

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS



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MASSWILDLIFE

ABSTRACT

This report summarizes data on abundance, distribution, and reproductive success of Piping Plovers (*Charadrius melodus*) in Massachusetts during the 2018 breeding season. Observers reported breeding pairs of Piping Plovers present at 157 sites; 174 additional sites were surveyed at least once, but no breeding pairs were detected at them. The population increased 5.7% relative to 2017. The **Index Count** (statewide census conducted 1-9 June) was **669 pairs**, and the **Adjusted Total Count** (estimated total number of breeding pairs statewide for the entire 2018 breeding season) was **688 pairs**. A total of 893 chicks were reported fledged in 2018 for an overall productivity of **1.30 fledglings per pair**, based on data from 99.6% of pairs.

Prepared by: Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife

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INTRODUCTION

Piping Plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from North Carolina to Newfoundland. The U.S. Atlantic Coast population of Piping Plovers has been federally listed as *Threatened*, pursuant to the U.S. Endangered Species Act, since 1986. The species is also listed as *Threatened* by the Massachusetts Division of Fisheries and Wildlife pursuant to the Massachusetts Endangered Species Act.

Population monitoring is an integral part of recovery efforts for Atlantic Coast Piping Plovers (U.S. Fish and Wildlife Service 1996, Hecht and Melvin 2009a, b). It allows wildlife managers to identify limiting factors, assess effects of management actions and regulatory protection, and track progress toward recovery. In this report, we summarize data on abundance, distribution, and reproductive success of Piping Plovers breeding in Massachusetts in 2018, as observed and reported by a coast-wide network of cooperators.

METHODS

Monitoring and management of Piping Plovers and other coastal waterbirds in Massachusetts is carried out by wildlife biologists, seasonal shorebird monitors, beach managers, researchers, and volunteers affiliated with over 20 federal and state agencies, local municipalities, local and regional land trusts, private conservation organizations, and universities. Cooperators monitored 323 sites in Massachusetts in 2018 for the presence of breeding Piping Plovers.

Abundance

We measure abundance of Piping Plovers in terms of breeding pairs, defined as pairs observed with either a nest or unfledged chicks or that exhibited site tenacity and evidence of pair bonding and territoriality for at least two weeks. We report three different measures of abundance: the *Index Count*, *Unadjusted Total Count*, and *Adjusted Total Count*. The *Index Count*, as reported since 1990, is the total number of pairs tallied statewide each year during a 9-day count period in late May and early June, standardized each year for the entire Atlantic Coast. In 2018, the *Index Count* period was 1-9 June. The objective of the *Index Count* is to estimate population size with minimal double-counting of pairs that may move between or within sites, thereby providing an index to population trends that is likely to be more precise than counts based on observations made over the entire breeding season. The *Index Count* likely minimizes double-counting because it occurs over such a short time period. However, it probably underestimates the actual number of breeding pairs because it does not include pairs that leave the state before, arrive after, or are present but simply go undetected during the 9-day *Index Count* period.

For sites for which “0” is reported for the *Index Count* but “ND” is reported for the *Total Count*, this indicates that the site was surveyed during the *Index Count* period (1-9 June) and no breeding pairs were detected, but during the rest of the breeding season, it was either not surveyed or was surveyed too infrequently during May and June to confidently conclude that no pairs were present for at least 2 weeks.

Since 2000, we have reported two different “Total Counts”. The *Unadjusted Total Count* is simply a tally of the total number of pairs reported for all sites over the course of the entire nesting season, with limited effort made to adjust for any pairs that may have been double-counted if they nested unsuccessfully at one location and then re-nested at another. We then derive an *Adjusted Total Count* by calculating the average of the *Index Count* and the *Unadjusted Total Count*, rounded to the nearest whole number of pairs.

The *Unadjusted Total Count* likely overestimates the actual population by double-counting pairs that establish nesting territories at more than one location in a given year. Without banded birds, however, it is impossible to

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accurately determine whether late-nesting pairs may have nested earlier at a different site or whether they simply did not arrive or begin breeding activities until June. It is too subjective, and likely inaccurate, to try to adjust the *Total Count* of pairs each year by not tallying late-nesting pairs (*i.e.*, pairs reported as “new” pairs that nested after the first week in June) based on the assumption that these birds were probably already counted earlier in the season. We believe that the *Adjusted Total Count* is the most accurate estimate of the actual number of breeding pairs in Massachusetts, because it falls midway between the *Index Count* and *Unadjusted Total Count*, which we suspect slightly underestimate and overestimate, respectively, the actual breeding population.

Reproductive success

The primary measure of reproductive success that we report is *Productivity*, measured as number of chicks fledged per pair. The denominator of this ratio is the number of breeding pairs for which fledging data were reported; this includes not only pairs that successfully fledged chicks, but also pairs that cooperators believed did not nest, pairs that nested unsuccessfully (eggs did not survive to hatch), and pairs whose chicks failed to fledge. Since 2000, we have reported two different estimates of *Number of pairs with fledge data*. As with counts of breeding pairs, estimates of the number of pairs for which fledging data are reported will be biased if double-counting of pairs occurs. Double-counting will overestimate the number of pairs in the denominator of the productivity ratio, and thereby will underestimate actual productivity. To reduce the potential bias associated with double-counting, we multiply the *Unadjusted number of pairs with fledge data* (a tally of the total number of pairs with fledge data reported for all sites, with limited effort made to adjust for pairs that may have been double-counted) by the ratio of the *Adjusted Total Count* to the *Unadjusted Total Count* to arrive at the *Adjusted number of pairs with fledge data*.

Median Lay and Hatch Dates

The median estimated date of first egg laid was calculated by using known and estimated dates of first egg laid. Two days were subtracted from Date Clutch Found when the nest was found at two eggs and four days were subtracted from Date Clutch Found when the nest was found at three eggs. For nests that were found at four eggs, only nests that successfully hatched were used and 33 days were subtracted from the hatch date to estimate dates of first egg laid to account for the egg-laying period (6 days) plus the mean incubation period (27 days). The median estimated hatch date was calculated using the known hatch date. For hatch dates that consisted of date ranges, the median date was used as the estimated hatch date.

Data reporting and quality control

All data were reported by cooperators who filled out a standard Massachusetts Piping Plover Census Form for each site monitored, in most cases using the Piping Plover Online Data Entry System ([PIPLODES](#)). These forms are used to report data on number of breeding pairs (*Index Count* and *Total Count*); frequency of site visits; design(s) and installation dates of predator exclosures; dates of nest discovery, completion, and hatching or failure; number of eggs on the date the nest was discovered; total numbers of eggs laid, eggs hatched, and chicks fledged; reasons for egg and chick loss, if determined; and comments regarding census results, limiting factors, and management needs. Maps of sites showing the locations of all nests were submitted with census forms. After reviewing census forms, if necessary, we contacted cooperators to obtain missing or incomplete data, resolve inconsistencies, and clarify ambiguities. When we could not obtain the needed information, we used best professional judgment to assign final values or noted data as preliminary; any such instances are noted in Table 1.

