1986 Delray Beach Sea Turtle Conservation Report

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INTRODUCTION

The sea turtle is an exceedingly complex lifeform which is poorly known throughout most stages of its natural history. Once sea turtles were abundant, inhabiting much of the tropical and sub-tropical waters of the world,but today this is no longer the case. Now most populations of these reptiles have been diminished by a variety of natural and human pressures, and their total population is much smaller than it was only a few decades ago. This drastic decline of sea turtles has made it necessary to declare all seven species of sea turtle as either "threatened" or "endangered". The Atlantic loggerhead sea turtle (Caretta caretta caretta) which is the focus of this conservation program, holds an endangered species status under the the I.U.C.N. (1970) and a "threatened" species status under the Federal Endangered Species Act. Considering this most marine biologists consider the sea turtle to be one of world's most over-exploited animals (King, 1979).

There are many reasons for the alarming decline of sea turtles. Some are natural and are the result of a variety of marine, avian, and terrestrial animals that are predators of hatchling and juvenile animals. Other problems related to man and his attempts to develop and sometimes exploit the coastal zone. Condominiums, hotels, private residences, and associated heavy pedestrain traffic seriously impact many important nesting beaches in the United States and other parts of the world. Artificial lights associated with development compound this problem by confusing baby turtles as they emerge from their nests, often causing them to head in the wrong direction away from the sea. Frequently hundreds of baby sea turtles are seen squashed along the

roadside. Their carcasses, lying in stench and decay, bear mute and dramatic testimony to what is becoming of the sea turtle. There are other problems which are not discussed in the text of this report. Figure 1 represents a model which depicts most of the sea turtle's survival problems.

THE PRESENT STUDY

The Delray Sea Turtle Conservation program was initiated when a beach ~~sand~~ renourishment project was conducted on the public beach during the summer of 1984.

Due to the discovery during the first year of this project that a large sea turtle population nested on Delray Beach (Figure 2), it was unanimously decided by the City Council to continue this program during the 1985 and 1986 seasons. This report represents a descriptive summary of the results of this summer's conservation effort and a comparison of the nesting data obtained over the three sasons this program has been in operation.

METHODS

Nesting surveys were conducted between 1 May and 31 August, between 6:30 A.M. and8:30 A.M each mornig. An initial survey of the beach each morning which involved making a reconnaissance along the entire length of the beach using a Yamaha 175 ATC. Whenever a sea turtle crawl was observed, it was recorded on a data form. It the crawl resulted in a nest, it was marked with an identification stake. After the first survey was concluded, a second survey was conducted to relocate the nest stakes. A majority of nests were promptly excavated and relocated to the artificial hatchery located on the beach 300 yards north of Atlantic Blvd.

