

Regional Director, Boston, MA (RF)

January 26, 1973

Refuge Manager, Chincoteague NWR

Loggerhead Turtle Study

Attached is a copy of the latest report on the subject study which is planned through 1975. Since travel outside of my area of travel authorization is involved, regional office approval will be required to continue to study. Please advise.

J. C. Appel

cc: Biologist Florschutz, Washington, NC
Refuge Manager, Cape Romain NWR, Awendaw, SC

Chincoteague
Apper _____
Stevens _____
Keel _____ RAV
Payton 10-27
Bowden _____
Justice _____
Scarborough _____
Grody 9A
Ridge _____
Wessells _____

REPORT OF
WILDLIFE MANAGEMENT STUDY

Progress Report (No. 4)

Division of Wildlife Refuges

Project: Chincoteague NWR, Cape
Romain, Back Bay & Pea
Island NWRs

Region 4

Code : Chincoteague No. 1 Williams
Date : October 31, 1972

Title: An Attempt at the Northward Extension of the Breeding Range of the Atlantic Loggerhead Turtle (Caretta caretta caretta) by Egg Transplants

ABSTRACT

Thirty loggerhead turtle nests were dated as laid on Cape Romain NWR beaches during June and July, 1972. These contained 4,010 eggs of which 712 were removed prior to transfer because they were infertile. Of the remaining 3,298 eggs, 1,346 were transferred to Chincoteague NWR and transplanted in wire cylinders as 11 nests, 837 of 9 nests were transplanted at Back Bay NWR and 1,115 of 10 nests were transplanted at Pea Island NWR. Nests at time of transfer were 50, 50 and 45-days old respectively.

Hatching success on the three transplant areas averaged 84.9 percent of the transplanted eggs and 69.6 percent of the original 4,010 eggs. The number of hatchlings to enter the ocean on each area was 1,075 at Chincoteague, 706 at Back Bay and 627 at Pea Island for a total of 2,608 or 79.1 percent of those transplanted or 65.0 percent of those laid at Cape Romain.

Hatching success was highest at Pea Island and lowest at Chincoteague. Percentage of eggs hatching turtles which entered the ocean was highest at Back Bay and lowest at Pea Island. Data indicate that the transplants are more successful and occur in shorter duration on areas closer to origin than those further away.

Eleven natural nests on Pea Island in 1972 contained 850 eggs of which 609 or 71.6 percent hatched and 64.1 percent entered the ocean. Both these percentages are close to those calculated for the 10-nest transplant on the same area.

RECEIVED

1972

OBJECTIVES

Primary objectives of this phase of the study are: (1) to increase the number of Chincoteague NWR-released hatchlings from a mere 29.5 percent of 2,772 eggs hatched from 1969 to 1971 to a higher degree by annual transplantings of 8 to 12 nests through 1977; and (2) that transplant attempts of 1,000 eggs (8 to 12 nests) be made at Back Bay and Pea Island NRs from 1972 through 1977. Of course, the purpose of these egg transplants is that, hopefully, the hatchlings emerging on these beaches will be imprinted to the new areas and return as adults to re-establish breeding colonies which once occurred there.

INTRODUCTION

Introductions and justifications for this study were presented in those sections in the Wildlife Management Study Outlines for Chincoteague (Aug. 29, 1969), Back Bay (May 26, 1972) and Pea Island (June 9, 1972). The latter two refuges had the benefit of three years of experimental transplants at Chincoteague during which time it was determined what age eggs are most responsive to successful transfer from Cape Romain. These experiments revealed that loggerhead turtle eggs 55-days or older have a higher degree of hatching success than those under that age. Both Back Bay and Pea Island NRs fall within the original loggerhead turtle nesting range. In fact both areas have had some natural nesting attempts each year and in 1972 Pea Island NWR had 11 nests that had 850 eggs laid from which 609 young have hatched and 545 entered the ocean.

METHODS

Loggerhead turtles began laying eggs on Cape Romain NWR beaches on May 16, 1972. Three severe storms delayed peak nesting till late June to late July. Cape Romain NWR estimated 2,655 nests laid in 1972; some of these were dated and marked for transfer to the three study areas.

