

1993

Shorebird Studies

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Virginia Department of Game and Inland Fisheries
PERFORMANCE REPORT (July 1, 1992 - June 30, 1993)

Project:	Nongame & Endangered Species Investigations	No:	WE99R-2
Study:	Bird Conservation	No:	IV-5
Job:	Shorebird Studies	No.	A

Personnel:	Bob Cross, Karen Terwilliger, Dana Bradshaw, Bryan Watts	Costs	
		Total:	\$32,000
		State:	\$ 1,700
		Fed'l:	\$30,300

Status/Recommendations: On schedule, continue study

Summary

A total of 212 piping plovers (106 pairs) and 86 Wilson's plovers (43 pairs) were found during the 1993 plover survey, an increase of 9.2 % and 43.3 % respectively for these species over 1992 estimates. A successful nesting season for piping plovers (1.45 chicks fledged per nesting pair) is attributed to improved habitat, diminished predator pressure, and an absence of tidal flooding.

Objective A: To determine and monitor piping plover (Charadrius melodus) and Wilson's plover (Charadrius wilsonia) populations along the barrier islands and in the Tidewater region of Virginia.

Procedure:

Annual surveys for piping plovers and Wilson's plovers have been conducted in Virginia since 1986. The 1993 survey was conducted during the first ten days of June. The survey was conducted by walking linear transects through all suitable nesting habitat and recording the number and location of all individuals. Barrier island nesting sites were traversed from south to north. Nesting stage was determined by locating the nest or brood or by evaluating the behavior of adult birds. The methodology is expected to minimize the possibility of double-counting individuals within the survey period and to yield an accurate count of the Virginia breeding population for piping and Wilson's plovers. Additionally, data were collected regarding physical parameters of nest locations for long term analysis of nest site selection. Nesting success for piping plovers was determined at selected sites by closely monitoring nesting pairs in weekly visits throughout incubation and brood rearing.

Results:

Population Estimates

The Virginia piping plover population showed a slight improvement (+9.2 %) in 1993 with 106 pairs of breeding adults discovered in the early June plover survey (Table 1). The greatest increases were found on Assawoman Island (+66.6 %) and Cedar Island (+200 %) where extensive overwash areas created by storms during the winter of 1991-92 were favored as nesting sites for piping plovers. There was a substantial decrease noted (-29.6 %) in the breeding population of piping plovers at Chincoteague National Wildlife Refuge (NWR) on Assateague Island where 27 pairs of adults nested. However, observations on Assawoman Island of piping plovers previously color banded at Chincoteague NWR suggest that Chincoteague piping plovers may be pioneering into recently created nesting habitats on other islands. Piping plovers were absent for the second consecutive year from Grandview Nature Preserve and were absent from their Wash Flats nesting area on Chincoteague NWR.

The Virginia Wilson's plover population showed an encouraging increase (+43.3 %) in 1993 to 43 pairs of breeding adults (Table 1) with the most significant increases found on Wallops Island (+350 %) and Assawoman Island (+83.3 %). Population improvement for Wilson's plovers may also be related to the abundance of newly formed nesting habitat as the result of winter storms. In 1991, the Virginia Wilson's Plover Recovery Team recommended 60 nesting pairs as a primary recovery objective and as a level which would ensure a self-sustaining population. The current level of 43 pairs remains well below that number. However, the population is approaching the Recovery Team's suggested level of 45 nesting pairs at which a status change may occur if the level is maintained for five consecutive years.

Most of the observed increase in the Wilson's plover population in 1993 appears to have occurred in the northern half of the barrier island chain. In 1991, 43.3 % (13/30) of the population occurred on the northern islands of Metompkin, Assawoman, and Wallops. In 1993, 62.7 % (27/43) of the population was found on those islands. A late-nesting pair of Wilson's plovers found on the southern tip of Assateague Island this year was the first breeding record there since 1981.

Nesting Success

Productivity estimates for piping plovers nesting in Virginia in 1993 indicate the most successful nesting season in recent years. Estimates from five different study sites (Table 2) range in value from 1.07 chicks fledged per nesting pair at Chincoteague NWR to 2.00 chicks fledged per nesting pair at Assawoman Island. All estimates are above 1.0 chicks fledged per nesting pair. Statewide, a mean productivity estimate was calculated as 1.45 chicks fledged per nesting pair based on data from 46 % of the breeding population in 1993. This figure represents a 75 % improvement in the mean number of chicks fledged per pair (0.83) during the period of 1988 through 1991. Further, this is the first year since the listing of the piping plover as an federally endangered/threatened species in 1986 that fledgling productivity has reached suggested maintenance values of 1.3-1.4 chicks fledged per nesting pair in Virginia.

