

## 2000-2001 STATUS UPDATE: U.S. ATLANTIC COAST PIPING PLOVER POPULATION

### Population Estimates

Atlantic Coast piping plover breeding pair counts from 1986 to 2001 are tallied by state in Table 1. These population estimates are based on census methodologies that have been used by each state since 1989 or earlier, except in New York, Virginia, and Massachusetts. New York and Virginia count methods were modified beginning in 1994 and 1996, respectively, while Massachusetts implemented a small change in methodology starting in 2000 (Mostello and Melvin 2001). Table 2 compares breeding pair estimates shown in Table 1 with counts obtained during "window" (International) censuses. The 2000 and 2001 "window" counts were conducted May 27 to June 4, 2000 and May 26 to June 3, 2001.

After a 3% decline between 1997 and 1999, the estimate of breeding pairs on the U.S. Atlantic Coast (Table 1) posted a 4% increase between 1999 and 2000, followed by a 6% gain in 2001. The total 2001 U.S. Atlantic breeding pair count of 1280 pairs is the highest since the species' 1986 listing under the U.S. Endangered Species Act. Increases occurred in all three U.S. Atlantic recovery units, with the largest percentage gains occurring in New York-New Jersey. The New England sub-population, which was generally flat between 1997 and 2000, increased almost 3% in 2001 to a total of 641 pairs. Population estimates in the New York-New Jersey recovery unit grew by 15% in 2000 and 7% in 2001. Increases occurred in both States, but recent gains in New Jersey have yet to fully recoup the major population decrease that occurred in the late 1990s. The Southern recovery unit population remained essentially unchanged between 1999 and 2000. A 14% increase in the Southern sub-population in 2001 is almost entirely attributable to two northern Virginia barrier islands in a portion of that State that experienced robust productivity in 1999 and 2000. By contrast, numbers in the southern half of the Virginia barrier island chain and North Carolina continued a very steep decline, from 75 pairs in 1995 to only 25 pairs in 2001. The population estimate in Atlantic Canada declined in 2000, but recouped in 2001 to post a 16-year high estimate of 245 pairs. Net change in the entire Atlantic Coast population over the two years 2000-2001 was +9%, for a total of 1525 pairs nesting between North Carolina and Newfoundland.

During the 2000 and 2001 "window counts," observers tallied 1141 and 1213 pairs of plovers, respectively, in the U.S. portion of the plover's Atlantic Coast range (Table 2). Consistent with past patterns, the 2000-2001 window counts constitute approximately 93% of the total season estimate for all states excluding New York, which conducts only the window census.

State coordinators believe that the "window" census methodology undercounts their plover populations because some birds that nest before or after the "window" are unpaired or go undetected during the census. By contrast, methodologies used to determine "total season" estimates may result in some double-counting of birds that re-nest during the season, despite diligent efforts by local monitors and state coordinators to detect re-nests and avoid double-counting. Actual nesting populations in each year probably lie somewhere between the two sets of estimates in Table 2.

## Productivity Estimates

Table 3 presents productivity data, as reported by state piping plover coordinators, from 1992 to 2001<sup>1</sup>. Unless otherwise noted, plover chicks are considered fledged<sup>2</sup> if they survive to 25 days of age or are seen flying, whichever comes first.

U.S. Atlantic Coast piping plover productivity averaged 1.17 and 1.40 fledged chicks per pair, respectively, in 2000 and 2001 (Table 3). Coastwide productivity in 2000 was well below the 10-year average of 1.34 chicks per pair, and less than the 1.24 chicks per pair that population modeling indicates is necessary to maintain a stationary population (Melvin and Gibbs 1994). The lowest productivity in Massachusetts since 1987 constituted the primary deviation from typical productivity patterns. Inclement weather, including storms that flooded 178 nests, was a major contributor to low 2000 productivity in Massachusetts, but other factors such as nest abandonment and predation were also important (Mostello and Melvin 2001). In 2001, productivity in all three U.S. recovery units met or exceeded long-term averages. Of particular positive note is two years of above-average productivity in both New Jersey and northern Virginia. Productivity patterns in Atlantic Canada were similar to those observed in the U.S. part of the range, with productivity below the long-term average in 2000 and above it in 2001. Average productivity in Atlantic Canada in both years exceeded all U.S. Atlantic Coast recovery units.