RESULTS

Observers reported breeding Piping Plovers at 157 sites in Massachusetts in 2018. An additional 174 sites were surveyed one or more times during May and June, but no breeding pairs were detected at them (Table 2). The ***Adjusted Total Count*** was **688 pairs**, a 5.7% increase over 2017 (650.5 pairs). The ***Index Count*** was **669 pairs** (vs. 633 pairs in 2017), or 97.3% of the *Adjusted Total Count* (Table 2).

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Distribution of breeding pairs by region (**Figure 1**) was similar to 2017, with a slight increase on the Lower Cape (31% in 2017) and a slight decrease on the North Shore (21% in 2017). Seventeen sites with ten or more breeding pairs accounted for 52.8% of the Massachusetts breeding population, while 111 sites with three or fewer pairs accounted for 24.9%.

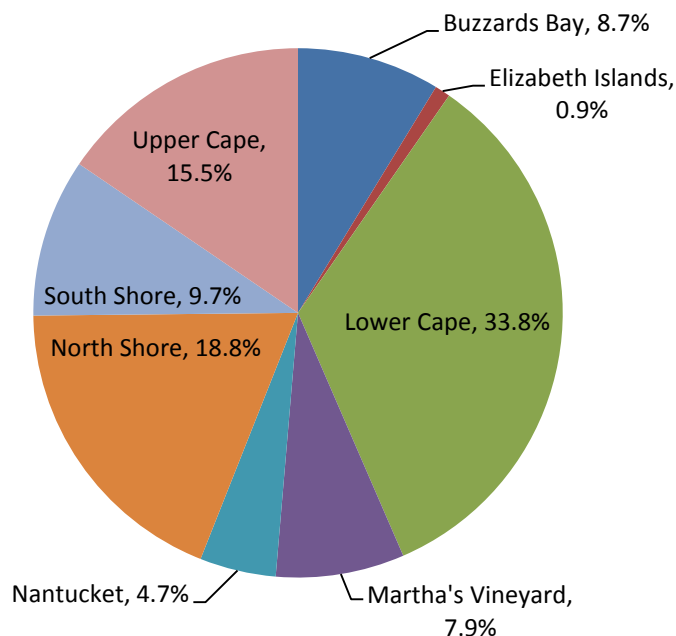


Figure 1. Distribution of Piping Plover breeding pairs by Massachusetts region in 2018, based on *Adjusted Total Counts* for each region.

In total, 893 chicks were reported fledged in 2018, resulting in overall productivity of **1.30 fledglings/pair**, based on data from 685 out of 688 pairs (99.6%; the *adjusted number of pairs with fledge data* divided by the *adjusted total count*) (**Table 2**).¹ This represents a 21.9% increase in productivity relative to 2017 (1.07 fledglings/pair). Productivity varied by region, ranging from 1.40 on the South Shore down to 0.93 on Martha's Vineyard. All other regions exhibited good productivity (**Table 1**).

¹ The *unadjusted number of pairs with fledge data* was 703 (out of 706).

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Table 1. Productivity (fledglings per pair) of Piping Plovers by Massachusetts region.

Region	2018	2017
Buzzards Bay	1.33	1.09
Elizabeth Islands	1.23	0.00
Lower Cape	1.38	1.39
Martha's Vineyard	0.93	0.82
Nantucket	1.25	0.98
North Shore	1.20	0.98
South Shore	1.40	0.87
Upper Cape	1.39	0.89

Overall, nest failure rates were lower in 2018 (49.9%) than in 2017 (54.8%). Causes of nest loss are shown in **Figure 2**. The largest causes of nest loss were predation (known and suspected) and overwash/flooding. Predation accounted for a greater proportion of nest loss in 2018 (68.0%) than in 2017 (56%), and overwash accounted for a smaller proportion (13.7% vs. 27% in 2017). **Figure 3** shows suspected predators of nests likely and suspected to have been depredated.

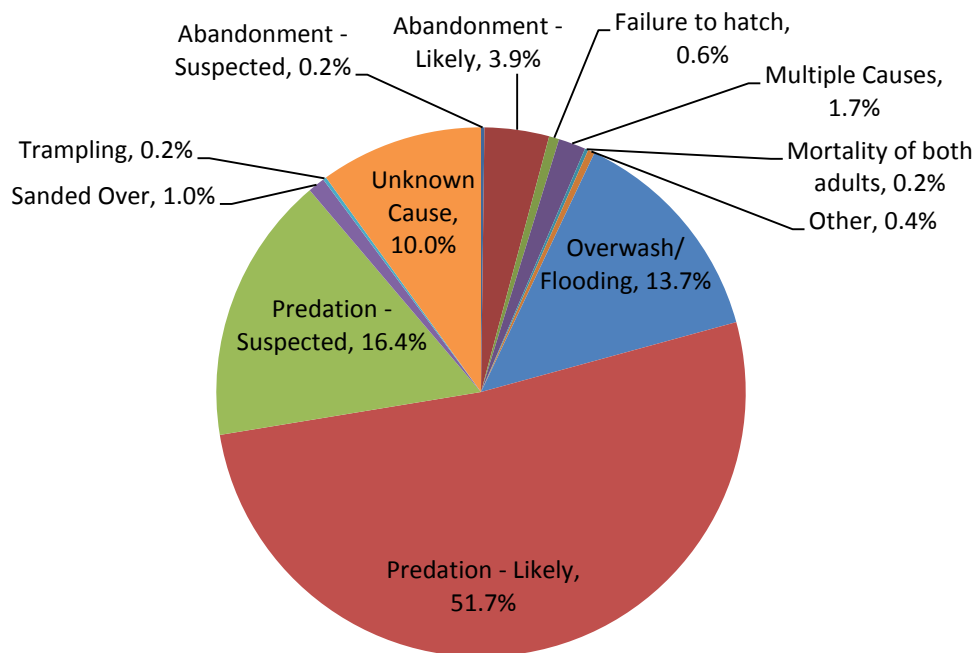


Figure 2. Causes of Piping Plover nest loss in Massachusetts, 2018 (n=482 nest failures).