No severe tidal flooding was documented in piping plover nesting areas during the early season. Predator pressure was assessed as light throughout the barrier islands, and a notable decrease in mammalian predators, including the absence of red foxes on some barrier islands,

was observed. These factors are believed to have contributed to improved hatching rates on initial nesting attempts resulting in an abundance of early broods and higher than usual fledgling rates. Twenty-seven percent of all piping plovers observed in this year's survey were actively defending broods during the first week of June, and many of those young were estimated to be greater than two weeks old. Although nesting success for Wilson's plovers was not quantified, our observations of many Wilson's plover young and infrequent re-nesting suggest that Wilson's plovers also experienced greater than usual nesting success.

Some predators which were active in piping plover nesting areas include an American kestrel (*Falco sparverius*) at Craney Island and a northern harrier (*Circus cyaneus*) at Chincoteague NWR. Predator exclosures, previously prescribed to protect all piping plover nests at Chincoteague NWR, were discontinued on the northern beach (Wild Beach) there. However, twelve predator exclosures were used on the southern tip (the Hook) of Chincoteague NWR.

Public access policies previously instated for the protection of piping plovers at Chincoteague NWR continued unchanged in 1993. Posting and/or symbolic fencing was used to protect piping plover nesting areas on Cedar Island and at Grandview Beach. The northern end of Wallops Island was again closed to vehicular traffic after piping plovers were observed foraging in large numbers and showing early courtship behaviors. Wild dogs were removed from Craney Island plover nesting areas.

Table 1. Results of Virginia piping plover and Wilson's plover survey, 1993.

Site	piping plover (pairs)	Wilson's plover (pairs)
Fisherman	0	0
Smith	4	0
Myrtle	9	4
Ship Shoal	1	0
Wreck	2	0
Cobb	4	2
Hog	1	0
Paramore	0	0
Cedar	12	10
Cedar Sandbar	0	0
South Metompkin	0	0
North Metompkin	28	7
Assawoman	10	11
Wallops	3	9
Assateague	27	0
Craney	5	0
Grandview	0	0
Totals	106	43

Table 2. Piping Plover productivity estimates for selected Virginia study sites and statewide weighted mean productivity estimate for 1993. Chicks were considered fledged if they survived for 25 days or were observed in flight.

Site	No. Pairs	% of Site Pop.	% of State Pop.	Chicks Fledged/ Nesting Pair
Wallops Island	3	100.0	2.8	1.33
Assawoman Island	10	100.0	9.4	2.00
Metompkin Island (USFWS Only)	4	14.3	3.8	1.75
Chincoteague NWR	27	100.0	25.5	1.07
Craney Island	5	100.0	4.7	1.40
Virginia	49	—	46.2	1.45

two northern islands of Assateague and North Metompkin even though both sites showed substantial population declines. The distribution was similar to the 1991 breeding season when 63.2% of the population was found on the same two islands. Mainland piping plover populations on the western shore of the Chesapeake Bay also declined this year. No piping plovers were known to breed at Grandview Beach in 1992 where 2 - 4 pairs have been found in all previous annual surveys.

Summary of Breeding Season

The exact cause of the plover population declines observed in this season are uncertain, but may be the lagging result of poor productivity and population recruitment in the immediately prior four years. Fledgling productivity, expressed as chicks fledged per nesting pair, has been consistently low (mean = 0.83, N = 4 yrs.) for piping plovers throughout the state since 1988. Extremely low productivity combined with naturally high first year, over-winter mortality may result in an insufficient number of replacement individuals to compensate for normal adult mortality.

Two severe storms (31 October, 2 January) in the winter of 1991-92 flooded all barrier island habitats in Virginia, flattening protective primary dunes, removing vegetation, and washing sand from beaches into salt marshes on the mainland side of most barrier islands. In most cases, these storms resulted in a net increase in the amount of nesting habitat available to beach-nesting birds including piping and Wilson's plovers. However, newly created habitats were critically low and vulnerable to washovers. At the south end of Wallops Island, suitable plover nesting habitat was mapped and measured before and after the storms of 1991-1992. There was a 77.24% increase (6.23 ha., 1991; 11.03 ha., 1992) in the amount of nesting habitat available to piping

and Wilson's plovers at this site between years. Despite the increase in availability of habitat, there was no significant increase in the number of piping plovers ($G = 0.00$, $P > 0.05$) or Wilson's plovers ($G = 0.111$, $P > 0.05$) nesting there by season's end and their distribution throughout the available habitat remained similar to previous years suggesting that birds were not available to colonize newly created habitat.