Regional population trends were generally consistent with productivity observed for each sub-population in the preceding two years. The 2001 Massachusetts population figures may have been largely buffered from poor productivity in 2000 by the earlier long run of high productivity, but some effects may be manifest in 2002. Three consecutive years of better-than-average productivity in New Jersey appear to be contributing to a slow rebuilding of breeding pair numbers in that State, following a very steep decline between 1996 and 1998. Record-high productivity in New York in 1999 was probably a major contributor to growth of that State's population in 2000 and 2001. However, disparities between pairs tallied for productivity estimates versus window count data in 1999 and 2000 in New York suggest double-counting of renesting pairs at some sites, which would, in turn, cause an underestimate of State-wide productivity. Efforts to increase productivity in southern Virginia and North Carolina are urgently needed if the on-going population slide at the southern end of the range is to be reversed.

## Distribution

Distribution of U.S. Atlantic Coast piping plovers remains very heavily concentrated in New England, where 50% of the population bred in 2001. Recent increases in the New York-New Jersey recovery units are encouraging. The precarious status of the small Southern recovery unit, however, is reinforced by the steeply declining population in southern Virginia and North Carolina. More than 80% of breeding pairs in the Southern recovery unit are now confined to the northern 20% of its coastline. Breeding birds on the southern end of the Atlantic Coast range are likely to be increasingly vulnerable to problems associated with very small, sparsely distributed population (e.g., difficulties locating mates).

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<sup>1</sup> Productivity data for 1987-1991 may be found in Table 6 of the Revised Recovery Plan (USFWS 1996).

<sup>2</sup> While considered fledged for the purposes of measuring productivity, 25-day old chicks are often unable to fly and therefore remain vulnerable to off-road vehicles and other sources of mortality.

### Sources of 2000-2001 Data in Tables 1-3

Maine - J. Jones, Maine Audubon Society; New Hampshire - J. Kanter and S. Conrad, NH Fish and Game Dept.; Massachusetts - C. Mostello and S. Melvin, MA Div. of Fisheries and Wildlife; Rhode Island - C. Raithel, RI Div. of Fish, Wildlife, and Estuarine Res.; Connecticut - J. Victoria, CT Dept. of Env. Protection; New York - D. Rosenblatt and M. Gibbons, NY Dept. of Env. Conservation; New Jersey - S. Canale and T. Pover, NJ Div. of Fish, Game, and Wildlife; Delaware - A. Doolittle, DE Div. of Fish and Wildlife; Maryland - D. Brinker, MD Dept. of Natural Res. and J. Kumer, National Park Service; Virginia - R. Cross, Terwilliger Consulting and R. Boettcher, Virginia Dept. of Game and Inland Fisheries; North Carolina - D. Allen, NC Wildlife Res. Commission; Atlantic Canada - D. Amirault, A. Boyne, and J. McKnight, Canadian Wildlife Service.

This status update summarizes data collected by dedicated biologists at hundreds of Atlantic Coast sites. We can never thank them enough.

### Literature Cited

Melvin, S.M. and J.P. Gibbs. 1994. Viability analysis for the Atlantic Coast population of piping plovers. Unpublished report to the U.S. Fish and Wildlife Service, Sudbury, Massachusetts. 16 pp.

Mostello, C.S. and S.M. Melvin. 2001. Summary of 2000 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife. Westborough, Massachusetts. 21 pp.

National Park Service and Maryland Dept. of Natural Resources. 1997. Management and monitoring of the piping plover at Assateague National Seashore, 1997 summary report, Appendix C. Berlin, Maryland. 46 pp.