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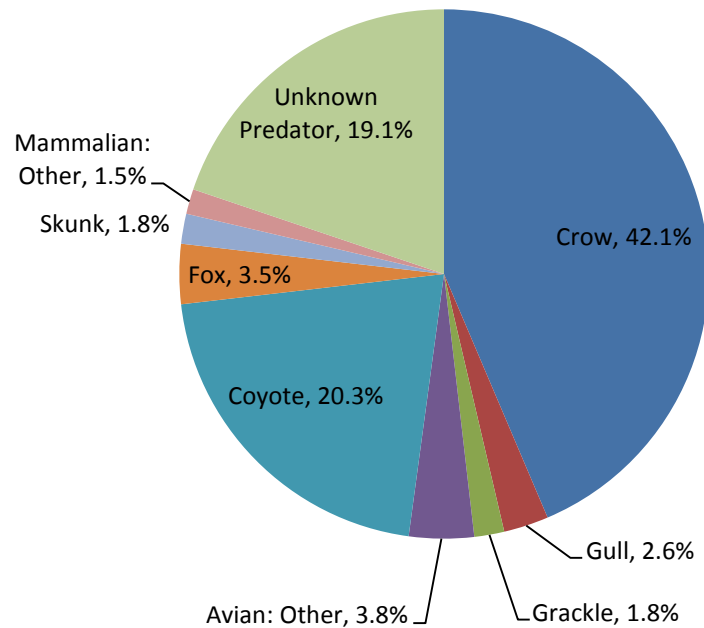


Figure 3. Suspected predators of Piping Plover nests likely and suspected to have been depredated in Massachusetts, 2018 (n=328).

The earliest clutch initiation date was estimated to be 24 April at Third Cliff, Scituate, a week later than the earliest clutch initiation in 2017 (17 April). However, the median clutch initiation date (19 May) was earlier than in 2017 (25 May). The earliest recorded hatch date was 27 May, also at Third Cliff, Scituate, compared to 21 May in 2017. The median hatch date statewide was 19 June, a week later than in 2017 (12 June).

Hatch rates increased modestly (50.1%; n=966 nests with known fates) relative to 2017 (45.2%; n=1014) and there was a corresponding decrease in nesting attempts per pair: 1.41 vs. 1.6 in 2017 (based on *adjusted total counts*). Hatch rates for exclosed and unexclosed nests in 2018 were 82.1% (n=156) and 44.0% (n=810) respectively, as compared to 79.7% (n=123) and 37.7% (n=891) in 2017. Nest abandonment rate for exclosed nests (3.2%; 5 of 156 nests) was higher than for unexclosed nests (1.9%; 15 of 810 nests with known fates), compared to 7.3% (9 of 123 nests) and 2.8% (22 of 794 nests), respectively in 2017.

Long term trends in breeding population size and productivity are shown in **Figure 4**. The five-year running average of productivity has declined overall since 1995. However, there have been successive increases since 2015, and for the first time since 2011, the average exceeded the approximately 1.2 fledglings per pair thought to be necessary to maintain a stable population (Melvin & Gibbs 1996).² The population trend has been stable since 2012, although the population increased by 5.7% between 2017 and 2018.

² Melvin and Gibbs (1996) suggest that the actual fecundity needed to maintain a stable population may be slightly lower than the estimate derived from their model. Other researchers have also suggested that early estimates of fecundity needed for a stable population may have been high (e.g. Catlin et al. 2015).

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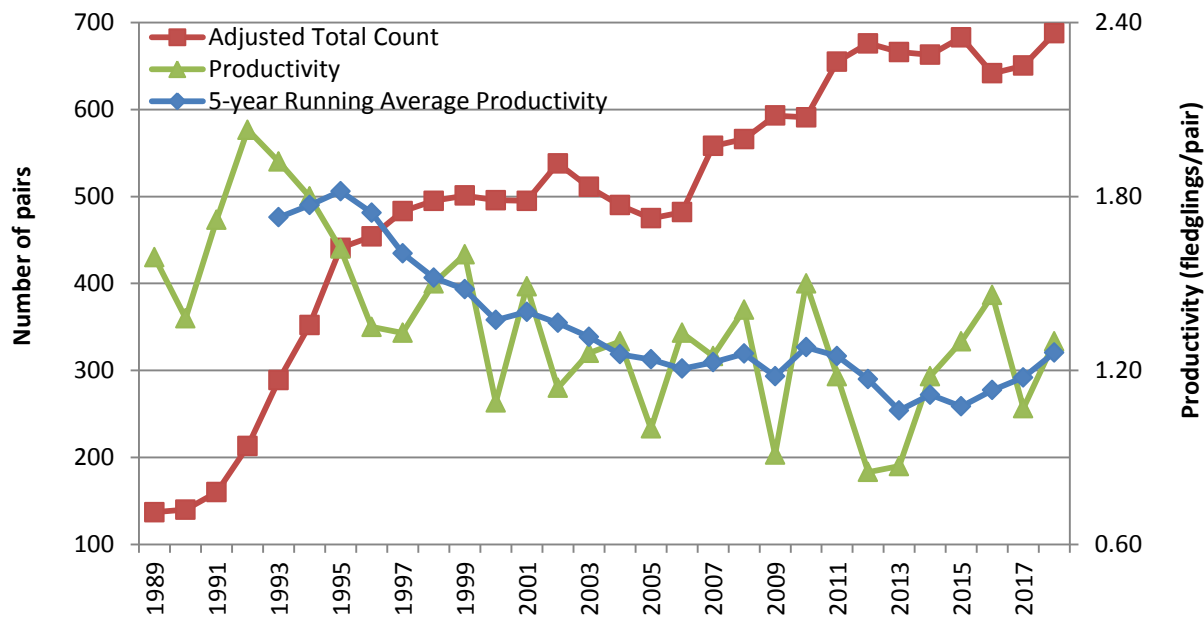


Figure 4. Piping Plover abundance (*adjusted total count*) and productivity (fledglings/pair) in Massachusetts, 1989-2018.

ACKNOWLEDGEMENTS

This report was prepared with assistance from Amanda Veinotte, Carolyn Mostello, and Jennifer Longsdorf. We extend our sincere thanks to the many biologists, seasonal shorebird monitors, beach managers, landowners, and volunteers who participated in conservation efforts on behalf of Piping Plovers and other coastal waterbirds in Massachusetts in 2018. We also thank the more than 20 state and federal agencies, local municipalities and county government, local and regional land trusts, private conservation organizations, and universities that supported their efforts. We especially thank all the individuals who participated in population monitoring and submitted the data that are summarized in this report.

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Table 2. Abundance, distribution, and productivity of Piping Plovers in Massachusetts, 2018.

