Piping Plover Nesting Results in New Jersey: 2017

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Photo Courtesy of William Pully

SUMMARY OF FINDINGS:

One hundred five (105) pairs of piping plovers nested in New Jersey in 2017, a 9% decrease compared to 2016 (115 pairs). The 2017 population is below the long-term average (117 pairs) and is the fifth lowest pair number recorded in the state since federal listing in 1987. Statewide productivity (1.29 fledglings/pair) remained above the long-term, thirty-year average (1.01) for the fourth consecutive season.

The total number of adults recorded for the entire nesting season (227) was slightly higher than the adults present during the date-restricted survey conducted June 1-9 (222). The final season pair count (105) was only one more than recorded during the date-restricted census (104). There were an unusually high number of unpaired adults tallied on the final season count (17) compared to previous seasons (2 in 2014, 2015, 2016). Several adults were seen on site without a mate and some exhibited strong breeding behavior for a long period of time without a nest being located.

Northern Monmouth County, as a region, remains the stronghold with the largest percentage of pairs in the state (54 pairs or 51% of the statewide total). Sandy Hook maintains the largest number of pairs per site in the state (40), but experienced a significant decrease of 11 pairs this season compared to 2016 (51 pairs). Sea Bright, south of Sandy Hook, continued to show growth and increased by four pairs in 2017 (10 total). The region comprised of Island Beach State Park and Barnegat Light accounted for 6% of the statewide total and recorded its highest number of pairs in ten years (6 pairs). The Holgate and Little Beach units of E.B. Forsythe National Wildlife Refuge, combined with the state's North Brigantine Natural Area, maintained a significant portion of the statewide population (41 pairs or 39% of the statewide total). Cape May County, the regions consisting of Ocean City to Cape May, continued to decline from its peak of 43 pairs in 2002 to just 4 pairs in 2017 (4% of the statewide total).

On an individual site level, the most significant shifts from 2016 occurred in Northern Monmouth County with slight gains and losses elsewhere throughout the state. The loss of 11 pairs at Sandy Hook accounted for a 22% population decrease from 2016. Sea Bright gained 4 pairs this year, which likely accounts for some of the lost pairs at Sandy Hook. In Ocean County, Island Beach State Park's oceanfront hosted one pair for the second year in a row after a decades long absence and Long Beach

Township had a nesting pair for the first time (pair originally nested on Forsythe Refuge property). In Southern Cape May County, Stone Harbor Point continued its downward trend with a 40% drop in pair number (3 in 2017, 5 in 2016) and is well below it's peak of 17 pairs in 2006 and 2007.

Pairs nested at 20 sites statewide in 2017, the same as 2016, with only one site added and one site deserted this season. New Jersey Division of Fish and Wildlife (NJDFW) monitored 9 of the active nesting sites (45% of the sites statewide). NJDFW-monitored sites accounted for 29 nesting pairs (28% of the nesting pairs statewide). Up slightly from 27 pairs in 2016 and significantly from 17 pairs in 2015 (the lowest recorded since federal listing). This increase is largely attributed to the successes in Monmouth and Ocean Counties and continues the reversal of a decade-long pair decline at NJDFW monitored sites. NJDFW also regularly monitored 12 other potential breeding sites with historic nesting records and/or highly suitable habitat. Individual adults (12) were noted this season on sites monitored by NJDFW, but nesting was not detected. NJDFW and cooperators observed breeding behavior by these individuals at several historic nesting sites, most notably Cape May Meadows and the Corson's Inlet system.

Statewide pair-nest success (the percentage of pairs that successfully hatch at least one nest) was down this year (78%) in comparison with 2016 (90%), but remains above the long-term average since listing (69%). Pair-nest success was moderately high across all the sites with the exception of Holgate (50% for 22 pairs) and Stone Harbor Point (0% for 3 pairs) which both suffered high rates of nest failure this season. Looking at just NJDFW-monitored sites, pair-nest success remained high this year (86% versus 93% in 2016) and well above average for NJDFW-monitored sites for the period since federal listing (67%).

