



One day old piping plover chick from Island Beach State Park. Photo credit: Kevin Knutsen

2017 NJ Beach Nesting Bird Project Report

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The New Jersey Division of Fish and Wildlife – Endangered and Nongame Species Program (NJDFW-ENSP) is responsible for the monitoring and management of beach nesting birds on all state, county and municipal sites and the collation of data for all sites in the state (including federal and private properties). This report offers a summary of nesting in NJ in 2017 for the four primary species that comprise this group – piping plover (federally threatened, state endangered), black skimmer (state endangered), least tern (state endangered) and American oystercatcher (species of special concern).

Due to a constraint on resources, not all potential sites in the state were surveyed for all species. All known nesting sites for piping plover and least tern were monitored. All known beach strand and some marsh island colonies nesting sites for black skimmer were monitored. All known beach strand nesting sites for American oystercatcher were monitored but only a small number of marsh island sites were monitored.

Each species has slightly different nesting phenology and habitat requirements and some species are solitary nesters (plovers and oystercatchers) while others are colonial (terns and skimmers). These differences can lead to not only distinctive management strategies but also to vastly disparate reproductive outcomes (at a given site, one species may be successful while another may fail). Therefore, it is difficult to formulate conclusions for the group so results are presented by species.

However, there were a across species commonalities. Most species experienced moderate success, although in lower rates than in the last few years. After a period of relatively weak influence, flooding and storm related issues (such as eggs being buried by high winds and sand) were once again a major contributor to nest failure among colonial nesting birds and a larger factor in piping plover and American oystercatcher productivity than in the years since Hurricane Sandy. Predation continued to be a serious impediment to high reproductive output for most species. Direct human disturbance continues to be a factor – fencing has prevented most cases of nests being stepped on or otherwise destroyed but dogs, harassment by beachgoers and the pressure on these habitats by human recreational activities are sizeable obstacles for chicks and adults.

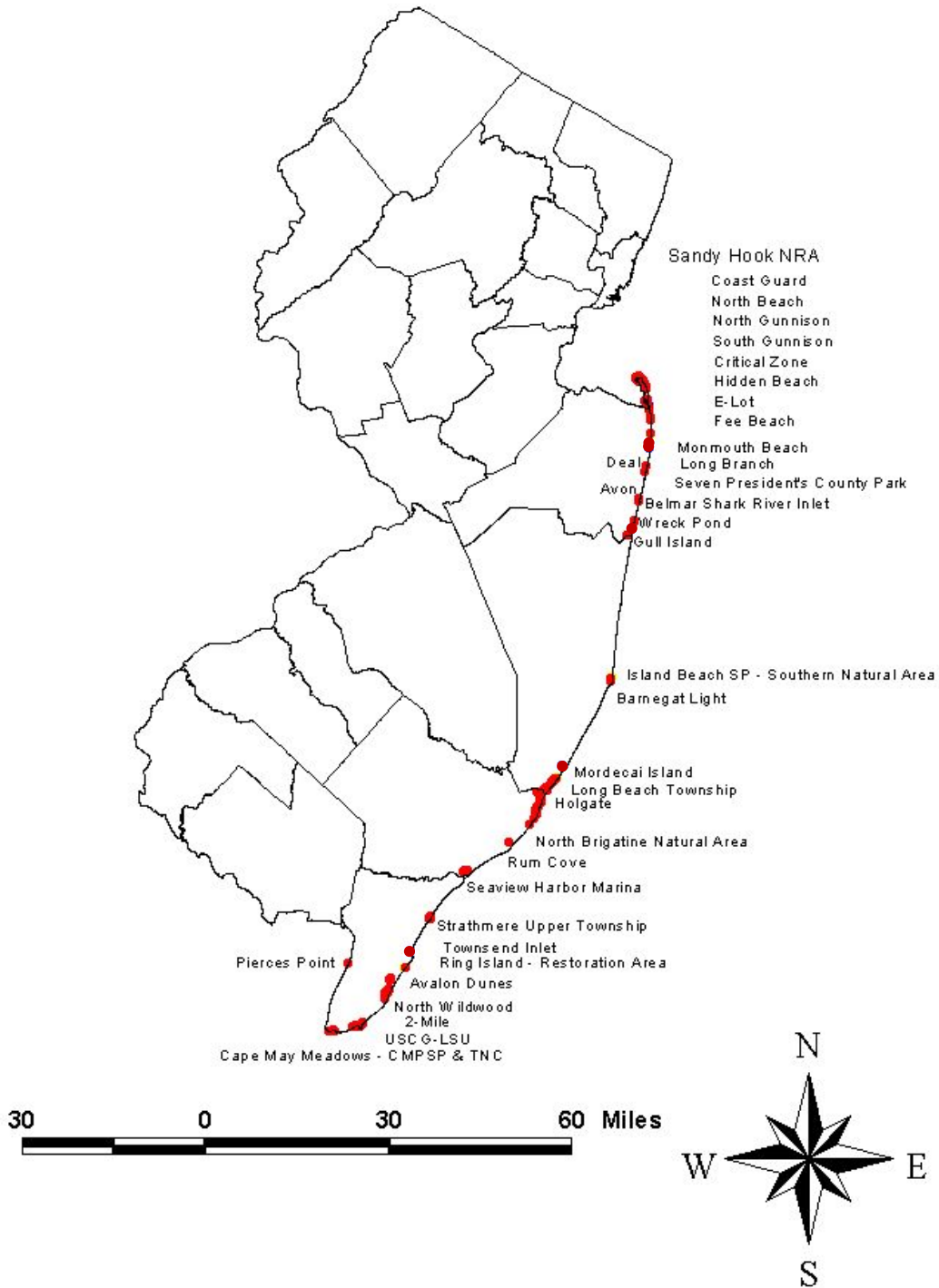
The NJDFW-ENSP does not own any of the property that it manages for these species so relationships with landowners and interested parties is paramount to a successful season. The staff of NJDFW-ENSP and the Conserve Wildlife Foundation of NJ worked hard to create and/or strengthen relationships this year with federal, state, county and municipal landowners, state and federal regulatory and engineering agencies and environmental consultants. We were deeply appreciative of the cooperation from these entities that resulted in the successes that were had.

