

Notes on Piping Plovers Nesting at Cape Hatteras National Seashore during 1987

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INTRODUCTION

Piping Plovers (*Charadrius melodus*) are listed as endangered in the Great Lakes region, and threatened elsewhere (Federal Register, 1985). North Carolina is near the southern limit of the Piping Plover's regular nesting range (American Ornithologists' Union, 1983). The first statewide survey of breeding Piping Plovers revealed 40 pairs nesting in five counties during 1988 (Carter, 1989). Previous records along with the 1988 survey indicate that most nesting plovers are found between Cape Hatteras and Cape Lookout (Am Birds 37:979; Fussell, 1986; Carter, 1989; Figure 1). Previous Piping Plover work within Cape Hatteras Nat-

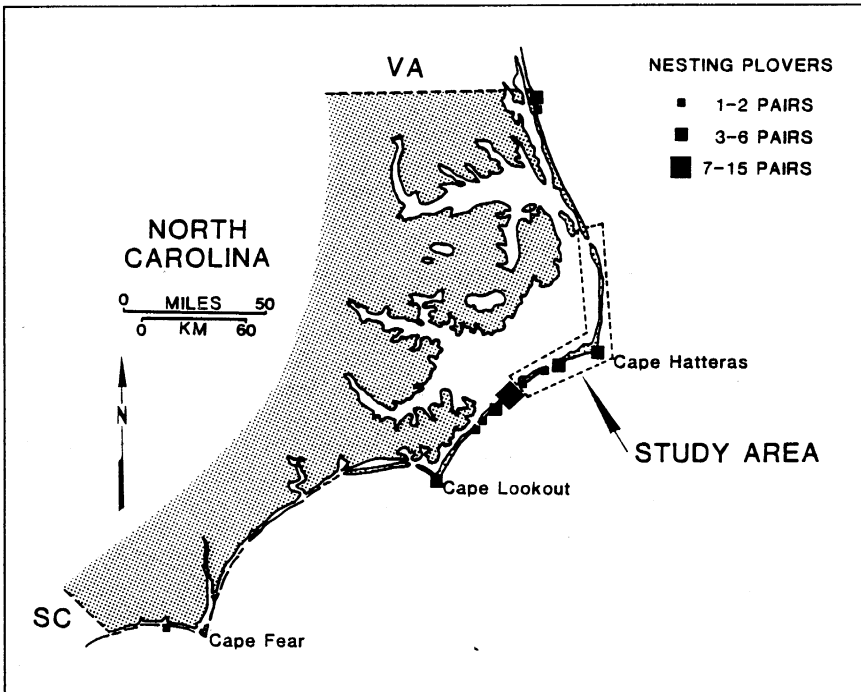


Figure 1. Study area at Cape Hatteras National Seashore together with results from 1988 statewide survey of nesting Piping Plovers (Carter, 1989).

ional Seashore has been confined to surveys of nesting pairs (Golder, 1985 and 1986). While there has been considerable interest in locating breeding areas within North Carolina, there has been little effort to describe nesting sites or breeding success. Information on Piping Plover breeding success is important for the manage-

ment of this threatened species. To provide a better understanding of breeding success, nest-site use and hatching success were studied at Cape Hatteras National Seashore between May and mid-August of 1987.

METHODS

Searches for Piping Plover nests were made between May and August by slowly driving most of the beaches and watching for any plover activity. Areas near inlets, capes, and overwashes were walked for more thorough coverage. Once located, nesting sites were posted and roped off from access by off-road vehicles. Nest contents were checked when initially found, when the eggs were not being incubated, and several times a week until the nest was empty. Observations using binoculars and spotting scopes were made from a vehicle.

Nest-site characteristics recorded for each site included: sediment size, distance and size of the closest vegetated dune, vegetation cover and diversity on the closest dune, and distance to the closest tern nest. Sediment samples were collected one meter north, east, south, and west of each nest, and sieved into the following categories: gravel (≥ 2.00 mm), coarse sand (0.50-1.99 mm), medium sand (0.25-0.49 mm), and fine sand (<0.25 mm).

RESULTS AND DISCUSSION

Ten pairs of Piping Plovers were observed during the summer at four sites within Cape Hatteras National Seashore. These sites were; Cape Point (area around Cape Hatteras), the southern end of Hatteras Island, the northern end of Ocracoke Island, and the southern end of Ocracoke Island. Nests were found for nine pairs. One pair was observed with a brood of three chicks.

