PERFORMANCE REPORT

STATE: NEW JERSEY PROJECT NUMBER: W-53-R-4

PROJECT TYPE: RESEARCH AND/OR SURVEY

PROJECT TITLE: WETLANDS ECOLOGY

STUDY NUMBER AND TITLE: II - TIDAL MARSHES

JOB NUMBER AND TITLE: II-B CLAPPER RAIL STUDY

PERIOD COVERED: April 30 to August 30, 1975

OBJECTIVES:

To determine the population trends, harvest and movements of the clapper rail.

SUMMARY:

Clapper rail nest censuses in Ocean, Atlantic and Cape May Counties indicated that the clapper rail is recovering from the low population of 1968. Production in 1975 was well above long term averages. Nesting success was very good in 1975 in all counties.

Banding operations were again successful. During 1975, a total of 250 clapper rail were banded.

TARGET DATE, STATUS:

Field work completed by August 15. Report due September 15 of the same summer, annually.

SIGNIFICANT DEVIATIONS: None

RECOMMENDATIONS:

This job is essential to the management of the clapper rail and should be continued.

COSTS:

Twenty man-days = $1,000.00; 1,000 miles = $85.00; Total $1,085.00

CONTENTS PAGES

BACKGROUND:

Nesting biology of the clapper rail has been studied by various investigators. Some of the early information was assembled by Bent (1926), Stone (1937), Pettingil (1938), Stewart (1953), Oney (1954), and Adams and Quay (1958). In New Jersey, Kozicky and Schmidt (1949) completed a thorough study of the nesting habits of the clapper rail. Nesting studies continued under P.R. Projects 16-R (Schmidt and McLain, 1947-54), W-34-R (Ferrigno and Widjeskog, 1955-72) and W-28-R (Shoemaker, 1961-72). A master thesis was completed in 1966 on the nesting biology, population dynamics and habitat association of the clapper rail (Ferrigno, 1966). MacNamara and Udell (1965) conducted clapper rail investigations on the south shore of Long Island. Extensive studies on nesting field sex identification populations and banding of clappers have been completed under a special migratory webless fund (Mangold, 1974). In 1973, studies on population trends of the clapper rail in Ocean, Atlantic and Cape May Counties previously covered under P.R. Projects W-34-R and W-28-R were consolidated under the new Wetlands Project W-53-R.

Extensive investigations on various aspects of the ecology of the clapper rail on New Jersey coastal marshes have led to valuable information in regard to nesting biology, population dynamics and habitat association. Production trends over the past twenty-one years indicated that clapper rail populations were not only affected by tides but by territorialism, climate, storms and possibly pesticides and diseases (Ferrigno and Widjeskog, 1969-71 and Shoemaker, 1972).

Population trends from 1955 to 1962 appeared normal with two population cycles present. In 1963, production trends continued downward to a 1968 low, far below the long term average. In 1969, a gradual incline commenced and this increasing trend is continuing. Presently, production trends are above the twenty year average for Cape May County and the fourteen year average for Atlantic and Ocean Counties.

Severe droughts during the 1963 to 1966 period were believed largely responsible for the Cape May County decline (Table 3). Since 1967 climatic conditions have improved and the use of insecticide reduced. Aerial spraying of DDT for mosquito control was terminated in 1966. Malathion replaced DDT but its use was greatly reduced during the 1968 to 1972 period. Some of the coastal mosquito commissions, by adopting the ecological approach (Ferrigno, Jobbins, and MacNamara, 1969), have concentrated their applications on heavy mosquito producing salt hay (Spartina patens) marshes. In recent years, tidal nest destruction was heavy in 1967 and 1968. Due to favorable phenological conditions, better production occurred in 1970, 1971, 1972, 1973, 1974 and 1975. Presently, clapper rail populations are above average levels.

PROCEDURES:

Nest censuses on two study areas, Coneys and Keyes, in Cape May County and the five study areas in Ocean and Atlantic Counties were continued. Nests were located by searching methodically on foot until all nests were found on a given area. Subsequent visits were made at nine-day intervals in Cape May County. Nest histories were recorded at weekly intervals in Atlantic and Ocean Counties. When a nest was found, a stake was placed nearby with a number that designated that particular nest. Each nest was closely observed until it was either destroyed or hatched successfully.