Chincoteague NWR picked up 1,344 eggs from 11 nests on August 3, 1972. Back Bay NWR picked up 830 eggs from 9 nests on August 14, 1972. And Pea Island NWR picked up 1,122 eggs from 10 nests on August 17, 1972. The individual nests were placed in separate styrofoam coolers with sand and transported in this way to the beaches of the three areas. They were transferred to individual wire cylinders (Photo #1) sunk in beach-side sand (Photo #2) and checked every morning thereafter. The hatchlings were removed every day and set free on the surf line.

Individual nest data were kept by the respective refuge staffs and forwarded to the East Coast Biologist at the termination of hatching of the last nest.

RESULTS

It should be noted that of the total number of eggs transplanted to the three areas was 3,296 from 30 nests. From these nests, infertile eggs numbered 694, rotten eggs totaled 13 eggs and 7 were opened. Therefore, the 30 nests to be transferred actually had 4,010 eggs or an average of 134 eggs per nest while the number actually transferred was 3,296 for a 110-per nest average. In previous years, all eggs laid in a nest on Cape Romain NWR were transferred and transplanted whereas this year only fertile eggs were sent. Consequently in reporting hatching success this year, 84.9 percent of those transferred and transplanted on the three areas hatched whereas only 69.8 percent of the total eggs laid hatched.

Table 1 shows that of 1,346 eggs transplanted at Chincoteague NWR, they varied from 49 to 52 days old, 80.3 percent hatched and 79.9 percent were released into the ocean. Table 2 shows that there were 837 eggs transplanted at Back Bay NWR, varying between 46 and 52 days of age, and that 84.7 percent hatched while 84.3 percent made the sea. Pea Island NWR data are presented in Table 3 and show that 1,115 eggs were transplanted and varied from 39 to 49 days old and that 90.5 percent of these hatched while 74.2 percent entered the surf. These data indicate a good rate of success compared to the three previous transplants at Chincoteague which were 44.4 percent in 1969, 3.4 percent in 1970 and 39.9 percent in 1971. Table 4 presents the combined 1972 transplant data on the three areas. It shows that in the 30 nests, 4,010 eggs were laid of which 3,296 or 82.2 percent were transplanted, 69.8 percent hatched and 65.0 percent actually entered the ocean.

Pea Island NWR had the highest hatching success of the three areas at 90.5 percent but also had the lowest percent enter the ocean at 59.8 percent. Chincoteague NWR had the lowest hatching success at 80.3 percent but had the second highest percent enter the sea.

Tables 5,6 and 7 present a chronological picture of hatching times and dates on Chincoteague, Back Bay and Pea Island. Widest hatching spans occurred at the northern most area which was Chincoteague where an average of 12 days were required to hatch out each nest. Back Bay NWR, the central transplanted area, was in the middle with an average of six days per nest while Pea Island NWR, the southern most area, needed an average of only four-days per nest.

SUMMARY AND CONCLUSIONS

The high hatching success of 69.8 percent experienced on the three areas in 1972 compared to the 29.5 percent of the previous three years at Chincoteague NWR further substantiates our earlier conclusion that age of the eggs at transplant time is important. This year, eggs averaged 50-days old at transfer and transplant time for Chincoteague and Back Bay and 45-days old for Pea Island.

The 1972 data also suggest a higher degree of hatching success for eggs transplanted closer to their origin. For instance, Pea Island hatching success of the transplanted eggs was 90.5 percent, while moving northward (away from Cape Romain), Back Bay's was 84.7 percent and Chincoteague's was 80.3. No doubt a greater change in sand, air and water temperature occur in further distances from origin of nest site. This may influence not only hatching success but also hatching longevity as presented in Tables 5, 6 and 7, where Pea Islands nesting span occurred from 2 to 6 days (4 average), Back Bay's from 1 to 10 days (6 average) and Chincoteague's from 7 to 25 days (12 average).

RECOMMENDATIONS

On the basis of the successful transplants conducted on all three areas this year, no major changes in procedures are recommended. Approximately 30 nests should again be dated at Cape Romain during the peak of the loggerhead nesting season there. These should again be transferred to the three areas in individual styrofoam coolers and transplanted in the type of containers used this year. Individual nest record keeping should be similar to that used this year and reporting procedures also should be similar.