It is difficult to draw conclusions over a period of one summer; however, several observations warrant discussion. Four of nine nests were located on medium to coarse substrates (Cape Point), and five nests were found on fine to medium substrates (near inlets) (Table 1). Nests found on medium to coarse substrates were composed mostly of shell fragments. Coarse shelly substrate is the result of wind-sorted overwash sediments. Overwash areas on narrower sections of the beach appeared to provide similar coarse substrate habitat, but were not used by any plovers. The majority of nesting pairs were associated with sandy overwash flats located near inlets. Substrate near inlets was dominated by fine and medium sediments with fewer shell fragments than at Cape Point.

Nests found on fine sediments around inlets were closer to vegetated dunes than those on coarse sediments at Cape Point. The average distance to the closest vegetated dune was 6.2 m around the inlets and 17.5 m at Cape Point. Individual nests were more difficult to find at Cape Point, where eggs were difficult to see on the coarse, light-colored substrate. Nests near inlets were generally closer to small "islands" of vegetated dunes where eggs were easily visible on the fine dark sediment.

Opposite page: Table 1. Measurements of physical and vegetative features at Piping Plover nest sites at Cape Hatteras National Seashore, 1987.

Nest Location	Substrate Size*	Closest Dune (m)	Dune Size (m)	Vegetation Cover	Dominant Species	
Cape Point 1	Medium - 29%	30	20x24	80%	<i>Panicum amarum</i>	80%
	Coarse - 26%				<i>Iva imbricata</i>	20%
Cape Point 2	Medium - 32%	20	8x4	80%	<i>Uniola paniculata</i>	100%
	Coarse - 27%					
Cape Point 3	Coarse - 29%	18	10x9	85%	<i>Spartina patens</i>	58%
	Medium - 28%				<i>Cynodon dactylon</i>	30%
					<i>Cakile harperi</i>	5%
					<i>Euphorbia polygonifolia</i>	5%
					<i>Amaranthus pumilis</i>	2%
Cape Point 4	Medium - 31%	2	10x20	40%	<i>C. harperi</i>	50%
	Coarse - 29%				<i>U. paniculata</i>	40%
					<i>P. amarum</i>	10%
Hatteras Inlet 1	Fine - 31%	5	16x30	65%	<i>U. paniculata</i>	98%
	Medium - 29%				<i>P. amarum</i>	2%
Hatteras Inlet 2	Fine - 56%	0.1	20x11	50%	<i>U. paniculata</i>	98%
	Medium - 41%				<i>P. amarum</i>	2%
Hatteras Inlet 3	Fine - 37%	2	12x18	60%	<i>U. paniculata</i>	95%
	Medium - 26%				<i>P. amarum</i>	5%
Hatteras Inlet 4	Fine - 36%	5	7x3	50%	<i>P. amarum</i>	100%
	Medium - 26%					
North Ocracoke	Fine - 33%	19	6x6	30%	<i>U. paniculata</i>	100%
	Medium - 32%					

* Substrate diameter size: 0.50 mm ≥ Coarse < 2.00 mm; 0.25 mm ≥ Medium < 0.50 mm; and Fine < 0.25 mm

Cover and diversity of vegetation on the closest dune varied among nests. *Uniola paniculata* and *Panicum amarum* were the most common and dominant dune plants (Table 1). There was slightly less vegetative cover on dunes around the inlets than on dunes at Cape Point.

All nests were within 300 m of tidal pools or flats. Most young from the Cape Point area moved to these pools after hatching. Young from nests near inlets were often observed feeding on moist, dark tidal flats or along the soundside shore of the island. Availability of these pools may be an important factor for nesting sites.

Nest Location	Closest Nesting Colonial Species	Eggs Laid	Young Seen (% hatched)
Cape Point 1	Common Tern (100m+)	3	1 (33)
Cape Point 2	Common Tern (20m)	2	0
Cape Point 3	Common Tern (20m)	4	0
Cape Point 4	Least Tern (7m)	3	1 (33)
Hatteras Inlet 1	Least Tern (100m+)	3	0
Hatteras Inlet 2	Least Tern (100m+)	4	0
Hatteras Inlet 3	Least Tern (50m)	4	2 (50)
Hatteras Inlet 4	Least Tern (100m+)	4	1 (25)
North Ocracoke	Common Tern (100m+)	4	2 (50)
South Ocracoke	Common Tern (?)	?	3

Table 2. Hatching success and nesting associates of nesting Piping Plovers within Cape Hatteras National Seashore, 1987.