FINDINGS

A. Cape May County

Population Dynamics

A summary of the last 21 years of study on the two Cape May County study areas is shown on the chart in Figure 1. The dark bar represents the total number of successfully hatched nests while the striped bar represents the total nesting attempts that were destroyed through tides and predation.

More detailed information on the possible effects of tidal destruction, population dynamics, territorialism, predation, decline, hunting, disease, intra-specific competition, pecticides, climate, and habitat loss can be found in a previous report (Ferrigno, 1969).

Production in 1975

In 1975 the successful nests recorded reached a 21 year high of 43. This was in spite of an increase of only one breeding pair over the 1974 level. This indicates a great number of second nests.

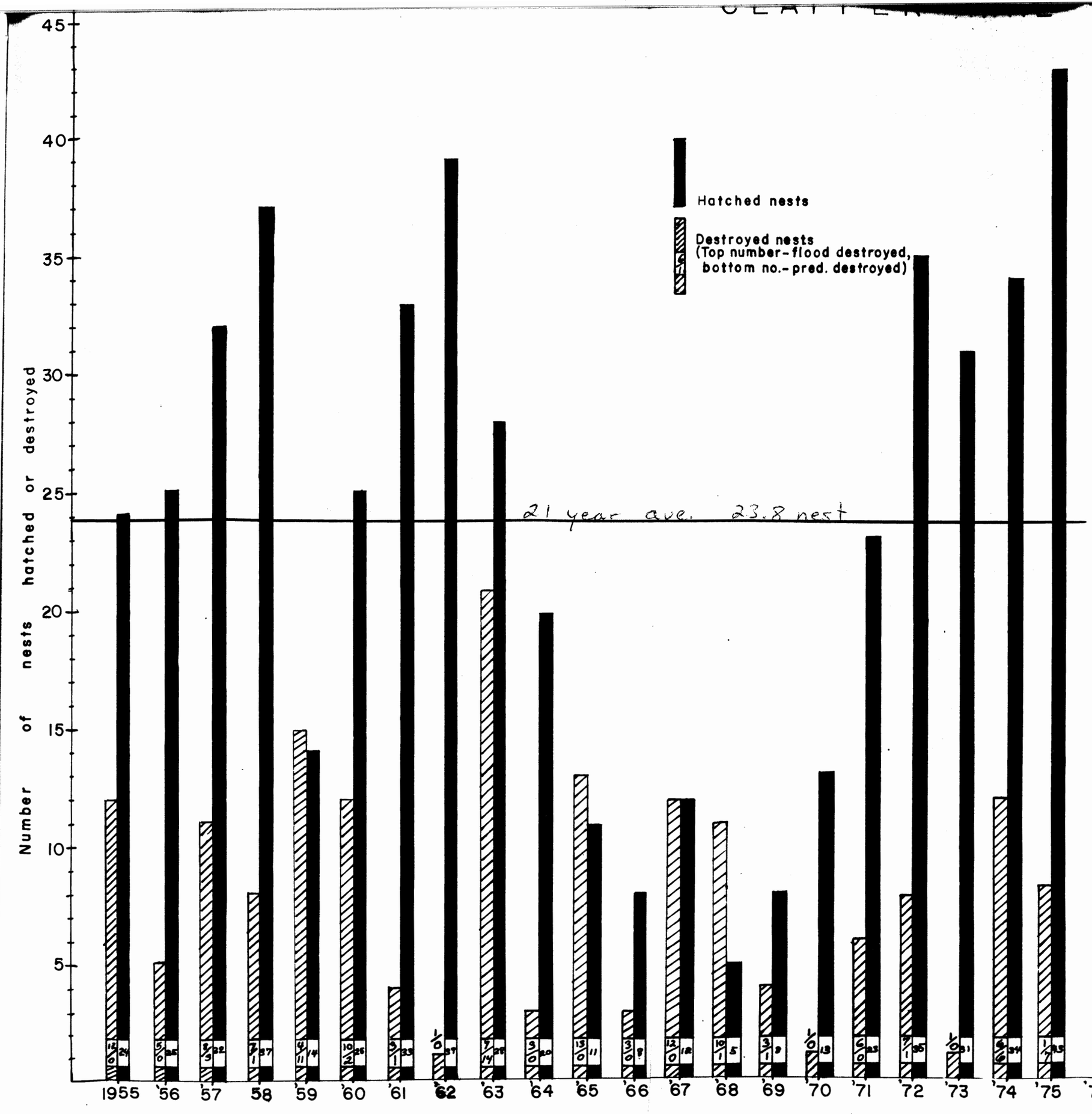
With the higher number of nests came greater predation which accounted for all the nesting losses but one (Table 1). That one exception was lost to flooding.