The cause of nest failure was determined in 57 of the 63 failed nest attempts statewide (90%). Depredation continues to be the leading cause of nest failure statewide (25 or 40%). Of the nests that failed due to predators, over two-thirds (17 or 68%) were lost to mammals and of those, 13 (76%) were lost to American mink between Holgate (11) and Little Beach (2). The remainder of nests were lost to gull and crow species (8% avian depredation) and unknown predator species (24%). Abandonment (13 or 20%) and flooding (13 or 20%) were equal contributors to nest loss this season. The number of nests blown over and/or buried contributed to 10% of the nest losses. The cause of nest failure could not be determined for 6 (10%) nest attempts. Statewide chick mortality assessments could not be made, but there were four site-level instances this season in which chick mortality was determined through an on-going research study by SUNY-ESF. The remains of two chicks were found in ghost crab burrows, one chick was found depredated by a great horned owl and a mink depredated one chick.

The statewide fledgling rate, which includes data collected and provided by all the state cooperators, was 1.29 fledglings per pair, down moderately from 2016 (1.35 fledglings/pair) and equal to 2015 (1.29 fledglings/pair). The productivity rate for 2017 falls below the recovery goal of 1.50 fledglings/pair established in the USFWS Recovery Plan for Atlantic Coast Piping Plovers. However, 2017 productivity is slightly above the 1.245 fledglings/pair range-wide threshold for population maintenance also established in the Recovery Plan. Furthermore, statewide productivity remains well above the long-term, statewide average (1.01 fledglings/pair) since listing for the fourth year in a row. At NJDFW monitored sites, productivity was 1.79 fledglings per 29 pairs. This falls short of 2016 productivity levels (1.89 fledglings per 27 pairs), but remains well above the thirty-year average of 0.89 fledglings per pair at NJDFW monitored sites. For the third consecutive year, the 2017 NJDFW fledge rate ran higher than the statewide average, whereas it usually falls short.

As is typical, productivity varied considerably by individual site and region. The Northern Monmouth County region fledged 1.37 chicks per pair (54 pairs), higher than the 2016 season (1.25 fledglings/pair). Sandy Hook's productivity was nearly the same compared to last year (1.13 fledglings/pair in 2017 versus 1.12 fledglings/pair in 2016). The other Northern Monmouth County sites (Sea Bright, Monmouth Beach and Seven Presidents Oceanfront Park) had an especially notable year with 2.07 fledglings per pair. This is the highest recorded productivity for that area in ten years and is mostly attributed to the high productivity at Sea Bright (2.60 fledglings/pair). Sea Bright has experienced phenomenal growth in the last two seasons, increasing from just 1 pair in 2015 to 6 in 2016 and 10 in 2017. In Ocean County, Island Beach State Park and Barnegat Light showed moderate growth in pair numbers (4 in 2016, 6 in 2017) and had strong productivity of 1.50 fledglings per pair. Productivity for the Holgate, Little Beach, and North Brigantine Natural Area region decreased 13% this season compared to the previous year (1.24 fledglings/pair in 2017 versus 1.43 fledglings/pair in 2016). Of particular note, Holgate's productivity was down to 1.05 fledglings/pair compared to a robust 1.44 chicks per pair in 2016. However, Little Beach saw a small rise in productivity from last season (1.00 fledglings/pair in 2017 versus .92 fledglings/pair in 2016). North Brigantine Natural Area maintains a strong level of productivity (2.25 in 2017, 2.60 in 2016). Cape May County continues a downward trend recording .25 fledglings/pair falling well below the statewide average (1.01 fledglings/pair) since federal listing.