Site	Index count ^a (no. pairs)	Total count ^b (no. pairs)	No. chicks fledged ^c	No. pairs with fledge data ^c	No. unpaired adults ^d	Source ^e	Notes
NORTH SHORE							
West Beach, Beverly	0	0	0	0	0	ECGA	
Lovell's Beach, Boston	0	0	0	0	0	MAS	
Rainsford Island, Boston	0	0	0	0	0	MAS	
L Street Bathhouse, Dorchester	1	1	0	1	0	MAS	
Constitution Beach, East Boston	0	ND	ND	0	ND	MAS	
Coffins Beach - Bradford, Gloucester	1	1	0	1	0	ECGA	
Good Harbor Beach, Gloucester	1	1	0	1	0	ECGA	
Two Penny Loaf, Gloucester	0	0	0	0	0	ECGA	
Crane Beach, Ipswich	42	43	76	43	0	TTOR	Two adult mortalities (same pair) due to unknown raptor, one pair failed and left the site before the index period
Sandy Point, Ipswich	9	10	12	10	0	MAS	One pair first seen on 6/21
Nahant State Beach, Nahant	1	1	0	1	0	DCR	
Parker River NWR, Newbury/Rowley	40	45	46	45	0	USFWS	One adult mortality due to unknown (presumed avian) predator; four pairs failed and left the site before the index period, and one pair first seen in late June
Newburyport Town Beach, Newburyport	6	6	8	6	0	MAS	
Point of Pines (Private), Revere	3	3	0	3	0	MAS	
Revere Beach-North, Revere	7	7	4	7	0	DCR	One adult mortality; found dead on the nest on the day the nest hatched
Revere Beach-South, Revere	5	5	2	5	0	DCR	
Salisbury Beach State Reservation-North, Salisbury	0	0	0	0	0	MAS	
Salisbury Beach State Reservation-South, Salisbury	1	1	0	1	0	MAS	
Carson Beach, South Boston	0	ND	ND	0	ND	MAS	

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Site	Index count ^a (no. pairs)	Total count ^b (no. pairs)	No. chicks fledged ^c	No. pairs with fledge data ^c	No. unpaired adults ^d	Source ^e	Notes
Snake Island, Winthrop	0	0	0	0	0	MAS	
Winthrop Beach, Winthrop	7	7	6	7	0	DCR	
Yirrell Beach, Winthrop	2	2	2	2	0	Winthrop	
SOUTH SHORE							
Sagamore Beach - Bourne, Bourne	0	0	0	0	0	MAS	
Duxbury Beach, Duxbury	24	24	24	24	0	MAS	
Bumpkin Island, Hull	0	0	0	0	0	MAS	
Nantasket Beach, Hull	7	7	4	7	0	MAS	
Peddocks Island, Hull	0	ND	ND	0	0	MAS	
Rexhame Beach, Marshfield	0	0	0	0	0	MAS	
Ellisville Harbor State Park, Plymouth	0	0	0	0	0	MAS	Pair that nested at Ellisville Shifting Lots was sometimes seen at Ellisville Harbor State Park early in the season
Plymouth Long Beach, Plymouth	25	26	52	26	0	Plymouth	One pair failed and left the site before the index period
Sagamore - Plymouth, Plymouth	0	0	0	0	0	MAS	
Saquish, Plymouth	1	1	0	1	0	MAS	
Ellisville Shifting Lots Preserve, Plymouth	1	1	2	1	0	MAS	
Scusset Beach State Reservation, Sandwich	0	1	0	1	0	MAS	One pair scraping throughout the first half of May
Sagamore Beach - Sandwich, Sandwich	2	3	2	3	0	MAS	
Fourth Cliff, Scituate	1	1	0	1	0	MAS	
Humarock, Scituate	0	ND	ND	0	ND	MAS	
The Glades, Scituate	0	0	0	0	0	MAS	
Third Cliff, Scituate	4	4	9	4	0	MAS	
Grape Island	0	0	0	0	0	MAS	
UPPER CAPE							
Bone Hill Road, Barnstable	0	ND	ND	0	ND	MAS	
Craigville Beach, Barnstable	1	1	2	1	0	MAS	
Dead Neck Sampsons Island, Barnstable	7	8	3	8	0	MAS	One pair first seen on 6/15

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Site	Index count ^a (no. pairs)	Total count ^b (no. pairs)	No. chicks fledged ^c	No. pairs with fledge data ^c	No. unpaired adults ^d	Source ^e	Notes
Dowdes Beach, Barnstable	2	2	4	2	0	Barnstable	
Fortes Beach, Barnstable	0	ND	ND	0	ND	MAS	
Kalmus Beach, Barnstable	3	3	1	3	0	Barnstable	
Long Beach, Barnstable	3	3	8	3	0	MAS	
Memorial Beach/Covell's, Barnstable	0	ND	ND	0	ND	MAS	
Mussel Point, Barnstable	ND	ND	ND	0	ND	MAS	No survey
Sandy Neck Beach Park, Barnstable	27	27	42	27	0	Barnstable	
Sea St./ Keyes Beach, Barnstable	0	ND	ND	0	ND	MAS	
Squaw Is. Road / Causeway, Barnstable	1	1	2	1	0	MAS	
Squaw Island, Barnstable	4	5	3	5	0	MAS	One non-nesting pair present from early April until early May
Bassetts Island, Bourne	0	ND	ND	0	ND	MAS	
Mashnee Dike, Bourne	0	0	0	0	0	USACOE	
Crosby Landing Beach, Brewster	2	2	4	2	0	MAS	
Linnell Landing Beach, Brewster	0	ND	ND	0	ND	MAS	
Paine's Creek, Brewster	0	ND	ND	0	ND	MAS	
Wings Island, Brewster	1	1	2	1	0	MAS	
Rushy Marsh Pond, Cotuit	1	1	0	1	0	MAS	
Bayview Ave/Howe's Beach (private), Dennis	1	1	0	1	0	MAS	
Bayview, Dennis	0	0	0	0	0	Dennis	
Chapin Beach, Dennis	2	2	0	2	0	Dennis	
Cold Storage Beach, Dennis	0	0	0	0	0	Dennis	
Corporation Beach, Dennis	0	0	0	0	0	Dennis	

