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 other colonial waterbird 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

Harbor Heron Study Sites

Islands surveyed in 2022 (Figure 1) included two islands in Lower New York Harbor (Hoffman and Swinburne Islands); three in the Arthur Kill and Kill Van Kull complex (Isle of Meadows and Prall's and Shooters Islands); three in the East River/Western Long Island Sound area (U Thant, Mill Rock, and South Brother Islands); two in the Hutchinson River/Long Island Sound area (Goose and Huckleberry Islands); and six in Jamaica Bay (Canarsie Pol, Elders Point East Marsh, Elders Point West Marsh, Little Egg Marsh, Ruffle Bar and Subway Islands). Davids and Hart Islands in the Hutchinson River/Long Island Sound area have not hosted nesting waders in the past, but were partially surveyed by boat for evidence of nesting waders. Mainland colonies (Hammel Houses, Redfern Houses, Marine Park and Governors Island) were also surveyed.

Figure 1. Locations of Harbor Heron Survey Locations (Island and Mainland)
(○) Current and former island waterbird nesting sites surveyed for waders, cormorants, and gulls
(○) Primary mainland colonies of Yellow-crowned Night-Heron
(○) Mainland nesting sites of Green Heron

Focal Species

Our focal species include ten long-legged colonial waders species, which form intra and interspecific congregations of breeding colonies: Black-crowned Night-Heron (*Nycticorax nycticorax*), Cattle Egret (*Bubulcus ibis*), Glossy Ibis *(Plegadis falcinellus*), Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*), Green Heron (*Butorides virescens*), Little Blue Heron (*Egretta caerulea*), Snowy Egret (*Egretta thula*), Tricolored Heron (*Egretta tricolor*) and Yellow-crowned Night-Heron (*Nyctanassa violacea*). An additional focal species is Double-crested Cormorant (*Phalacrocorax auritus*), a gregarious diving bird which also congregates in breeding colonies, often among or in close proximity to wading bird rookeries in the NY/NJ Harbor Islands. This species is part of an ongoing study of population dynamics, habitat use, and foraging ecology in New York Harbor. Great Black-backed Gulls (Larus marinus) and Herring Gulls (*Larus argentatus*) are common nesters on the islands which are also recorded. In addition to focal species we record "incidental species" - species which occur on the Harbor Heron Islands that are likely breeders. This includes all species outside of our focal group.

Surveys - Wading Birds

Surveys were conducted by NYC Audubon staff, and/or trained volunteers from 17 May to 27 May 2022 between 06:00 to 16:00 hrs under clear conditions (no precipitation) with low marine winds (>8 knots) and temperatures below 80°F[1]. For each survey, an island is partitioned into sections, dependent on the size and geography of each island. Groups of surveyors are assigned a section to systematically search for the presence of nests and/or adult wading birds. These searches involve quickly locating nests, identifying them to species (based on clearly discernible nest structure/features and/or presence of nestlings or eggs), and quickly moving on to avoid prolonged nests disturbance. In instances where nests are too high to identify to species, binoculars or a telescopic mirror pole are used to examine the contents of nests to identify the species by presence of nestlings and/or eggs. A nest is deemed active if it contains eggs or young, or 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. Nests that are not able to be identified to species are recorded as "unknown". A nest is recorded as "inactive" if presumed as remnants from a previous year (discernible by features such lack of feces underneath, no eggs or nestlings present and generally an unmaintained nest lacking fresh nesting materials). Once counted, individual trees are marked with biodegradable flagging tied around the trunk and ground nests are marked with a dab of spray chalk closely outside of the nest to avoid double counting. In instances/islands where terrain prevents accurate nest counts, adult counts (presence of an adult bird) are used as a substitute. In this case, the presence of an adult is equivalent to one nest[1].

Surveys - Double-crested Cormorants

Within the New York Harbor Double-crested Cormorants generally form large intraspecific congregations of breeding colonies but display a wide variety of canopy-preference. On islands devoid of vegetation they will nest on the ground, on islands with tall trees they will nest in the tree canopy. On islands with sparse and short trees, they will nest within the stronger limbs. Therefore, for this species, only nests are counted despite of canopy-preference.

Surveys - Gulls

Great Black-backed Gulls and Herring Gulls nests and/or adult counts were conducted on each of the islands. Both species make rudimentary ground nests and generally prefer the exterior rocky outcroppings of an island above the high tide line, but will also nest in shallow grasses within an island interior. Nests were recorded by the presence of eggs and/or nestlings. While eggs of both species appear superficially similar, they can be reliably identified by length and width of the egg, with minimal overlap.

[1] The 2022 survey followed field methods designed for previous Harbor Herons Project nesting surveys [Katherine Parsons (1986–1995), Paul Kerlinger (1996–2004), Andy Bernick (2004–2007), Liz Craig (2008–2013), Tod Winston (2014–2021)] 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).

Permissions and Permits

All surveys were conducted under permits from NPS, NYC Parks and written permission. Surveys at Goose and Huckleberry islands were conducted with the support of New York City Department of Parks & Recreation, Van Cortlandt & Pelham Bay Parks Administrators' Office. Permits were issued by New York City Department of Parks & Recreation and National Park Service to conduct surveys on protected islands under city and federal jurisdiction, and permission to access the privately owned Huckleberry Island was provided by Huckleberry Indians, Inc. Don Riepe of the American Littoral Society/Jamaica Bay Guardian/NYC Audubon provided additional information on colonial waterbird activity in Jamaica Bay.

Transportation

Boat access to the Jamaica Bay islands (Big Egg, Little Egg, Elders East, Elders West, Subway, Ruffle Bar, Canarsie Pol) and Swinburne and Hoffman Islands was provided by Don Riepe of the American Littoral Society / Jamaica Bay Guardian / NYC Audubon.

Boat access to Isle of Meadows, Prall's Island and Shooter's Island were provided by Micheal Abegg and crew of Brooklyn Marine Services.

Boat access to North Brother Island, South Brother Island, Mill Rock and U-thant were provided by John Carter of BoatrideNYC.

Results

Trends in the Total Number of Nesting Pairs

This year a total of 1,116 breeding pairs of nine wading bird species (Table 1) were recorded on seven of the sixteen Harbor Heron Islands (Figure 2, Table 2). This is the lowest record count of nesting wading pairs recorded since 1993. The most recent years, from 2019 to present, represent the lowest counts since 1993, where 2,234 nesting pairs of birds were recorded (see Figure 2).

Table 1. Common name, Scientific Name and Alpha Code for the 10 wading bird species found on Harbor Herons Surveys.

Common Name	Scientific Name	Alpha Code
Great Egret	*Ardea alba*	GREG
Cattle Egret	*Bubulcus ibis*	CAEG
Snowy Egret	*Egretta thula*	SNEG
Black-crowned Night-Heron	*Nycticorax nycticorax*	BCNH
Yellow-crowned Night-Heron	*Nyctanassa violacea*	YCNH
Little Blue Heron	*Egretta caerulea*	LBHE
Glossy Ibis	*Plegadis falcinellus*	GLIB
Tricolored Heron	*Egretta tricolor*	TRHE
Great Blue Heron	*Ardea herodias*	GBHE
Green Heron	*Butorides virescens*	GRHE

Figure 2. Total number of nesting wading species across all Harbor Heron Islands surveyed per year. Red shaded areas represent years with unresolved counts (e.g. no survey was conducted, or a substantial number of islands were not surveyed). Mainland locations not reported.

Table 2. Data from the 2022 Harbor Herons Survey from actively surveyed islands. Mainland locations are not included in the table.

	Island																
Alpha Code	**Hoffman Island**	**Swinburne Island**	**North Brother Island**	**South Brother Island**	**Mill Rock Island**	**Goose Island**	**Huckleberry Island**	**Elders Point East Marsh**	**Elders Point West Marsh**	**Subway Island**	**Little Egg Marsh**	**Ruffle Bar**	**Canarsie Pol**	**Shooters Island**	**Prall's Island**	**Isle of Meadows**	**Totals**
GREG	156	0	0	55	0	0	0	22	50	0	17	0	0	0	0	0	**300**
CAEG	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
SNEG	92	0	0	57	0	0	0	109	26	0	0	0	0	0	0	0	**284**
BCNH	161	0	0	198	5	0	0	29	5	0	23	0	0	0	0	0	**421**
YCNH	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	**6**
LBHE	7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**8**
GLIB	0	0	0	0	0	0	0	77	12	0	0	0	0	0	0	0	**89**
TRHE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
GBHE	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
GRHE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
Unidentified	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
# Pairs	**422**	**0**	**0**	**316**	**6**	**0**	**0**	**238**	**93**	**1**	**40**	**0**	**0**	**0**	**0**	**0**	**1116**

Island Results by Region

Below are the results of individual island / mainland surveys from 2022. Note that "Status" pertains to wading birds only. *Surveyed* means that researchers were present and on the ground whereas *SBB* means an island was observed by boat only. *Active* means that wading birds were recorded breeding at that island within the past 3 years, *Inactive* means that breeding activity has not been observed in 3 or more years. Figures reported are trends of each currently surveyed island beginning from the year in which consistent surveys were conducted.

Hutchinson River/Long Island Sound

Huckleberry Island (10 acres) - **Status:** Surveyed / Inactive

Date: 27 May 2022, 9:40am-10:43am
Survey Team: Shannon Curley (NYC Audubon), Mike Feller (NYC Audubon volunteer), Opal Feller (NYC Audubon volunteer), José Ramírez-Garofalo (Rutgers University), Kevin Chaikelson (Columbia University), Mike Abegg (Boat Captain).

No nesting waders or cormorant activity was noted on Huckleberry Island in 2022, a colony first surveyed in 1986 (Figure 3). Breeding activity was most recently observed here in 2016, with low numbers of Black-crowned Night-Heron and Double-crested Cormorant nests. This colony abandonment follows a trend of increasingly low numbers of nesting waders on Huckleberry Island, since a 20-year high of 140 nests observed in 2001, and a survey-period maximum of 311 pairs in 1990. No Herring Gull or Great Black-backed Gull nests were observed in 2022 and have not been observed nesting on the island since 2014. Four American Oystercatcher adults were observed on the island, suggesting the presence of several nesting pairs. Three Spotted Sandpipers were sighted, possibly representing breeding birds. Three Canada Geese were observed foraging with 1 Brant, but no Canada Goose nests were observed.

It was suggested this year by the caretaker of Huckleberry Island that the abandonment of the wader and cormorant colonies on Huckleberry Island coincided with the presence of predators (rats and raccoons and most recently, white-tailed deer). Human activity on the island during the breeding season may also play a role, however in 2022 our survey team was the first visitors to the Island. Raccoon prints and scat were observed during the survey. NYC Audubon and NYCDPR will continue to work closely with Huckleberry Indians, Inc. to ensure necessary researcher access to this island, and to understand and address any potential factors contributing to the colony abandonment.

Incidental species: American Robin, American Redstart, Semipalmated Sandpiper, Common Grackle, Yellow Warbler, Canada Goose, Red-winged Blackbird, Black-throated Blue Warbler, Song Sparrow, Osprey, Brant, European Starling, Willow Flycatcher, Baltimore Oriole \

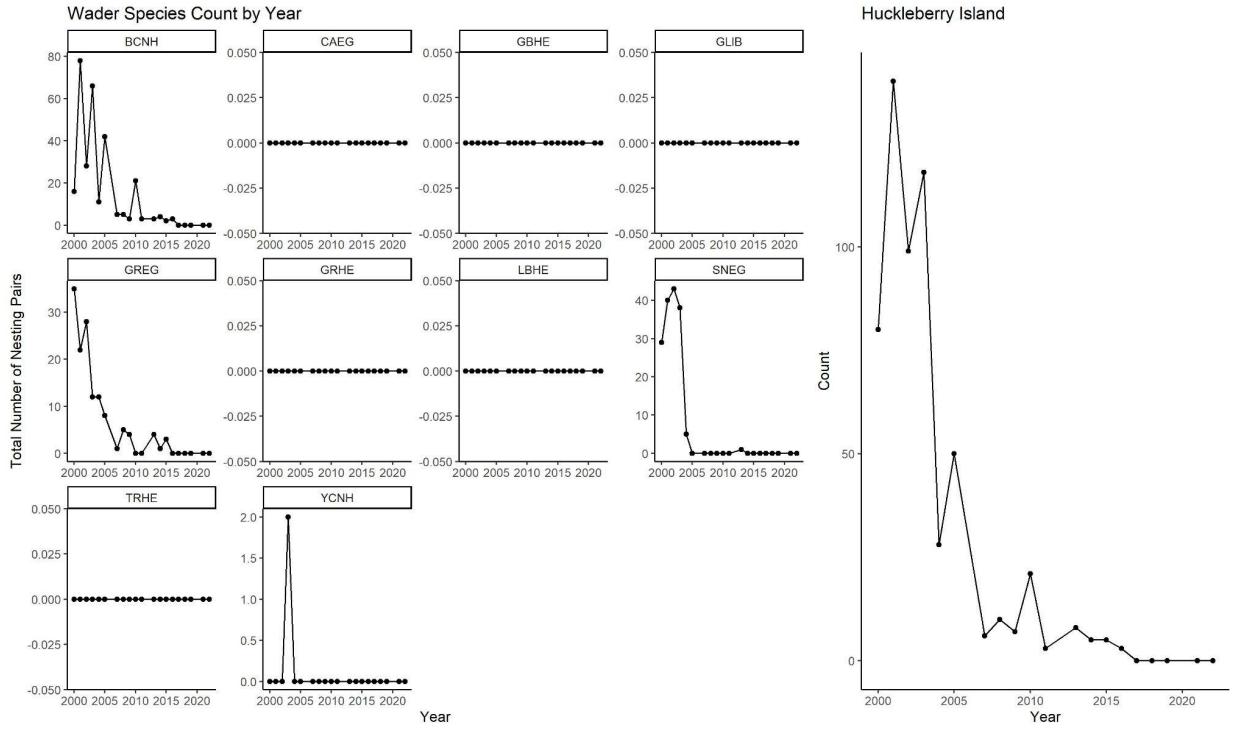

Figure 3. Huckleberry Island.