**** Special thanks to Emily Heiser and Alfred Breed for their help in compiling the information in this report.***

Data from partners was provided by USNPS -Gateway National Recreation Area – Sandy Hook Unit, USFWS – Edwin B. Forsythe National Wildlife Refuge & Cape May National Wildlife Refuge, The Nature Conservancy, The Wetlands Institute and the New Jersey Audubon Society.

A more detailed report for Piping Plover is available through the Conserve Wildlife of NJ website or can be requested through NJDFW-ENSP.

NJ Beach Nesting Bird Sites: 2017



** This map represents all the beach strand sites that were regularly visited and where management (ie fencing, closures) occurred. It does not show all marsh islands that were monitored.*

Piping Plover Nesting Summary

- One hundred five (105) pairs of piping plovers nested in New Jersey in 2017, a 9% decrease from 2016 (115). This decrease was not expected given the strong reproductive rate in 2014-16 and is both alarming and without explanation.
- The total number of adults recorded for the entire nesting season (227) was somewhat higher than during the date-restricted survey conducted June 1-9 (222). Likewise, the number of pairs tallied during the entire nesting season (105) was very similar to the pairs recorded during the date-restricted census (104). There were a higher than average number of unpaired adults tallied in 2017 (14 during census, 16 for end of season).
- Pairs nested at 20 sites statewide, same as 2016, but well below the peak count of 30 sites recorded in both 2004 and 2005. Much of this loss has been sustained at Cape May County sites.
- Statewide pair-nest success (the percentage of pairs that successfully hatch at least one nest) decreased in 2017 compared to 2016 (78% vs. 90%, respectively), but still above-average for the period since federal listing (69%). Looking at just NJDFW-monitored sites, 2016 pair-nest success (86%) was higher than the state-wide tally and when compared to the period since federal listing (67%) but lower than 2016 (93%).
- The statewide productivity rate was 1.29 fledges/pair, a slight decrease from 2016 (1.35 fledges/pair). Productivity at NJDFW-monitored sites (1.79 fledges/pair for 29 pairs) was below the 2016 metric (1.89 fledges/pair) but above the 2017 statewide tally, an unusual occurrence. This was the fourth consecutive year of strong productivity for piping plover, above the long-term average in New Jersey (1.01 fledges/pair) and well above the levels believed necessary to maintain a recovery unit-wide stationary population (~1.00 fledges/pair). The discouraging, and unexpected, result in 2017 was that the previous year's robust productivity did not lead to an increase in pair numbers in 2017. It is not well understood why this occurred but it is also notable that there were a larger number than average of unpaired adults as well as pairs where a nest was never detected (a pair is not counted to the state total unless nesting is confirmed).
- NJDFW continued to use predator exclosures judiciously in 2017 with 60% of nesting attempts were exclosed (statewide was 69%). The exclosed hatch rate for NJDFW nests was 88% (statewide was 73%). The NJDFW unexclosed hatch rate was 25% (statewide was 17%) and of the NJDFW nests not exclosed, 19% were lost to depredation (statewide was 33%).
- NJDFW purchased radio transmitters and GPS data loggers in support of the State University of New York (SUNY)–Syracuse's piping plover chick mortality research project. In 2017, 21 chicks were equipped with traditional VHF tags and 11 adult males were outfitted with GPS data loggers using a novel attachment method for this species (leg harness). No problems were detected with this method. Of the 21 chicks outfitted with transmitters, 13 chicks fledged, two were lost and the fate could not be determined, one tag fell off the chick before it perished, and one tagged chick was taken to rehab with a broken leg (possibly from ghost crab attack) and later expired. Four fates were determined using this method – two from ghost crabs, one from great horned owl and one from mink. Data from the adults will not be available until 2018.
- There continued to be an increase in pairs on state and municipal sites, reducing the concentration of pairs on federal sites. However, the majority of plovers (72%) are still nesting at two federal sites (Gateway NWA – Sandy Hook and EB Forsythe NWR) and the severe decline of nesting plovers in Cape May County continues to be of dire concern (four pairs in 2017, compared to 43 pairs in 2002).