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Crowes Pasture (Cole's Pond) / Quivett Neck, Dennis	2	2	0	2	0	Dennis	
Depot Street, Dennis	0	0	0	0	0	Dennis	
Dr. Botero, Dennis	0	0	0	0	0	MAS	
Glendon Beach, Dennis	0	0	0	0	0	Dennis	
Haigis to Inman Rd., Dennis	0	0	0	0	0	Dennis	
Harbor View, Dennis	0	0	0	0	0	Dennis	
Howe's St. Beach, Dennis	0	0	0	0	0	Dennis	
Inman Beach, Dennis	0	0	0	0	0	Dennis	
Mayflower Beach, Dennis	0	0	0	0	0	Dennis	
Metcalfe Memorial, Dennis	0	0	0	0	0	Dennis	
Miramar Beach (Swan River), Dennis	1	1	0	1	0	MAS	
Raycroft Beach, Dennis	0	0	0	0	0	Dennis	
Sea Street (West Dennis), Dennis	0	0	0	0	0	Dennis	
Sea Street Beach, Dennis	0	0	0	0	0	Dennis	
Sesuit Harbor Beach, Dennis	0	0	0	0	0	Dennis	
South Village Beach, Dennis	0	0	0	0	0	Dennis	
West Dennis Beach, Dennis	3	3	7	3	0	Dennis	
Acapesket Beach, Falmouth	0	ND	ND	0	ND	MAS	
Black Beach, Falmouth	2	2	0	2	0	MAS	Unpaired territorial male present for less than two weeks during the census period
Little Island Beach, Falmouth	0	ND	ND	0	ND	MAS	
Menauhant Beach, Falmouth	1	1	4	1	0	MAS	Not surveyed during the index period; discovered young chicks on 6/8
Sippewisset, Falmouth	1	1	0	1	0	MAS	
Washburn Island, Falmouth	3	4	0	4	0	MAS	One pair failed and left the site before the index period

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Woodneck Beach, Falmouth	0	0	0	0	0	MAS	
Trunk River , Falmouth	0	0	0	0	0	MAS	
Allens Harbor, Harwich	0	0	0	0	0	MAS	
Belmont Condos, Harwich	0	ND	ND	0	ND	MAS	
Red River Beach, Harwich	1	1	4	1	0	MAS	
Saquatucket Bluffs, Harwich	0	0	0	0	0	MAS	
Stone Horse Yacht Club, Harwich	0	0	0	0	0	MAS	
Town Beach- Grey Neck Rd/Earle Rd, Harwich	0	0	0	0	0	MAS	
Winstead Inn, Harwich	0	0	0	0	0	MAS	
Wychmere-Merkel-Bank St, Harwich	1	1	2	1	0	MAS	
New Seabury, Mashpee	3	3	8	3	0	MAS	
Popponesset Spit, Mashpee	4	4	0	4	0	MAS	
South Cape Beach, Mashpee	6	6	4	6	0	MAS	
East Sandwich, Sandwich	2	2	4	2	0	Sandwich	
Scorton Neck (Torrey), Sandwich	4	4	10	4	0	MAS	
Scorton Shores, Sandwich	1	1	2	1	0	Sandwich	
Spring Hill, Sandwich	7	7	14	7	0	Sandwich	An eighth pair was present and scraping for <2 weeks. The female was in basic plumage.
Town Neck Beach, Sandwich	1	1	4	1	0	Sandwich	
Bass River Beach, Yarmouth	0	ND	ND	0	ND	MAS	
Grays Beach, Yarmouth	1	1	0	1	0	MAS	
Great Island Causeway, Yarmouth	1	1	3	1	0	MAS	
Great Island - Smith Point, Yarmouth	3	3	3	3	0	MAS	

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Radio City Beach, Yarmouth	0	0	0	0	0	MAS	
Red Jacket Beach, Yarmouth	0	ND	ND	0	ND	MAS	
Seagull Beach, Yarmouth	2	2	8	2	0	MAS	
Standish Way/Colonial Acres, Yarmouth	0	ND	ND	0	ND	MAS	
LOWER CAPE							
Chatham Bars Inn, Chatham	0	ND	ND	0	ND	MAS	
Chatham Lane (Mill Ck.), Chatham	0	0	0	0	ND	MAS	
Clafin Landing, Chatham	0	ND	ND	0	ND	MAS	
Cockle Cove, Chatham	0	0	0	0	0	MAS	
Forest Beach, Chatham	2	2	4	2	0	MAS	
Harding Beach, Chatham	5	5	10	5	0	MAS	
Harding Shores, Chatham	0	0	0	0	0	MAS	
Linnell Lane, Chatham	0	0	ND	0	ND	MAS	
Minimoy Island, Chatham	0	0	0	0	0	USFWS	
Morris Island Dike/ Hardings Beach Point, Chatham	0	0	0	0	0	MAS	
Morris Island Dredge Spoil, Chatham	0	ND	ND	0	ND	MAS	
North (Nauset) Beach, Chatham	18	21	37	21	0	Chatham	
North Beach Island, Chatham	13	17	3	17	2	Chatham	Three pairs were territorial in May but never nested; there were also two unpaired males scraping
North Monomoy Island, Chatham	0	0	0	0	0	USFWS	
Pleasant St. Beach, Chatham	0	0	0	0	0	MAS	
Ridgevale Beach, Chatham	2	2	6	2	0	MAS	
South Beach - Middle Island, Chatham	8	9	9	9	0	MAS	

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South Beach (North of Break) , Chatham	0	0	0	0	0	MAS	
South Beach (South of Break) , Chatham	14	16	8	16	0	MAS	One pair nested at Monomoy NWR and then re-nested on South Beach; two additional pairs were sometimes present at the site but ultimately nested at Monomoy NWR
South Monomoy Island, Chatham	33	36	20	36	0	USFWS	One pair moved to South Beach Chatham and re-nested in area monitored by MAS
Tern Island, Chatham	2	2	0	2	0	MAS	
Boat Meadow, Eastham	0	ND	ND	0	ND	MAS	
Coast Guard Beach, Eastham	10	13	16	13	0	NPS	Three pairs first seen in late June
Dyer Prince Beach, Eastham	0	ND	ND	0	ND	MAS	
First Encounter Beach, Eastham	0	0	0	0	0	MAS	
Nauset Light Beach, Eastham	0	0	0	0	0	NPS	
South Sunken Meadow, Eastham	1	1	1	1	0	MAS	
North Spit, Orleans	15	15	42	15	0	Orleans	
Rock Harbor, Orleans	0	ND	ND	0	ND	MAS	
Skaket Beach, Orleans	0	ND	ND	0	ND	MAS	
South Beach (Nauset), Orleans	13	13	33	13	0	Orleans	
Armstrong Beach, Provincetown	9	11	3	11	0	NPS	Two pairs failed in May and re-nested at Longnook; unpaired adult was present for ~3 weeks after nest failed and mate left
Exit 9, Provincetown	2	2	4	2	0	NPS	One pair nested at Mission Bell and then moved to Exit 9 mid-census
Hatches Harbor, Provincetown	3	3	3	3	1	NPS	One unpaired adult was scraping for over two weeks
Herring Cove, Provincetown	0	0	0	0	0	NPS	
Mission Bell, Provincetown	2	3	1	3	0	NPS	One pair moved from Race Point South and re-nested at Mission Bell; another pair moved from Mission Bell and re-nested at Exit 9

