NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, Bureau of Wildlife
625 Broadway, 5th Floor, Albany, NY 12233-4754
P: (518) 402-8883 F: (518) 402-8925
www.dec.ny.gov

MID-SUMMER SWAN SURVEY, 2023

New York State Department of Environmental Conservation
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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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Introduction

Mute swans (*Cygnus olor*) have been present in North America since the late 1800s. They are not native to New York State, but were brought over from Europe to beautify ponds on private estates in the lower Hudson Valley and on Long Island. In the early 1900s, some captive mute swans escaped or were released by property owners forming feral populations. Once mute swans became feral, they began nesting in the wild and established a population that grew to more than 2,000 birds statewide by 1990 (Figure 1). Currently, mute swans inhabit Long Island, the Lower Hudson Valley, the Upper Hudson Valley, western New York's Lake Ontario region, and a small number of birds have been observed in western NY outside of the lake region. All free-flying mute swans living in the state today are descendants of birds that were released or escaped from captivity.

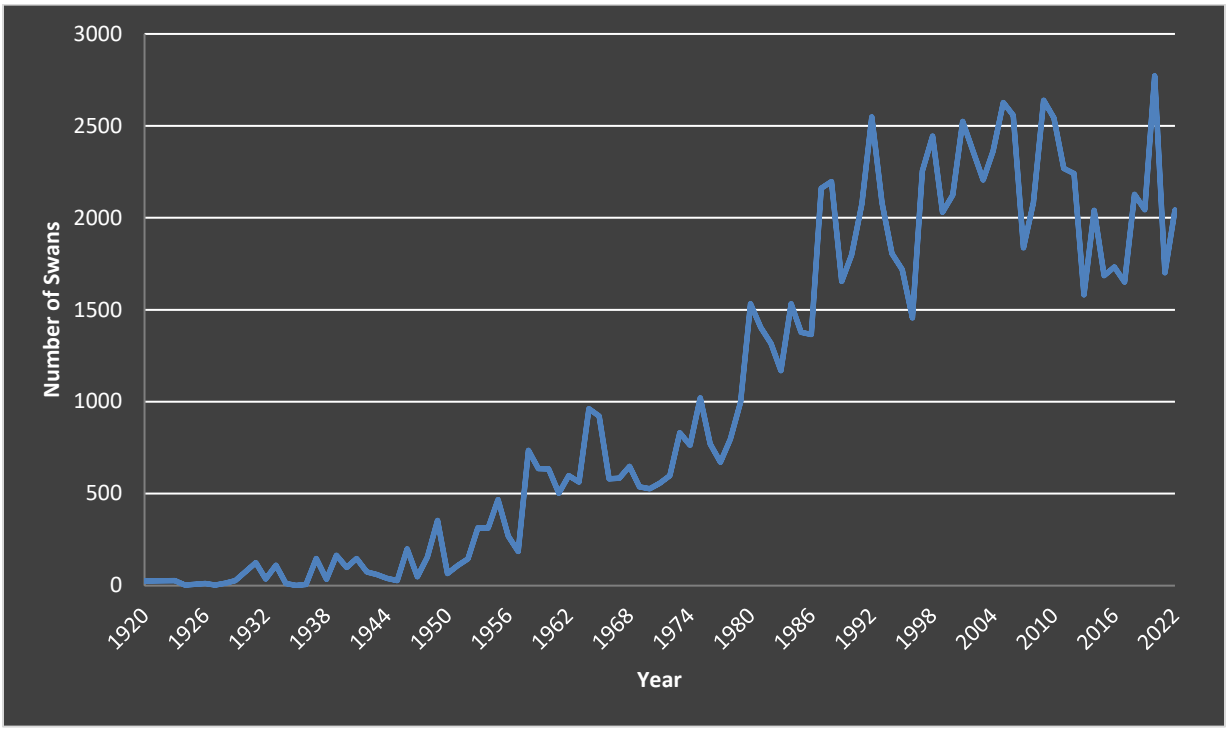

Figure 1. Total number of mute swans counted during Christmas Bird Counts in New York State, 1920-2022 (source: National Audubon Society, Christmas Bird Count Historical Results [Online], http://netapp.audubon.org/cbcobservation, accessed October 2023).

The New York State Department of Environmental Conservation (DEC) manage mute swans as two distinct populations in New York: the historic downstate population and the more recent upstate population. The downstate population occurs on many inland and coastal waterbodies around Long Island (Nassau and Suffolk counties), New York City (Bronx, New York, Richmond, Kings, and Queens counties), and in the four lower counties of the Hudson Valley (Westchester, Rockland, Orange, and Putnam). This population was estimated at approximately 500 birds in the early 1970s but, expanded northward and grew to more than 2,000 birds by the early 2000s (Figure 2).