Piping plovers were first observed on Metompkin Island on 5 March this year. Unusually cold temperatures lingered into mid-June and were accompanied by frequent violent storms and flooding tides, and undoubtedly were a factor in plover nesting success. All barrier island nesting habitats experienced tidal flooding in the early Spring. Distinct washover events resulting in plover nest losses were noted on Cedar Island on 12 May, Wallops Island on 12 May and 2 July, and on Metompkin Island on 1 May and 8 May.

Nesting success for piping and Wilson's plovers was monitored at the south end of Wallops Island this year. Six Wilson's plover nests were discovered (mean clutch size = 3.0 eggs/nest). The earliest Wilson's plover nest was located on 28 April containing 3 eggs suggesting a clutch initiation date of 25 April. Hatching rates for Wilson's plover nests were low (mean = 1.5 eggs/nest), primarily due to overwash losses. The incubation period for one nest was found to be 28 days to hatching from the start of incubation with the third egg. Some Wilson's plovers (40.0%, 2/5 pairs) re-nested after losing the initial nest to overwash. An estimate of 1.6 young fledged/nesting pair is provided based on the sighting of 10 adult Wilson's plovers with 8 flighted juveniles at the south end of Wallops Island on 3 July.

Piping plovers nesting on Wallops ($N = 4$ pairs) experienced higher hatching rates (mean = 3.0 eggs hatched/nest), but also have larger clutches (mean = 3.75 eggs/nest). Only 1 piping plover nest (25%) failed to hatch (overwash). No re-nesting was observed. Despite greater hatching success, fewer piping plover chicks survived. Productivity for piping plovers is estimated at 1.25 young fledged/nest for Wallops Island. Differences in productivity and annual population recruitment for piping and Wilson's plovers on Wallops Island may be related to differences in food preference and habitat preference during the pre-fledgling period. Wilson's plover chicks may realize some anti-predator benefits from their selection of heavily vegetated salt marsh or Salicornia flats as foraging areas. Piping plovers, on the other hand, select foraging sites near marsh edges and waterfront areas which may be more easily searched by predators.

At Chincoteague National Wildlife Refuge, 53 piping plover nests were discovered this year (Hook = 23, Wild Beach = 15, Wash Flats = 15), but hatching success and juvenile survival were low. Only 22 nests (41.5%) successfully hatched one or more eggs per nest. Mean hatching rates were lowest on the Wash Flats (0.0 hatched/nest), highest on the Wild Beach (2.44 hatched/nest), and intermediate on the Hook (1.26 hatched/nest). Most nest losses (22.6%) were attributed to flooding from tidal overwash or inclement weather. Nineteen piping plover chicks were known to survive to 25 days of age, all from the Hook nesting area.

Statewide estimates of fledgling productivity for piping plovers are lacking this year due to the ending of our three year Memorandum of Agreement (MOA) with the U.S. Fish and Wildlife Service on 30 October 1991 which facilitated detailed monitoring of nesting success at Chincoteague National Wildlife Refuge. Specific findings and recommendations stemming from the MOA can be found in the final project report Monitoring, Management, and Research of the

Piping Plover at Chincoteague National Wildlife Refuge, 1991, available from Chincoteague National Wildlife Refuge.

Protective Efforts

Predator exclosures, in use to protect piping plover nests at Chincoteague National Wildlife Refuge since 1988, were used there again this year. Forty-three piping plover nests (81.1%) were protected through the use of exclosures. A triangular exclosure design (25 ft. per side) was implemented on 24 piping plover nests (55.8%) in an attempt to deter red foxes (Vulpes vulpes) from pacing the perimeters of circular exclosures and forcing nest abandonments. No exclosed nests were lost to foxes this year. Nine nest abandonments (16.9%) occurred, but none are attributed to red fox harassment or depredation.

Nesting areas for piping plovers were posted to discourage human disturbance at several sites including: Cedar Island (north point), Metompkin Island (north point), Cedar Sand Bar, Craney Island, and Grandview Beach. Vehicular traffic was re-routed on the north end of Cedar Island and, on Craney Island, a perimeter road was closed to within 200 meters of any piping plover nest. Additionally, vehicular and pedestrian access was prohibited at the north end of Wallops Island where as many as 18 piping plovers were observed in May. However, by 1 June, no piping plovers had nested there and pedestrian access was reinstated. At Grandview Beach, 31 of 71 no trespassing signs erected to protect piping plovers and least terns (Sterna antillarum) were destroyed by vandals early in the season but were replaced by early April.