New Jersey piping plover nesting summary by site: 2017

SITE	Pairs	Pairs Hatched	Chicks Fledged	Pair Success	Fledge Rate	SP Fledge Rate
Sandy Hook NRA	40	35	45	0.88	1.13	1.29
<i>Coast Guard</i>	3	3	3	1.00	1.00	1.00
<i>North Beach</i>	13	11	16	0.85	1.23	1.45
<i>North Beach Recreational</i>	1	1	2	1.00	2.00	2.00
<i>North Gunnison</i>	6	6	11	1.00	1.83	1.83
<i>South Gunnison</i>	5	3	1	0.60	0.20	0.33
<i>Critical Zone</i>	5	5	8	1.00	1.60	1.60
<i>Hidden Beach</i>	3	3	0	1.00	0.00	0.00
<i>Fee Beach</i>	3	2	2	0.67	0.67	1.00
<i>South Fee Beach</i>	1	1	2	1.00	2.00	2.00
Sea Bright North	10	10	26	1.00	2.60	2.60
Monmouth Beach North	3	3	2	1.00	0.67	0.67
7 President's Park	1	1	1	1.00	1.00	1.00
Region 2 Subtotal	54	49	74	0.91	1.37	1.51
Island Beach SP SNA	1	1	1	1.00	1.00	1.00
Barnegat Light	5	5	8	1.00	1.60	1.60
Region 3 Subtotal	6	6	9	1.00	1.50	1.50
Long Beach Township	1 ¹	1	4	1.00	4.00	4.00
EB Forsythe NWR	37	22	38	0.59	1.03	1.73
<i>Holgate</i>	22 ¹	11	23	0.50	1.05	2.09
<i>Little Beach</i>	15	11	15	0.73	1.00	1.36
North Brigantine NA	4	3	9	0.75	2.25	3.00
Region 4 Subtotal	41	26	51	0.63	1.24	1.96
Avalon Dunes	1	1	1	1.00	1.00	1.00
Region 6 Subtotal	1	1	1	1.00	1.00	1.00
Stone Harbor Point	3	0	0	0.00	0.00	0.00
Region 7 Subtotal	3	0	0	0.00	0.00	0.00
NJDFW sites TOTAL	29	25	52	0.86	1.79	2.08
All NJ sites TOTAL	105	82	135	0.78	1.29	1.65

Active Sites **20**

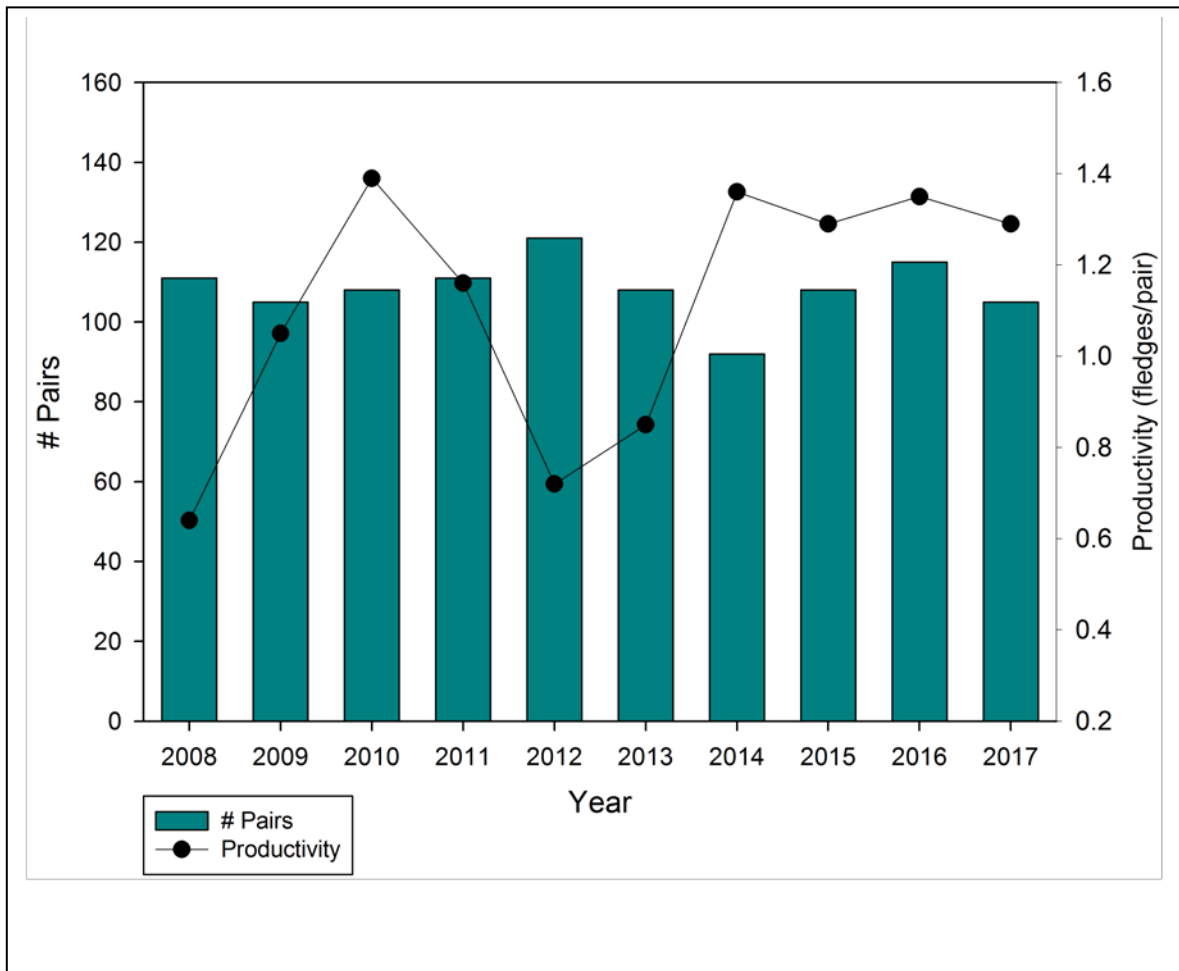
¹ The same pair nested at two nearby sites. Therefore "subtotals" and "totals" are less than sum of individual sites.

Pair Success equals the percentage of pairs that hatched young (at least one chick observed).