U.S. Fish and Wildlife Service. 1996. Piping plover (*Charadrius melodus*), Atlantic Coast population, revised recovery plan. Hadley, Massachusetts. 258 pp.

U.S. Fish and Wildlife Service. 1997-2000. Annual status updates, 1996-1999: U.S. Atlantic Coast piping plover population. Sudbury, Massachusetts.

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**Table 1. Summary of Atlantic Coast Piping Plover Population Estimates, 1986 to 2001**

STATE/REGION	PAIRS																
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Goal
Maine	15	12	20	16	17	18	24	32	35	40	60	47	60	56	50	55	
New Hampshire	-	-	-	-	-	-	-	-	-	-	-	5	5	6	6	7	
Massachusetts <sup>h</sup>	139	126	134	137	140	160	213	289	352	441	454	483	495	501	496 <sup>i</sup>	495 <sup>i</sup>	
Rhode Island	10	17	19	19	28	26	20	31	32	40	50	51	46	39	49	52	
Connecticut	20	24	27	34	43	36	40	24	30	31	26	26	21	22	22	32	
NEW ENGLAND <sup>h</sup>	184	179	200	206	228	240	297	376	449	552	590	612	627	624	623	641	625
New York <sup>g</sup>	106 <sup>a</sup>	135 <sup>a</sup>	172 <sup>a</sup>	191	197	191	187	193	209	249	256	256	245	243	289	309	
New Jersey	102 <sup>b</sup>	93 <sup>b</sup>	105 <sup>b</sup>	128	126	126	134	127	124	132	127	115	93	107	112	122	
NY-NJ REGION	208	228	277	319	323	317	321	320	333	381	383	371	338	350	401	431	575
Delaware	8	7	3	3	6	5	2	2	4	5	6	4	6	4	3	6	
Maryland	17	23	25	20	14	17	24	19	32	44	61 <sup>e</sup>	60	56	58	60	60	
Virginia	100	100	103	121	125	131	97	106	96	118	87	88	95	89	96	119	
North Carolina	30 <sup>c</sup>	30 <sup>c</sup>	40 <sup>c</sup>	55	55	40	49	53	54	50	35	52	46	31	24	23	
South Carolina	3	-	-	-	1	1	-	1	-	-	0	-	-	-	-	0	
SOUTHERN REGION	158	160	171	199	201	194	172	181	186	217	189 <sup>e</sup>	204	203	182	183	208	400
U.S. TOTAL	550	567	648	724	752	751	790	877	968	1150	1162	1187	1168	1156	1207	1280	1600
ATLANTIC CANADA <sup>h</sup>	240	223	238	233	229	234	234 <sup>d</sup>	234 <sup>d</sup>	181	208	186	197 <sup>f</sup>	212	240	231	245	400
ATLANTIC COAST <sup>h</sup>	790	790	886	957	981	985	1024	1111	1149	1358	1348	1384	1380	1396	1438	1525	2000

**Table 1, continued:**

<sup>a</sup> The recovery team believes that this estimate reflects incomplete survey effort. See discussion on page 22 of the Revised Atlantic Coast Piping Plover Recovery Plan (USFWS 1996).

<sup>b</sup> The New Jersey plover coordinator conjectures that one quarter to one third of the apparent population increase between 1986 and 1989 is due to increased survey effort.

<sup>c</sup> The recovery team believes that the apparent 1986-1989 increase in the North Carolina population is due to intensified survey effort. See discussion on page 22 of the recovery plan (USFWS 1996). No actual surveys were made in 1987; estimate is that from 1986.

<sup>d</sup> 1991 estimate. Actual counts of 174 pairs in 1992 and 186 pairs in 1993 reported by Canadian Wildlife Service reflect partial surveys.

<sup>e</sup> Reflects correction in 1996 Maryland population from 60 pairs reported in 1996 Status Update to 61 pairs.