REFERENCES CITED

- Back Bay NWR, 1972 field notes by Assistant Manager Frank Smith, et al.
- Cape Romain NWR, 1972 field notes and correspondence by Manager Neely, et al.
- Chincoteague NWR, 1972 field notes and correspondence by Manager Appel and Biologist Keel, et al.
- Pea Island NWR, 1972 field notes and correspondence by Manager Williamson, et al.
- Progress Reports #1, #2 and #3.

Distribution of Report Copies:

1. Regional Office
2. Central Office (via Regional Office)
3. Back Bay NWR
4. Cape Romain NWR
5. Chincoteague NWR ✓
6. Pea Island NWR

Submitted by:

Otto Florschutz, Jr.
East Coast Biologist
November 17, 1972

O. F. Jr.

PHOTOS

Type of cylinders used at Back Bay NWR (left) and Chincoteague NWR (below) into which transplanted loggerhead turtle eggs were placed and buried.



Table 1

Hatching Success of Loggerhead Turtle Eggs
Transplanted at Chincoteague National Wildlife Refuge
1972

Nest No.	Number Eggs*	Est. Age at Transplant	Hatched		Not Hatched		Number to Ocean
			No.	%	No.	%	
1	116	49 days	89	76.7	27	23.3	89
2	149	49 days	116	77.9	33	22.1	116
3	135	49 days	118	87.4	17	12.6	118
4	142	49 days	70	49.3	72	50.7	70
5	66	49 days	60	90.9	6	9.1	59
6	101	52 days	96	95.0	5	5.0	95
7	144	52 days	141	97.9	3	2.1	140
8	117	52 days	99	51.2	22	48.8	94
9	99	52 days	74	74.7	25	25.3	74
10	143	52 days	107	74.8	36	25.2	106
11	134	49 days	115	85.8	19	14.2	114
Totals 1,346*			50 avg.	1,081	80.3	265	19.7
							1,075 (79.9%)

* Cape Romain NWR records show that 2 more eggs were transferred.

Table 2
 Hatching Success of Loggerhead Turtle Eggs
 Transplanted at Back Bay National Wildlife Refuge
 1972

Nest No.	Number Eggs*	Est. Age at Transplant	Hatched		Not Hatched		Number to Ocean
			No.	%	No.	%	
1	61	52 days	50	82.0	11	18.0	49
2	136	50 days	130	95.6	6	4.4	130
3	92	50 days	51	55.4	41	44.6	50
4	103	50 days	88	85.4	15	14.6	87
5	101	50 days	93	92.1	8	7.9	93
6	37	52 days	27	73.0	10	27.0	27
7	136	50 days	102	75.0	34	25.0	102
8	125	46 days	123	98.4	2	1.6	123
9	46	46 days	45	97.8	1	2.2	45
Totals	837*	50 avg.	709	84.7	128	15.3	706 (84.3%)

*Cape Romain NWR records show that 7 less eggs were transferred.

Table 3
 Hatching Success of Loggerhead Turtle Eggs
 Transplanted at Pea Island National Wildlife Refuge
 1972

Nest No.	Number Eggs*	Est. Age at Transplant	Hatched		Not Hatched		Number to Ocean
			No.	%	No.	%	
1.	90	39 days	78	86.7	12	13.3	76
2	139	49 days	132	95.0	7	5.0	111
3	146	49 days	139	95.2	7	4.8	8
4	127	49 days	112	88.2	15	11.8	106
5	109	39 days	100	91.7	9	8.3	95
6	135	49 days	123	91.1	12	8.9	118
7	35	49 days	35	100.0	0	0.0	33
8	106	39 days	99	93.4	7	6.6	96
9	111	49 days	79	71.2	32	28.8	75
10	117	42 days	112	95.7	5	4.3	109
Totals		45 days	1,009	90.5	106	9.5	827 (74.2%)

* Cape Romain NWR records show that 7 more eggs were transferred.