Fledge Rate equals the number of chicks fledged per pair.

Successful Pair (SP) Fledge Rate equals the number of chicks fledged per pair that successfully hatched young.

New Jersey piping plover population: 2008-2017



Black Skimmer Nesting Summary

- Black skimmer breeding bird counts were conducted approximately every two weeks at active sites from arrival (generally mid-May) until nesting ceased (mid-October was the latest) on beaches along the entire Atlantic coast and selected marsh islands from Barnegat Bay south. Surveys took place at 15 sites and active nesting (at least one nest with eggs) was observed at eight sites. These sites were also visited 3-5x/week for management and outreach for the duration of the nesting season.
- A total of 2,505 adults were present at the active sites. This figure is the cumulative total of site counts that occurred in the peak survey period, which took place 16-31 July. The cumulative peak adult number from each site was 2,811. A large difference between these two numbers can suggest failure at any given colony and then relocation/re nesting to another colony. The difference in these two numbers in 2017 appears to be related to relocation/re nesting occurring at small colonies but not at the state's largest colony, which was relatively stable throughout the season. As has now been the case since 2010, the majority (86%) of the state's known population was present at just one site, Seaview Harbor Marina in Longport (2,152 peak adult count). For the first time, skimmers were documented nesting on the sandy restored areas of marsh islands (Ring Island and Mordecai Island).
- A peak count of 575 incubating adult black skimmers was tallied in the 16-31 July survey period. The incubation number was lower than might be expected given the number of adults present and was likely lower than what actually nested. As is generally the case, the vegetation at the largest colony blocked observers from garnering an accurate count of these ground nesters and walk through colony counts have not shown to be effective in NJ.
- Black skimmer statewide productivity appeared to be moderate, with 457 fledglings produced. This translates to 0.79 chicks per pair, a figure that is likely an overestimate given the issues in the pair count numbered detailed above. If the total adult number is halved and used as a pair count, the productivity was 0.37. The true rate is likely somewhere in the middle. Just two sites fledged young and they were almost all were produced at one site, Seaview Harbor Marina (99%). Depredation was the primary factor responsible for nest and chick loss on beach strand sites. For the marsh nesting birds, the lower number of observations at these sites meant it was difficult to ascertain reasons for failures but it was likely a combination of flooding and depredation.
- The Wetlands Institute, in partnership with NJDFW, banded four Black Skimmer chicks at Ring Island in a follow-up to 2016's pilot project, using improved, easier to read bands. Long-term goals of banding include better understanding of site fidelity and inter-state movements (particularly with New York breeding birds). There were plans to band additional chicks, but colony collapse at study sites (Belmar and Ring Island) prevented this on any large scale.
- Over the course of fall 2016-summer 2017, seven of the 35 chicks banded in Belmar in 2016 were observed either on migration or wintering grounds, an excellent resight rate. An eighth individual was observed in summer 2017 at two NJ breeding sites – skimmers do not breed in their first year so it was valuable to capture scouting behavior.
- Although NJDFW is less concerned about the small number of nesting colonies than it was in the first decade of the 2000s (down to five colonies in some years), the fact that the majority of black skimmers are at just one site continues to be a cause for concern, especially since erosion and vegetation encroachment are making the site less suitable. Regional coordination efforts have highlighted the importance of New Jersey's population in the Atlantic coast's breeding population since this state

supports a relatively large number of birds when compared to surrounding areas. Therefore, this one site is critical on both the state and regional levels.

- The impact of sea-level rise in the marsh islands may be affecting occupied nesting areas. The largest colonies are located either on the beach strand or on large, relatively stable marsh islands with a sandy substrate. Whether this represents a true move away from wrack nesting marsh colonies or is temporary change is yet to be determined but something NJDFW will be closely tracking in future years. However, the use of sandy restored areas in the marsh (Ring Island and Mordecai Island) by skimmers (and terns) may signal an opportunity to reestablish some nesting in this area. Not enough data currently exists to assess long-term viability of this technique.
- Please note that the data is presented both in terms of peak tallies of each site *and* the peak counts statewide in a given survey window. It is presented by site so that the use of any given location can be understood. However, simply tallying these peaks can lead to double counting individuals since this species is known to use multiple sites in one year (e.g.. a colony fails at one site and they re-nest at another site.) so the statewide peak window count is an effort to reduce that issue and add context to the site total figures.