CONCLUSION and DISCUSSION:

After reaching a historic low statewide population in 2014 (92 pairs), the following two years saw reasonably good productivity and growth in pair numbers (108 in 2015, 115 in 2016). While a continuing trend of high productivity should have correlated into a rise in pair numbers, that was not the case in 2017. New Jersey's statewide breeding population stands at 105 pairs rendering a loss of 10 pairs this season. It should be noted that while that downward fluctuation is of concern, a high rate of individual adults (17) were noted exhibiting breeding behavior with no known nests located. Pairs were noted at Sandy Hook and Cape May Meadows and were not known to nest. Several marked, first-year males were also noted on territory for multiple weeks without attracting a female. With the addition of marked birds to New Jersey's piping plover population dating back to 2012, adults that are seen prospecting have been observed coming back to those same areas to nest the following season. The last four seasons have yielded sustained, high productivity (1.36 in 2014, 1.29 in 2015, 1.35 in 2016, 1.29 in 2017). While this is encouraging, it will take several more years of increased population and higher productivity to move towards recovery.

In recent years, New Jersey has seen a high concentration of breeding pairs to primarily federally protected lands such as Gateway National Recreation Area's Sandy Hook Unit and E.B. Forsythe's Holgate and Little Beach Units. Both of these areas have become the strongholds for the statewide population, moving away from historic records of birds nesting on municipal and state managed lands. Shifts in and the creation of suitable habitat have contributed to the rise in pair numbers and productivity at these critical sites. As pair numbers and productivity has risen on these sites, the distribution of pairs to municipal and state-owned properties has recently been on the rise. With several marked birds in the New Jersey population, we know that many of the adults returning to nest on municipal sites are coming from federal lands. We also have reports of marked adults nesting in New York, Delaware, Maryland and Virginia. In addition to the pair increases on municipal beaches, productivity on municipal sites has shown strong growth in the last two years (1.89 in 2016, 1.79 in 2017). In particular, Monmouth and Ocean Counties have seen strong increases in pair number and productivity.

NJDFW maintains that full recovery cannot be achieved without a wider distribution of breeding pairs along federal, state and municipal sites. Increased successes in places such as Monmouth and Ocean Counties are promising, but Cape May County is rapidly "blinking of the map" with an alarming 90% decline in breeding pairs over nine years. A number of factors are suspected in the decline of that population including, but not limited to habitat loss and the lack of a local successful feeder population. In addition to the losses in Cape May County, several sites are experiencing habitat changes negatively impacting plover populations. While Hurricane Sandy created habitat for piping plovers at several sites throughout New Jersey (Maslo Pover 2016), much of that habitat is starting to degrade naturally over time. Holgate experienced several issues this season, but specifically an unprecedented level of American mink depredation (Cook 2017). Storm-related issues, such as flooding and buried eggs, were experienced at higher levels than previous years after Sandy, particularly at Stone Harbor Point.

A strong monitoring program on the state, federal and non-profit levels have led to more thorough management and protections of historic and current nesting sites. Several statewide partners have implemented a new, advanced data collection smartphone app to increase the effort and efficiency of monitoring piping plovers. An ongoing chick mortality study through SUNY-ESF looks to answer questions regarding chick mortality statewide. Forsythe National Wildlife Refuge implemented the use of the PiperEx exclosure model to strategically deploy predator exclosures in an effort reduce adult mortalities. Additionally, partners in the southern region of the state are testing predator aversion techniques on eggs and chicks. NJDFW is hopeful that expanding monitoring, research and management of piping plovers will ensure that historic and current nesting sites remain viable options for the future, and aid in the establishment of a sustainable population.

LITERATURE CITED:

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Table 1. Number of pairs of piping plovers at New Jersey nesting sites: 2008-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sandy Hook NRA	32[1]	35	45	49	50	43	47	53	51	40
Coast Guard	4	4	5	4	4	3	4	3	5	3
North Beach	8	9	13	14	14	13	14	15	14	13
North Beach Recreational	0	0	0	0	0	0	0	0	1	1
North Gunnison	7	9	9	9	13	8	8	10	8	6
South Gunnison	2	5	5	4	5	7	9	8	7	5
Visitor Center	0	0	0	0	0	0	0	0	1	0
D-Lot	0	0	0	1	0	0	0	0	0	0
Skeleton Hill Island	0	0	0	1	0	0	0	0	0	0
Critical Zone	4	2	6	5	6	5	4	7	6	5
Hidden Beach	2	3	3	5	4	3	4	4	4	3
Fee Beach	5[1]	3	3	5	3	4	4	6	4	3
South Fee Beach	2[1]	0	1	1	1	0	0	0	1	1
Sea Bright North	8	6	3	2	2	0	0	1	6	10
Monmouth Beach North	1	1	2	0	0	2	1	1[1]	5	3
Seven Presidents Park	3	2	2	2	0	0	1	1[1]	1	1
Region 2 subtotal	**44**	**44**	**52**	**53**	**52**	**45**	**49**	**55**	**63**	**54**
Belmar – Shark River Inlet	0	0	0	0	0	0	1	0	0	0
Sea Girt - Wreck Pond	0	1	0	0	1	0	0	0	0	0
Island Beach SP SNA	0	0	0	0	0	0	0	0	1	1
Barnegat Light	3	1	3	3	1	2	1	1	3	5
Region 3 subtotal	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**1**	**4**	**6**
Long Beach Township	0	0	0	0	0	0	0	0	0	1[1]
EB Forsythe NWR	23	17	23	23	32	35	26	38	37	37
Holgate	11	7	10	6	14	12	12	24	25	22[1]
Little Beach	12	10	13	17	18	23	14	14	12	15
North Brigantine NA	8	6	3	5	8	6	3	5	5	4
Region 4 subtotal	**31**	**23**	**26**	**28**	**40**	**41**	**29**	**43**	**42**	**41**
Seaview Harbor Marina	0	0	0	1	1	1	0	1[1]	0	0
Malibu WMA	0	0	0	0	0	0	1	1[1]	0	0
Ocean City - Center	3	1	0	1	0	0	0	0	0	0
Region 5 subtotal	**3**	**1**	**0**	**2**	**1**	**1**	**1**	**1**	**0**	**0**
Corson's Inlet SP	1	2	0	0	0	0	0	0	0	0
Strathmere NA	0	0	1	1	1	2[1]	1	0	0	0
Strathmere (Upper Twp.)	0	0	1	2	2	4[1]	2	0	0	0
Avalon - Dunes	4	4	5	5	5	3	3[1]	2[1]	1	1
Region 6 subtotal	**5**	**6**	**7**	**8**	**8**	**8**	**6**	**2**	**1**	**1**
Stone Harbor Point	11	15	9	10	9	6	4[1]	6[1]	5	3
Champagne Island	0	0	0	0	0	0	0	0	0	0
N. Wildwood - Hereford	1	2	2	1	1	1	1	1	0	0
Two-Mile Beach	0	0	1	0	0	0	0	0	0	0
Cape May NWR	0	0	0	0	0	0	0	0	0	0
Coast Guard - LSU	0	0	1	0	0	0	0	0	0	0
Coast Guard - TRACEN	1	0	0	0	2	1[1]	0	0	0	0
Cape May City	1	1	0	0	0	1[1]	0	0	0	0
Cape May Meadows	11	11	8	6	6	3	1	0	0	0
The Nature Conservancy	7	7	5	4	3	1	0	0	0	0
Cape May Point SP	4	4	3	2	3	2	1	0	0	0
Region 7 subtotal	**25**	**29**	**20**	**17**	**18**	**11**	**6**	**6**	**5**	**3**
Total Pairs	**111**	**105**	**108**	**111**	**121**	**108**	**92**	**108**	**115**	**105**
Pairs at NJDFW sites	**49**	**46**	**34**	**35**	**36**	**29**	**19**	**17**	**27**	**29**

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

Table 2. New Jersey piping plover window census results: June 1-9 2017.