Only four nests were within 100 m of nesting colonial waterbirds (Table 2). Two nests at Cape Point were in a colony of Common Terns (*Sterna hirundo*), Gull-billed Terns (*Sterna nilotica*), and Black Skimmers (*Rynchops niger*). One nest near the tip of Cape Point was within 10 m of two Least Tern (*Sterna antillarum*) nests. Another Piping Plover nest was within 100 m of a colony of 14 Least Tern nests at Hatteras Inlet. Three pairs of Wilson's Plovers (*Charadrius wilsonia*) also nested among Piping Plover nests at Hatteras Inlet.

Although Cape Hatteras National Seashore is near the edge of the Piping Plover's breeding range, clutch size and hatching success were similar to those reported from neighboring states. Clutch size averaged 3.4 eggs per nest in this study. This is similar to results reported from Virginia (3.64, Patterson, 1988), Maryland (3.72, Patterson, 1988), and New Jersey (2.83 to 3.85, Burger, 1987). Of the 34 eggs found, only 10 hatched. Hatching success averaged 1.0 chick per

nest. This is within the range of rates reported from areas in Virginia (0.19, Patterson, 1988), Maryland (1.00 to 2.00, Patterson, 1988), and New Jersey (0.23 to 1.26, Burger, 1987). Although no egg or chick predation was observed, the disappearance of single eggs and entire clutches suggested predation. Burger (1987) attributed the major cause of egg loss in New Jersey to "unknown/missing" and "predation" for seven of eight years. Cat (*Felis domesticus*) predation on adult and chick terns occurred near three plover nests at Cape Point. Fish Crow (*Corvus ossifragus*) predation on tern eggs was also observed. One pair of plovers re-nested at Cape Point after the disappearance of the first clutch.

Nine pairs of Piping Plovers were found nesting at Cape Hatteras National Seashore during both 1985 (Golder, 1986) and 1988 (Carter, 1989). Piping Plovers have been shown to be site faithful between years (Haig and Oring, 1988), which may partially account for the stable population at Cape Hatteras National Seashore over the past several years.

The fate of breeding Piping Plovers in North Carolina is uncertain. Most nests were near paths heavily used by off-road vehicles. The extensive use of Cape Hatteras National Seashore by off-road vehicles creates unavoidable conflicts. A small nesting population and increasing pressures from human disturbances indicate a need to protect and manage the remaining critical habitat for Piping Plovers in North Carolina.

SUMMARY

A survey of Piping Plover nest-site use and hatching success was conducted at Cape Hatteras National Seashore during May-August 1987. Ten nesting pairs and nine nests were located.

Piping Plover nests were found on broad, open, sandy flats associated with either inlets or Cape Point. Nesting sites were in areas characterized by island-like, fragmented dunes near tidal pools or flats. No nests were near the long, continuous, high primary dune found along most of the Outer Banks.

Piping Plovers did not prefer any particular beach substrate for nesting; however, nests on fine sediments (near inlets) were closer to vegetation than nests on coarse sediments (Cape Point).

Clutch size averaged 3.4 eggs/nest. Hatching success averaged 1.0 young fledged per nest. A combination of predation and/or disturbance appear to be the cause of breeding failure.

ACKNOWLEDGEMENTS

Data collected for this paper was funded by Cape Hatteras National Seashore. Alan Barron and Rosemary Bauman assisted with portions of the field work. I am grateful for Kent Turner's cooperation throughout the summer. Kevin Markham and Alexander Smith reviewed earlier drafts of this paper.

LITERATURE CITED

- American Ornithologists' Union. 1983. Checklist of North American Birds. 6th edition. Lawrence, Kansas. 877 pp.
- Burger, J. 1987. Physical and social determinants of nest-site selection in Piping Plover in New Jersey. *Condor* 89:811-818.
- Carter, D. S. 1989. 1988 survey of the breeding status of the Piping Plover in North Carolina. unpublished report to U. S. Fish and Wildlife Service. Raleigh, N.C. 6 pp.
- Federal Register. 1985. Determination of endangered and threatened status for the piping plover. 50:50726-50734.
- Fussell, J. O. III. 1986. 1986 breeding season census of piping plovers between Ocracoke Inlet and Cape Lookout, Cape Lookout National Seashore. unpublished report to Cape Lookout National Seashore, N.C. 17 pp.
- Golder, W. W. 1985. Piping Plovers nesting at Cape Hatteras, N.C. *Chat* 49:69-70.
- _____. 1986. Piping Plover nesting at Cape Hatteras, N.C., in 1985. *Chat* 50:51-52.
- Haig, S. M. and L. W. Oring. 1988. Mate, site, and territory fidelity in Piping Plovers. *Auk* 105:268-277.
- Patterson, M. E. 1988. Piping Plover breeding biology and reproductive success on Assateague Island. M.S. Thesis. Virginia Polytechnic Institute and State University, Blacksburg, VA. 131 pp.

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