David's Island (78 acres) - **Status:** SBB / Inactive
Date: 27 May 2022, 10:50am - 11:15am
Survey Team: Shannon Curley (NYC Audubon), Mike Feller (NYC Audubon volunteer), Opal Feller (NYC Audubon volunteer), José Ramírez-Garofalo (Rutgers University), Kevin Chaikelson (Columbia University), Mike Abegg (Boat Captain).

No evidence of nesting waders was observed during a pass-by of David's Island by boat; this Island was partially surveyed by foot for the first time in 2016; no nesting activity was found at that time. This island seems to present a potential for wader nesting habitat, although it was reported to the author in 2016 that raccoons trapped on the mainland are often moved to this island. White-tailed deer are also reported to occur on the island.

Incidental species: (observed by boat): Barn Swallow, Northern Mockingbird, European Starling, Common Grackle, Northern Cardinal, and Song Sparrow

Hart Island (131 acres) - **Status:** SBB / Inactive
Date: 27 May 2022, 9:40am-11:15am
Survey Team: Shannon Curley (NYC Audubon), Mike Feller (NYC Audubon volunteer), Opal Feller (NYC Audubon volunteer), José Ramírez-Garofalo (Rutgers University), Kevin Chaikelson (Columbia University), Mike Abegg (Boat Captain).

Hart Island, the management of which has recently been transferred from the New York City Department of Corrections to NYCDPR, was observed during a pass-by by boat. No evidence of nesting waders was observed. In 2021, Bank Swallow (*Riparia riparia*) burrows were observed by boat on the east side of the island though they were not present in 2022.

Incidental species: NA

Goose Island (1 acre) - **Status:** Surveyed / Inactive
Date: 27 May 2022, 11:40am-12:30pm
Survey Team: Shannon Curley (NYC Audubon), Mike Feller (NYC Audubon volunteer), Beryl Feller (NYC Audubon volunteer), José Ramírez-Garofalo (Rutgers University), Kevin Chaikelson (Columbia University), Mike Abegg (Boat Captain).

No waders were observed on Goose Island in 2022 (Figure 4). This island was abandoned shortly before the 2013 survey was conducted. Seven Canada Goose nests were found on the island, all appeared to have been predated. This finding is similar to 2021 (see previous report). We found no other evidence of ground-nesting birds. Due to its proximity to the mainland and introduction of mammalian predators should be considered for future conservation efforts. The signage that was posted on the shoreline in 2015 was upside-down and clearly tampered with. In 2021 a dead raccoon was found on the island.

Incidental species: Red-winged Blackbird, Canada Goose, Mallard, Song Sparrow, Gray Catbird, Semipalmated Plover (5 foraging).

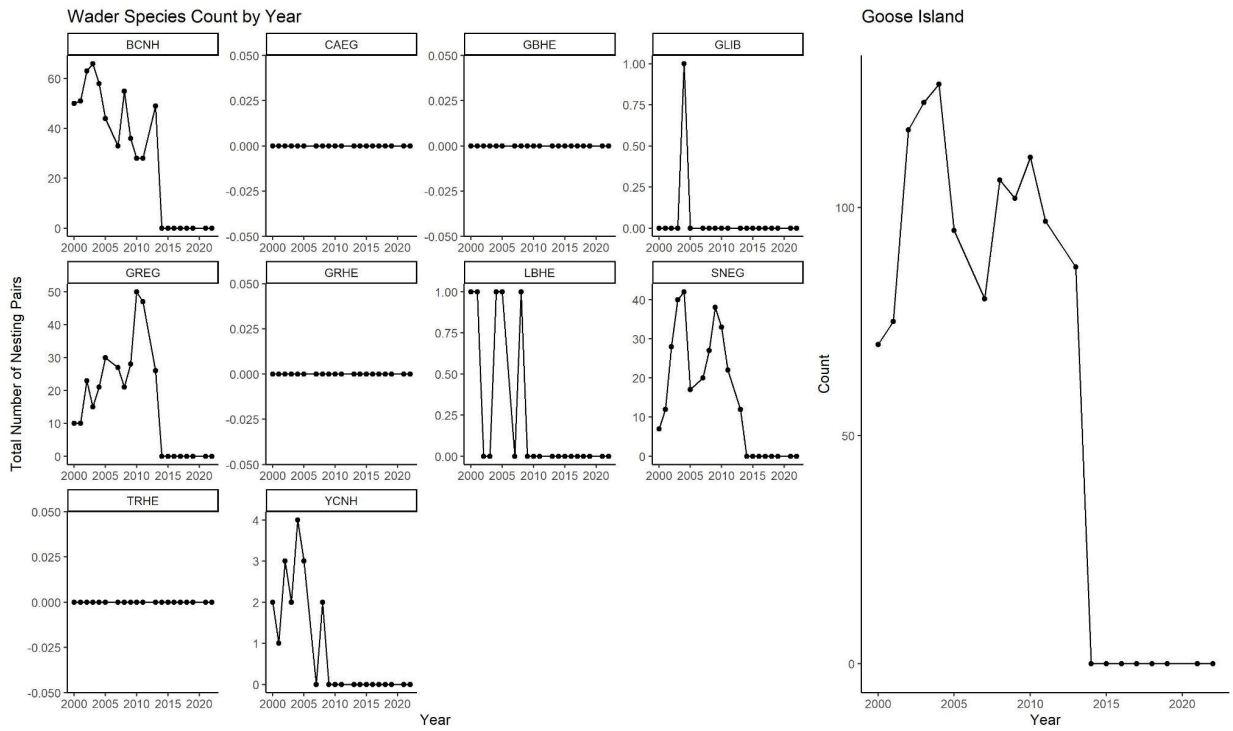

Figure 4. Goose Island.

East River:

North Brother Island (19 acres) - **Status:** Surveyed / Inactive
20 May 2022, 9:30am-11:00am
Survey Team: Mike Feller (NYC Audubon volunteer), Beryl Perron-Feller (NYC Audubon volunteer), José Ramírez-Garofalo (Rutgers University), John Carter (Boat Captain)

North Brother Island has not hosted nesting waders since 2007 (Figure 5). There was no evidence of wader or cormorant nesting activity in 2022. However, this island was particularly active with non-wader birds and avian activity.

Incidental species: Chuck-wills-Widow, American Woodcock, Great Horned Owl, Peregrine Falcon, Osprey, Common Grackle, Barn Swallow, Tree Swallow, Northern Rough-winged Swallow, Eastern Towhee, White-eyed Vireo, Red-eyed Vireo, Common Raven, American Crow, Fish Crow, Black-crowned Night-Heron (foraging), American Redstart, Yellow Warbler, Common Yellowthroat, Mallard.

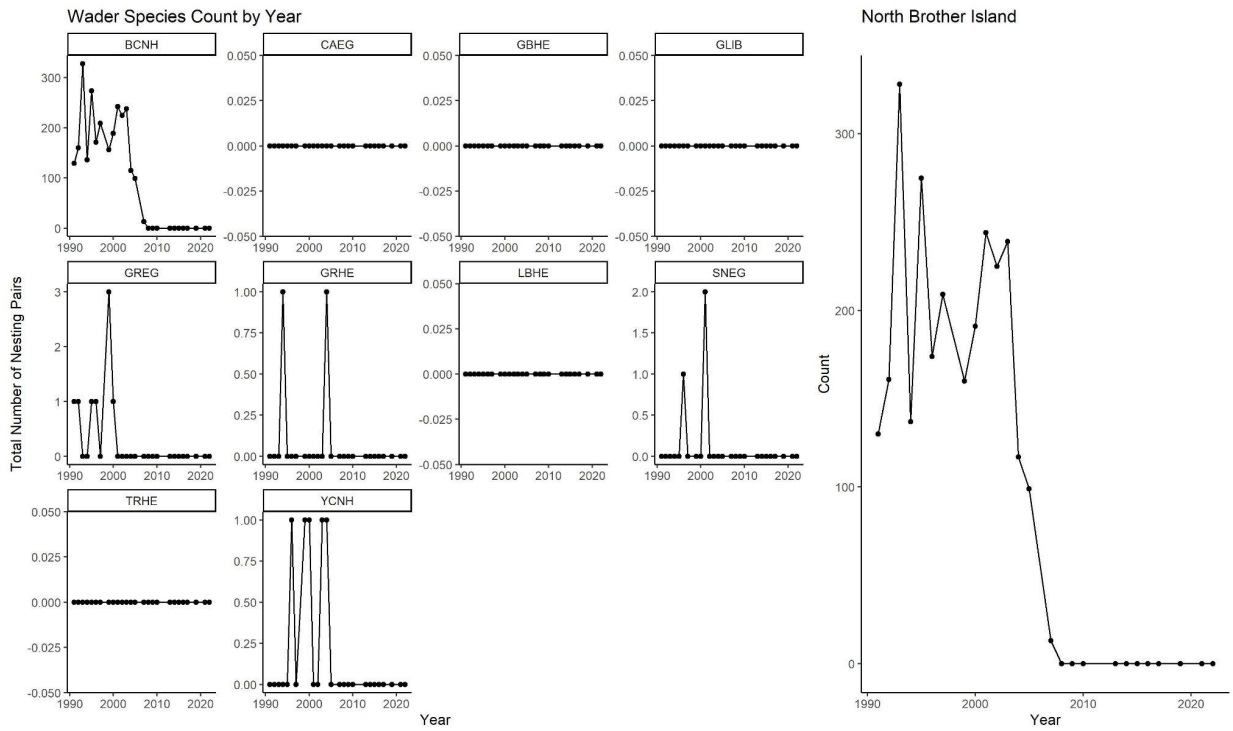

Figure 5. North Brother Island.

South Brother Island (12 acres) - **Status:** Surveyed / Active
20 May 2022, 8:30am–12:30pm
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Mike Feller (NYC Audubon volunteer), Beryl Perron-Feller (NYC Audubon volunteer), Ellen Pehek (NYC Audubon volunteer), Kellye Rosenheim (NYC Audubon volunteer), Neha Savant (NYC Parks), Daniel Chi (Wild Bird Fund), John Carter (Boat Captain)

The South Brother Island colony was the second largest wader colony in the NY/NJ Harbor in 2022 (Figure 6). A total of 316 nests of four wader species were observed on the island, a 19.3% decrease from 2021. Black-crowned Night-Heron, Great Egret, Snowy Egret and Yellow-crowned Night-Heron nests were observed. Though this island's overall wader population has remained relatively stable over the past five years, a decline has been observed over the past 15 years, from a high of 592 pairs in 2007. From 2021, Black-crowned Night-Heron nesting pairs declined from 222 to 198 (10.8% decrease). Great Egret nesting pairs declined from 98 pairs to 55 pairs (43.8% decline). Snowy Egret declined from 81 nests to 57 (29.6 % decrease). Six Yellow-crowned Night-Heron pairs were found this year, which were not observed in 2021. For the 11th year, we did not record evidence of nesting Glossy Ibis on this

island. Double-crested Cormorant nests decreased from 394 nests in 2021 to 328 (16.7% decrease).

Six Great Black-backed Gull nests and 6 Herring Gull nests were found. *Note: Herring and Great Black-backed Gulls regularly nest on roof tops on neighboring Rikers Island. Because of its close proximity to a major New York City airport (LaGuardia), the population is being controlled via egg addling. USDA/Aphis/Wildlife Services biologists counted 220 Herring Gull nests and 0 Great Black-backed Gull nests on Rikers Island this year.*

Incidental Species: Fish Crow, American Robin, Song Sparrow, Common Yellowthroat, American Oystercatcher, Brant, Gray Catbird, American Crow, Mallard, American Goldfinch, Gadwall, Common Raven, Barn Swallow, Osprey, American Robin and Common Grackle.