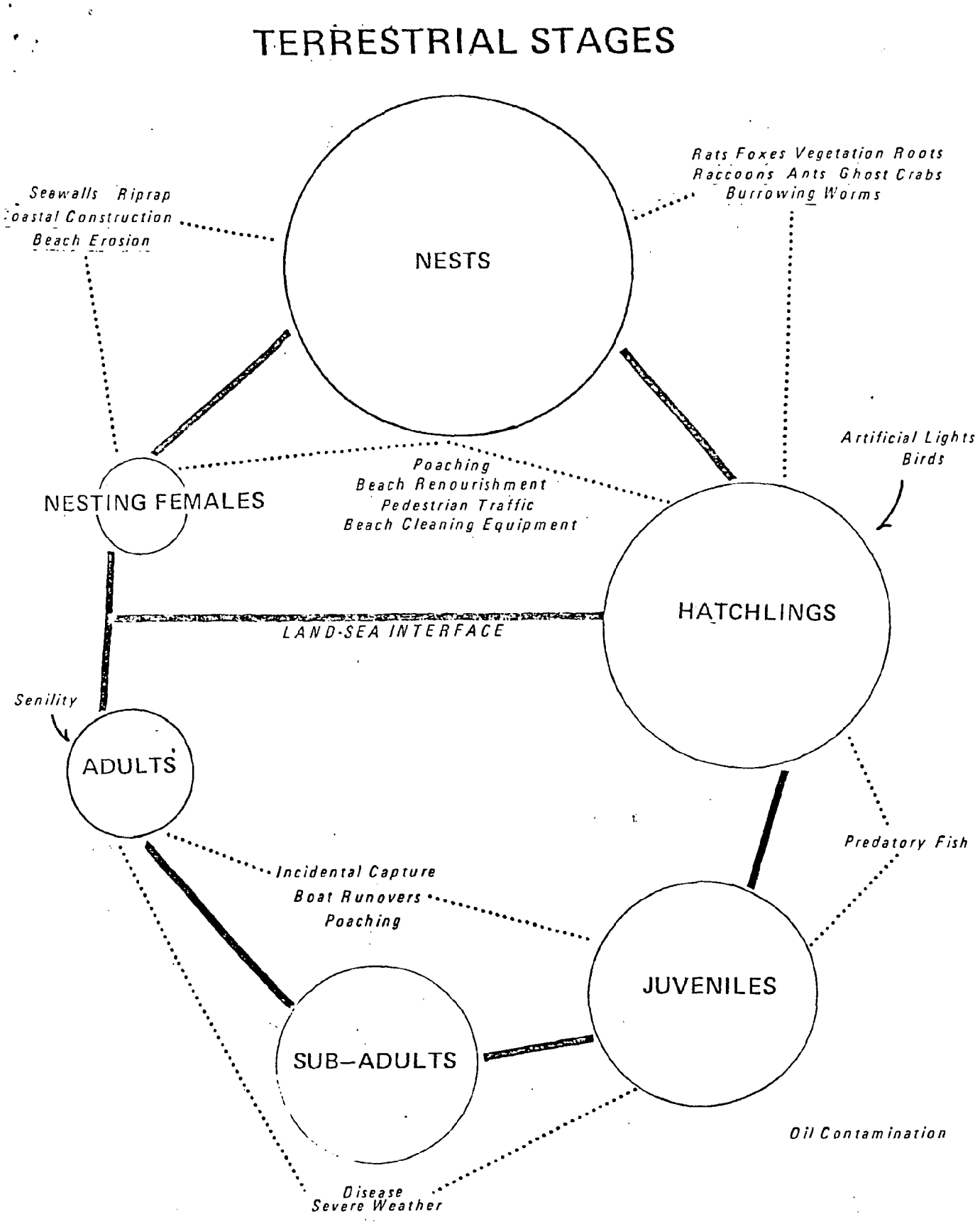


Fig. 1:
HYPOTHETICAL MODEL DEPICTING NATURAL AND HUMAN DISTURBANCES RESPONSIBLE FOR REDUCING SEA TURTLE POPULATIONS AT VARIOUS STAGES OF THEIR NATURAL HISTORY