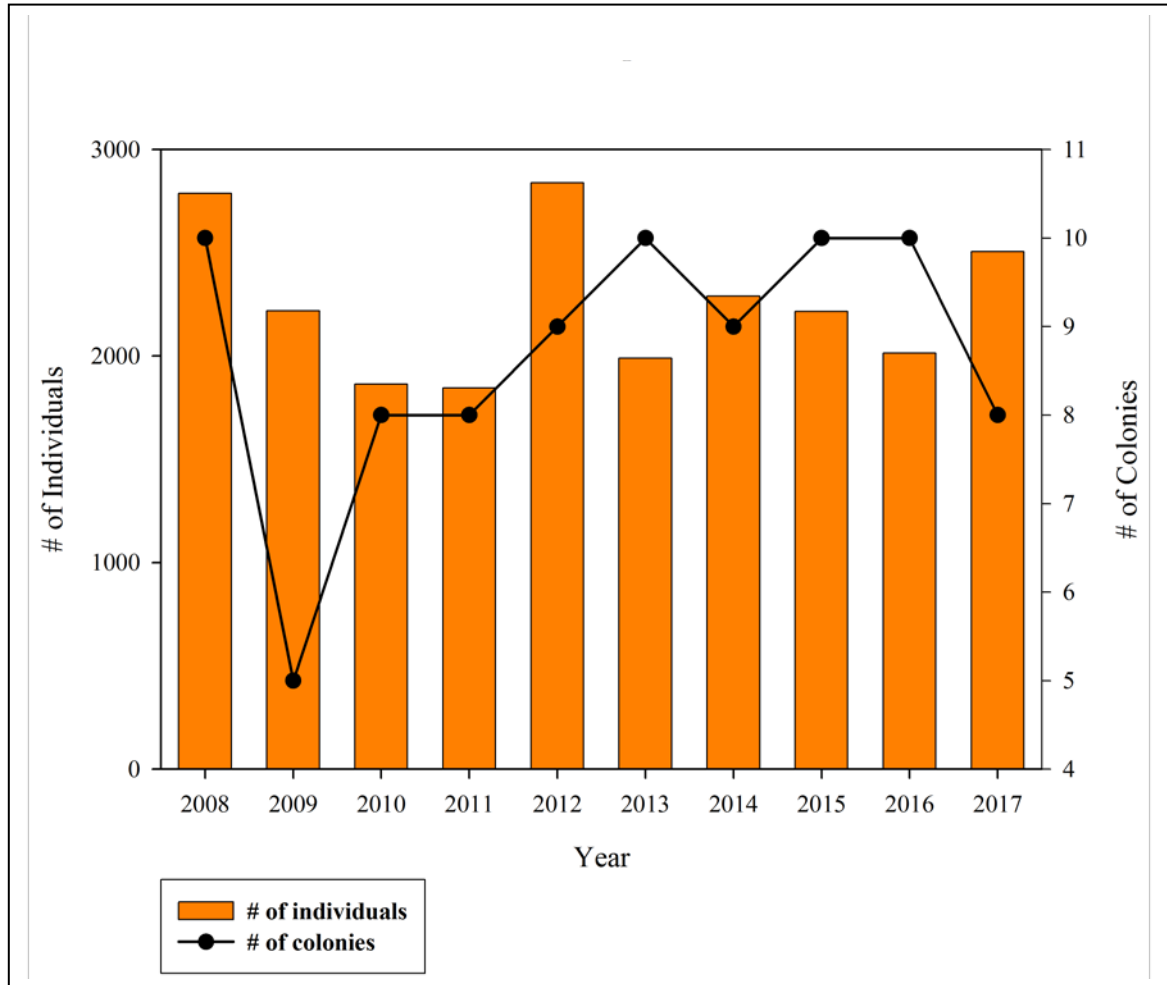
New Jersey black skimmer nesting summary by site: 2017

SITE	Peak Total Adult Count	Peak Incubating Adult Count	Chicks Fledged	Fledge Rate
Belmar – Shark River Inlet	119	7	0	0.00
Mordecai Island	87	32	0	0.00
East Sedge¹	4	0	0	0.00
Hither Island	88	9	0	0.00
Holgate - South	5	1	0	0.00
Seaview Harbor Marina	2152	648	452	0.70
Ring Island	114	12	5	0.42
Stone Harbor Point	242	69	0	0.00
NJDFW sites TOTAL	2605	733	452	--
All NJ sites TOTAL	2811	778	457	--
Statewide Peak Window Count	2505	575	--	--
	(7/16/17-7/31/17)	(7/1/17 – 7/15/17)		
# Active Sites	8			

1 – This site is included in active sites even though no adults were ever observed incubating and no fledges were ever tallied because unfledged chicks were counted on some surveys – therefore nesting must have occurred but was not captured.

- **“Fledge Rate”** equals the number of chicks fledged per incubating adult. This number should be considered an estimate as there is not a high degree of confidence in the incubating adult and fledge number as these data points are very difficult to collect. Because of this difficulty, there is no statewide fledge rate tallied here.
- **“Peak Total Adult Count”** & **“Peak Incubating Adult Count”** are the highest adult counts observed at any point during the breeding season. **“Statewide Peak Window Count”** represents the highest tally for one two-week survey window. This species exhibits a high degree of intra-year movements so both numbers are important to understand the distribution of adults and habitat use (on site and state levels) in NJ.
- The following sites had adults present during some surveys but no nesting was directly observed. Nesting may have occurred at some of these but it was not captured by our surveys.
 - East Sedge Island
 - Middle Sedge Island
 - TNC - South Cape May Meadows
 - Cape May Point State Park

New Jersey black skimmer population: 2008-2017



Least Tern Nesting Summary

- Least tern breeding bird surveys were conducted approximately every two weeks from mid-May until the end of August at beaches along the entire Atlantic coast. Colonies were located at 23 sites and observations were made at these locations for the duration of the season. These sites were also visited 3-5x/week for management and outreach for the duration of the nesting season.
- A total of 1,273 adults were present at these sites (based on a cumulative total of peak site counts that occurred in the 16-30 June survey period), a seven-year high. The cumulative peak adult number from each site was 1,687. A large difference between these two numbers can suggest failure at a given colony and then relocation/re-nesting to another colony, which given the data and on-the-ground observations appears to have happened in 2017.
- The population was distributed fairly evenly throughout the state and six colonies had >100 adults (two others had just below 100) with one colony 300+. The largest colony was in Monmouth Beach - North, with 317 adults on its peak count followed by Strathmere - Natural Area with 272 adults at its peak. A second marsh nesting colony was detected this year (Mordecai Island joined Ring Island), also the result of a restoration project. The statewide adult number was higher than recent years and more in line with the longer-term trend. As always, there was some difficulty tallying birds in dense vegetation.
- A peak (census period of 1-30 June) of 588 adult least terns were observed incubating. Productivity was moderate for least terns with 221 fledglings produced statewide (0.38 chicks per pair, based on the peak number of incubating adults). The fledge rate represents a dip from last year and illustrates an increase issue with depredation and flooding.
- Please note that the data is presented both in terms of peak tallies of each site *and* the peak counts statewide in a given survey window. It is presented by site so that the use of any given location can be understood. However, simply tallying these peaks can lead to double counting individuals since this species is known to use multiple sites in one year (e.g., a colony fails at one site and they re-nest at another site.) so the statewide peak window count is an effort to reduce that issue and add context to the site total figures.