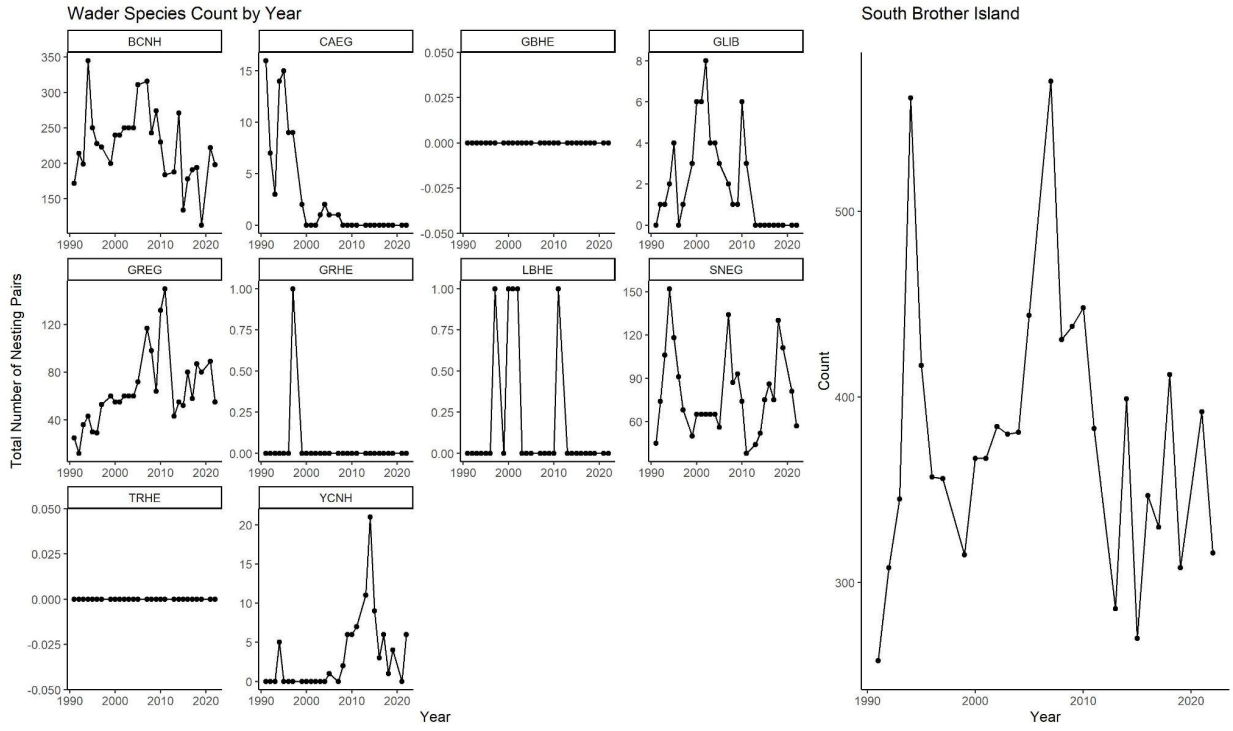

Figure 6. South Brother Island.

Mill Rock Island (3 acres) - **Status:** Surveyed / Active
20 May 2022, 1:17pm-2:36pm
Survey Team: Shannon Curley (NYC Audubon), Mike Feller (NYC Audubon volunteer), Beryl Feller (NYC Audubon volunteers), José R. Ramírez-Garofalo (Rutgers University), Daniel Chi (Wild Bird Fund), John Carter (Boat Captain).

The Mill Rock colony first established in 2004 and reached a maximum of 203 wader pairs in 2012 but has rapidly declined since 2016 (Figure 7). Five Black-crowned Night-Heron nests were found in 2022. The most notable find was a nesting pair of Great Blue Heron, representing the first recorded nest for this species in New York County. A manuscript documenting this occurrence is currently under review in *The Kingbird*. Double-crested Cormorants began nesting on Mill Rock Island in 2011 and sharply increased in 2019. This year we recorded 98 nests, five less nests than recorded in 2021. We recorded 17 Great Black-backed Gull nests, consistent with our 2019 and 2021 counts. We recorded one Herring Gull nest.

Norway Rats have been a continuing presence on this island; 17 burrows were counted in 2021 and 12 recorded this year. Though human disturbance was not evident during the survey of Mill Rock Island, man-made structures including benches and tables have been found in recent few years, and human visitation may be at least partially responsible for the decline of this wader colony. Future efforts to discourage disturbance should include increased signage on the island, particularly at the north harbor. Kayaking clubs known to visit Mill Rock Island and other Harbor Herons nesting islands should be contacted and educated about the importance of maintaining zero human disturbance during the critical nesting period.

Incidental Species: European Starling, American Crow, American Robin, Barn Swallow, Cedar Waxwing, Northern Flicker, Mallard, Gray Catbird, Common Yellowthroat, Song Sparrow, Fish Crow.

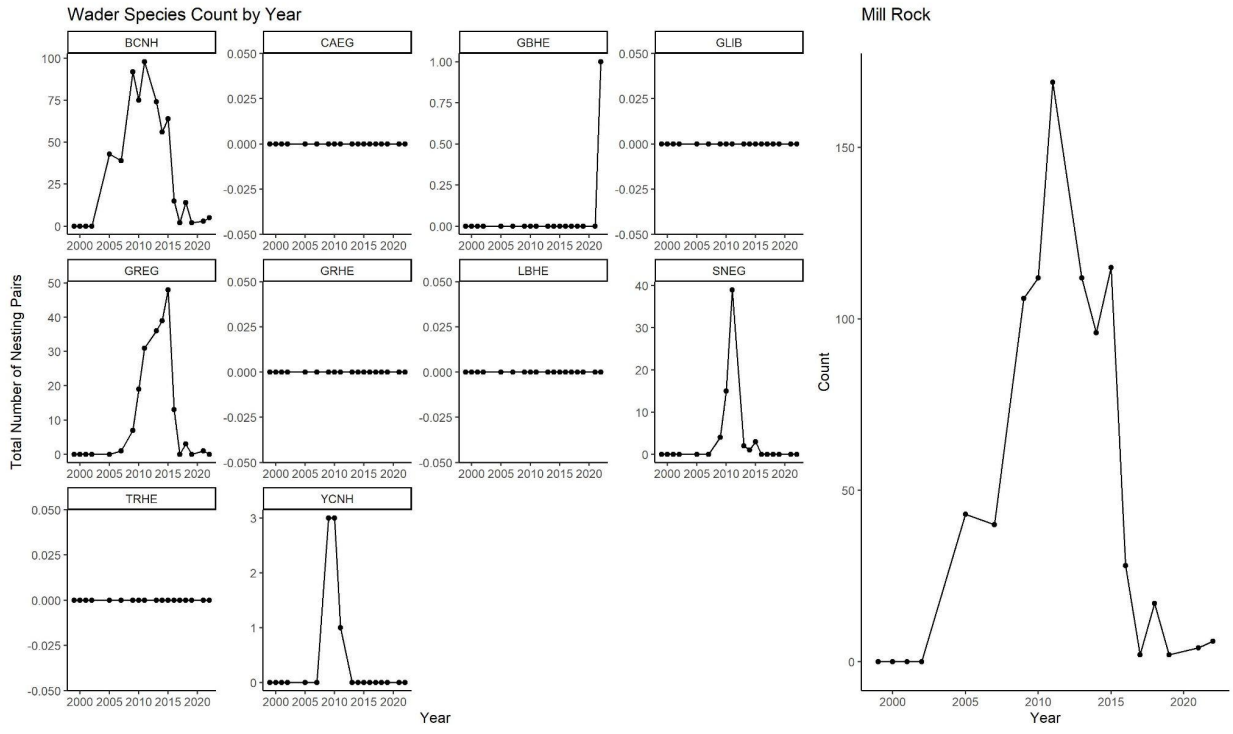

Figure 7. Mill Rock Island.

U Thant (1/4 acre) - **Status:** SBB / Inactive
20 May 2022, 3:45pm-3:50pm
Survey Team: Shannon Curley (NYC Audubon), Mike Feller (NYC Audubon volunteer), Beryl Feller (NYC Audubon volunteers), José R. Ramírez-Garofalo (Rutgers University), Daniel Chi (Wild Bird Fund), John Carter (Boat Captain)

This island was surveyed closely by boat in 2021 and 2022. This year a total of 38 Double-crested Cormorant nests were observed on the collapsed metal arch sculpture, in trees, and on the ground, from 46 in 2021 (a 21.0% decrease). Since 2019 Double-crested Cormorants have nested on this island. A total of 9 Great Black-backed Gull adults were counted; this species has been found nesting here in the single digits in each of the last four surveys. No Herring Gulls were observed.

Incidental species: NA

Upper New York Bay:

Governors Island (172 acres) - **Status:** Surveyed / Inactive
No Yellow-crowned Night-Heron nest was found on Governors Island in 2021 and 2022 as reported by NYC Audubon volunteer Annie Barry.

Incidental species: NA

Staten Island – Arthur Kill and Kill Van Kull:

Isle of Meadows (101 acres) - **Status:** Surveyed / Inactive
19 May 2022, 10:40am-11:30am
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Mike Abegg (Boat Captain)

No evidence of wader nesting activity was observed on Isle of Meadows, which has not been found to host breeding wading birds since 2001 (Figure 8). This island appears to have suitable habitat for nesting wading birds. Despite the lack of wading species, this island is particularly active with birds (see Incidental species below) and other wildlife. In 2021 and 2022 several red foxes (and burrows) were found on the island. Potential river otter burrows were located on the tide-lines in 2021 and again in 2022.

Incidental species: Gray Catbird, Red-winged Blackbird, Yellow Warbler, House Wren, European Starling, American Robin, Carolina Wren, Common Yellowthroat, Yellow-billed Cuckoo, Northern Cardinal, Marsh Wren, Veery, Woodthrush, Canada Warbler, Eastern Towhee,

American Redstart, Scarlet Tanager, Black-billed Cuckoo, Ovenbird, Red-bellied Woodpecker, Mourning Dove, Wilson's Warbler, Mallard.

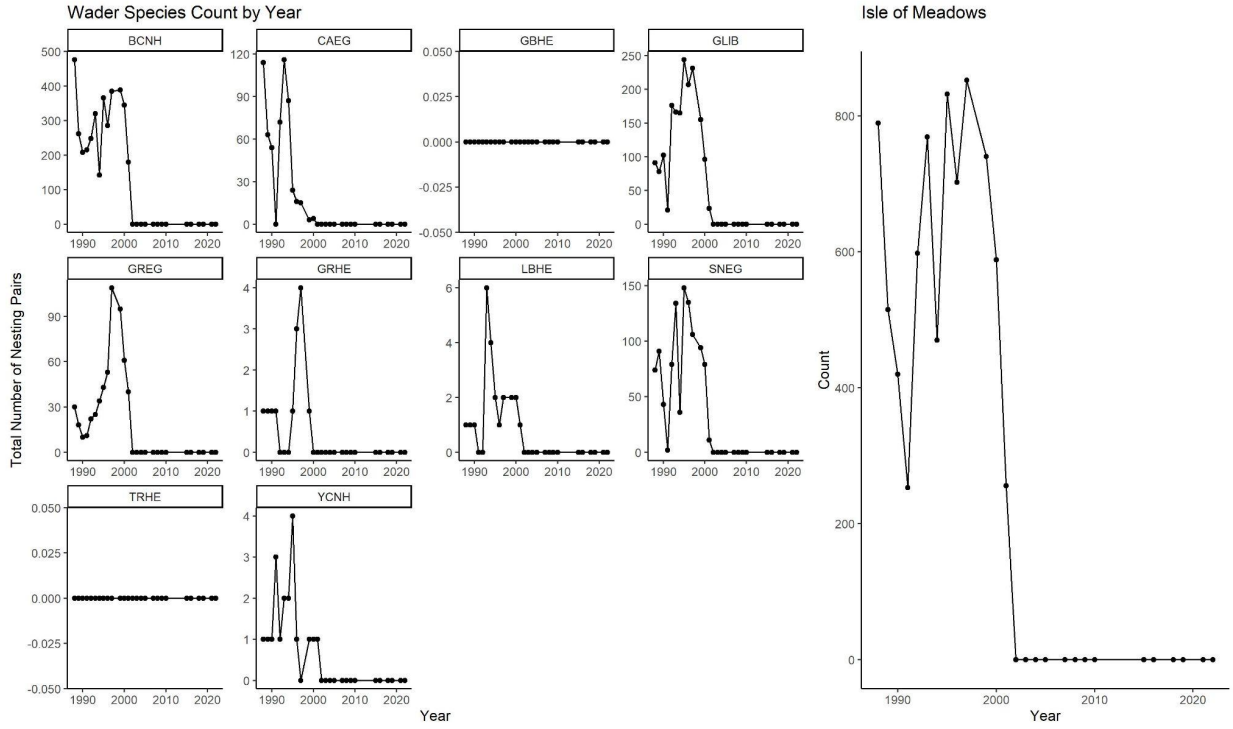

Figure 8. Isle of Meadows.

