PERFORMANCE REPORT

STATE:	VIRGINIA	PROJECT NO:	EW-2-2
PROJECT TYPE:	RESEARCH/SURVEY	STUDY NO:	VIII
PROJECT TITLE:	NONGAME AND ENDANGERED WILDLIFE INVESTIGATIONS	JOB NO:	VIII A-D
STUDY TITLE:	SHOREBIRD INVESTIGATIONS		
JOB TITLE:	SHOREBIRD STUDIES		
DATES COVERED:	July 1, 1989 - June 30, 1990		

JOB VIII-A: To determine and monitor piping and Wilson's plover populations along the barrier islands and Tidewater Virginia.

The annual barrier island plover survey was conducted in late May this year. Unfortunately, the survey took place just after a major storm had passed through producing strong winds and abnormally high tides. All of the islands suffered nest losses from flooding with many of the southern islands being almost entirely washed over. As a result, little information was gained other than a count of adult birds, since many of the first nesting attempts were washed out. In addition, the numbers of plovers located on any particular island need not represent the ultimate numbers of birds that would nest on that particular island. This was supported by the results of a long-term monitoring project on three of the barrier islands which showed that several additional pairs of plovers actually nested on these islands than were located during the May census. Given the propensity for these birds to wander during the recycling phase between a first and second clutch, we suspect the May survey was accurate in terms of population size, but possibly not in terms of breeding distribution.

Table 1 provides survey results for all barrier islands in addition to mainland sites and Chincoteague National Wildlife Refuge.

Table 1. 1990 Plover Survey Results.

ISLAND	PP PAIR	PP IND.	WP PAIR	WP IND.
SMITH	3	0	0	0
MYRTLE	7	1	2	0
SHIP SHOAL	1	1	4	0
WRECK	0	0	1	0

COBB	3	3	1	1
HOG	4	0	1	0
PARRAMORE	0	0	0	0
CEDAR	5	0	7	0
METOMKIN	40	3	13	1
ASSAWOMAN	2	0	1	0
WALLOPS	5	0	6	0
CEDAR SANDBAR	3	0	0	0
S. METOMKIN	0	3	0	0
CHINCOTEAGUE NWR	42	0	0	1
FISHERMAN'S	1	0	0	0
GRANDVIEW BEACH	5	0	0	0
CRANEY ISLAND	4	0	1	0
TOTALS	**125**	**11**	**37**	**2**

Additional monitoring projects on specific island and mainland sites produced the following results.

Craney Island, Portsmouth, Virginia: A total of eight piping plover adults was observed weekly at Craney Island, Portsmouth, Virginia since May 1, 1990. There were four territorial pairs until June 1, 1990. Three nests were located. There was no evidence of a fourth nest. Seven young were hatched, with only five surviving through fledgling. Each piping plover nest was posted at an appropriate distance to prevent disturbance. The main road around the nesting areas was closed to vehicular traffic during the critical periods.

One pair of Wilson's plovers was observed during eight of the twelve visits between May 1 and July 7. The pair acted territorial, however no nest or fledged young was observed. It is possible that this species attempted to nest and the nest failed.

A fox was reported on the premises of Craney Island, and evidence of the fox was observed in the immediate area of the piping plover nests.

Grandview Beach, Hampton, Virginia: Five pairs of piping plovers nested on Grandview Beach, Hampton, Virginia. Eight young hatched, but only three fledged juveniles were observed in late June. One piping plover chick (approximately 5 days old) was taken by a fish crow (S. Rottenborn). A pair of northern harriers was observed harassing the birds during the course of the breeding season. Severe weather, including a storm with heavy rain, hail, and high winds, may have affected the remaining young and eggs.

No Wilson's plovers were observed on Grandview Beach in 1990.

<u>Hog, Cobb, and Little Cobb Islands:</u> A high count of nineteen adult piping plovers was censused on Hog Island. Seven territorial pairs produced seven fledged young as of July 11, 1990. Cobb Island supported eight pairs of piping plovers resulting in four fledged young and two chicks by July 12, 1990. Potential avian predators on Cobb Island included great black-backed gulls, herring gulls, and northern harriers. Evidence of fox predation on Cobb Island was also documented. One pair of piping plovers nested on Little Cobb Island, but the nest was washed out in late May by a major storm accompanied by the spring high tides. The piping plovers on all three islands were plagued by flooding from heavy storms with high winds.

One pair of Wilson's plovers was observed on Hog Island, and five pairs were observed on Cobb Island. There were no Wilson's plovers on Little Cobb Island. No fledged young were observed on the islands.

<u>JOB VIII-B:</u> To conduct a detailed census and survey of piping plovers on Chincoteague NWR according to the conditions of our cooperative agreement.