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

Site	Index count ^a (no. pairs)	Total count ^b (no. pairs)	No. chicks fledged ^c	No. pairs with fledge data ^c	No. unpaired adults ^d	Source ^e	Notes
Race Point Beach, Provincetown	3	3	6	3	0	NPS	
Race Point North, Provincetown	16	15	31	15	0	NPS	One pair was seen scraping for three days during the index period but left without nesting; one fledgling was unable to fly adequately due to injury and was transferred to New England Aquarium
Race Point South, Provincetown	3	3	3	3	0	NPS	One pair re-nested at Mission Bell after the index period
Wood End/Long Point, Provincetown	9	9	26	9	0	NPS	
Ballston, Truro	1	1	0	1	0	NPS	
Beach Point, Truro	1	1	2	1	0	MAS	
Between Corn Hill Beach and Beach Point, Truro	0	ND	ND	0	ND	MAS	
Coast Guard Beach, Truro	0	0	0	0	0	MAS	
Coast Guard Truro, Truro	4	4	0	4	0	NPS	One nesting pair (not present during index count) also nested at High Head; one pair nested at Head of the Meadow before the index period and re-nested at Coast Guard Truro; an additional pair was observed only during the index period (6/1 and 6/3)
Corn Hill Beach, Truro	2	2	3	2	0	MAS	
Fisher Beach South, Truro	0	0	0	0	0	MAS	
Fisher Beach, Truro	2	2	4	2	0	MAS	
Head of Meadow, Truro	0	0	0	0	0	MAS	
Head of the Meadow, Truro	6	7	9	7	0	NPS	One pair left Head of the Meadow in May and re-nested at Coast Guard Truro
High Head, Truro	2	2	0	2	1	NPS	Pair 1 attempted a fifth nest at Coast Guard Truro after the index period; the banded female from Pair 2 re-nested with a different mate at Great Island at end of index period, leaving its "unpaired" mate at High Head

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

Site	Index count ^a (no. pairs)	Total count ^b (no. pairs)	No. chicks fledged ^c	No. pairs with fledge data ^c	No. unpaired adults ^d	Source ^e	Notes
Longnook, Truro	2	2	3	2	0	NPS	Both pairs nested at Armstrong Beach before the index count
Ryder Beach, Truro	0	0	0	0	0	MAS	
Ballston Beach, Truro	1	1	1	1	0	MAS	
Bound Brook, Wellfleet	1	2	0	2	0	NPS	One unpaired adult was seen during the index period, unknown if it was territorial
Cahoon Hollow, Wellfleet	0	1	0	1	0	NPS	Pair nested at Newcomb Hollow before and after nest attempt at Cahoon Hollow
Duck Harbor, Wellfleet	3	4	8	4	0	NPS	
Field Point /Fox Is. WMA, Wellfleet	0	ND	ND	0	ND	MAS	
Great Is., Wellfleet	7	8	11	8	0	NPS	One banded female moved from High Head during the index period and re-nested at this site, likely with a male from an existing pair at Great Island; one other pair was not seen at this site until late June
Jeremy Point, Wellfleet	2	2	1	2	0	NPS	One unpaired adult was seen during the index period, unknown if it was territorial
Lecount Hollow, Wellfleet	0	1	1	1	0	NPS	Pair previously nested at White Crest Beach
Lieutenant Island - NW, Wellfleet	0	0	0	0	0	MAS	
Lieutenant Island - SW, Wellfleet	0	0	0	0	0	MAS	
Lieutenant Island - The Hook, Wellfleet	0	ND	ND	0	ND	MAS	
Marconi Beach, Wellfleet	2	3	1	3	0	NPS	
Marconi Station, Wellfleet	4	4	8	4	0	NPS	
Mouth of Herring River - Mayo Beach, Wellfleet	0	ND	ND	0	ND	MAS	
Newcomb Hollow, Wellfleet, Truro	2	2	4	2	0	NPS	One pair nested at Cahoon Hollow in between nest attempts at Newcomb Hollow
Old Wharf, Wellfleet	0	ND	ND	0	ND	MAS	
White Crest Beach, Wellfleet	1	1	0	1	0	NPS	Pair re-nested at Lecount Hollow

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

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BUZZARDS BAY							
Barney's Joy/Little Beach, Dartmouth	17	17	22	17	0	MAS	
Demarest Lloyd State Park, Dartmouth	5	5	6	5	0	DCR	One suspected adult mortality attributed to great-horned owl
Nonquitt, Dartmouth	1	1	4	1	0	MAS	
Round Hill Beach, Dartmouth	0	0	0	0	0	MAS	
Salters Pond, Dartmouth	1	1	3	1	0	MAS	
Timmy's Rock, Dartmouth	0	0	0	0	0	MAS	
Fish Island, Fairhaven	0	ND	ND	0	ND	DFW	Surveyed 5/30
Long Island, Fairhaven	ND	ND	ND	0	ND	DFW	No survey
Round Is., Fairhaven	0	0	0	0	0	DFW	
South Shore Marshes, Fairhaven	0	ND	ND	0	ND	DFW	
Ward's Rock, Fairhaven	0	ND	ND	0	ND	DFW	Surveyed 5/30
West Island, Fairhaven	8	8	20	8	0	LCE	
Winsegansett Heights, Fairhaven	0	0	0	0	0	LCE	
Blankenship Cove	0	ND	ND	0	0	MAS	
Gravel Island	0	ND	ND	0	ND	MAS	
Haskell Island, Marion	ND	ND	ND	0	ND	MAS	No survey
Little Island, Marion	0	ND	ND	0	ND	MAS	
Meadow Island, Marion	0	ND	ND	0	ND	MAS	
Planting Island, Marion	0	ND	ND	0	ND	MAS	
Ram Is., Marion, Marion	0	ND	ND	0	ND	DFW	Surveyed 5/29
Stewart's Island, Marion	ND	ND	ND	0	ND	MAS	No survey
Brandt Island, Mattapoisett	ND	ND	ND	0	ND	DFW	No survey
Pine Island (Angelica Point and Strawberry Point), Mattapoisett	0	ND	ND	0	ND	DFW	
Ram Is., Mattapoisett, Mattapoisett	0	0	0	0	0	DFW	