Pralls Island (88 acres) - **Status:** Surveyed / Inactive
19 May 2022, 12:07pm - 12:40pm
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Mike Abegg (Boat Captain)

No evidence of wader nesting activity was observed on Prall's Island in 2022. This island, continuously active from 1985 to 1997, last hosted a small number of Black-crowned Night-Herons in 2005 (Figure 9). This Island is becoming completely inundated with invasive plants. Poison ivy and Multiflora rose make many parts of the island hard to access. Three red foxes were observed on the island.

Incidental species: Spotted Sandpiper, Yellow Warbler, Gray Catbird, Common Yellowthroat, Willet, Brant, Northern Cardinal, Red-winged Blackbird, Short-billed Dowitcher (3 foraging), Forster's Tern, Boat-tailed Grackle, European Starling, Song Sparrow, Chimney Swift, Tree Swallow.

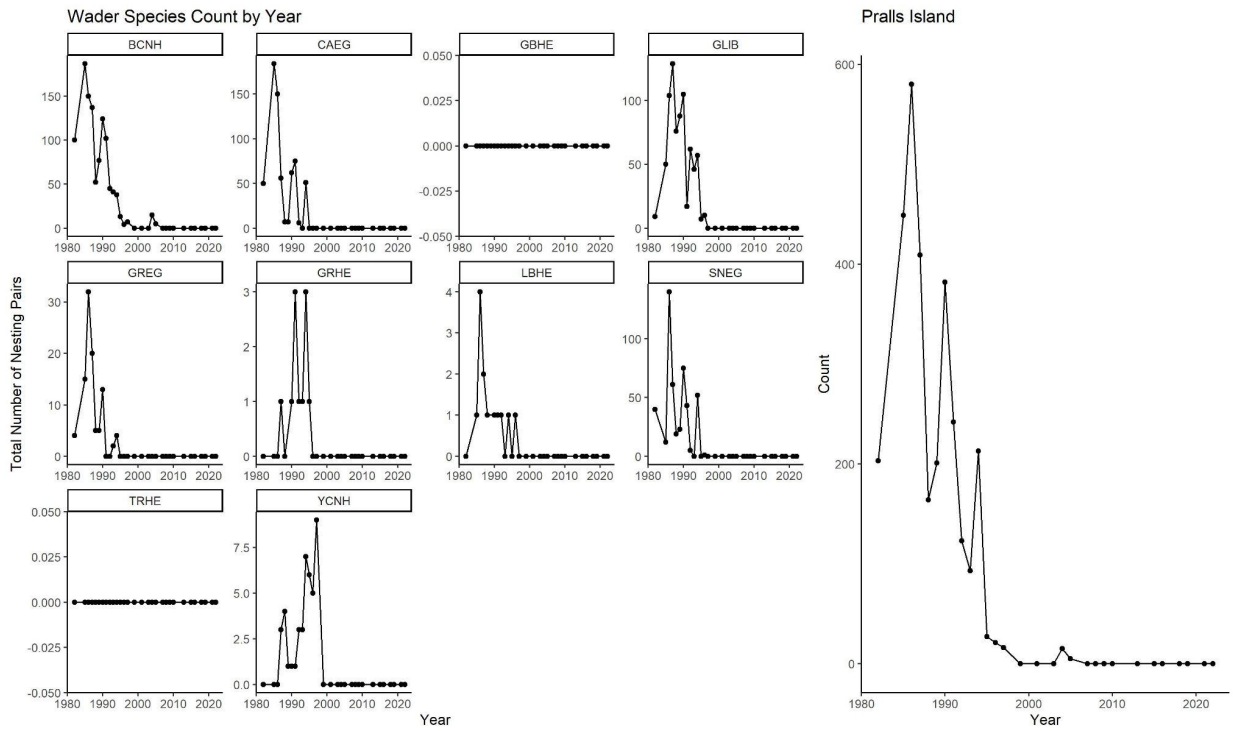

Figure 9. Pralls Island.

Shooter's Island (48 acres) - **Status:** SBB / Inactive
19 May 2022, 12:58pm-1:30pm

Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Mike Abegg (Boat Captain)

No evidence of wader nesting activity was observed on Shooters Island in 2022 and no waders have been found nesting on this island since 1999 (Figure 10). The interior of this island has become almost impossible to enter, due to large walls of multiflora rose, poison ivy and other dense vegetation. Due to a large amount of wind and an outgoing tide, this year the waters were too choppy to safely bring the boat close enough to shore to allow researchers on the island, therefore the survey was conducted around the perimeter of the island by boat. We did not record Double-crested Cormorants nesting on this year's survey.

Incidental species: Canada Goose, Osprey, Song Sparrow, Yellow Warbler, Northern Rough-winged Swallow, Barn Swallow, Forster's Tern, Tree Swallow, Common Yellowthroat, Spotted Sandpiper, Gray Catbird, Brant, Eastern Towhee, Willow Flycatcher, Blue Jay,

Boat-tailed Grackle, Red-tailed Hawk, Semipalmated Plover, Common Tern, Mallard, House Wren.

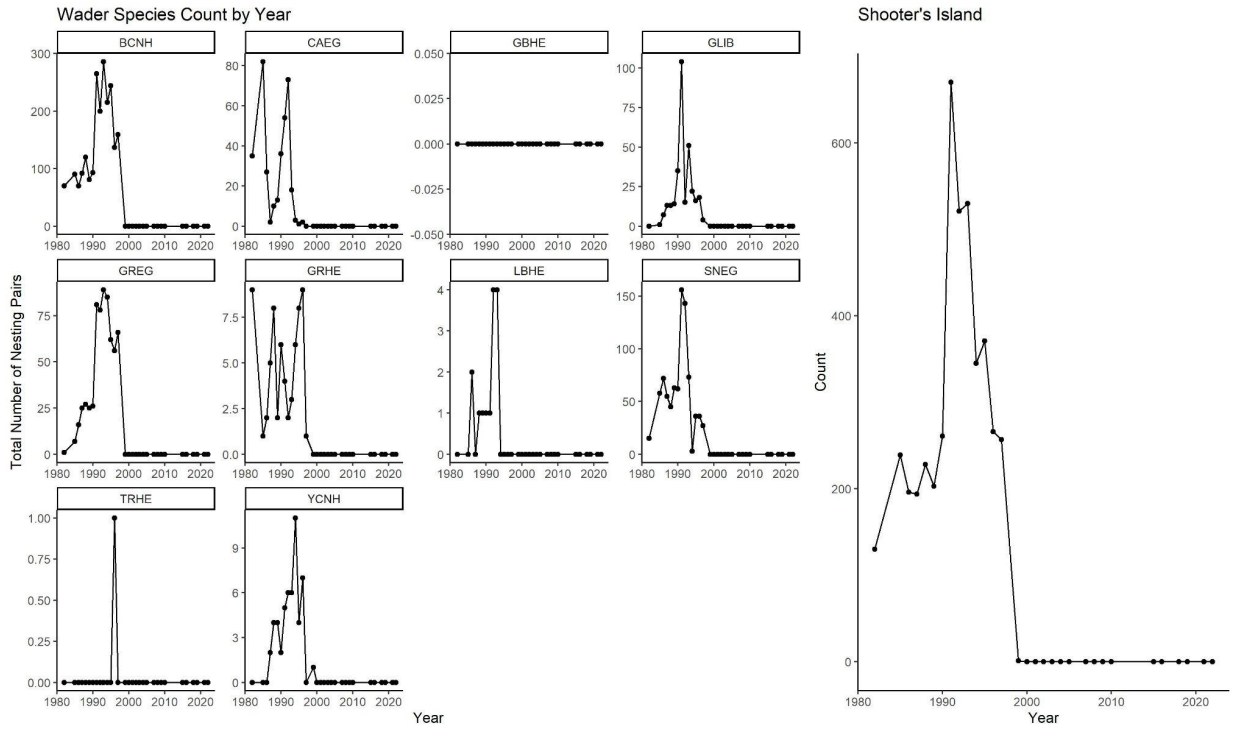

Figure 10. Shooter's Island.

Lower New York Harbor:

Hoffman Island (10 acres) - **Status:** Surveyed / Active
25 May 2022, 10:44am-12:36pm; 26 May 2022
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Emilio Tobon (NYC Audubon), Emily Einhorn (Wild Bird Fund), Georgina Cullman (NYC Parks), Marit Larson (NYC Parks), Don Riepe (American Littoral Society & Boat Captain)

Hoffman Island was the largest wader colony in the harbor in 2022 (Figure 11). In 2021 Hoffman Island was the second largest colony, surpassed by South Brother, which was the first time since 2009 that Hoffman was not the largest colony in the harbor. This year Hoffman hosted five wader species, with a notable absence of Glossy Ibis this year. A total of 422 nests were observed representing a 11.8% increase in active nesting waders from 2021 (372 pairs, the lowest count recorded since 2000). Wader numbers have fluctuated but remained relatively stable since the population reached an all-time high of 824 pairs in 2011. In order of decreasing

frequency: Black-crowned Night-Heron, Great Egret, Snowy Egret, Little Blue Heron and Cattle Egret were found nesting on the island. Black-crowned Night-Heron increased from 129 pairs in 2021 to 161 pairs this year, representing a 24.8% increase, making them the most abundant nesting species on this island this year. Great Egret numbers remained similar to 2021, with 156 pairs recorded in 2022, one less than in 2021. Snowy Egret numbers increased from 68 pairs in 2021 to 92 pairs in 2022, a 35.2% increase. Seven pairs of Little Blue Heron were estimated in 2022, which is consistent with previous years, in 2021 six pairs were recorded. Two pairs of Cattle Egrets were recorded, representing the first time this species has been recorded as a breeding on Hoffman Island since 2004. Perhaps most notably was the absence of Glossy Ibis. In 2021 ten nests were recorded, however, several dead adult Glossy Ibis were also found during that survey. Until this year, this represented the lowest count. The absence of these species should be noted, as they typically nest in shrubs and close to the ground, and may be an indication that mammalian predators have reached the island. Waders primarily nested in mulberry sp., multiflora rose, box elder, black locust, hackberry, oriental bittersweet, wild grape and/or porcelain-berry, and on the ground (Glossy Ibis).

A total of 1,128 Double-crested Cormorant nests were observed on Hoffman Island in 2022, a 19.8% decrease from 2021 where 1,407 nests were recorded. The Double-crested Cormorant colony first established in 2002, and has experienced a rapid increase since. This decrease on the island represented the first decrease since 2002. However, several former egret nesting areas at the southern end of the island appear to have converted to cormorant nesting since the 2019 survey.

Herring Gulls increased from 63 nests in 2021 to 119 in 2022 representing a 88.8% increase. Great Black-backed Gull nests severely declined from 71 in 2021 to only 14 in 2022, a staggering 80.2.% decrease.

Note - the noted decline in ground nesting birds such as Glossy Ibis and the two nesting gull species should be of interest and incentive to increase monitoring efforts for mammalian predators on this Island, which is the potential cause of colony abandonments survey-wide.

Incidental species: Fish Crow, Red-winged Blackbird.