1993 STATUS UPDATE

U.S. ATLANTIC COAST PIPING PLOVER

DIVISION OF ENDANGERED SPECIES
NORTHEAST REGION
U.S. FISH AND WILDLIFE SERVICE
WEIR HILL ROAD
SUDBURY, MASSACHUSETTS 01776

DECEMBER 1993

1993 STATUS UPDATE - U.S. ATLANTIC COAST PIPING PLOVER POPULATION

Nesting pair counts and productivity figures for the piping plover on the U.S. Atlantic Coast are tallied by state in Table 1. Two 1993 nesting pair estimates are provided:

(1) The first estimate of 875 pairs is based on the census methodology used since 1989 and provides the most reliable comparison with the 1991 and 1992 estimates of 790 and 751 pairs, respectively.

(2) The second estimate is based on the methodology used during the 1991 international census, which reflects a single survey of breeding sites conducted during the peak of the breeding season, May 29 - June 6, 1993. Because only six states were able to conduct this census in 1993, no total is shown.

Most state coordinators believe that the international census methodology undercounts their plover populations because some plovers that nest before or after are unpaired during the census window. However, alternate methodologies used in many states may allow double counting of birds that reneest during the season, and the actual nesting population probably lies somewhere between the two figures. Except in North Carolina where survey effort increased over 1992, State coordinators indicated that the 1993 survey methodologies were generally consistent with those used in 1991 and 1992; they believe that the counts reflect actual trends in numbers of breeding plovers.

The 85 pair (11%) overall increase in the U.S. Atlantic Coast population was very unevenly distributed. The New England portion of the population increased 79 pairs, accounting for 93% of the net gain. Estimates from the mid-Atlantic States of New York and New Jersey remained stable, with a combined decrease of 2 pairs. However, New Jersey biologists expressed concern regarding a multi-year decline in the portion of the plover population nesting in the southern part of that State, attributing the trend to the cumulative effects of several years of low productivity and to habitat erosion during winter storms without reciprocal habitat creation. The four states south of Delaware Bay experienced a net gain of 8 pairs over 1992, but remained 14 pairs below their 1991 total.

Average productivity was 1.46 chicks per pair, the highest recorded since efforts to consolidate productivity figures were initiated in 1987. This productivity figure reflects 83% of 1993 nesting pairs. Productivity was highest in New England and was ascribed to very intensive management including predator exclosures, symbolic fencing and signing of nesting areas, and restrictions on off-road vehicles, especially during brood-rearing. Maryland, Virginia, and North Carolina biologists documented the highest-ever productivity rates for those States. Contributing factors included intensive protection from human disturbance and improved predator exclosure design in Maryland, use of predator exclosures at some North Carolina sites, improved habitat conditions created by coastal storms over the last two winters, and absence of major storms during the breeding season. While these productivity

gains are encouraging, still further improvements will be needed, particularly in North Carolina, if real progress towards recovery is to be achieved in the southern part of the piping plover's Atlantic Coast range. The major decline in pairs and productivity noted for Connecticut is unexplained, and reflects no changes from previous years in intensity of either survey or protection efforts.

Tables 2, 3, and 4 summarize nesting pair counts from 1986-1992 and productivity data from 1987-1992. The U.S. Fish and Wildlife Service attributes most of the 1987-1988 increase to intensified survey efforts (especially in New York and North Carolina), while the 1989 increase is thought to reflect both improved survey and "real" population increase. The population increased about 2% in 1990 and remained virtually unchanged in 1991. Biologists believe that the 1992 and 1993 increases are indicative of the actual population trend, but note the uneven geographic distribution of these gains.

Atlantic Coast piping plover population trends reflect the extremely intensive annual protection effort. Survival of the Atlantic Coast piping plover will demand an unflagging commitment to these labor-intensive efforts.

Table 1. 1993 U.S. Atlantic Coast Piping Plover Population and Productivity

STATE	NESTING PAIRS BASED ON 1990 CENSUS METHODOLOGY	NESTING PAIRS BASED ON INTERNATIONAL CENSUS METHODOLOGY	PRODUCTIVITY (CHICKS FLEDGED/NESTING PAIR)	NUMBER OF PAIRS ON WHICH PRODUCTIVITY FIGURE IS BASED	SOURCE
Maine	32	-	2.38	32	J. Jones
Massachusetts	289	258	1.92	264	S. Melvin
Rhode Island	31	-	1.80	30	C. Raithel
Connecticut	24	21	.38	24	J. Victoria
New York	192	-	1.24	125	M. Schetbel
New Jersey	127	-	.93	127	D. Jenkins
Delaware	2	2	.50	2	L. Gelvin-Innvaer
Maryland	19	17	1.79	19	J. Kumer
Virginia	106	106	1.45	49	R. Cross
North Carolina	53	53	.74	53	J. Nicholls
South Carolina	0	-	-	-	J. Nicholls
TOTAL	875	-	1.46	725 (83%)	