This year marks the second in a three year piping plover research and management program conducted at Chincoteague National Wildlife Refuge under a cooperative agreement between the Virginia Department of Game and Inland Fisheries and the U.S. Fish and Wildlife Service. Management procedures for the piping plover at the refuge in 1990 included trapping for mammalian predators beginning on 1 February and the employment of wire framed predator exclosures around all piping plover nests located on the refuge. Refinement of the criteria for nesting habitat selection and analyses of the availability of nesting habitat continued to be the predominant research goals of the 1990 field season. All piping plovers nesting on the refuge were monitored daily or nearly daily from arrival through the end of brood-rearing to attain population estimates and estimates of nesting success.

Piping plovers were first observed on the refuge earlier this year (24 February) than in previous years. Nesting occurred only within the three traditional nesting areas known as the hook, wild beach, and the north wash flats. Policies regarding public access to piping plover nesting areas during the breeding season remained unchanged from the previous year.

<u>Results:</u>

Results provided in this report are given as of 1 August 1990 and are subject to final modifications to include nesting pairs still involved in raising young.

A total of 59 piping plover nests were located on Chincoteague NWR this year (table 1). More nests were found on the hook (33) than on the wild beach (16) or the Wash flats (10) and more nests were found in all areas this year than in 1989.

Table 1. Number of piping plover nests discovered on Chincoteague NWR in 1990 by nesting area.

	Hook	Wild Beach	Wash Flats	Refuge
Nesting Pairs	23	13	6	42
Initial Nests[1]	23	13	6	42
Known Renests[2]	10	3	4	17
Total Nests	33	16	10	59

[1] First nest attempt on Chincoteague NWR in 1990. May have nested previously in another area in 1990.
[2] Nested at least once previously on Chincoteague NWR in 1990.

Although the number of breeding pairs increased from 32 in 1989 to 42 in 1990 at Chincoteague NWR, breeding success is expected to be much lower than the previous year owing to severe early season losses to inclimate weather and consistent loss of eggs and chicks to a variety of predators, most notably red foxes (*Vulpes vulpes*), Fish crows (*Corvus ossifragus*), and ghost crabs (*Oncyopoda sp.*). High losses of early egg clutches to tidal flooding and storm effects may have forced piping plovers to attempt renesting when predator populations were peaking resulting in subsequent losses to predation.

Table 2. Piping plover egg production and egg losses by nesting area at Chincoteague NWR, 1990.

	Hook	Wild Beach	Wash Flats	Refuge
total eggs	91	54	34	179
eggs per nest	2.76	3.38	3.40	3.04
eggs hatched/nest	1.09	2.50	2.10	1.64

no. eggs hatched	36	40	21	97
percent eggs hatched	39.6	74.1	61.8	54.2

Table 3. Cause of piping plover egg loss by nesting area at Chincoteague NWR, 1990.

	Hook	Wild Beach	Wash Flats	Refuge
no. eggs lost	55	14	13	82
eggs lost/weather (flood, wind, tide)	28	10	7	45
eggs lost/predator	24	4	0	28
eggs lost/infertile	3	0	3	6
eggs lost/abandoned	0	0	3	3

Overall hatching success (table 2) was 54.2% in 1990 with only 97 of 179 eggs surviving. Most egg loss (54.9%) on the refuge was the result of severe weather conditions with 45 of 82 eggs lost to storm or tidal flooding or to burying in wind drifted sand (table 3). Predation as a cause of egg loss was more severe on the hook than in other nesting areas. Eggs lost to predation accounted for 43.6% of eggs lost on the hook while only 28.6% of egg loss on the wild beach was due to predation and no eggs were lost to predators on the wash flats. Thirteen piping plover nests on the hook were lost to predators before the clutch was completed and thus before a predator exclosure could be erected.

Most egg predation was attributed to fish crows which systematically searched nesting areas in groups of two to six. One crow was observed taking the single egg from a piping plover nest located within a least tern (Sterna albifrons) colony on the hook on 7 June.

Management procedures called for the use of predator exclosures at all piping plover nests discovered in 1990. Exclosures were to be constructed after the clutch was completed (four eggs). This procedure was changed to begin exclosing nests with the third egg in an effort to offer greater protection after early egg losses at pre-exclosed nests. Sixty-one percent (36 of 59) of all nests on the refuge were protected by predator exclosures (table 4). Hatching success was higher (1.84 eggs/nest) at exclosed nests than at unexclosed nests (1.17 eggs per nest). Three complete clutches of eggs were lost to predators (2 avian, 1 fox) even though the nests were exclosed.

Table 4. Piping plover nesting success at exclosed and unexclosed nests at Chincoteague NWR, 1990.