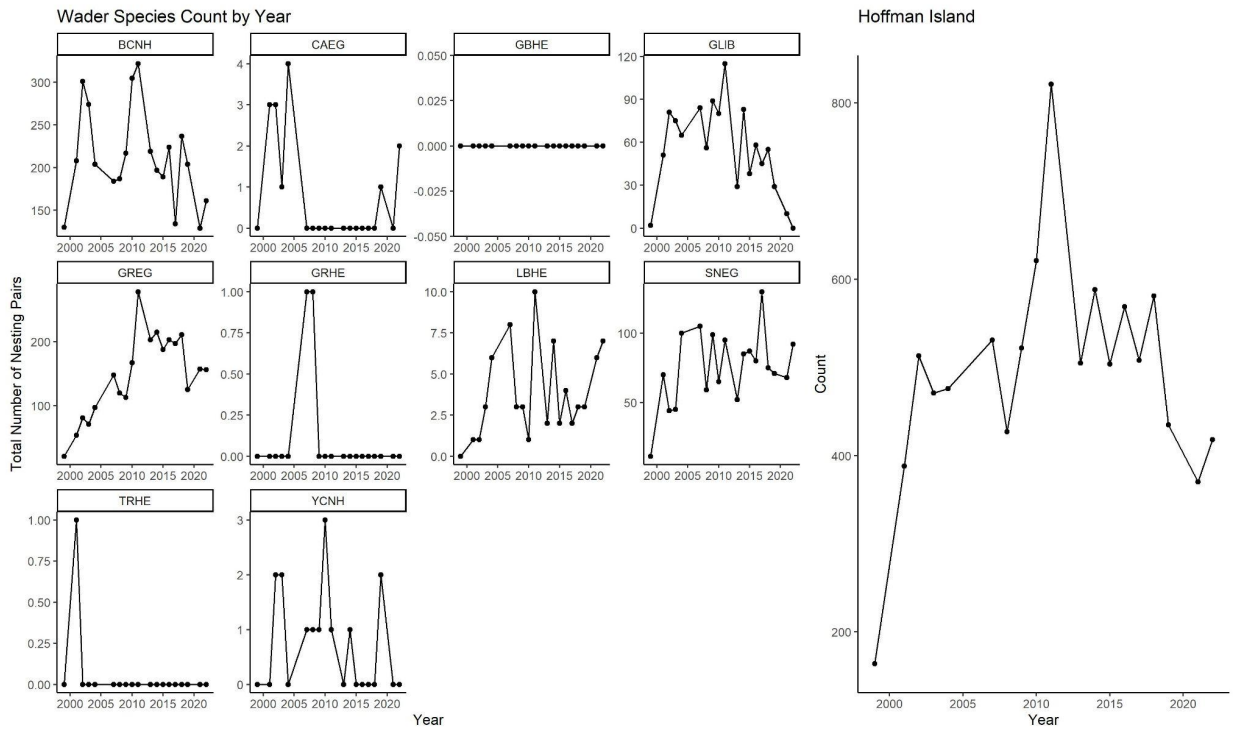

Figure 11. Hoffman Island.

Swinburne Island (4 acres) - **Status:** Surveyed / Inactive
26 May 2022, 1:06pm-2:23pm
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Emily Einhorn (Wild Bird Fund), Georgina Cullman (NYC Parks), Don Riepe (American Littoral Society & Boat Captain)

No waders were found nesting on Swinburne Island in 2022 (Figure 12). The Double-crested Cormorant population continues to expand on this island. A total of 791 Double-crested Cormorant nests were observed this year, representing a 49.2% increase from 530 nests recorded in 2021 and the highest count recorded since this colony was first surveyed in 1998. Swinburne Island's cormorant populations have increased despite significant transformation of the habitat in 2012 by Hurricane Sandy, which removed topsoil and completely or partially felled all the standing buildings. As in 2021, nests in 2022 were located on the remains of buildings, on the ground, and in several hackberry and black locust trees, though these trees have deteriorated in recent years.

Herring Gull nests increased from 79 in 2021 to 143, a 81.0% increase. Great Black-backed Gull nests decreased from 62 nests in 2021 to 34 nests in 2022, a 45.1% decrease.

Incidental species: NA

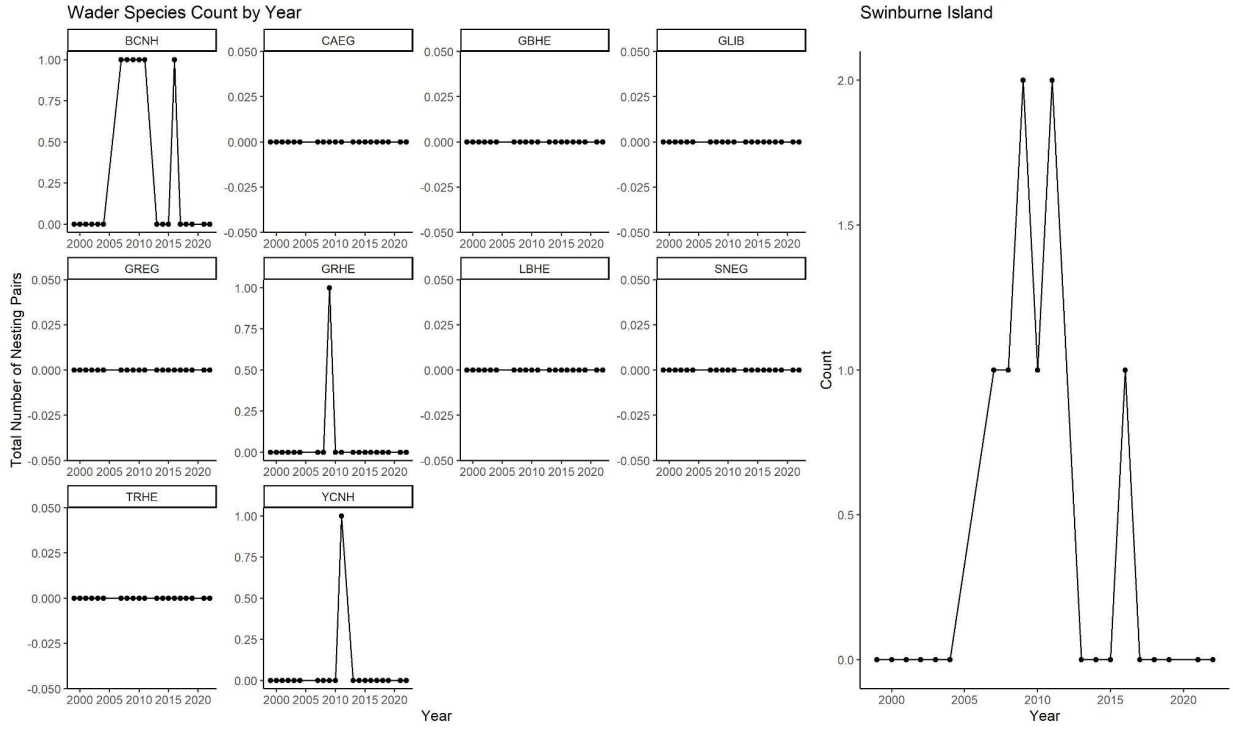

Figure 12. Swinburne Island.

Jamaica Bay:

Elders Point East Marsh Island (40 acres) - **Status:** Surveyed / Active
17 May 2022, 8:50am-9:35am
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Dustin Partridge (NYC Audubon), Andrew Maas (NYC Audubon) Ritamarie McMahon (Wild Bird Fund), Rachel Frank (Wild Bird Fund), Don Riepe (American Littoral Society)

The restoration of Elders Point East Marsh Island was begun 13 years ago as part of a marsh restoration project undertaken in Jamaica Bay by the U.S. Army Corps of Engineers (USACE). During the intervening decade, a wader and cormorant colony was established on this low-lying island, becoming one of the most diverse in the harbor, with up to five wader species with increasing abundances (Figure 13). For the second year in a row, a diverse wading bird colony was recorded on this island, with 5 species recorded nesting, including Snowy Egret, Glossy Ibis, Black-crowned Night-Heron, Great Egret and Little Blue Heron. This colony was devoid of

waders in 2019, however in 2021, 121 wading pairs were found on the island, and 238 recorded in 2022, a 96.6% increase, making it the largest colony this year in Jamaica Bay. Waders were found nesting in Phragmites and a broad expanse of high-tide bush on the southern part of the island, at a height of two feet or less. These species included, in order of decreasing abundance, Snowy Egret 109 pairs, up from 52 in 2021 (70.8% increase). Glossy Ibis increased from 21 pairs in 2021 to 77 pairs in 2022 (266% increase).
Black-crowned Night-Heron pairs decreased from 45 pairs to 29 pairs in 2022 (46.2% decrease). Great Egret pairs increased from 3 in 2021 to 22 in 2022 (152% increase) and one Little Blue Heron pair in 2022. Tricolored Heron, which have nested here in very low numbers, were not observed in 2021 or 2022.

At the northern end of the island, a small grove of dying trees upon which the cormorants nested has deteriorated considerably. Though no Double-crested Cormorants were found nesting on this island in 2019 and 2021, 11 nests were found on this side of the island this year.

This colony continues to seem particularly vulnerable to disturbance by recreational boating activity in Jamaica Bay, as well as to storms and sea-level rise. (This vulnerability to flooding was evidenced during both the 2017 and 2018 surveys, when several dead Great Egret chicks were found, apparently drowned during recent high tides.)

Herring gull adult count increased 29.0% to 260 birds, up from 194 in 2021. Great Black-backed Gull adults slightly decreased from 23 in 2021 to 16 in 2022. It is not clear what proportion of these birds are nesting, however.

A total of 19 American Oystercatcher adults were observed in 2022, indicating a continuing breeding presence of this species.

Incidental species: Boat-tailed Grackle, Red-winged Blackbird, Fish Crow and Osprey.

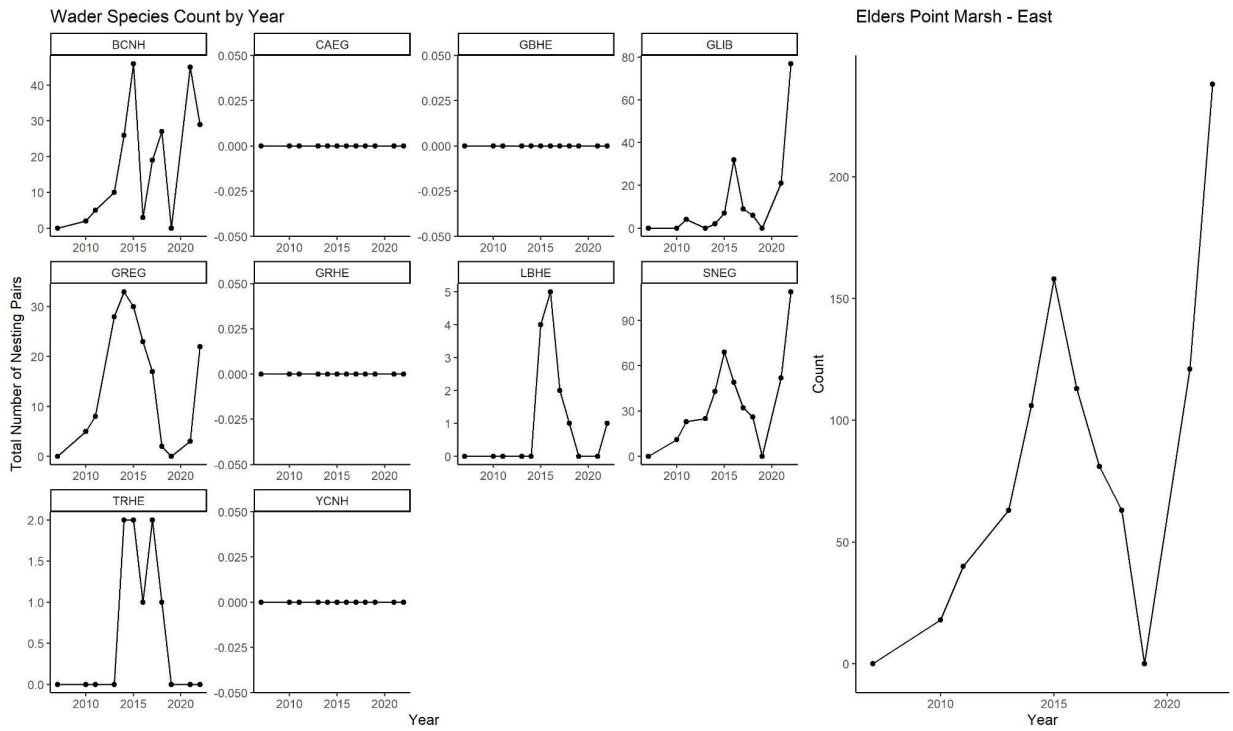

Figure 13. Elders Point East Marsh.

Elders Point West Marsh Island (40 acres) - **Status:** Surveyed / Active
17 May 2022, 9:56am-10:29pm
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Dustin Partridge (NYC Audubon), Andrew Maas (NYC Audubon) Ritamarie McMahon (Wild Bird Fund), Rachel Frank (Wild Bird Fund), Don Riepe (American Littoral Society)

Elders Point West Marsh Island, like its eastern counterpart, was restored as part of a marsh restoration project undertaken in Jamaica Bay by USACE. In 2021, 63 wader nests were estimated to be present on the island, approximately half of the 2019 total, however this number increased to 93 nests in 2022 (Figure 14). Great Egrets increased from 25 pairs in 2021 to 50 pairs in 2022, representing a 100% increase. Snowy Egret pairs slightly decreased from 32 pairs in 2021 to 26 pairs in 2022. Glossy Ibis pairs were not recorded in 2021, but 12 pairs were recorded in 2022. Black-crowned Night-Heron pairs remained low compared to previous years, where 5 pairs were recorded in 2021 and 2022.Waders on this island nested in high-tide bush, while cormorants nested primarily on the ground. This island appears to be slightly higher in elevation than Elders Point East Marsh Island, so may afford more protection from high tides.

The island's Double-crested Cormorant colony has continued to expand, from 428 nests in 2021 to 595 nests in 2022, a 39.0% increase.