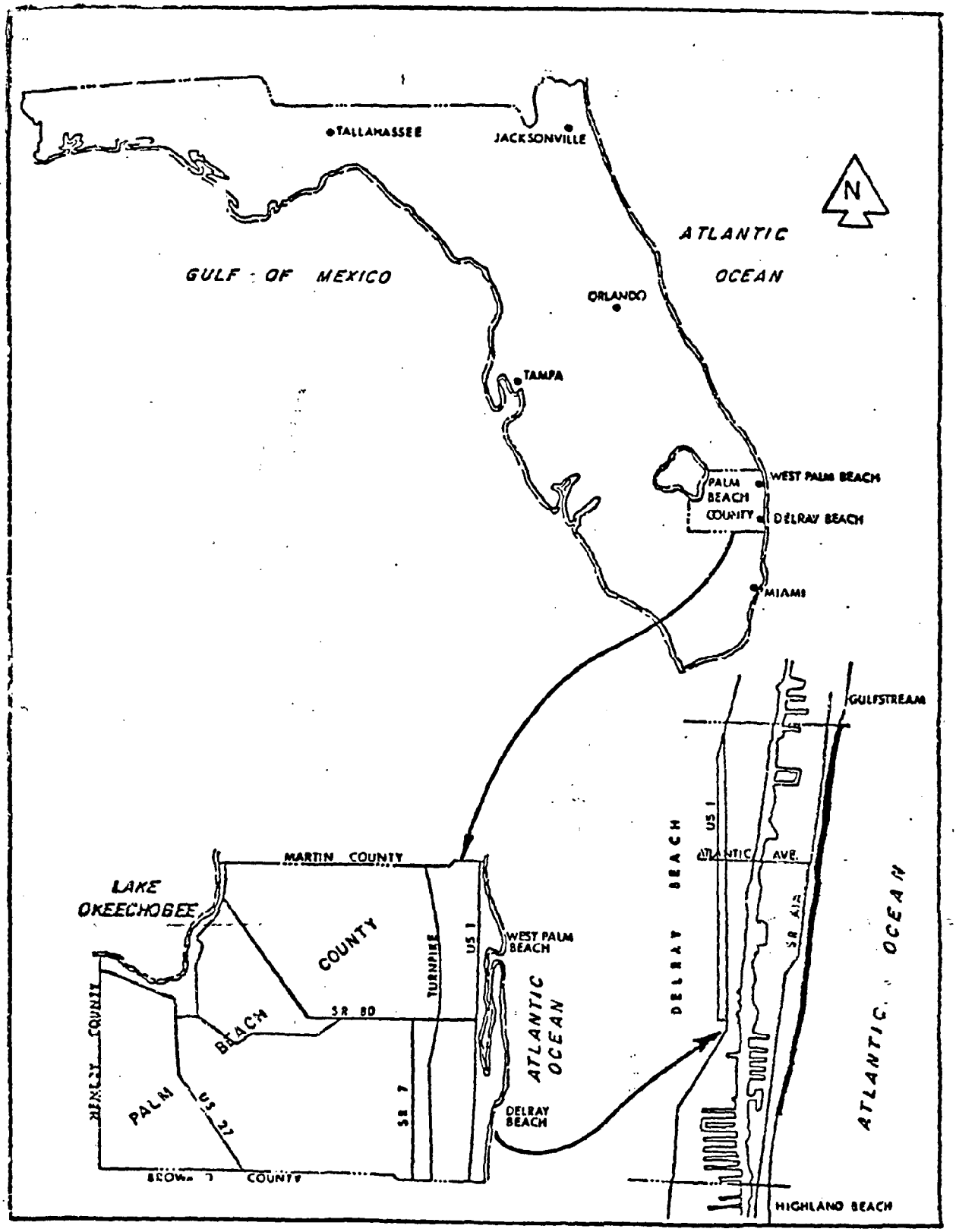


FIGURE 2: Location of the Delray Beach Sea Turtle Conservation Proejct.

The reason for leaving a small number of nests on the beach was was to determine if the nesting success of the relocated nests was similar to that of natural nests. In order ensure the protection of the natural nests, they were marked with ID steaks. Also the only area where natural nests were left on the beach was the area where private homes were located. This helped to eliminate problems dealing with pedestrain traffic associated with the public beach area.

When a natural nest or a relocated nest hatched, the contents of the nests were examined according to the following criteria:

1. Total No. of eggs in the clutch
2. Total No. of unhatched eggs
3. Total No. of eggs to successfully hatch
4. Total No. of pipped eggs with dead hatchlings
5. Total No. of pipped eggs with alive hatchlings
6. Total No. of dead hatchlings observed in the nests
7. Total No. of days it took nest to hatch

After the above nest hatching data was recorded, the hatchlings from each nest were immediately transported to the water's edge in plastic buckets. The baby turtles were then allowed to crawl about 10 feet down the beach before swimming out to sea. In most cases turtle releases were conducted as early as possible, usually between the hours of 7:00 A.M. and 8:00 A.M.

PUBLIC EDUCATION

Since a major objective of this program was to educate the public about the survival status and natural history of the sea turtle, numerous attempts were made to invovle the public with this program. This was achieved in the follwing ways:

1. Special educational brochures were distributed to the public.
2. Special "Please Keep Lights off the Beach" bulletins were distributed to private residences and condos located on the beach.
3. The public was encouraged to participate in the early morning baby sea turtle releases.

RESULTS

During the 1986 turtle season, nesting activity on Delray Beach lasted 107 days, beginning on 1 May with a loggerhead sea turtle nest and ending on 16 August with a nest from the same species. In comparison during the 1985 season nesting last 110 days, and during the 1984 season nesting lasted 105 days.