The 43 successful nests represent an increase of 26.5% over the 1974 level and 86.2% over the 21 year average (Table 2).

Predation was spread throughout the summer with no obvious concentration in time. The greatest predation occurred on the Coney's area that has seen an increase in use for crabbing, fishing and trapping of bait fish.

As in the past few years, the grass growth was good and a good stand of old vegetation remained after the winter. This resulted in a high number of nests by the middle of June.

Two hatching peaks were noted. The first was during the second week of June (20 nests) and the other was the first week of August (8 nests). Successful nests hatched beginning the first week of June and extended through the second week of August.



Clapper Rail Production
Production trends and nest losses of the clapper rail on two census areas in Cape May County, New Jersey

Table 1. Results of the clapper rail nest census over a twenty-one year period.

Area	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
	(A) Number of Observed Nests																				
Coneys	29	20	26	26	13	18	14	12	21	8	9	5	12	10	8	8	12	25	16	19	22
Keyes	7	10	18	19	16	19	23	28	28	15	15	6	12	6	4	6	17	18	16	27	29
Totals	36	30	44	45	29	37	37	40	49	23	24	11	24	16	12	14	29	43	32	46	51
	(B) Number Hatched Successfully																				
Coneys	20	16	19	20	6	13	11	12	12	8	4	4	7	5	4	8	10	19	16	14	18
Keyes	4	9	13	17	8	12	22	27	16	12	7	4	5	0	4	5	13	16	15	20	25
Totals	24	25	32	37	14	25	33	39	28	20	11	8	12	5	8	13	23	35	31	34	43
	(C) Number Destroyed by Tides																				
Coneys	9	4	5	5	2	4	2	0	2	0	5	1	5	5	0	0	2	5	0	3	0
Keyes	3	1	3	2	2	6	1	1	5	3	8	2	7	5	3	1	4	2	1	3	1
Totals	12	5	8	7	4	10	3	1	7	3	13	3	12	10	3	1	6	7	1	6	1
	(D) Number Destroyed by Predators																				
Coneys	0	0	2	1	5	1	1	0	7	0	0	0	0	0	0	0	0	1	0	2	4
Keyes	0	0	1	0	6	1	0	0	7	0	0	0	0	1	1	0	0	0	0	4	3
Totals	0	0	3	1	11	2	1	0	14	0	0	0	0	1	1	0	0	1	0	6	7
	(E) Mean No. Lineal Ft. of Ditch/Successful Nest																				
Coneys (10,510)	526	657	553	516	1752	809	956	876	876	1314	2628	2628	1501	2102	2628	1314	1051	553	657	751	584
Keyes (12,200)	3050	1355	938	718	1525	1016	555	452	763	1017	1743	3050	2440	12200	3050	2440	938	762	813	610	488
Totals (22,710)	1030	908	709	614	1622	908	688	582	811	1135	2065	2839	1893	4542	2849	1747	987	637	733	668	528
	(F) Acres/Successful Hatch																				
Coneys (61)	3.05	3.81	3.21	3.05	10.18	4.69	5.55	5.08	4.36	7.63	15.25	15.25	8.71	12.20	15.25	7.63	6.10	3.21	3.81	4.36	3.39
Keyes (32)	8.00	3.55	2.46	1.88	4.00	2.66	1.45	1.19	1.60	2.66	4.57	8.00	6.40	32.00	8.00	6.40	2.46	2.00	2.13	1.60	1.28
Totals (93)	3.88	3.72	2.91	2.51	6.74	3.72	2.82	2.38	2.74	4.65	8.45	11.63	7.75	18.60	11.63	7.15	4.04	2.66	3.00	2.74	2.16

Table 2. Production trends of the clapper rail from 1955 to 1975.