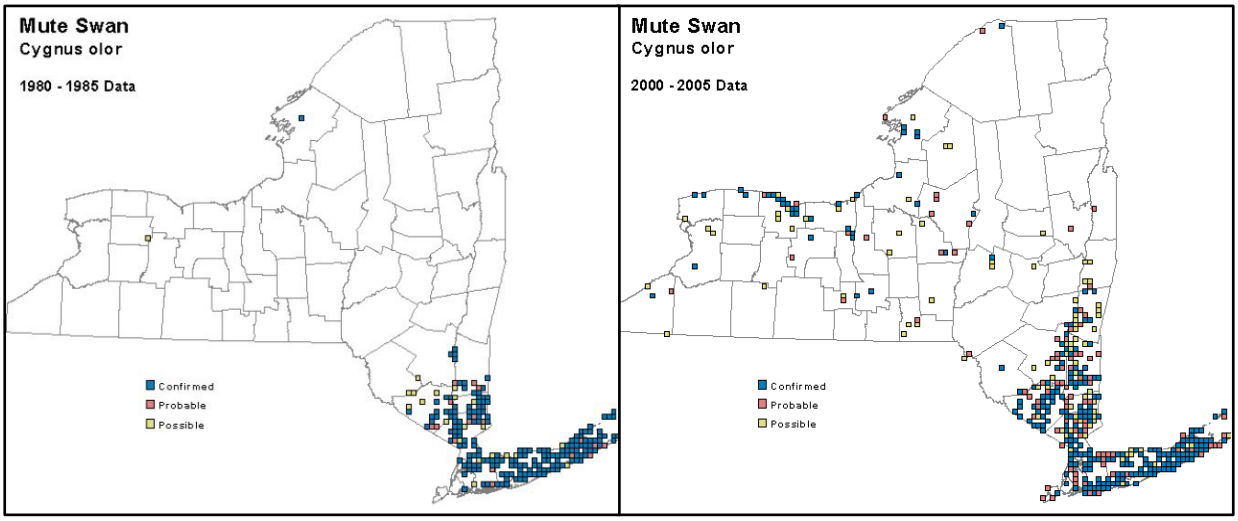

Figure 2. Breeding distribution of mute swans based on New York State Breeding Bird Atlas data, 1980-1985 (Andrle and Carroll 1988) and 2000-2005 (McGowan and Corwin 2008).

The upstate population includes all the remaining counties in New York State north and west of Orange and Putnam. A population became established around Lake Ontario in the late 1980s, presumably from birds that came across the lake from Ontario (Figure 2). This population grew from just a few pairs in 1990 to more than 300 birds in winter 2007 (NYSOA 2017; http://nybirds.org/ProjWaterfowl.htm). Free-ranging mute swans continue to appear at new locations upstate, often from unknown sources.

Since 1986, DEC has conducted mute swan surveys every three or four years as part of the Atlantic Flyway's Mid-Summer Mute Swan Survey to assess the population of the species. In 2017, DEC began surveying every two years to more closely monitor breeding mute swan population changes.

In addition, beginning in 2017, trumpeter swans were recorded when observed. Trumpeter swans (*Cygnus buccinator*) are native to North America and nest in a few locations around Lake Ontario. Trumpeter swan numbers in New York have fluctuated at approximately 50 birds since 2010 (Swift et al. 2013).

Methods

Surveys were run from July 31 – August 28, 2023. Surveys were conducted by 1-3 observers depending on the size of the waterbody. Observers documented all swans they observed (mute and trumpeter), the number of adults, number of cygnets, and the number of broods. Observers also documented what portion of the waterbody that was visible/surveyed, and the approximate latitude/longitude centroid of each wetland surveyed.

Due to the uneven distribution of swans across the landscape, DEC used all available information regarding the current and potential distribution of mute swans in New York

to maximize survey coverage in areas that are known to be, or are potentially, inhabited by swans. DEC used e-bird observations (https://ebird.org/home) from the past five years (2019 – 2023) during the summer months, observations/reports from the public, and staff observations. DEC's goal was to survey all areas in the state where mute swans have been reported in the past five years, and areas where there was reason to believe swans are likely to be found.

Individual surveys were conducted by vehicle, boat, on foot, or by fixed-wing aircraft. The appropriate methodology for each site was determined by the observer. The survey timing was selected to capture the summer molting period when most swans are flightless and thus minimizing the likelihood of counting the same swans at multiple sites. In some instances, a combination of two survey types was used to ensure the greatest survey coverage of each wetland. Every effort was made to observe the entirety of a waterbody that swans were believed to inhabit. When the entire waterbody was not surveyed (e.g., access issues, unable to gain permission from landowners, etc.), the observer recorded the estimated proportion of the waterbody observed.