	State Census Count			Final Season Count		
	# Pairs	# Unpaired Adults	# Total Adults	# Pairs	# Unpaired Adults	# Total Adults
Sandy Hook Coast Guard	3	0	6	3	0	6
Sandy Hook North Beach	13	4	30	13	4	30
Sandy Hook North Beach Recreational	1	0	2	1	0	2
Sandy Hook North Gunnison	6	0	12	6	0	12
Sandy Hook South Gunnison	5	0	10	5	0	10
Sandy Hook Visitor Center	0	0	0	0	0	0
Sandy Hook Critical Zone	5	0	10	5	0	10
Sandy Hook Hidden Beach	3	0	6	3	0	6
Sandy Hook Fee Beach	3	0	6	3	0	6
Sandy Hook South Fee Beach	1	0	2	1	0	2
Sea Bright North	10	0	20	10	0	20
Monmouth Beach North	3	1	7	3	1	7
Monmouth Beach South	0	0	0	0	0	0
Seven Presidents Park	1	0	2	1	0	2
Long Branch	0	0	0	0	0	0
Region 2 subtotal	**54**	**5**	**113**	**54**	**5**	**113**
Belmar - Shark River Inlet	0	0	0	0	0	0
Sea Girt - Wreck Pond	0	0	0	0	0	0
Sea Girt - NGTC	0	0	0	0	0	0
Island Beach SP – Northern NA	0	0	0	0	0	0
Island Beach SP – Southern NA	1	0	2	1	0	2
Barnegat Light	5	0	10	5	0	10
Region 3 subtotal	**6**	**0**	**12**	**6**	**0**	**12**
Long Beach Township	0	0	0	1[1]	1	2[1]
Holgate	22	1	45	22[1]	1	45[1]
Little Beach	14	1	29	15	0	30
North Brigantine NA	4	2	10	4	3	11
Region 4 subtotal	**40**	**4**	**84**	**41**	**5**	**86**
Brigantine Beach	0	0	0	0	0	0
Brigantine - Inlet (Cove)	0	0	0	0	0	0
Seaview Harbor Marina	0	0	0	0	0	0
Malibu WMA	0	0	0	0	0	0
Ocean City - North	0	0	0	0	0	0
Ocean City - Center	0	0	0	0	0	0
Region 5 subtotal	**0**	**0**	**0**	**0**	**0**	**0**
Corson's Inlet SP	0	0	0	0	0	0
Strathmere Natural Area	0	1	1	0	1	1
Strathmere (Upper Twp.)	0	0	0	0	0	0
Whale Beach	0	0	0	0	0	0
Townsend's Inlet	0	0	0	0	0	0
Sea Isle	0	0	0	0	0	0
Avalon - North	0	0	0	0	0	0
Avalon - Dunes	1	0	2	1	1	3
Stone Harbor - Oceanfront	0	0	0	0	0	0
Region 6 subtotal	**1**	**1**	**3**	**1**	**2**	**4**
Stone Harbor Point	3	3	9	3	3	9
N. Wildwood - Hereford Inlet	0	0	0	0	0	0
2-Mile Beach - USFWS	0	0	0	0	0	0
2-Mile Beach - LSU	0	0	0	0	0	0
Coast Guard - TRACEN	0	0	0	0	0	0
Cape May City	0	0	0	0	0	0
Cape May Meadows - TNC	0	1	1	0	2	2
Cape May Meadows - CMPSP	0	0	0	0	0	0
Cape May Point Borough	0	0	0	0	0	0
Region 7 subtotal	**3**	**4**	**10**	**3**	**5**	**11**
Total	**104**	**14**	**222**	**105**	**17**	**227**

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

Table 3. New Jersey piping plover nesting summary by sites: 2017.

	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
Coast Guard	*3*	*3*	*3*	1.00	1.00	1.00
North Beach	*13*	*11*	*16*	0.85	1.23	1.45
North Beach Recreational	*1*	*1*	*2*	1.00	2.00	2.00
North Gunnison	*6*	*6*	*11*	1.00	1.83	1.83
South Gunnison	*5*	*3*	*1*	0.60	0.20	0.33
Critical Zone	*5*	*5*	*8*	1.00	1.60	1.60
Hidden Beach	*3*	*3*	*0*	1.00	0.00	0.00
Fee Beach	*3*	*2*	*2*	0.67	0.67	1.00
South Fee Beach	*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 State Park 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	1.02	1.73
Holgate	*22*[1]	*11*	*23*	0.50	1.05	2.09
Little Beach	*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.