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

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Bourne Cove, Wareham	0	ND	ND	0	ND	MAS	
Cedar Island, Wareham	0	ND	ND	0	ND	MAS	
Cromeset, Wareham	0	ND	ND	0	ND	MAS	
Little Harbor Beach, Wareham	2	2	3	2	0	MAS	Non-nesting pair present from June 1 until mid-June
Long Beach Point, Wareham	1	1	0	1	0	MAS	
Stony Point Dike, Wareham	2	2	0	2	0	USACOE	
Swift's Beach, Wareham	0	ND	ND	0	ND	MAS	
Acoaxet, Westport	0	0	0	0	0	TNC	
Baker's Beach, Westport	2	2	3	2	0	LCE	
Beach Ave, Westport	0	0	0	0	0	MAS	
Cockeast Pond (Elephant Rock), Westport	2	2	5	2	0	TNC	
East Beach, Westport	1	1	0	1	0	MAS	
Gooseberry Neck, Westport	0	0	0	0	0	LCE	
Horseneck Beach State Reservation, Westport	15	15	9	15	0	DCR	
Richmond Pond, Westport	1	1	3	1	0	TNC	
Westport Town Beach, Westport	2	2	2	2	0	MAS	
ELIZABETH ISLANDS							
							One non-nesting pair was observed only 1-2 times and is included in the index count but not the total count; one unpaired adult was scraping in May and June
Cuttyhunk, Gosnold	4	3	4	3	1	MAS	
Nashawena Island-Canapitsit, Gosnold	ND	ND	ND	0	ND	DFW	No survey
Nashawena Island-Quicks Hole, Gosnold	ND	ND	ND	0	ND	DFW	No survey
Naushon Is. - Crescent Beach, Gosnold	1	1	ND	0	ND	DFW	Site visited only once during the index period; one pair with four chicks

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

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Naushon Is. - French Watering Hole, Gosnold	0	ND	ND	0	ND	DFW	Site visited only once during the index period
Naushon Is. - Kettle Cove, Gosnold	0	ND	ND	0	ND	DFW	Site visited only once during the index period
Naushon Is. – Robinson’s Hole, Gosnold	0	ND	ND	0	ND	DFW	Site visited only once during the index period
Naushon Is. - Tarpaulin Cove, Gosnold	1	1	ND	0	ND	DFW	Site visited only once during the index period; one pair with four chicks
Naushon Is. - West Beach, Gosnold	1	1	ND	0	ND	DFW	Site visited only once during the index period; one pair with four eggs
Pasque Island-Cobbly, Gosnold	0	ND	ND	0	ND	DFW	Site visited only once during the index period
Pasque Island-Quicks Hole, Gosnold	ND	ND	ND	0	ND	DFW	No survey
Pasque Island-Robinson's Hole, Gosnold	0	ND	ND	0	ND	DFW	Site visited only once during the index period
Penikese Island, Gosnold	0	0	0	0	0	DFW	
MARTHA'S VINEYARD							
Dogfish Bar, Aquinnah	6	5	10	5	0	BW	One territorial pair seen only on 6/1
Lobsterville Beach, Aquinnah	0	0	0	0	0	MAS	
Menemsha Neck Preserve, Aquinnah	0	0	0	0	0	MVLBC	
Moshup Beach, Aquinnah	0	0	0	0	0	MVLBC	
Philbin Beach, Aquinnah	0	ND	ND	0	ND	BW	
Black Point Pond, Chilmark	1	1	0	1	0	BW	
Cape Higgon, Chilmark	0	ND	ND	0	ND	BW	
Chilmark Pond Preserve, Chilmark	0	0	0	0	0	MVLBC	
Chilmark Pond, Chilmark	2	3	0	3	0	BW	One pair failed and left the site before the index period
Edey's Island, Chilmark	0	0	0	0	0	MAS	
Great Rock Bight Preserve, Chilmark	0	0	0	0	0	MVLBC	

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

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Lucy Vincent Beach, Chilmark	2	2	0	2	0	BW	
Nomans Land Island NWR, Chilmark	0	0	0	0	0	USFWS	
Quansoo, Chilmark	2	2	0	2	0	MAS	
Spring Point, Chilmark	0	0	0	0	0	BW	
Squibnocket Beach/Long Beach, Chilmark	3	3	0	3	0	BW	
Stonewall Beach, Chilmark	0	0	0	0	0	BW	
Arruda's Point / The Jetties , Edgartown	1	1	0	1	0	TTOR	
Bend-in-the-Road Beach, Edgartown	0	0	0	0	0	MAS	
Caleb's Pond, Edgartown	0	ND	ND	0	ND	BW	
Cape Pogue Elbow / The Narrows, Edgartown	2	3	2	3	1	TTOR	One territorial adult present for two weeks in May
Chappaquiddick Point Beach, Edgartown	0	0	0	0	0	MVLBC	
Cove Meadow Preserve, Edgartown	0	0	0	0	0	MVLBC	
Cow Bay, Edgartown	0	0	0	0	0	MAS	
Cracktuxet Trust Beach, Edgartown	0	ND	ND	0	ND	BW	
Edgartown Great Pond (Job's Neck), Edgartown	6	7	5	7	0	BW	
Edgartown Great Pond, Edgartown	0	0	0	0	0	MVLBC	
Haystack Island, Edgartown	0	0	0	0	0	MAS	
Leland / East Beach, Edgartown	6	6	5	6	1	TTOR	One unpaired territorial male present from late April through May
Lighthouse Beach, Edgartown	1	1	3	1	0	BW	
Little Beach / Eel Pd., Edgartown	2	3	3	3	0	BW	
Little Neck, Edgartown	0	0	0	0	0	TTOR	

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Norton Point Beach, Edgartown	7	9	12	9	0	TTOR	Two pairs were not present until late June; three unpaired adults were present during the index count but may have formed pairs later on
Oyster Pond, Edgartown	1	1	0	1	0	BW	
Paqua Pond, Edgartown	1	1	4	1	0	BW	
Pease's Pond, Edgartown	ND	ND	ND	0	ND	BW	Surveyed once in May
Quammox Preserve, Edgartown	0	0	0	0	0	MVLBC	
South Beach, Edgartown	0	ND	ND	0	ND	BW	
Sylvia State Beach Edgartown , Edgartown	1	1	0	1	0	MAS	
Wasque, Edgartown	0	0	0	0	0	TTOR	
Yorke - Allen Point, Edgartown	1	1	0	1	0	MAS	
Big Gravel Island, Oak Bluffs	0	0	0	0	0	MAS	
Dougs Cove Preserve, Oak Bluffs	0	0	0	0	0	MVLBC	
Eastville Beach, Oak Bluffs	0	0	0	0	0	MAS	
Harthaven, Oak Bluffs	2	2	0	2	0	MAS	
Little Gravel Island, Oak Bluffs	0	0	0	0	0	MAS	
Sarsons Island, Oak Bluffs	0	0	0	0	0	MAS	
Sylvia State Beach Oak Bluffs, Oak Bluffs	0	0	0	0	0	MAS	
East Tashmoo, Tisbury	0	0	0	0	0	MAS	
Lagoon Pond-Maciel Marine/Ferry Boat Island, Tisbury	0	0	0	0	0	MAS	
Mink Meadows /West Chop, Tisbury	1	1	1	1	0	MAS	
West Tashmoo, Tisbury	1	1	0	1	0	BW	
Wilfrids Pond Preserve, Tisbury	0	0	0	0	0	MVLBC	