Table 4
 Summary of Loggerhead Turtle Egg Transplants
 from Cape Romain National Wildlife Refuge
 1972

Transferred to	Date	No. Nests	No. Eggs*	Avg. Age	Hatched		Not Hatched		To Ocean		No. Eggs Laid at Cape Romain	% to Ocean
					No.	%	No.	%	No.	%		
Chincoteague	8/3	11	1,346	50	1,081	80.3	265	19.7	1,075	79.9	1,595	67.4
Back Bay	8/14	9	837	50	709	84.7	128	15.3	706	84.3	1,032	68.4
Pea Island	8/17	10	1,115	45	1,009	90.5	106	9.5	827	74.2	1,383	59.8
Totals and Averages	—	30	3,298*	48	2,799	84.9	499	15.1	2,605	79.1	4,010	65.0

*Cape Romain NWR records show that 2 less eggs were actually transferred.

Table 5
 Chronology of Loggerhead Turtle Hatching on
 Chincoteague National Wildlife Refuge - Transplanted August 4, 1972

Nest No.	No. Eggs Transplanted	Hatching Dates				Days to Start	Days to Completion	Days Hatching Span	Percent Hatched
		Begin	50%	75%	100%				
1	116	8/4	8/12	8/14	8/22	50	68	19	76.7
2	149	8/12	8/14	8/15	8/23	58	69	12	77.9
3	135	8/10	8/10	8/12	9/3	56	80	25	87.4
4	142	8/27	8/28	8/30	9/6	73	83	11	49.3
5	66	8/11	8/11	8/11	8/17	57	63	7	90.9
6	101	8/10	8/12	8/15	8/22	59	71	13	95.0
7	144	8/8	8/10	8/13	8/17	57	66	10	97.9
8	117	8/10	8/10	8/10	8/18	59	67	9	81.2
9	99	8/6	8/10	8/10	8/14	55	63	9	74.7
10	143	8/5	8/9	8/10	8/15	54	64	11	74.8
11	134	8/11	8/14	8/15	8/17	57	63	7	85.8
Average	134.6	8/10	8/13	8/14	8/22	58	69	12	80.3

Table 6
 Chronology of Loggerhead Turtle Hatching on
 Back Bay National Wildlife Refuge - Transplanted August 15, 1972

Nest No.	No Eggs Transplanted	Hatching Dates				Days to Start	Days to Completion	Days Hatching Span	Percent Hatched
		Begin	50%	75%	100%				
1	61	8/18	8/21	8/21	8/22	55	59	5	82.0
2	136	8/26	8/28	8/28	9/1	64	68	5	95.6
3	92	8/16	8/17	8/20	8/25	51	60	10	55.4
4	103	8/25	8/25	8/25	8/29	60	64	5	85.4
5	101	8/15	8/15	8/15	8/23	50	58	9	92.1
6	37	8/15	8/15	8/15	8/24	52	61	10	73.0
7	136	8/25	8/26	8/29	9/2	60	68	9	75.0
8	125	8/29	8/29	8/29	8/30	60	61	2	98.4
9	46	9/1	9/1	9/1	9/1	63	63	1	97.8
Averages	Total	8/23	8/23	8/24	8/28	57	62	6	84.7

Table 7

Chronology of Loggerhead Turtle Hatching on
Pea Island NWR - Transplanted August 17, 1972

Nest No.	No. Eggs Transplanted	Hatching Dates				Days to Start	Days to Completion	Days Hatching Span	Percent Hatched
		Begin	50%	75%	100%				
1	90	9/2	9/2	9/2	9/5	55	58	4	86.7
2	139	8/22	8/23	8/25	8/27	54	59	6	95.0
3	146	8/21	8/22	8/22	8/22	53	54	2	95.2
4	127	8/24	8/24	8/26	8/26	56	58	3	88.2
5	109	9/2	9/2	9/5	9/5	55	58	4	91.7
6	135	8/24	8/24	8/26	8/26	56	58	3	91.1
7	35	8/22	8/25	8/25	8/26	54	58	5	100.0
8	106	8/31	8/31	8/31	9/2	53	55	3	93.4
9	111	8/23	8/24	8/25	8/26	55	58	4	71.2
10	117	8/27	8/27	8/29	8/29	52	54	3	95.7
Averages	total 1,115	8/26	8/27	8/28	8/29	54	57	4	90.5