Figure 1. New Jersey piping plover population: 1987-2017.

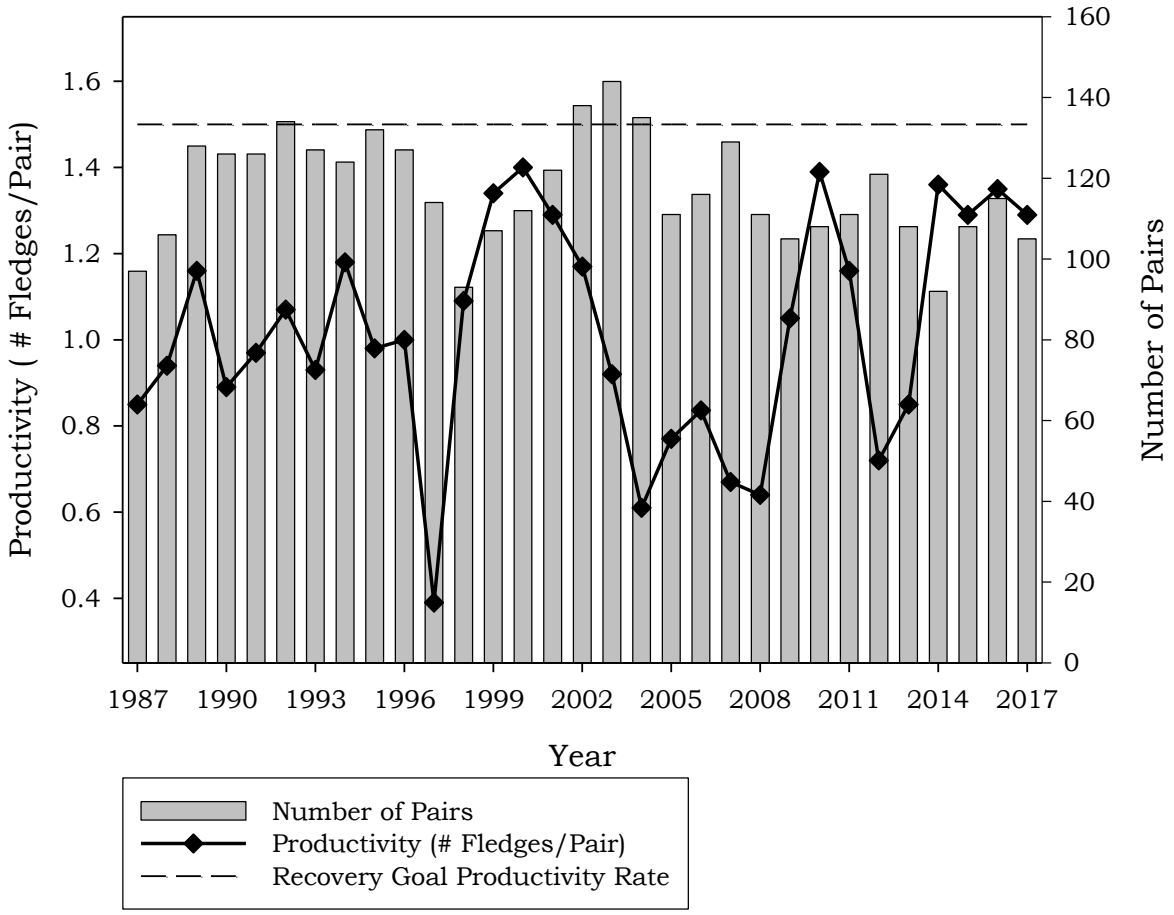

Figure 2. Causes of piping plover nest failure in New Jersey: 2017.