Area	Nests (N)	Exclosed Nests No.	Exclosed Nests Eggs/ Nest	Exclosed Nests Hatch/ Nest	Unexclosed Nests No.	Unexclosed Nests Eggs/ Nest	Unexclosed Nests Hatch/ Nest
Hook	33	17	3.41	1.47	16	2.06	0.68
Wild Beach	16	13	3.69	2.77	3	2.00	1 33
Wash Flats	10	6	3.83	1.50	4	3.00	3.00
Refuge	59	36	3.58	1.84	23	2.20	1.17

Whereas exclosures offered some protection to piping plover eggs, newly hatched chicks gained no survival advantage from them and were heavily preyed upon. Sixty-four chicks (table 5) representing 66.0% of all chicks hatched were lost before reaching 25 days of age.

Greatest chick loss (25 chicks, 39.1% of all chicks lost) was attributed to predation by red fox. All nesting areas experienced high chick predation by red foxes (hook = 33.3%, wild beach = 24.2%, wash flats = 75.0%) even though predator trapping efforts were initiated earlier (1 February) than in 1989.

Table 5. Cause of piping plover chick loss by nesting area at Chincoteague NWR, 1990.

	Hook	Wild Beach	Wash Flats	Refuge
total chicks lost	15	33	16	64
chicks lost/fox	5	8	12	25
chicks lost/avian	3	0	0	3
chicks lost/crab	1	12	0	13
chicks lost/unknown	6	13	4	23
no. chicks fledged[1]	11	2	3	16

no. prefledged chicks[2]	10	5	2	17

[1] Chicks are considered fledged if surviving to 25 days of age or observed in extended flight.
[2] Younger than 25 days.

Earlier trapping efforts resulted in a 45% increase in the number of raccoons taken this year but only a slight increase ((4.6%) in the number of red foxes removed (table 6). Red fox trapping success was evenly distributed between the hook and the wild beach. However, more chick loss was attributed to red fox predation this year on the wash flats (table 5) than any other nesting area. Foxes, denning on the wild beach, were believed to divide their hunting activities between the wild beach and the wash flats.

Table 6. Raccoons and red foxes removed by trapping or shooting at Chincoteague NWR, 1990.

	Hook	Wild Beach	Wash Flats	Refuge 1989/1990
raccoon	16	60	1	53/77
red fox	13	10	0	22/23

Ghost crabs accounted for the greatest source of known chick loss (60.0%) on the wild beach but were not a significant predator on piping plovers elsewhere on the refuge (1 chick, hook). One ghost crab unsuccessfully attempted to take an egg from a piping plover nest on the wild beach on 25 June.

Ghost crab burrows were surveyed in 0.1 acre circular plots on the wild beach on 23 July (N = 8) and on 1 August (N = 8). Burrow counts ranged from 81 to 354 per 0.1 acre and mean counts increased from 181.6 to 198.5 burrows per 0.1 acre from July to August.

No banding of adult or young piping plovers was conducted at Chincoteague NWR this year. Therefore, closer monitoring of some nesting pairs and their young was often necessary to determine their final nesting fate. However, 42 breeding adults (of 42 pairs present on the refuge) were banded from previous studies and, therefor. of known identity. Sixty-eight percent of all nests this year involved at least one banded adult and 50% of all breeding adults were of known identity through their band compliments. Of 29 piping plovers banded as prefledged chicks in 1989, 8 (27.6%) were resighted on the refuge in 1990 and 4 (13.8%) were known to breed on the refuge this year.

Piping plover fledgling productivity cannot be confidently reported at this date. However a possible range of productivity values can be reported. Based on the number of chicks fledged at this date and the number of prefledged chicks remaining, productivity can be estimated at 0.38 to 0.79 chicks fledged per nesting pair. These values represent a likely decrease in productivity from 66.4 to 30.1 percent respectively from the 1989 productivity estimate of 1.13 chicks fledged per nesting pair.

JOB VIII-C: To determine the flushing distances of the plovers.

Little information was gained on flushing distances this year given the paucity of actual nests present at the time of survey. However results from previous years are being combined with current data and will be analyzed for a forthcoming report on this subject.

JOB VIII-D: To determine habitat requirements of piping and Wilson's plovers on the barrier island beaches.

Habitat requirements for plovers have been studies in detail on Chincoteague National Wildlife Refuge and Metompkin Island over the last four years. This data is currently being analyzed and will be presented in a comprehensive report next year.

TARGET DATE FOR COMPLETION: Continuing

STATUS OF PROGRESS: On schedule

SIGNIFICANT DEVIATIONS: None

RECOMMENDATIONS: Continue study

COST THIS SEGMENT: $13,900 total
$11,425 federal
$ 2,475 state

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