Table 2. Summary of Atlantic Coast Piping Plover
Population Estimates, 1986 to 1993

STATE	PAIRS							
	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
Maine	15	12	20	16	17	18	24	32
Massachusetts	139	126	134	137	139	160	213	289
Rhode Island	10	17	19	19	28	26	20	31
Connecticut	20	24	27	34	43	36	40	24
New York	106	135	168	191	186	191	187	192
New Jersey	102	93	105	128	126	126	134	127
Delaware	8	7	3	3	6	5	2	2
Maryland	17	23	25	20	14	17	24	19
Virginia	100	100	103	121	125	131	97	106
North Carolina	30	30 ¹	40	55	55	40 ²	49	53
South Carolina ³	3	-	-	-	-	1	-	0
U.S. TOTAL	550	567	644	724	739	751 ⁴	790	875

¹ 1986 estimate.

² Estimate revised from figure previously reported based on information received from J. Nicholls (memorandum of March 24, 1993).

³ 1986 South Carolina estimate was based on sightings of adults during the nesting season. No nests were confirmed, nor were any nests documented in South Carolina in 1987-1990 (P. Wilkerson, South Carolina Wildlife and Marine Resources Dept., pers. comm. 1990).

⁴ Reflects change in North Carolina estimate.

Table 3. Summary of Piping Plover Productivity Estimates for the U.S. Atlantic Coast

1987 - 1993

STATE	CHICKS FLEDGED/PAIR ¹						
	1987	1988	1989	1990	1991	1992	1993
Maine	1.75 (12)	.75 (20)	2.38 (16)	1.53 (17)	2.50 (18)	2.00 (24)	2.38 (32)
Massachusetts	1.1 (89)	1.29 (114)	1.59 (123)	1.38 (125)	1.72 (156)	2.03 (206)	1.92 (264)
Rhode Island	1.13 (17)	1.6 (19)	1.47 (19)	.90 (26)	.77 (26)	1.55 (20)	1.80 (30)
Connecticut	1.29 (24)	1.7 (27)	1.79 (34)	1.63 (43)	1.39 (36)	1.45 (40)	.38 (24)
New York	.9 (39)	1.24 (42)	1.02 (62)	.80 (70)	1.09 (158)	.98 (130)	1.24 (125)
New Jersey	.85 (93)	.94 (105)	1.12 (128)	.93 (126)	.98 (126)	1.07 (134)	.93 (127)
Delaware		0 (3)	2.33 (3)	2.00 (6)	1.60 (5)	1.00 (2)	.50 (2)
Maryland	1.17 (23)	.52 (25)	.9 (20)	.78 (14)	.41 (17)	1.00 (24)	1.79 (19)
Virginia		1.02 (64)	1.16 (32)	.65 (63)	.88 (43)	.59 (39)	1.45 (49)
North Carolina			.59 (49)	.43 (14)	.07 (14)	.42 (41)	.74(53)
AVERAGE	1.04 (297)	1.11 (419)	1.28 (486)	1.06 (504)	1.23 (599)	1.35 (660)	1.46 (725)
							1.27 (3390/4522)
							1.95 (127/127)
							1.73 (988/1072)
							1.33 (140/143)
							1.44 (204/204)
							1.06 (587/1115)
							1.00 (746/746)
							1.67 (18/21)
							.90 (119/119)
							.95 (290/683)
							.54 (171/292)

¹ Parentheses indicate number of pairs on which productivity estimate is based.

² Parentheses indicate number of pairs on which productivity is based / estimated number of nesting pairs in each state between 1988 and 1993.

Table 4. U.S. Atlantic Coast Piping Plover
 Nesting Population and Average Productivity, 1986 - 1993

YEAR	NESTING POPULATION (PAIRS)	AVERAGE PRODUCTIVITY (CHICKS FLEDGED PER NESTING PAIR)	PERCENT OF NESTING POPULATION ON WHICH PRODUCTIVITY FIGURE IS BASED
1986	550		
1987	570	1.04	52
1988	644	1.11	65
1989	724	1.29	67
1990	739	1.06	68
1991	751 ¹	1.23	80 ¹
1992	790	1.35	84
1993	875	1.46	83

¹ Reflects change in 1991 North Carolina population estimate. See Table 2, footnote #2.