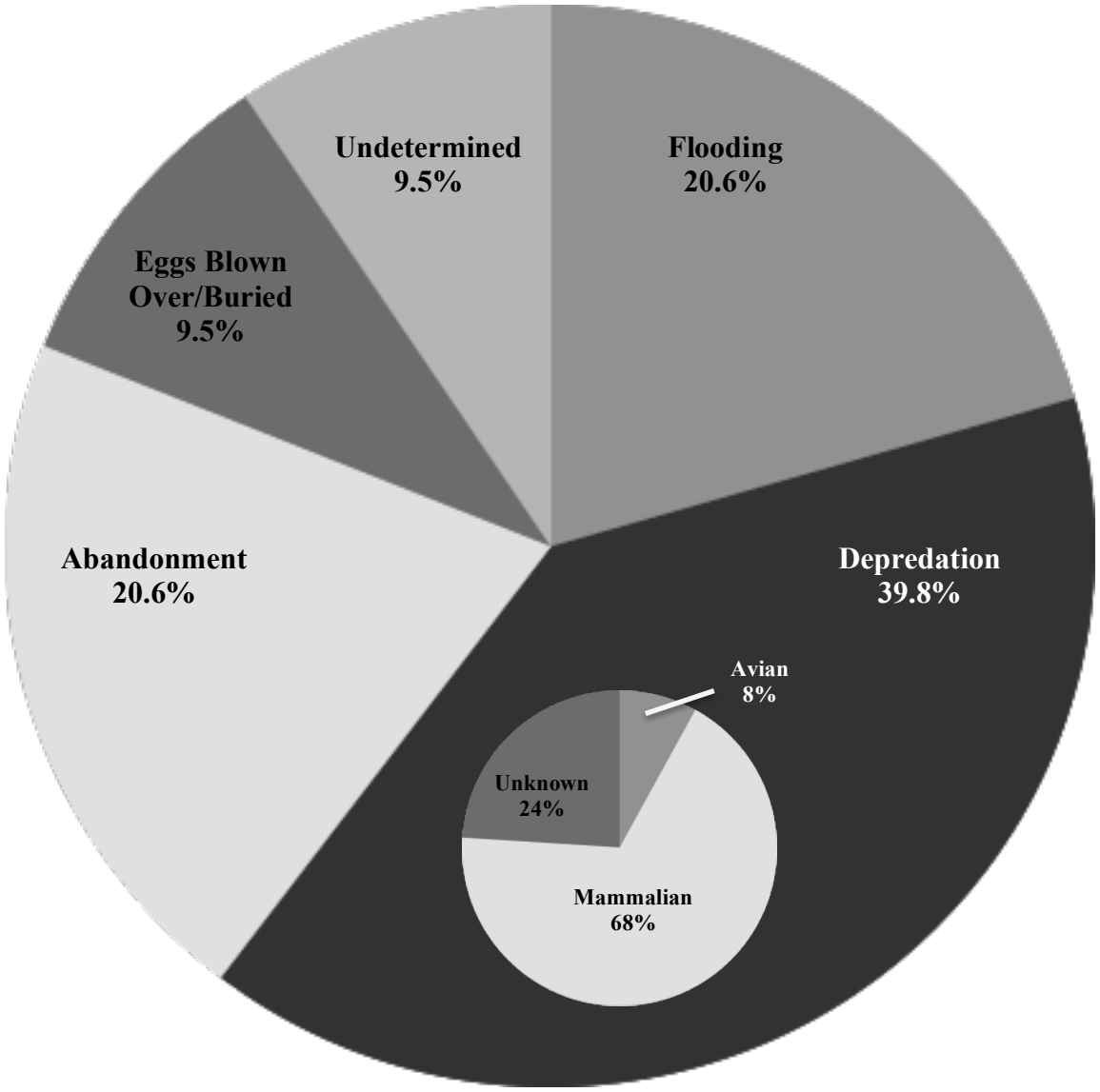

Figure 3. Map of Nesting Sites in New Jersey: 2017.