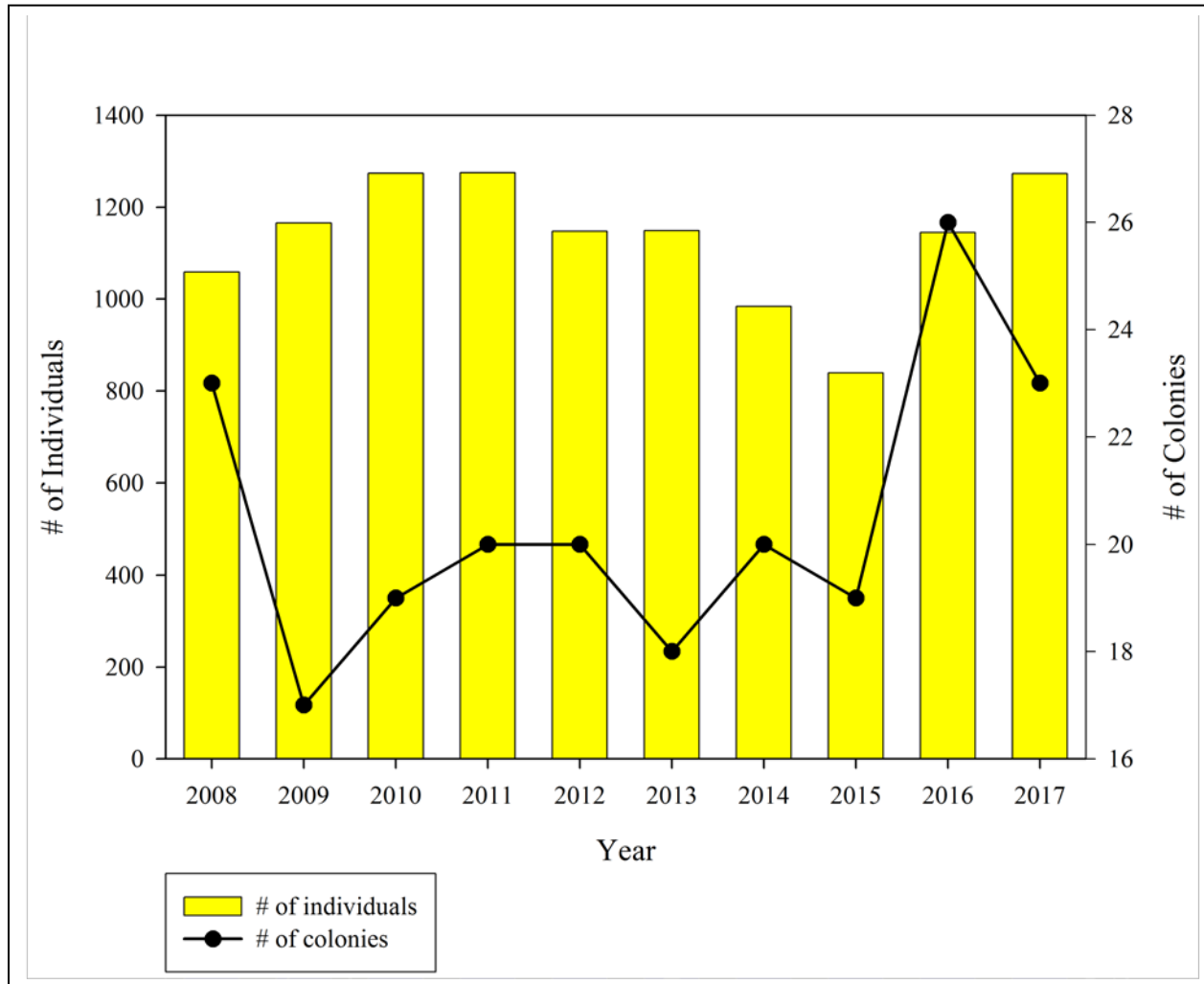
New Jersey least tern nesting summary by site: 2017.