Both species of swan found in New York during the summer months are large conspicuous white birds that are unlikely to be missed by observers if they are in the open water. Other studies have examined the detection probability of land-based waterfowl surveys and found detection to be greater than 90% for more secretive, smaller, and less conspicuous species of ducks (Pagano and Arnold 2009). We assume detection was likely greater than 90%. Any bias in the sampling design would potentially cause an underestimation of the population; therefore, the results of this study represent a *minimum* population estimate.

The surveys were conducted across New York State by DEC staff with assistance from New York City Department of Environmental Protection (NYCDEP), the United States Fish & Wildlife Service (USFWS), and the Port Authority of New York and New Jersey (PANYNJ).

Results and Discussion

DEC surveyed a total of 508 locations across New York State (Figure 3). Of these 508 locations, mute swans were observed at 165 locations in numbers from a single swan to more than 250 at a single site. In total, 1,905 mute swans and 53 trumpeter swans were observed (Table 1). Since DEC isn't planning to manage mute swans on Long Island, efforts were reduced to only aerial surveys for Nassau and Suffolk counties. As a result, survey numbers are lower in 2023 compared to previous years.

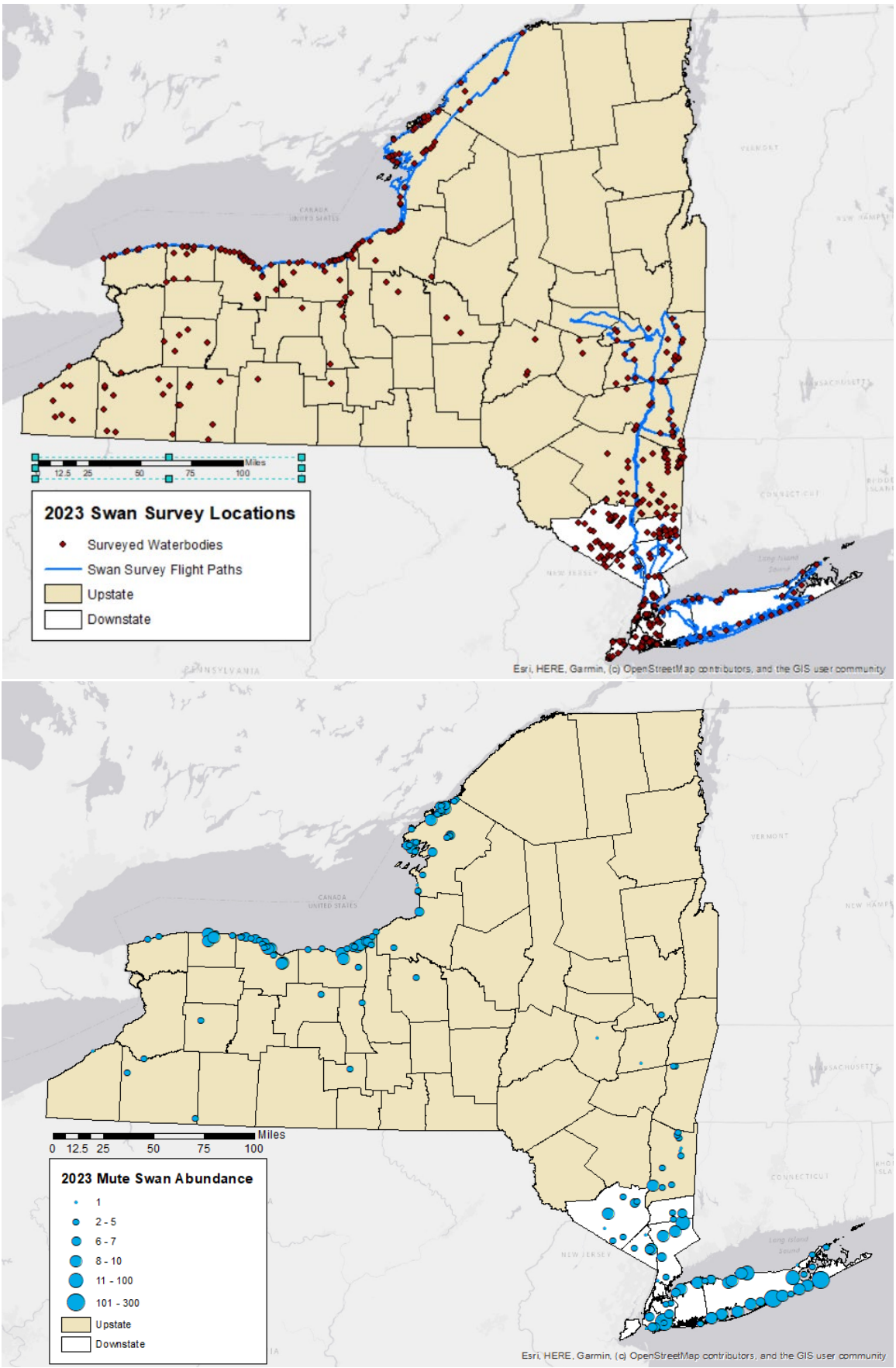

Figure 3. 2023 Swan Survey Locations (top) and Mute Swan Abundance (bottom).