Year	Number of Successful Hatches	Percent Change Compared With Previous Year	Percent Change Compared With 1955-1964 Average (27.7)
1955	24	-	-13.4
1956	25	+ 4.2	- 9.7
1957	32	+28.0	+15.5
1958	37	+15.6	+33.6
1959	14	-62.2	-49.5
1960	25	+78.6	- 9.7
1961	33	+32.0	+19.1
1962	39	+18.2	+44.4
1963	28	-28.2	+ 1.1
1964	20	-40.9	-27.8
1965	11	-45.0	-60.3
1966	8	-27.3	-71.1
1967	12	+50.0	-56.7
1968	5	-58.3	-81.9
1969	8	+60.0	-71.1
1970	13	+62.5	-53.1
1971	23	+76.8	-16.9
1972	35	+52.2	+26.4
1973	31	-11.4	+11.9
1974	34	+ 9.7	+22.7
1975	43	+26.5	+55.2

Table 3. Monthly precipitation departures (in inches) from the normal amount.

Year	April	May	June	July	August	*Average (April to Aug.)	*Average (May to July)
1955	- .64	-2.89	+2.46	-1.49	+2.39	+0.85	-1.92
1956	- .70	-1.15	+0.29	-1.01	- .26	-0.81	-1.87
1957	-1.13	-2.97	-0.07	-3.41	+1.52	-6.06	-6.45
1958	+0.92	+1.91	+1.55	+6.00	+4.58	+14.96	+9.46
1959	-0.08	+2.52	-1.54	+9.37	-1.33	+8.94	+10.35
1960	-1.17	-0.77	-2.22	+2.14	-2.22	-4.24	-0.85
1961	-0.21	+0.19	-0.01	- .30	-2.85	-3.16	-0.12
1962	+0.17	-1.74	+1.37	-1.05	+0.39	-0.86	-1.42
1963	-2.02	-0.56	+0.24	-1.15	-1.97	-5.56	-1.47
1964	+4.18	-1.86	-1.99	- .95	-3.27	-3.87	-4.78
1965	-1.41	- .92	-1.59	-1.17	-1.11	-6.20	-3.68
1966	-0.83	-0.34	-0.82	-1.16	+4.14**	+ .99	-2.32
1967	-0.65	+0.17	-1.46	+1.47	+7.08**	+5.61	-1.16
1968	-2.25	+2.04	+3.20	-2.60	-2.70	-2.31	+2.60
1969	+0.38	-1.73	-1.40	+7.25	-0.99	+3.51	+4.12
1970	+1.39	-0.70	+1.56	-0.14	-3.90	-1.79	+0.72
1971	-2.03	-1.02	-2.43	+ .07	+5.23**	- .18	-5.41
1972	+0.59	+1.94	+2.17	-0.13	-3.68	+1.89	+3.98
1973	+0.65	-0.33	+4.24	-0.65	-4.08	-0.17	+3.22
1974	-1.47	-0.61	-0.79	-1.55	+1.76	-2.66	-2.95
1975	+0.72	-0.32	+0.92	+1.51	-2.50	+0.33	+2.11

* Total departure from the normal for the five month period (April to August) and the three month period (May to July).

** Heavy rain in late August distorted the precipitation figure for the five month period.

Hunters in Cape May reported one of the best years for clapper rail in years.

B. Ocean and Atlantic Counties

Production

During 1975, as in the past, five study areas were used to determine annual abundance and production of the clapper rail (Rallus longirostris crepitans) in the State of New Jersey. Two of these areas were located on the Sheepshead Meadows near Tuckerton in Ocean County, and three were on a section of the Brigantine National Wildlife Refuge in Atlantic County adjacent to Great Bay.

Clapper rails appeared in abundance in Ocean County in mid-April, 1975. This arrival date was about average for the last seven years when arrival dates varied between April 6 and April 22. Nesting cover on the marsh was poor at the end of May when initial nesting efforts began, but good cover for construction and concealment of nests was abundant by the end of June. Initial nesting began during the third week of May in 1975, and most clutches were completed during the first week of June. Hatching of most clutches was completed by the third week of June.

Nesting success on the study areas was good in 1975 with only one nest being lost to flooding and none to predation. A total of 27 nests was under observation. Annual production is graphically illustrated in Figure 2 and 3. Total production for 1975 (225 successful eggs) was 11 percent below that of 1974 (253 successful eggs). Production in both Atlantic and Ocean County decreased in 1975. Table 4 also indicates that nesting success was higher in 1975 (96.2 percent) than in 1974 (78.9 percent). Hatching success was also higher in 1975.