SITE	Peak Total Adult Count	Peak Incubating Adult Count	Chicks Fledged	Fledge Rate
Sandy Hook NRA	68	26	0	0.00
<i>North Beach</i>	21	6	0	0.00
<i>North Gunnison</i>	29	12	0	0.00
<i>Hidden Beach</i>	13	4	0	0.00
<i>South Fee Beach</i>	5	4	0	0.00
Sea Bright North	38	30	17	0.57
Monmouth Beach North	317	190	65	0.34
7 President's Park	63	48	1	0.02
Belmar – Shark River Inlet	119	50	11	0.22
Sea Girt – Wreck Pond	79	60	0	0.00
NGTC	4	1	0	0.00
Gull Island	27	4	0	0.00
Mordecai Island	46	0	0	0.00
EB Forsythe NWR	226	89	19	0.21
<i>Holgate – North</i>	95	20	7	0.35
<i>Holgate – South</i>	131	69	12	0.17
North Brigantine NA	4	1	0	0.00
Seaview Harbor Marina	72	38	0	0.00
Malibu WMA	30	6	1	0.17
Strathmere Natural Area	272	108	70	0.65
Strathmere - Upper Township	12	6	8	1.67
Townsend's Inlet	95	41	20	0.49
Stone Harbor Point	34	2	0	0.00
Ring Island	34	15	9	0.60
Cape May Meadows	147	48	0	0.00
<i>The Nature Conservancy</i>	106	30	0	0.00
<i>Cape May Point State Park</i>	41	18	0	0.00
NJDFW sites TOTAL	1207	603	193	--
All NJ sites TOTAL	1687	763	221	--
Statewide Peak Window Count	1273 (6/16/17 - 6/30/17)	588 (6/16/17 - 6/30/17)	--	--

Active Sites **23**

- “Fledge Rate” equals the number of chicks fledged per incubating adult. This number should be considered an estimate as there is not a high degree of confidence in the incubating adult and fledge numbers. As these data points are very difficult to collect.
- “Peak Total Adult Count” & “Peak Incubating Adult Count” are the highest adult counts observed at any point during the breeding season. “Statewide Peak Window Count” represents the highest tally for one two-week survey window. This species exhibits a high degree of intra-year movements so both numbers are important to understand the distribution of adults and habitat use (on site and state levels) in NJ.