A total of 109 Herring Gulls were recorded, up from 98 in 2021, representing an 11.2% increase. Five Great Black-backed Gulls were observed in 2022, a 44.4% decrease from 9 recorded in 2021.

Twelve adult American Oystercatchers were observed, likely representing several nesting pairs. A Mallard nest with 11 intact eggs was recorded. One occupied Osprey nest was observed.

Incidental species: Dunlin, Red-winged Blackbird, Least Sandpiper, Semipalmated Sandpiper, Clapper Rail, Common Tern, Osprey, Song Sparrow, European Starling.

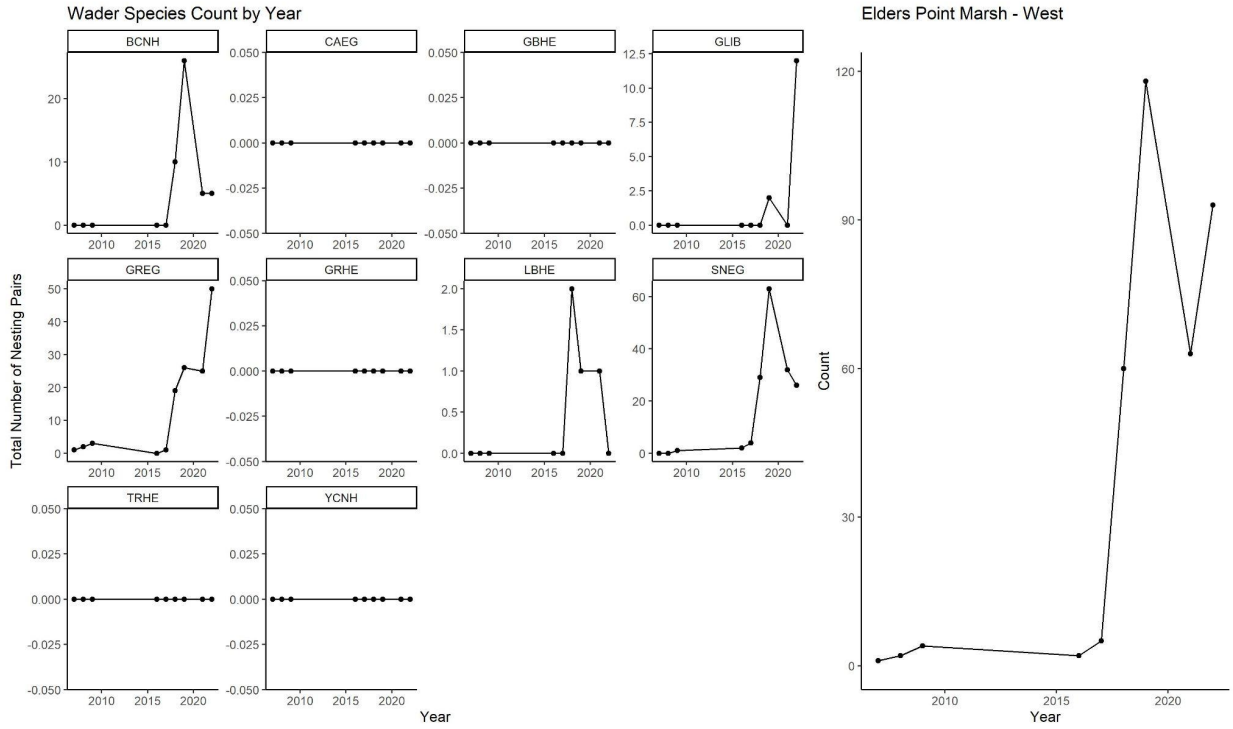

Figure 14. Elders Point West Marsh.

Subway Island (40 acres) - **Status:** Surveyed / Active
17 May 2022, 11:17am-12:09pm
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Dustin Partridge (NYC Audubon), Andrew Maas (NYC Audubon) Ritamarie McMahon (Wild Bird Fund), Rachel Frank (Wild Bird Fund), Don Riepe (American Littoral Society)

The Subway Island colony was formerly the third-largest nesting colony in NY/NJ Harbor in 2021 however, in 2022 this island was completely abandoned after 12 years of hosting a large colony of wading birds (Figure 15). Formally, this island hosted five wading species, including Great Egret, Black-crowned Night-Heron, Glossy Ibis, Snowy Egret, and Green Heron. A single Green Heron was seen foraging on this island this year.

In 2021, a total of 197 wader nests were observed, a 35% decrease from 2019, however, no breeding activity was noted on this island this year. From previous reports, there seems to be strong indication that this population decline was occurring first with ground nesting birds including Herring Gulls, Great Black-backed Gulls and Glossy Ibis, species which are particularly vulnerable to mammalian predators. A total of 109 Herring Gull adults were observed and 20 Great Black-backed Gull adults, there was no indication of any nesting activity. Of particular importance was the presence of raccoon scat throughout the Island. We speculate that the arrival of raccoon to Subway Island has caused this colony to abandon. A total of 29 American Oystercatcher adults were observed.

Incidental species: Forster's Tern, Northern Raven, Common Grackle, Brant, European Starling, Yellow Warbler, Boat-tailed Grackle, Double-crested Cormorant (foraging), Tree Swallow, Northern Flicker, Red-winged Blackbird, Least Sandpiper, Laughing Gull, Barn Swallow, Semipalmated Plover, Semipalmated Sandpiper.

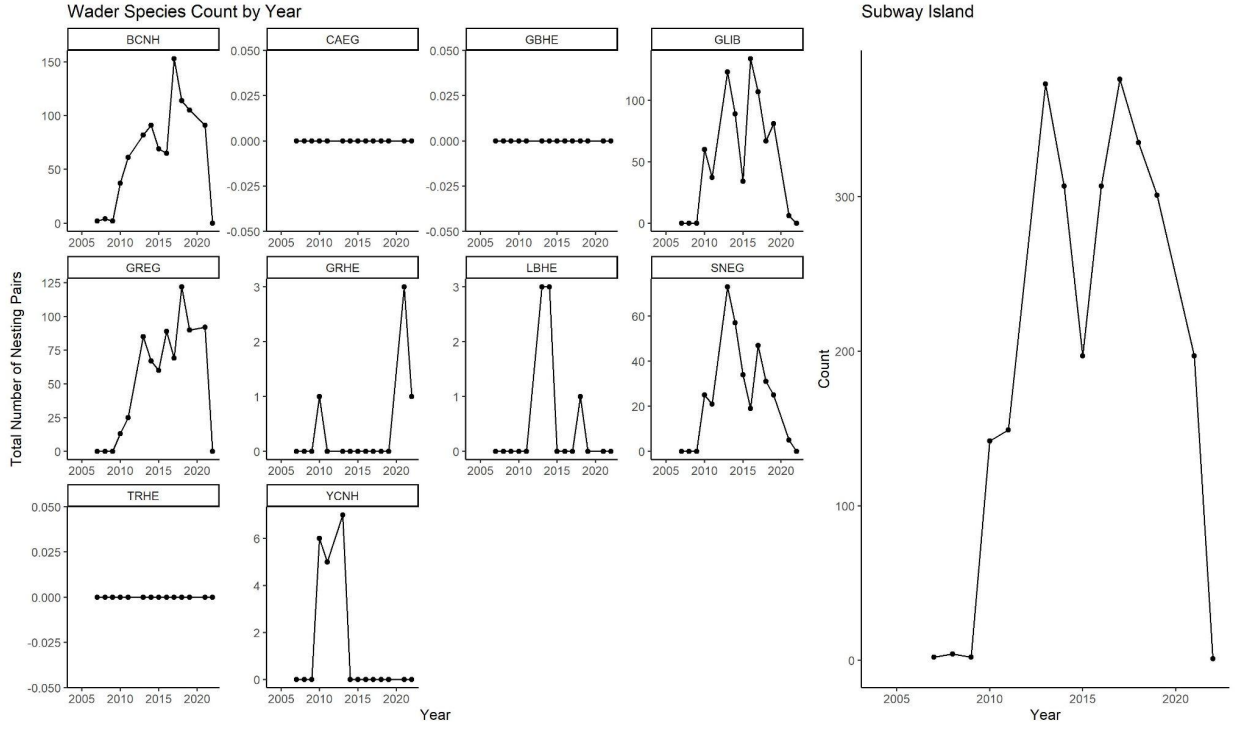

Figure 15. Subway Island.

Little Egg Marsh Island (acreage unknown) - **Status:** Surveyed / Active
18 May 2022, 9:56am - 11:14am
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Jessica Wilson (NYC Audubon), Gail Karlsson (NYC Audubon Volunteer), Mike Feller (NYC Audubon Volunteer), Carla Garcia (NYC Parks), Don Riepe (American Littoral Society)

The number of nesting waders observed in this small colony (Figure 16), first detected in 2013, has fluctuated, reaching a peak of 59 estimated nests in 2017 before declining for several years. In 2022, 40 pairs of two nesting species were recorded, down from 46 pairs in 2022 (13.0% decrease). Black-crowned Night-Heron dramatically declined from 42 pairs to 23 pairs in 2022 (a 45.2% decrease). Great Egret dramatically increased from 3 pairs in 2021 to 17 in 2022 (466% increase).

Herring Gulls appear to have rebounded from 169 in 2021 to 559 in 2022. A total of 147 Great Black-backed Gull pairs were estimated, a decrease from 233 pairs in 2021.

A Common Tern colony has been observed on the island in recent years although the number of pairs was not estimated this year, as this survey was conducted a week earlier than in previous years and Common Tern generally arrive later to this island. A total of 58 American Oystercatchers were observed.

Note - Recreational boaters have been observed walking on the island during the Jamaica Bay surveys; increased signage and increased Park Service presence would be helpful to prevent disturbance of nesting colonies during the breeding season. Research being conducted by multiple organizations should also be coordinated to minimize human visitation to the island.

Incidental species: Fish Crow, Tree Swallow, Red-winged Blackbird, Song Sparrow, Osprey, Gadwall, Yellow Warbler, Boat-tailed Grackle, Common Yellowthroat, European Starling, Mallard, Willet, Semipalmated Sandpiper, American Oystercatcher, Black-bellied Plover, Gray Catbird.

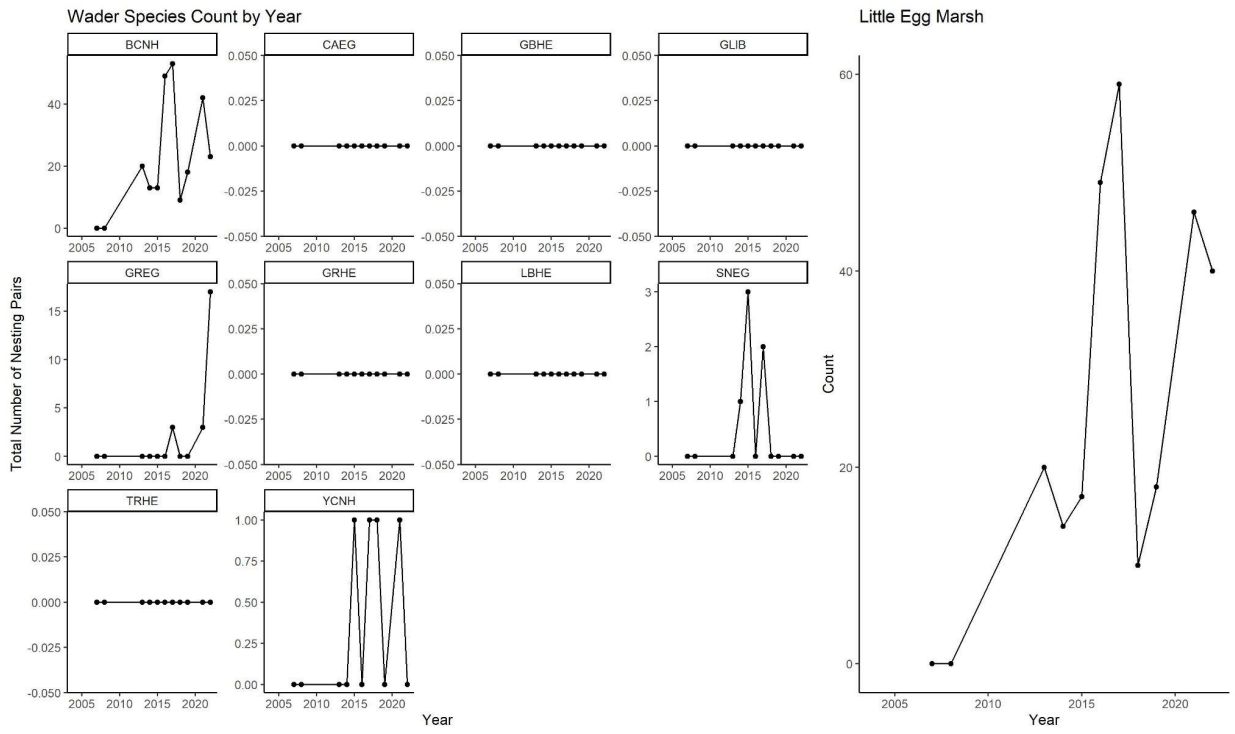

Figure 16. Little Egg Marsh.