The decrease in total egg production in 1975 is due to the decrease in the number of breeding pairs. In recent years, it has been found that a large percentage of clappers will endeavor to either renest, if the initial nest is destroyed; or, if the initial nest is successful, many will attempt to second nest and raise an additional brood. Clapper rail second nesting has also been documented by other biologists along the Atlantic Flyway (Blandin, 1963). During banding activities with night lighting in New Jersey, all adult birds having broods were found to be males after the total clutch had hatched. In some years, nests have been observed

Figure 2 CLAPPER RAIL PRODUCTION - OCEAN AND ATLANTIC COUNTIES (1964-1975)

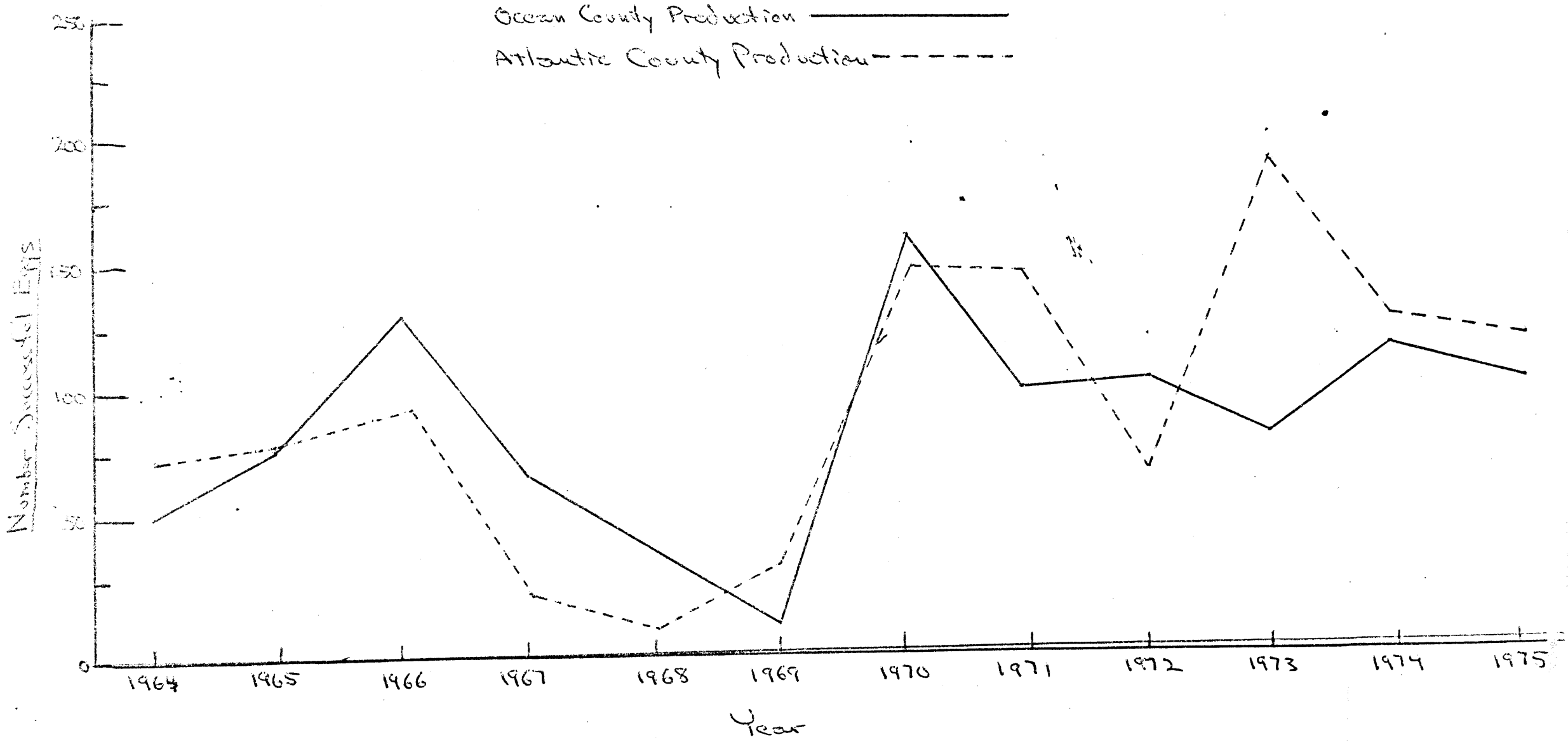
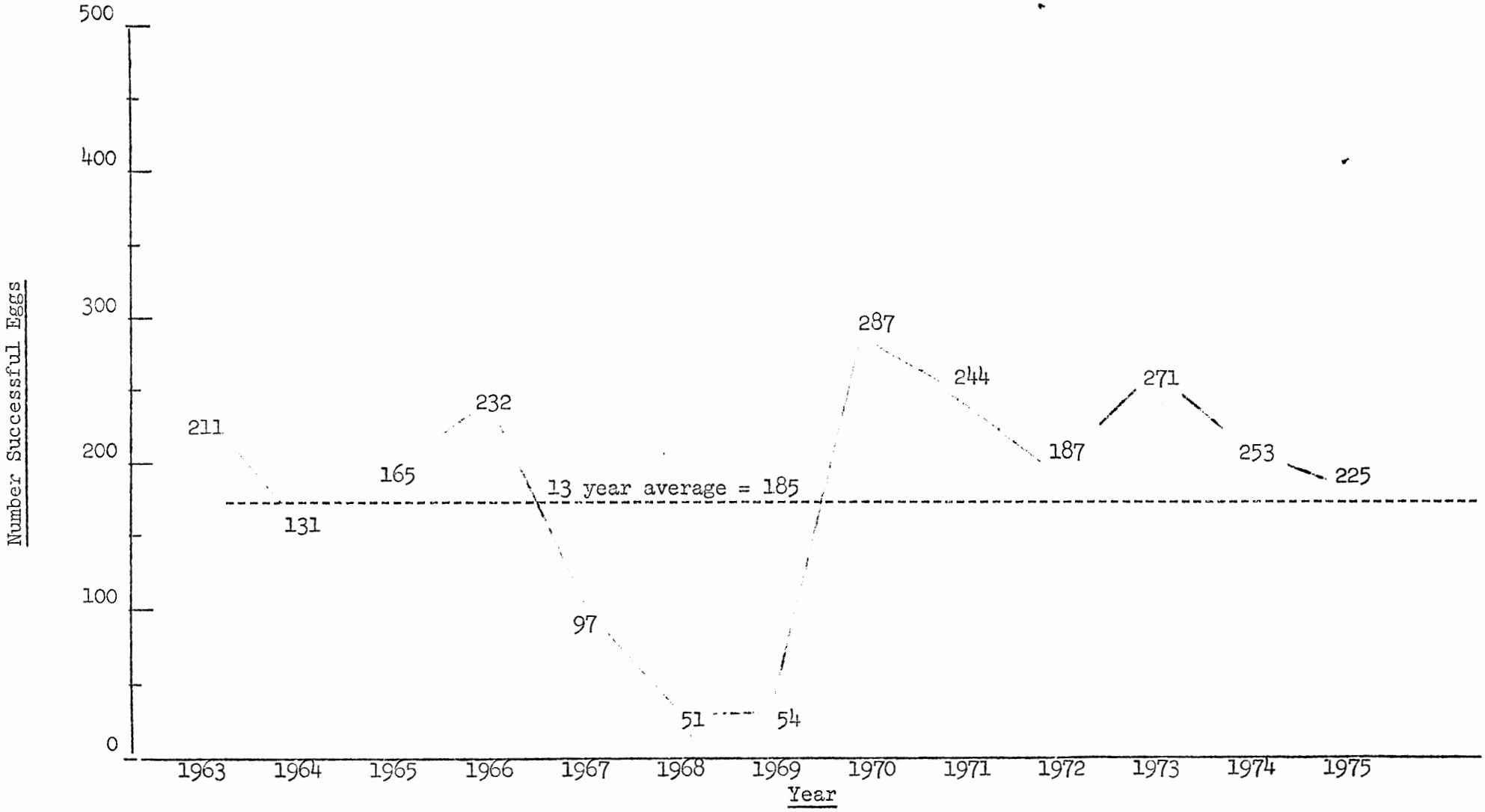


Figure 3. Total Clapper Rail Production (1963 - 1975)



hatching in August. In many years prior to 1966, nest searches were discontinued after all nests had hatched in June, tides and predators permitting.