<sup>f</sup> Assumes that the number of pairs in Newfoundland in 1997 was 11 pairs, the same as 1996; Newfoundland reported 35 adults in 1997, up from 27 in 1996, but provided no 1997 estimate for breeding pairs.

<sup>g</sup> As noted in the discussion of population estimates and note "j" accompanying Table 2, the only statewide count tallied in New York in 1994-2000 is the window census.

<sup>h</sup> Changes in 1991-1995, 1998, and 1999 Atlantic Canada estimates from those reported in the 1999 Status Update reflect corrections received from Canadian Wildlife Service. Changes in 1990 and 1997 Massachusetts estimates from those reported in the 1999 Status Update reflect corrections received from Massachusetts Division of Fisheries and Wildlife. Adjustments in New England and Atlantic Coast totals correspond with Massachusetts and Atlantic Canada corrections.

<sup>i</sup> Beginning in 2000, Massachusetts estimates reflect a slight change in methodology from prior years. See description of Adjusted Total Count in Methods section, Mostello and Melvin (2001).

**Table 2. Comparison of Population Estimates Based on "Window" and "Total Season" Count, 1996-2001<sup>o</sup>**

STATE	1996		1997		1998		1999		2000		2001	
	Window Estimate	Total Season Estimate										
Maine	57	60	42	47	46 <sup>m</sup>	60	53	56	48	50	48	55
New Hampshire	-	-	5	5	5	5	6	6	6	6	7	7
Massachusetts	437	454	457	483	475	495	498	501	484	496	481	495
Rhode Island	45	50	43	51	44	46	40	39	41	49	46	52
Connecticut	20	26	18	26	20	21	21	22	16	22	22	32
New York <sup>j</sup>	256	256	256	256	245	245	243	243	289	289	309	309
New Jersey	103	127	101	115	59 <sup>n</sup>	93	101	107	94	112	109	122
Delaware	4	6	3	4	6	6	4	4	3	3	5	6
Maryland	50	61	56	60	55	56	54	58	52	60	56	60
Virginia	72	87	81	88	92	95	84	89	91	96	109	119
North Carolina	34	35	39	52	45	46	30	31	17	24	21	23
South Carolina	0	0	-	-	-	-	-	-	-	-	0	0
U.S. ATLANTIC TOTAL	1078	1162	1101	1187	1092	1168	1134	1156	1141	1207	1213	1280
(Difference <sup>k</sup> )	(90.7%)		(90.8%)		(91.8%)		(97.6%)		(92.8%)		(93.1%)	

**Table 2, continued**

<sup>j</sup> New York has conducted only window census beginning in 1994.

<sup>k</sup> Percent of total count (excluding New York) observed during window.

<sup>m</sup> Maine reported an additional 15 unpaired plovers present during the 1998 window census.

<sup>n</sup> Does not include any pairs for two New Jersey sites, which together reported 25 pairs for the 1998 total season estimate. These sites tallied a total of 47 adults during the 1998 window count, but did not provide pair estimates.

<sup>o</sup> 1991 and 1994 window estimates and comparison with total season estimates may be found in Table 5 (page 21) of the Revised Atlantic Coast Piping Plover Recovery Plan (USFWS 1996). 1995 window estimates may be found in Status Updates for 1996-1999 (USFWS 1997, 1998, 1999, 2000).