Canarsie Pol (220 acres) - **Status:** Surveyed / Inactive
18 May 2022, 12:21pm-12:39pm
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Jessica Wilson (NYC Audubon), Gail Karlsson (NYC Audubon Volunteer), Mike Feller (NYC Audubon Volunteer), Carla Garcia (NYC Parks), Don Riepe (American Littoral Society)

No nesting wader activity was evident on Canarsie Pol in 2022. No breeding has been observed since 2012 (Figure 17). It is unclear why these declines occurred, but the presence of mammals on the island, including raccoons, may have been a primary cause, as has occurred on other nesting islands in the harbor. From 2003 to 2010, this island was one of the largest and most diverse heron colonies within the New York Harbor system.

Incidental species: Mallard, Laughing Gull, Red-winged Blackbird, Willet, Song Sparrow, Tree Swallow, American Black Duck, American Robin, Yellow Warbler, Barn Swallow, Gray Catbird, Osprey, Northern Mockingbird, House Wren, Willow Flycatcher, Eastern Towhee.

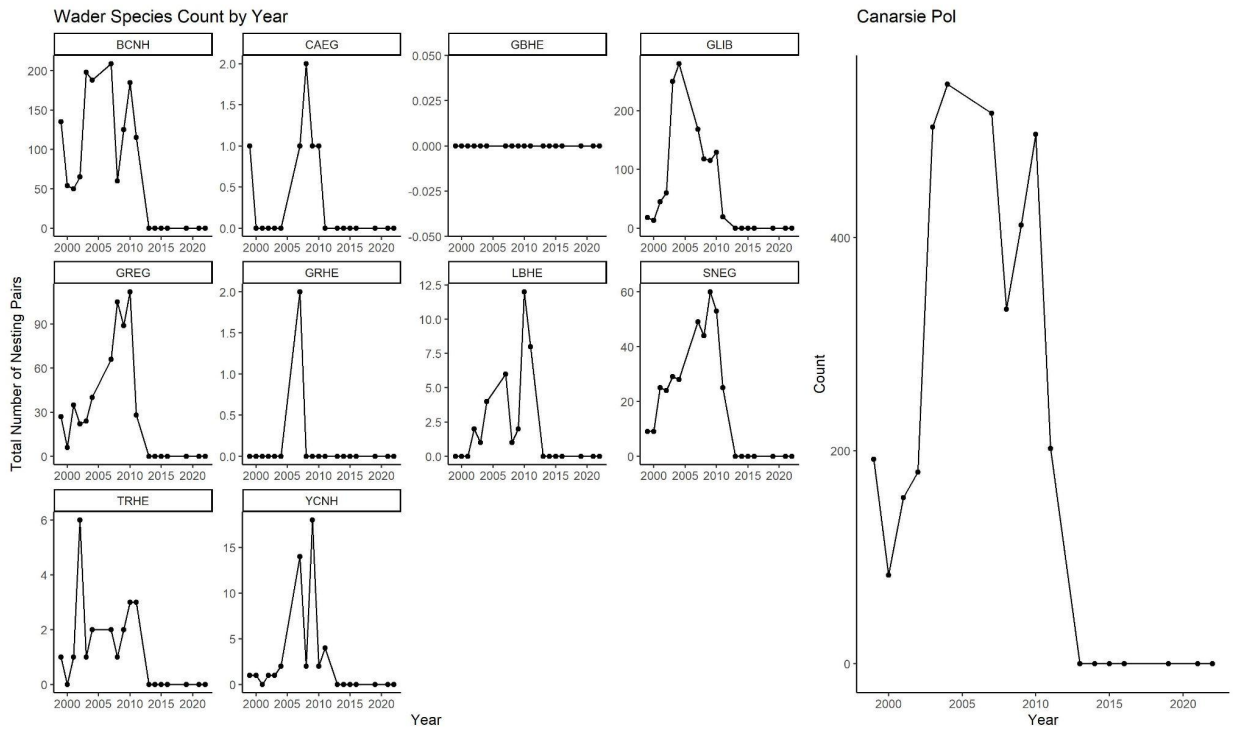

Figure 17. Canarsie Pol.

Ruffle Bar (143 acres) - **Status:** Surveyed / Inactive
18 May 2022, 11:30am-11:59am
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Tod Winston (NYC Audubon), Jessica Wilson (NYC Audubon), Gail Karlsson (NYC Audubon Volunteer), Mike Feller (NYC Audubon Volunteer), Carla Garcia (NYC Parks), Don Riepe (American Littoral Society)

Ruffle bar is the second largest uninhabited island in Jamaica Bay, and has not been found to host nesting waders in the time period of this project. Gulls may be nesting on the island: three Great Black-backed Gulls were observed on the island during our survey. One Canada Goose nest was located.

Raccoons are known to be present on the island. Tracks were found in 2021 and a raccoon was also observed foraging on the shoreline during the 2019 survey.

The number of Osprey nests increased from 3 nests in 2021 to 8 nests in 2022. There was also a Barn Owl observed at a nest box for a second year in a row.

Incidental species: Gray Catbird, Common Yellowthroat, Osprey, Boat-tailed Grackle, Tree Swallow, Northern Mockingbird, House Wren, Red-winged Blackbird, Willet, Laughing Gull, Forster's Tern, Yellow Warbler, Song Sparrow, Barn Owl, Eastern Towhee, Northern Cardinal.

Mainland New York Accounts:

Redfern Houses, Far Rockaway - **Status:** Surveyed / Active
21 May 2022, 9:07am-9:56am
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Mike Feller (NYC Audubon Volunteer)

A total of 31 Yellow-crowned Night-Heron nests were observed, a 34.7% increase from 23 nests recorded in 2021, although 61 nests were recorded in 2019. It is not clear what caused this recent decline, though some construction and tree removal was conducted in 2018 and 2019. NYC Audubon was given the opportunity by NYC Parks to review those plans; it appeared that the affected area and trees were not part of the principal nesting colony. This remarkable colony, located among the buildings of a New York City Housing Authority community, was first detected in 2006. Nests are located primarily in tall interior willow oak and honey locust trees, close to the community buildings.

Local residents and workers have proven to be a good source of information on the behavior and location of these local, distinctly urban colonies. Though many residents seem fond of the birds, there are also many who find the birds to be a nuisance. They tend to be very messy and often defecating along highly trafficked walkways.

Incidental species: American Redstart, Rock Dove, Yellow Warbler, European Starling, Chimney Swift, Northern Cardinal, House Wren.

Hammel Houses, Rockaway Beach - **Status:** Surveyed / Active
21 May 2022, 10:32am-11:20am
Survey Team: Shannon Curley (NYC Audubon), José R. Ramírez-Garofalo (Rutgers University), Mike Feller (NYC Audubon Volunteer)

This colony was first discovered in 2018, though may have been present in previous years. A total of 38 Yellow-crowned Night-Heron nests was observed in this colony in New York City House Authority's Hammel Houses community, down from 42 in 2021. As in 2021, nests were located primarily in Willow Oak trees, also the preferred nesting tree species in the nearby Redfern Houses colony. Almost all nests were concentrated directly over community pathways, which is causing conflict with residents; several individuals complained about the birds' droppings and smell during the survey, though others expressed interest and support.

Incidental species: Scarlet Tanager, Rock Dove, European Starling, Rose-breasted Grosbeak

Species Accounts

The species trends discussed below are based primarily on comparisons of nesting numbers between surveys conducted in 2021 and 2022, though longer-term comparisons are made when considered relevant. Species trends results shown in Figure 18.

Black-crowned Night-Heron (421 pairs): Breeding Black-crowned Night-Herons were observed on 6 islands in 2022. In order of decreasing colony size; South Brother Island (n = 198), Hoffman Island (n = 161), Elders Point East Marsh (n = 29), Little Egg Marsh (n = 23), Elders Point West Marsh (n = 5), and Mill Rock Island (n = 5). Total observed island nesting activity decreased from 537 pairs recorded in 2021. This species has been steadily declining since 1995.

Yellow-crowned Night-Heron (78 pairs): Six pairs were located on South Brother Island. New York City mainland hosted 72 pairs including 3 pairs in Marine Park, which is the first time this location was officially surveyed. Numbers of island-nesting Yellow-crowned Night-Herons have fluctuated over 30 years but have shown a steady decrease since 2010, with only a single HH island observed hosting this species. The largest colony in the survey area in 2022 was the mainland colony at Hammel Houses in the Rockaways (38 nests), with similar numbers recorded since 2019. The older, nearby colony at Redfern Houses increased this year compared to 2021, from 23 nests to 31 in 2022. Great Kills, Staten Island hosted 2 pairs, and there was an additional report of two nests located off of Victory Boulevard close to the College of Staten Islands, although this was not confirmed by NYCA researchers. Yellow-crowned Night-Herons did not nest on Governors Island in 2022.

Great Egret (300 pairs): Great Egrets were observed on five islands in NY/NJ Harbor this year. In order of decreasing colony size, Hoffman (n = 156), South Brother (n = 55), Elders Point West Marsh (n = 50), Elders Point East (n = 22), Little Egg Marsh (n = 17). Great Egrets were not observed on Mill Rock this year. This species' declined from 370 pairs in 2021. While Great Egrets have experienced a general positive increase over the past 35 years, recent years show a population that is now declining Great Egrets appear to shift their breeding locations around the harbor. This year 5 islands hosted this species (Hoffman, South Brother, Elders Point West Marsh, Elders Point East and Little Egg Marsh). Elders Point East again increased with breeding bird activity with very low activity on two islands that have been considerably more productive in the past: Elders Point East Marsh and Mill Rock Islands—as well as on Little Egg Island. No nesting activity was observed this year on the previously productive Huckleberry or Goose Islands. The Great Egret population rebounded since 2019 on Hoffman Island, but remained stable compared to 2019 on Subway, South Brother, and Elders Point West Marsh Islands.

Snowy Egret (284 pairs): Snowy Egrets nested on four islands in NY/NJ Harbor in 2022 (in order of decreasing colony size, Elders Point East Marsh, Hoffman Island, South Brother Island

and Elders Point West Marsh. This year's count of 284 pairs represents a 19.3% increase from 238 pairs in 2021. Despite year-to-year fluctuations, the population of this species has remained fairly stable over the history of this survey. (See Figure 18) The Snowy Egret, like the Great Egret, has continued to move its centers of nesting activity throughout the harbor, and has recently abandoned several nesting islands: formerly productive colonies (Huckleberry, Goose, and Mill Rock Islands) remained inactive in 2022. The Elders Point East Marsh Island colony, abandoned in 2019, experienced the greatest increase in nesting pairs from 2021, from 52 to 109 pairs. Hoffman Island nesting pairs also increased from 68 pairs to 92 pairs. South Brother Island pairs continued to decline from 81 pairs to 57 pairs.

Little Blue Heron (8 pairs): Little Blue Herons were observed on Hoffman and Elders Point East Marsh Islands in 2022, and not found this year on Elders Point West Marsh. 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.

Cattle Egret (2 pairs): Two pairs of Cattle Egrets were observed on Hoffmand Island this year. Although they were not recorded on the 2021 survey, one breeding-plumaged Cattle Egret was observed during the 2019 survey on Hoffman Island, which represented the first time this species had been observed during the nesting survey since 2010, when one pair was estimated on Canarsie Pol. (Cattle Egrets previously bred in low numbers on Hoffman Island from 2001 to 2005.) The harbor-wide breeding Cattle Egret population declined to 0 in 2011 from a high of 266 nests on two islands (Prall's and Shooters islands) in 1985. A possible cause of this decline was closure of local landfills that were a foraging source.

Tricolored Heron (0 pairs): No Tricolored Herons were observed this year during the Jamaica Bay surveys. This species has been consistently found in the Bay in very low numbers in recent years. This is a species more typical of southern colonies, and no increasing trends in NY Harbor have been observed since the first nesting recorded here during this study period, in 1999. The first record of Tricolored Herons nesting in NY/NJ Harbor occurred in 1955 on Ruler's Bar Hassock in Jamaica Bay. Nesting for this species has also been observed in colonies in Long Island's Great South Bay (McGowan and Corwin 2008).

Green Heron (1 pair): a single Green Heron was observed on Subway Island. This species has been noted on Subway Island for several years in low numbers and was the only wader present after this colony abandoned the island.