Table 4. Clapper rail nesting and hatching success for 1974 and 1975 in Ocean and Atlantic Counties.

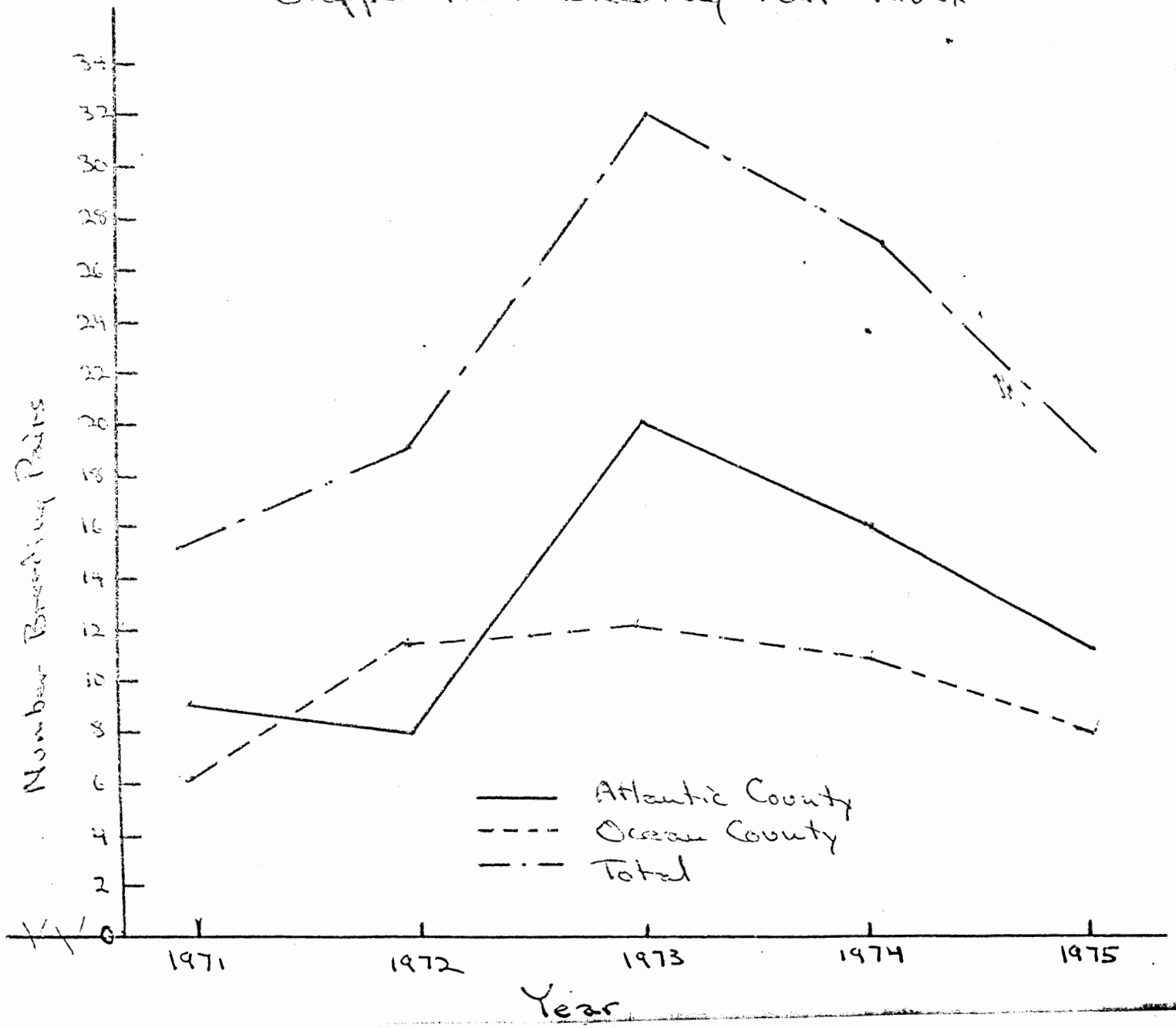
	No. Nests	Successful Nests	No. Eggs	Successful Eggs	Av. No. Eggs/Nest	Nesting Success	Hatching Success
1974							
Ocean County	17	15	137	120	8.1	88.2%	87.6%
Atlantic County	19	15	154	133	8.0	78.9%	86.4%
Total	36	30	291	253	8.0	78.9%	86.4%
1975							
Ocean County	12	11	116	104	9.7	91.7%	89.7%
Atlantic County	15	15	127	121	8.5	100%	95.3%
Total	27	26	243	225	9.0	96.2%	92.6%