**Table 3. Summary of Piping Plover Productivity Estimates for the U.S. Atlantic Coast, 1992-2001<sup>t</sup>**

STATE/REGION	CHICKS FLEDGED PER PAIR										
	1992	1993	1994	1995	1996	1997	1998	1999	2000 <sup>p</sup>	2001 <sup>p</sup>	1992-2001 AVG <sup>q</sup>
Maine	2.00	2.38	2.0	2.38	1.63	1.98	1.47	1.63	1.60 (50)	1.98 (55)	1.85 (459/459)
New Hampshire	-	-	-	-	-	0.60	2.40	2.67	2.33 (6)	2.14 (7)	2.07 (29/29)
Massachusetts	2.03	1.92	1.80	1.62	1.35	1.33	1.50	1.60	1.09 (487)	1.49 (494)	1.52 (4081/4219)
Rhode Island	1.55	1.80	2.0	1.68	1.56	1.34	1.13	1.79	1.20 (49)	1.50 (52)	1.52 (406/410)
Connecticut	1.45	0.38	1.47	1.35	1.31	1.69	1.05	1.45	1.86 (22)	1.22 (32)	1.33 (274/274)
NEW ENGLAND	1.91	1.85	1.81	1.67	1.40	1.39	1.46	1.62	1.18 (614)	1.53 (640)	1.54 (5249/5391)
New York	0.98	1.24	1.34	0.97	1.14	1.36	1.09	1.35	1.11 (301 <sup>u</sup> )	1.27 (294)	1.19 (2008/2436)
New Jersey	1.07	0.93	1.16	0.98	1.00	0.39	1.09	1.34	1.40 (112)	1.29 (122)	1.06 (1178/1193)
NY-NJ REGION	1.03	1.08	1.25	0.97	1.07	1.02	1.09	1.35	1.19 (413)	1.28 (416)	1.14 (3186/3629)
Delaware	1.00	0.50	2.5	2.0	0.50	1.00	0.83	1.50	1.67 (3)	1.50 (6)	1.31 (42/42)
Maryland	1.00	1.79	2.41	1.73	1.49 <sup>r</sup>	1.02 <sup>s</sup>	1.30	1.09	0.80 (60)	0.92 (60)	1.27 (474/474)
Virginia	0.59	1.45	1.65	1.00	1.54	0.71	1.01	1.21	1.42 (85)	1.52 (110)	1.24 (716/991)
North Carolina	0.42	0.74	0.36	0.45	0.86	0.23	0.61	0.48	0.54 (24)	0.50 (22)	0.51 (406/417)
SOUTHERN	0.62	1.18	1.37	1.06	1.34 <sup>r</sup>	0.68	0.99	1.04	1.09 (172)	1.22 (198)	1.07 (1638/1924)
U.S. AVERAGE	1.35	1.47	1.56	1.35	1.30 <sup>r</sup>	1.16	1.27	1.45	1.17 (1199 <sup>u</sup> )	1.40 (1254)	1.34 (10073/10944)
ATLANTIC CANADA	1.55	0.69	1.25	1.69	1.72	2.10	1.84	1.74	1.47 (200)	1.77 (219)	1.63 (1281/2168)

**Table 3, continued:**

<sup>p</sup> Parentheses indicate the number of pairs on which productivity is based. Number of pairs reflected in 1992-1995 data, by year, may be found in Table 6 (page 25) of the Revised Recovery Plan (USFWS 1996), while the number of pairs reflected in 1996 -1999 productivity is provided in the respective Status Updates for those years (USFWS 1997, 1998, 1999, 2000).

<sup>q</sup> Parentheses denote number of pairs on which productivity is based/estimated number of pairs in the state or region between 1992 and 2001.

<sup>r</sup> Reflects correction in 1996 Maryland productivity from 1996 Status Update.

<sup>s</sup> Chicks surviving to 25 days projected from data collected through day 15 based on linear regression analysis. For further information see NPS and Maryland DNR (1997).

<sup>t</sup> Productivity data for 1987 - 1991 may be found in Table 6 (page 25) of the Revised Recovery Plan (USFWS 1996).

<sup>u</sup> Number of pairs on which New York 1999 and 2000 productivity is based exceeded the population estimate, Tables 1 and 2. Reasons for the relatively large discrepancy between the 1999-2000 window estimates and the number of pairs on which the 1999-2000 New York productivity estimates are based are unclear, but appear to reflect undercounts in the window estimates and double counting of some renesting pairs at some sites in the productivity estimates. If this is the case, it would, in turn, result in an underestimate of State-wide productivity.