Great Blue Heron (1 pair): Two Great Blue Heron adults were observed on Hoffman Island this year. This is only the third confirmed nesting of this species on the islands during the entire period of the survey; one pair was found nesting on Goose Island in 2011 and 2012. It is also possible that a Great Blue Heron pair nested on South Brother Island in 2019, post-survey; a

photo of a bird was captured on a “camera trap” on the island in July 2019. A Great Blue Heron pair nested for six consecutive years in Staten Island’s Clove Lakes Park, from 2013 to 2018, but nesting has not been confirmed at this site since 2019.

Glossy Ibis (89 pairs): Glossy Ibis nests were recorded on only two islands, Elders Point East Marsh and Elders Point West Marsh. This is the first time since the Hoffman Island surveys that Glossy Ibis nests were not observed. The total of 89 nests represents a 14.2% increase, however, this increase should be interpreted with caution, as many of the observations from Elders Point East Marsh were from large adult counts flying over the disturbed island, however very few nests were located on the island itself. This species nests particularly low in vegetation, and over several years have experienced sharp declines on Hoffman and Subway Island.

Double-crested Cormorant (2,989 pairs): Double-crested Cormorant nests were observed on seven of the twenty islands surveyed for cormorant nesting activity in 2022 (in order of decreasing colony size, Hoffman, Swinburne, Elders Point West Marsh, South Brother, Mill Rock, U Thant Islands and Elders Point East Marsh). This year’s count represents a 2.7% increase since 2021, continuing an increasing trend across the harbor exhibited since 2005. This increase has continued despite the recent abandonment of longtime colonies Huckleberry and Shooters Islands. This species has appeared to recolonize Elders Point East Marsh, which was deserted in 2016, and has continued to rapidly expand on Elders Point West Marsh. The Hoffman Island colony decreased by 279 nests in 2022, the largest colony that has experienced rapid growth in recent years. As pertains to island cormorant colonies, this year’s island-nesting total of 2,989 pairs is the highest count registered during the period of this survey. Double-crested Cormorant colonies must continue to be carefully monitored to determine the potential impact of cormorant nesting activity on wader nesting populations.

Herring and Great Black-backed Gulls: Gulls were monitored using adult counts, nest counts, or both whenever possible. We report only nest counts here. A total of 269 Herring Gull nests were recorded on Swinburne Island, Hoffman Island, South Brother Island and Mill Rock Island representing an 89% increase from 2021. A total of 71 Great Black-backed Gull nests were recorded on Swinburne Island, Mill Rock Island, Hoffman Island and South Brother Island representing a 57.2% decrease from 2021.

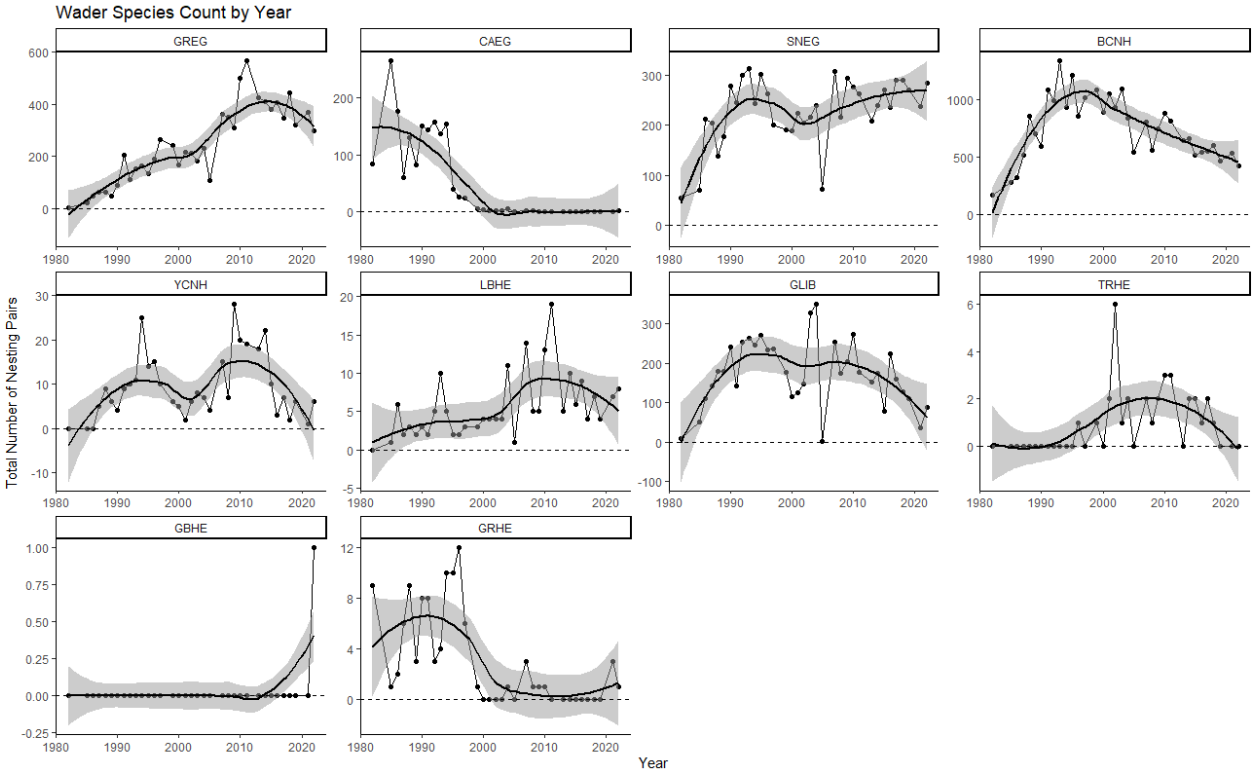

Figure 18. Total number of nesting wading pairs per species across all Harbor Heron Islands (excludes mainland locations). Notice that the y-axis is scaled differently for each species. Dashed line is y = 0.

Conclusions and Recommendations

Harbor Heron wading bird populations are declining. In 2022, nine species of long-legged wading birds were confirmed breeding on six of the nineteen islands surveyed in New York Harbor.

Nine wader species were recorded on the survey, in order of decreasing abundance on island colonies, Black-crowned Night-Heron, Great Egret, Snowy Egret, Glossy Ibis, Little Blue Heron, Yellow-crowned Night-Heron, Green Heron, Great Blue Heron. This year's total of 1,116 nesting wader pairs is the second lowest survey count (the lowest count being 2019) recorded since 1987, when years with substantial uncertainty or gaps in the data (1998, 2006, 2012, 2020) are excluded.

Hoffman Island hosted the most pairs of wading birds in 2022, 422 pairs up from 372 pairs in 2021. South Brother Island decreased its number of wading bird pairs from 392 in 2021 to 316 in 2022. Elders Point East Marsh continues to grow after its abandonment in 2016. This year, Elders Point East hosted 283 pairs of nesting waders, up from 121 in 2021. Elders Point West also hosted a larger number of waders this year, 93, up from 63 in 2021. Little Egg Marsh populations decreased, from 46 pairs to 40 pairs. Perhaps the most alarming observation in 2022 was the complete abandonment of Subway Island in Jamaica Bay, which previously hosted 197 pairs in 2021 but had been experiencing notable declines since 2009.

This year, Black-crowned Night-Herons showed the steepest decline (21.6%) from the 2021 survey, followed by a decline in Great Egret nesting pairs (18.9%). Snowy Egret nesting pairs increased 19.3% from 2021 and Glossy Ibis, whose numbers have fluctuated greatly over the past decades, increased 14.2 %, however this increase should be interpreted with caution, as many of these were adult counts of birds flying over the islands. This was the first year that Glossy Ibis was not recorded on Hoffman Island. Yellow-crowned Night-Heron numbers appear to have increased harbor-wide, though this species has shifted its population from island to mainland colonies in recent years, the number of mainland pairs has declined since 2019. Little Blue Heron and Green Heron continue to nest in low numbers. Tricolored Heron was not observed in 2022. Two pairs of Cattle Egrets were observed on Hoffman Island, which were not recorded in 2021. A single pair of Great Blue Heron were found nesting on Mill Rock Island, representing the first record of this species nesting in New York County.

It is normal for waterbird colonies to move from island to island over time. However, it is imperative that a large number of suitable nesting islands remain available for these birds to continue to colonize and recolonize, and that when islands are abandoned, other suitable nesting islands continue to remain available. NYC Audubon is currently conducting an in-depth nesting population trend analysis to determine statistical significance and environmental correlates of trends. Continued monitoring of wader populations through nesting surveys is a necessary step to comprehend species status, population trends, and overall health and persistence of the system. Further, monitoring of mammalian predators should occur to determine the threat presented by mammalian predator presence on the harbor islands.

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

1. A greater emphasis on developing methods of the documentation of mammalian predators. Suggestions include a) formally recording data on Harbor Heron datasheets. b) training volunteers and provide volunteers with visuals (id cards) of tracks / scat of common mammals that can potentially be recorded on islands (eg. raccoon, opossum). c) encourage volunteers to take pictures and document tracks/scat/predated nests and gps locations.
2. A repeatable method to large survey islands with dense vegetation is required. Many researchers face the somewhat intractable problem of surveying islands heavily colonized by invasive species and/or dense undergrowth. NYC Audubon has received a NPS permit for implementation of a grid system of directionally marked posts on Hoffman Island, and has been in discussion with NYC Parks to implement a similar system on South Brother Island. This system should 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, and add a valuable spatial component to the dataset. An additional, and quickly implemented approach would be to grid islands on georeferenced aerial photos / shapefiles and assign groups to cover these locations, keeping track with handheld GPS.
3. Rapid vegetation assessments that can be done quickly, without adding to time-sensitive surveys. These are surveys which can provide information about how vegetation structure is changing on the islands and can be quickly implemented for non-botanist. A rapid assessment consisting of a radius around a randomly sampled GPS point which records percent composition of variables such as % shrubs, % bare ground, % canopy vegetation can be easily implemented and quickly assessed by staff and trained volunteers.

A relevant 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, gulls, and other waterbirds has been observed on Ruffle Bar, Canarsie Pol, and Goose, South Brother, Huckleberry, and Mill Rock Islands. Efforts to quantify mammalian presence throughout the year using camera trapping 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 nesting islands at a considerable distance from the mainland, appropriate control methods could include live capture and relocation of mammals. For islands that mammals can reach more readily, control methods such as exclosures around nesting trees may be more appropriate. The colonies in Jamaica Bay and on Hoffman Island account for over 66% of the harbor-wide wading bird population, yet there is increasing evidence of raccoon colonization of the islands in Jamaica Bay and ground nesting birds are in decline on Hoffman Island, potentially indicating mammalian predator presence. A significant portion of the harbor's wading bird population is at risk due to racoons.

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 islands 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 in addressing unauthorized visitation of islands is the placement of 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. (Additional signage is included in the previously mentioned plans for grid systems on Hoffman and South Brother Islands.) In addition to signage, managing agencies and stakeholders should establish a dialogue with law enforcement entities that patrol NY/NJ 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, wild 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 and 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. NYC Audubon's programming and collaboration with community organizations create opportunities for community and educational outreach through participation in birding events as well as 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 the danger to colonies easily remedied, without resorting to regulatory enforcement.

The Harbor Herons Conservation Plan was published in 2010 (Elbin and Tsipoura, Eds. 2010). Efforts are under way 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, many of which include banding initiatives of multiple species at nesting islands throughout the NY/NJ Harbor. In recent years, color bands have been affixed to young-of-the-year Double-crested Cormorants, Great Egrets, Snowy Egrets, Glossy Ibis, and Herring Gulls. Wing tags (yellow) were used as a means of Great Egret identification in 2012-2015. USGS metal bands without color have been used on Herring Gulls, Great Black-backed Gulls, and Black-crowned Night-Herons. Color band re-sightings of any of these species should be communicated to NYC Audubon (bands@nycaudubon.org), giving leg band or wing tag code, color, location, date, and name of observed. All band sightings should be reported to the Bird Banding Laboratory by visiting www.reportband.gov or calling 1-800-327-2263.

Additional recommendations and goals are as follows:

- Complete the analysis and summary of data from the New York City Audubon Harbor Herons Nesting Surveys (1986-present).
- 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.

- 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 in the NY/NJ Harbor area at high school, undergraduate, and graduate levels.
- Examine relationships between or among metropolitan NY/NJ area colonies and colonies in 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.
- Outreach to the local birding community would be helpful to learn about the location of mainland wader colonies (principally Green Heron and Yellow-crowned Night-Heron) in the NY/NJ Harbor area.
- Provide guidance for continued tern habitat enhancement on Governors Island.

New York City Audubon's Harbor Herons Project has included additional programs in recent years (i.e., the Harbor Herons Foraging Study) that allow for greater public participation and awareness of the "Harbor Herons," and have strengthened NYC Audubon's role as an advocate for conserving NY/NJ Harbor's wader populations. New and vital collaborations between NYC Audubon and other organizations (i.e., New Jersey 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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