New Jersey least tern population: 2008-2017



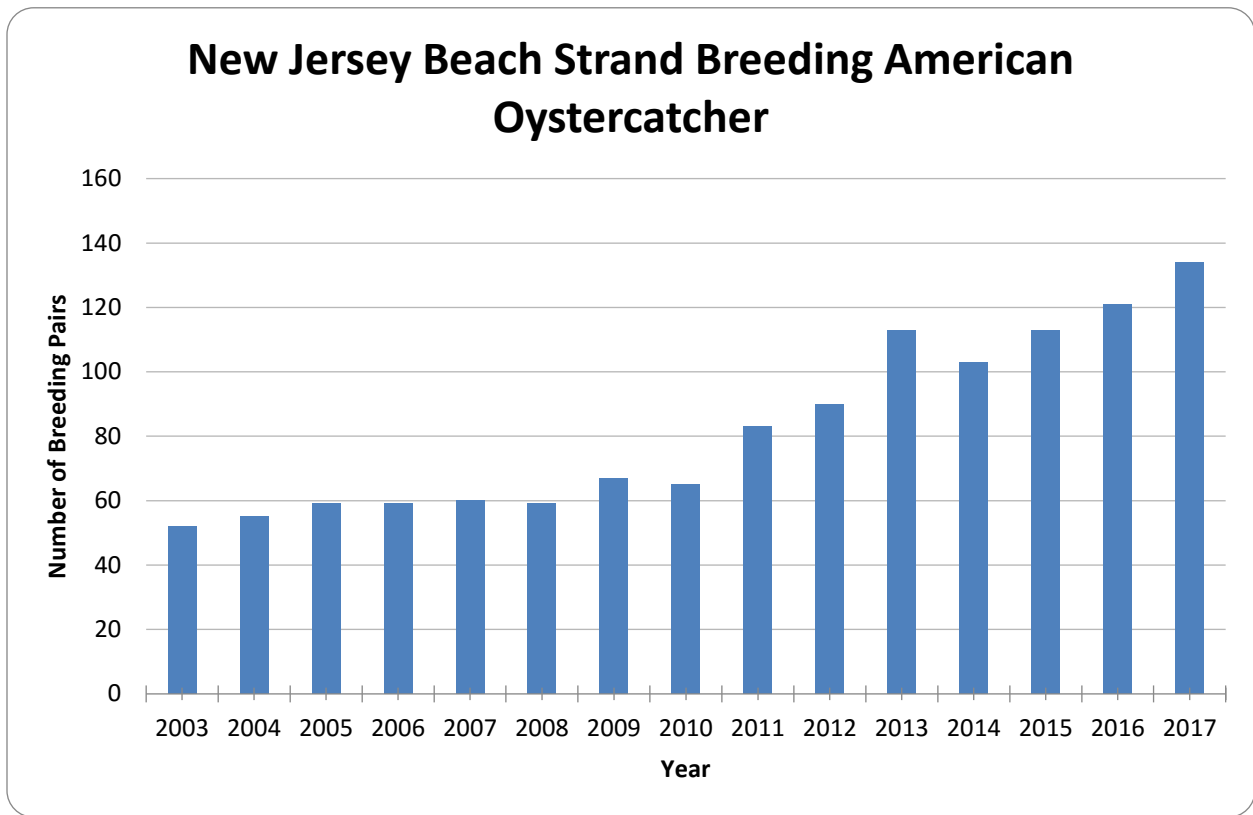
American Oystercatcher Nesting Summary

- Although American Oystercatchers are a management priority in areas of high human disturbance, resource limitations dictate that the data collected on this species is neither comprehensive to the state (it is well known that many individuals nest in the marsh but the vast majority are not tracked) nor is the data broken down in the same way it is for the listed species. The chart below shows the reproductive output for all the pairs that were tracked by NJDFW-ENSP and their partners. Looking at the data, it is clear the reproductive output was very low for this species. As a longer-lived species, they can cope with lower rates than a shorter-lived species (like piping plover), but there still must be some success to secure the population. They may have more difficulty than other species because they are more conspicuous in a beach environment (unlike the well-camouflaged and diminutive plover) and have a less aggressive strategy for protection of their nests (like terns).
- A second figure shows the increasing use of the beach strand by this species. Although it is only a hypothesis at this point (some partners are pursuing funding to answer this question), it is postulated that the change in distribution is at least partially a result of increased flooding regimes in the marsh environment because of sea-level rise and subsidence. This increase in use of the beach strand also raises questions about potential competition for habitat with piping plovers.
- A final note was the discovery, by a contracted monitor during work related to the beach replenishment in Atlantic City, of ~5 pairs of oystercatchers utilizing rooftops as breeding “habitat” in the northern area of the boardwalk (observed at Revel, House of Blues, the Casino Control Commission, Bally’s and Trump Plaza). That data is not reflected in this chart because it has not yet been provided to NJDFW-ENSP, but from correspondence it appears that some pairs were successful in hatching and perhaps even fledging young. Rooftop nesting has previously been detected in Ventnor (one pair) but this “cluster” of birds was something new to 2017 (although it is possible they have been nesting there undetected for a longer period of time). The monitor and NJDFW-ENSP worked with the building managers for access to the rooftops to confirm nesting, as well as to provide chick shelters to protect them from extreme heat of that environment. Rooftop nesting may also indicate a response to an increasingly flooded marsh environment.

American Oystercatcher Nesting Summary: New Jersey 2017

SITE	Pairs	Pairs Hatched	Chicks Fledged	Pair Success	Fledge Rate
Sandy Hook NRA	29	2	0	0.07	0.00
<i>Coast Guard</i>	2	0	0	0.00	0.00
<i>North Beach</i>	9	0	0	0.00	0.00
<i>North Beach Recreational</i>	1	0	0	0.00	0.00
<i>North Gunnison</i>	2	0	0	0.00	0.00
<i>Gunnison Recreational</i>	1	0	0	0.00	0.00
<i>South Gunnison</i>	2	0	0	0.00	0.00
<i>E-lot</i>	1	0	0	0.00	0.00
<i>Skeleton Hill Island</i>	5	0	0	0.00	0.00
<i>Visitor's Center</i>	1	0	0	0.00	0.00
<i>Critical Zone</i>	3	0	0	0.00	0.00
<i>Hidden Beach</i>	1	1	0	1.00	0.00
<i>Fee Beach</i>	1	1	0	1.00	0.00
Sea Bright North	1	1	0	1.00	0.00
Monmouth Beach North	1	1	2	1.00	2.00
Region 2 Subtotal	31	4	2	0.13	0.06
Long Branch	1	1	1	1.00	1.00
Deal	1	0	0	0.00	0.00
Avon	1	0	0	0.00	0.00
Belmar-Shark River Inlet	2	1	1	0.50	0.50
Sea Girt-Wreck Pond	1	0	0	0.00	0.00
Gull Island- Shoreline & CDF	3	1	0	0.33	0.00
Island Beach SP – SNA	1	0	0	0.00	0.00
Barnegat Light	1	1	2	1.00	2.00
Region 3 Subtotal	11	4	4	0.36	0.36
Holgate	18	2	1	0.11	0.06
Tucker's Island	3	0	0	0.00	0.00
Little Beach	18	5	9	0.28	0.50
Region 4 Subtotal	39	7	10	0.18	0.26
North Brigantine Natural Area	4	1	0	0.25	0.00
Brigantine City - Rum Cove	1	0	0	0.00	0.00
Seaview Harbor Marina	1	1	2	1.00	2.00
Malibu WMA	2	1	1	0.50	0.50
Region 5 Subtotal	8	3	3	0.38	0.38
Strathmere NA	1	1	1	1.00	1.00
Strathmere Upper Twp	1	1	1	1.00	1.00
Strathmere Beach Bar	1	0	0	0.00	0.00
Avalon – Dunes	1	0	0	0.00	0.00
Region 6 Subtotal	4	2	2	0.50	0.50
Ring Island	6	3	6	0.50	1.00
Stone Harbor Point	26	2	1	0.08	0.04
N. Wildwood-Hereford Inlet	1	0	0	0.00	0.00
Pierce's Point	1	1	0	1.00	0.00
Two-Mile Beach	6	3	5	0.50	0.83
<i>Cape May NWR</i>	3	1	0	0.33	0.00
<i>USCG LSU</i>	3	2	5	0.67	1.67
Coast Guard-TRACEN	3	0	0	0.00	0.00
Cape May Meadows	6	1	0	0.17	0.00
<i>The Nature Conservancy</i>	4	0	0	0.00	0.00
<i>Cape May Point State Park</i>	2	1	0	0.50	0.00
Region 7 Subtotal	49	10	12	0.20	0.24
NJDFW sites TOTAL	57	14	12	0.25	0.21
All NJ sites TOTAL	142	30	33	0.21	0.23
# Active Sites	42				

American Oystercatcher Increase on New Jersey Beach Strand Sites: 2003-2017



** Note that 2017 bar includes only those pairs on the beach strand, not all the pairs that were monitored, as captured in previous chart.*

Miscellaneous report note: Common Terns and Royal Terns also nested at a few beach strand locations but those results are not included in this report because of time constraints in compiling and presenting data. The vast majority of Common Terns in the state nest in the marshes, so the beach strand sites make up a small percentage of the NJ population. Royal Terns are an occasional nester in NJ, generally at one site within the Hereford Inlet system. This year they were at Stone Harbor Point with a maximum count of ~170. The colony failed due to predation and no chicks were hatched or fledged.