Table 1. Mute and Trumpeter Swan abundance by management region from the 2023 Mid-summer Swan Survey.

	Mute Swans				Trumpeter Swans			
Management Region	No. of Adult	No. of Broods	No. of Cygnets	Total	No. of Adult	No. of Broods	No. of Cygnets	Total
Upstate	380	62	193	573	36	5	17	53
Downstate	1203	44	129	1332	0	0	0	0
Total	1583	106	322	1905	36	5	17	53

With 1,332 birds observed, the downstate region remains where the greatest number of mute swans exist. This number continues to remain highest despite reduced survey efforts on Long Island.

Upstate, where mute swans have invaded more recently, the population has increased to nearly record highs. During the 2014 population survey, staff counted just 39 mute swans along the Lake Ontario shoreline. During the 2017 population survey using the same methodology and covering the same area, 234 mute swans were counted, a 500% increase in just 3 years. Much of the apparent population growth is likely the product of dispersal and range expansion of mute swans in southern Ontario that have increased from 1,193 to 2,363 during the same time-period (unpublished report; Badzinski 2017). In 2019, 341 mute swans were counted, followed by a total of 533 observations in 2021, demonstrating a 56% increase (Table 2). The significant increase was concerning to managers. Unchecked population growth has the potential to result in significant adverse ecological impacts on Lake Ontario embayments. In 2023, 428 swans were observed on the Lake Ontario shoreline, a 20% decrease from the 2021 survey (Table 2). This decrease is likely due to the implementation of the mute swan management plan written in 2019.

Statewide, mute swan numbers trended upwards from the early 2010s until 2021. The decrease in downstate observations in the 2023 swan survey is a result of a partial survey on Long Island. Upstate and along the Lake Ontario shoreline, the decrease may be due to the development of a mute swan management plan.

The next summer swan survey is scheduled for August 2025.

Table 2. Total number of mute swans counted during the 2017, 2019, 2021, and 2023 Mid-summer Swan Surveys in the upstate region including the Lake Ontario Shoreline, Inland Areas, and Hudson River Valley.

Locations	Year	No. of Adults	No. of Cygnets	Total	% Change since previous survey
Lake Ontario Shoreline	2017	156	78	234	-
	2019	230	112	342	46%
	2021	397	136	533	56%
	2023	286	142	428	-20%
Inland Areas	2017	31	11	42	-
	2019	22	7	29	-31%
	2021	34	31	65	124%
	2023	64	40	104	60%
Hudson Valley	2017	28	23	51	-
	2019	34	22	56	10%
	2021	48	23	71	27%
	2023	30	11	41	-42%
Total	2017	215	112	327	-
	2019	286	141	427	31%
	2021	479	190	669	57%
	2023	380	193	573	-14%

Table 3. Mid-summer Mute Swan counts, 1986-2023.

Year	No. Adults	No. Broods	No. Cygnets	Total Swans	Cygnets/brood
1986[1]	1,609	62	206	1,815	3.32
1989	1,748	58	157	1,905	2.71
1993	1,823	79	246	2,069	3.11
1996	1,421	NA[2]	223	1,644	2.71
1999	2,206	79	223	2,429	2.82
2002	2,520	102	328	2,848	3.22
2005	1,879	97	267	2,146	2.75
2008	2,311	106	313	2,624	2.95
2011[3]	1,601	85	228	1,829	2.68
2014[4]	1,176	63	169	1,345	2.68
2017	2,140	104	328	2,468	3.15
2019[5]	2,128	144	404	2,539	2.76
2021[6]	2,856	114	601	3,457	3.18
2023[7]	1,583	106	322	1,905	3.04

[1] The first survey (1986) was completed entirely by aircraft and was limited to the Hudson River and Long Island coastal areas. Coverage was expanded in 1989 and subsequent years to include additional inland areas wherever mute swans were known to occur.
[2] Total number of broods was not accurately determined in 1996, so the calculation of cygnets/brood was based on 52 known broods with a total of 140 cygnets.
[3] Surveys were incomplete in 2011 due to impacts of Hurricane Irene in the Hudson Valley region.
[4] Partial count - Lake Ontario and Long Island were the only areas surveyed in 2014.
[5] In 2019, there were 7 cygnets observed that the number of broods could not be determined for, so they were not included in the total number of cygnets per brood.
[6] In 2021, there were 239 cygnets observed that the number of broods could not be determined for, so they were not included in the total number of cygnets per brood.
[7] In 2023, only part of Long Island was surveyed.

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