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

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Cedar Tree Neck, West Tisbury	0	0	0	0	0	BW	
Lamberts Cove, West Tisbury	0	ND	ND	0	ND	BW	
Long Point, West Tisbury	0	0	0	0	0	TTOR	
Paul's Point, West Tisbury	0	1	2	1	0	BW	Pair first seen on 6/15
Sepiessa Point Reservation, West Tisbury	0	0	0	0	0	MVLBC	
Seven Gates, West Tisbury	0	0	0	0	0	BW	
Short Cove Preserve, West Tisbury	0	0	0	0	0	MVLBC	
Tisbury Great Pond, West Tisbury	0	0	0	0	0	MVLBC	
Watcha Pond, West Tisbury	2	2	3	2	0	BW	
NANTUCKET							
40th Pole, Nantucket	1	1	3	1	0	Nantucket	
Capaum Pond, Nantucket	1	1	0	1	0	NCF	
Coatue, Nantucket	2	3	0	3	0	NCF	Third pair found with completed clutch on 6/21
Coskata-East Beach, Nantucket	0	0	0	0	0	TTOR	
Coskata-West Beach, Nantucket	0	0	0	0	0	TTOR	
Dionis Beach, Nantucket	1	1	2	1	0	Nantucket	
Eel Point, Nantucket	5	5	9	5	0	NCF	
Great Point, Nantucket	0	0	0	0	0	TTOR	
Hallowell Lane Beach, Nantucket	0	0	0	0	0	Nantucket	
Hoicks Hallow, Nantucket	0	ND	ND	0	ND	MAS	
Hummock and West Hummock Ponds, Nantucket	0	0	0	0	0	NCF	
Jetties Beach, Nantucket	1	1	0	1	0	Nantucket	
Little Neck, Nantucket	0	0	0	0	0	NCF	
Long Pond, Nantucket	0	0	0	0	0	NCF	

SUMMARY OF THE 2018 MASSACHUSETTS PIPING PLOVER CENSUS

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Low Beach , Nantucket	2	2	4	2	0	Nantucket	
Monomoy Creeks, Nantucket	0	0	0	0	0	NCF	
Muskeget Is., Nantucket	2	1	0	1	ND	MAS	Site visited infrequently; two pairs were scraping and courting during the census period, but only one pair was nesting on a subsequent visit in late June
Nantucket NWR (Great Point), Nantucket	1	1	0	1	0	USFWS	
Polpis Harbor (Medouie Creek and Pocomo Meadows), Nantucket	0	0	0	0	0	NCF	
Quaise Point, Nantucket	0	0	0	0	0	Nantucket	
Quidnet/Sesachacha Pond/Greenhills, Nantucket	1	2	2	2	0	MAS	One nest failed prior to the census period
Sheep Pond, Nantucket	0	0	0	0	0	NCF	
Smith Point / Esther Is., Nantucket	3	4	3	4	0	Nantucket	Pair 1 re-nested nearby at Smith's Point at a site monitored by MAS
Smith's Point, Nantucket	1	1	0	1	0	MAS	Pair previously nested at Smith Point/Esther Island
South Pastures (Madequecham Valley to Tom Nevers), Nantucket	0	0	0	0	0	NCF	
Squam Pond, Nantucket	0	0	0	0	0	MAS	
Squam Pond, Nantucket	0	0	0	0	0	NCF	
Surfside/Western Ave, Nantucket	0	0	0	0	0	Nantucket	
The Galls, Nantucket	1	1	2	1	1	TTOR	One territorial adult present 5/6 to 6/3
The Glades, Nantucket	0	1	0	1	0	TTOR	One territorial but non-nesting pair present 5/4 to 5/26
The Haulover , Nantucket	0	0	0	0	0	NCF	
Tom Nevers/Wanoma, Nantucket	1	1	0	1	0	MAS	

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Tuckernuck Is. - Bigelow's Point, Nantucket	1	1	3	1	0	TLT	
Tuckernuck Is. - East Pond, Nantucket	0	0	0	0	0	TLT	
Tuckernuck Is. - North Pond, Nantucket	0	0	0	0	0	TLT	
Tuckernuck Is. - Whale Point, Nantucket	3	3	6	3	0	TLT	
UMass Field Station, Nantucket	0	0	0	0	0	NCF	
Washing Pond, Nantucket	1	1	0	1	0	MAS	
Wauwinet, Nantucket	2	2	6	2	1	MAS	Unpaired male attempting to court paired female during first two weeks of June
Western Ave, Nantucket	1	1	0	1	0	MAS	Nesting pair failed and left site prior to index period; non-nesting pair was only seen once during the index period
UNADJUSTED TOTALS	669	706	893	703	9		
ADJUSTED TOTALS		688		685			

^a *Index Count* = number of pairs counted between 1-9 June 2018, the standardized *Index Count* period for the Atlantic Coast population.

^b *Total Count* = total number of territorial or breeding pairs present at a site for at least 2 weeks during the breeding season.

^c *Chicks fledged* are defined as chicks ≥ 25 days of age or observed in flight, whichever occurs first. Number of *Pairs with fledge data* includes all pairs for which number of *chicks fledged* was determined; this includes not only pairs that successfully fledged chicks, but also pairs for which no nests were found, pairs that nested unsuccessfully, and pairs whose chicks failed to fledge.

^d *Unpaired adults* = total number of territorial single adults present at a site for at least two weeks during the breeding season.

^e Source = primary source(s) that provided monitoring data: Barnstable = Town of Barnstable, BW = BiodiversityWorks, Chatham = Town of Chatham, DCR = Department of Conservation and Recreation, Dennis = Town of Dennis, DFW = Massachusetts Division of Fisheries & Wildlife, ECGA = Essex County Greenbelt Association, LCES = Lloyd Center for Environmental Studies, MAS = Massachusetts Audubon Society, MVLBC = Martha's Vineyard Land Bank Coalition, Nantucket = Town of Nantucket, NCF = Nantucket Conservation Foundation, NPS = National Park Service, Orleans = Town of Orleans, Plymouth = Town of Plymouth, Sandwich = Town of Sandwich, TLT = Tuckernuck Land Trust, TTOR = The Trustees of Reservations, USACOE = U.S. Army Corps of Engineers, USFWS = U.S. Fish & Wildlife Service, Winthrop = Town of Winthrop