In these years, further nest searches were often discontinued, assuming that the nesting season was at an end. Thus, total documented clapper production is at a minimum for years prior to 1966. Present nesting studies have been extended into August. In 1975, thirty-seven percent of the breeding adults produced second nests; while in 1973, only twenty-two percent of the breeding adults made a second nesting attempt. The variation in the degree of second nesting attempts is considerable from year to year, and the reason for second nesting or the lack of it is not known. Brood survival could possibly affect the annual variation in second nesting.

Breeding population data were submitted during the third week of June as in the past so that these data could be used to help establish state and federal hunting regulations. An endeavor was made to establish a population index for adult breeding pairs since total brood production figures from the study areas cannot be obtained until sometime in late July or August. An estimate of active breeding pairs

Figure 4

Clapper Rail Breeding Pair Index



(number of first nests) on the study area was submitted. Figure 4 indicates clapper breeding pair trends over the last 5 year period. On the Atlantic and Ocean County study areas, it was found that the number of breeding pairs decreased from 27 in 1974 to 19 in 1975 on similar dates. Since it appears that the clapper rail population has been relatively low in recent years, a continued reduction in the daily bag limit of ten clappers was recommended to the New Jersey Fish and Game Council. This recommendation was adopted and became part of the 1975 hunting code.

An interesting phenomenon has been observed on the study areas located on the Brigantine National Wildlife Refuge (Atlantic County) during the past two years. Snow geese "eat-outs" were observed on all three Atlantic County study areas. These eat-outs were mainly areas which contained high vigor Spartina alterniflora. The areas preferred by the geese seemed to be at the heads of very small tide creeks and along tide creeks and old mosquito ditch edges. These areas are also those areas favored for nesting by clapper rails. A substantial reduction in preferred clapper rail nesting cover has therefore resulted. No snow geese eat-outs were observed on the Ocean County study areas. In addition, while the breeding pair index for 1974 showed a 20% decrease in Atlantic County, it only went down 9% in Ocean County.

In 1975 a continued disproportionate breeding pair reduction was observed. This alteration in nesting habitat may also affect other marsh species, and it certainly bears further study to document changing habitat conditions.

Banding

During 1974, a total of 250 clapper rails were banded in New Jersey. This banding was accomplished by methods pioneered in New Jersey. The majority of the rails were banded with the use of night lighting equipment on spring tides which flood the Spartina alterniflora salt marsh. Since 1967, a total of 4,184 clappers have been banded by this and other methods.

In 1975, 170 clappers were banded on the Sheepshead Meadows at Tuckerton and 7 on the Brigantine National Wildlife Refuge. All rails were caught by night lighting with the Division's air boat and a smaller boat using a 4 horsepower air motor. These banding activities were cooperative endeavors and were successful

only through the cooperation of Robert Mangold, New Jersey Division of Fish, Game, and Shellfisheries, and voluntary time donated by Russell Chase and William E. Shoemaker, Jr.

C. Both Areas

Past six-year trends in the number of successful nest hatches are compared for the three counties involved (Table 5). The total of 69 successful nest hatches indicated above average production for 1975. This production was similar to 1973. Because of this above average production, maximum daily bag limits of approximately ten birds should be encouraged.

Table 5. Trends in successful nest hatches on study areas.

Counties	1970	1971	1972	1973	1974	1975
Ocean	14	10	14	10	15	11
Atlantic	15	16	9	23	15	15
Cape May	13	23	35	31	34	43
Total	42	49	58	64	64	69

RECOMMENDATIONS

This job is essential to the management of the clapper rail and should be continued.

PREPARED BY:

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APPROVED BY:

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Paul D. McLain
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DATE: July 26, 1975

George P. Howard, Chief
Bureau of Wildlife Management

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