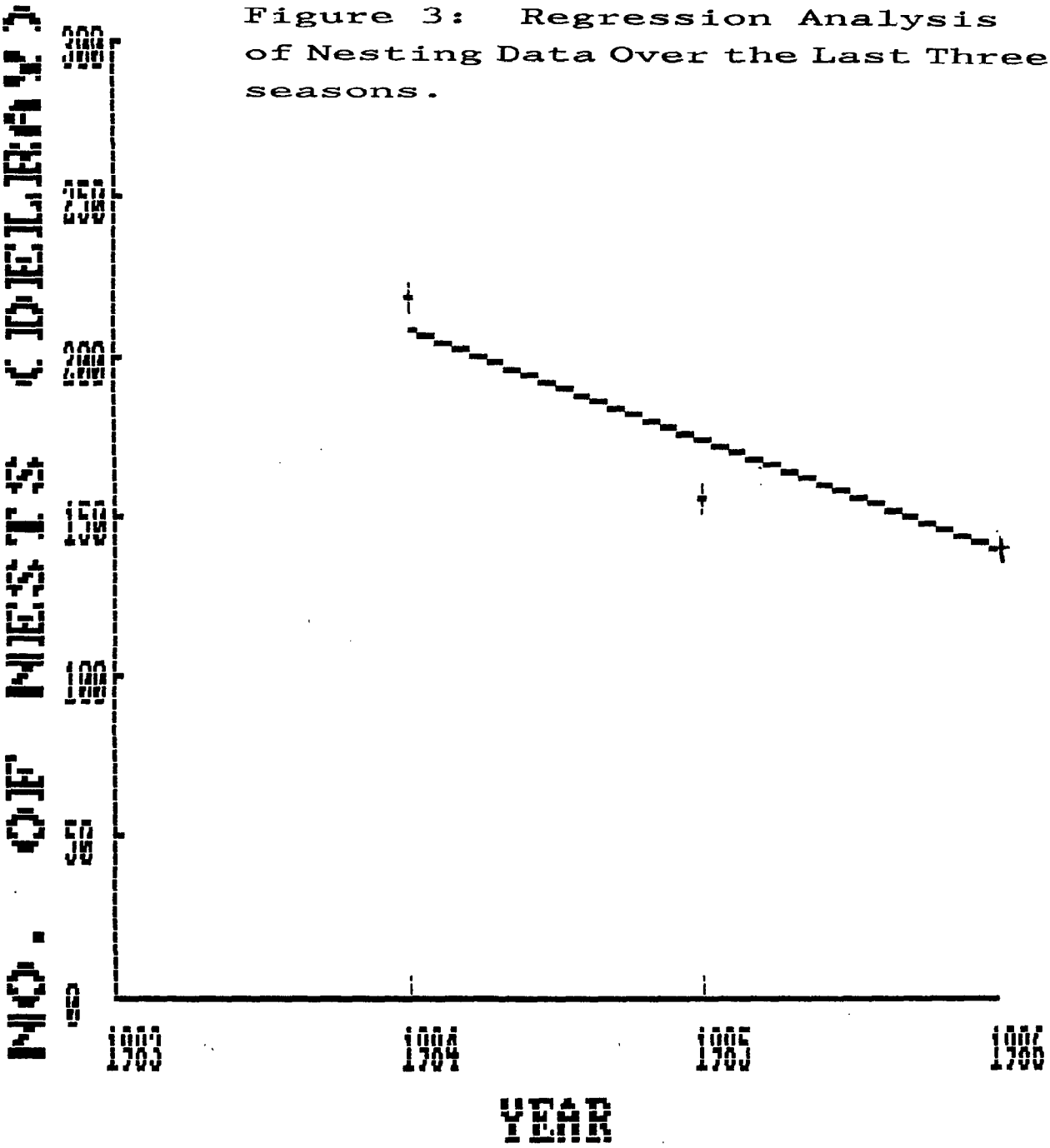
This season a total of 355 turtle emergences were observed on Delray Beach. From this total, 150 of these emergences represented nests. This represents a nesting success of 49%. The total numer of emergences and the computed nesting success is compared for the last three seasons (1984-86) is presented in table 1.

Table 1: Comparison of nesting success and the total number of emergences on Delary Beach during the past 3 seasons.

YEAR	NO. of NESTS	No. of FALSE CRAWLS	NESTING SUCCESS
1984	218	202	55%
1985	156	224	41%
1986	150	205	49%

To determine if nesting on Delray beach is increasing or decreasing over the last three seasons, the total number of nests observed on the beach for each year was subjected to a regression analysis. Results of this analysis revealed a trend toward a decrease (Figure 3). However, the P value = .141 indicates that this is not a highly significant trend. *It should be noted that three years of data is not enough to discern any long term trends in sea turtle nesting.

Figure 3: Regression Analysis of Nesting Data Over the Last Three seasons.



Would you like to see the table of statistics (Y/N)? y
STANDARD DEVIATION OF X VARIABLE = 1
STANDARD DEVIATION OF Y VARIABLE = 37.6475
SLOPE OF REGRESSION LINE = -34
STANDARD ERROR OF SLOPE = 16.1658
Y INTERCEPT OF REGRESSION LINE = 67664.7
REGRESSION COEFFICIENT (R) = -.903115
Would you like to do more plotting?

T = 2.103
P = .141

The peak nesting month was June (Fig.4). June also was the peak month during the 1984 and 1985 seasons. During the past three seasons, the month with the least number of nests observed was August.

From the total number nests observed on Delray Beach all but one belonged to Atlantic loggerehead sea turtles, Caretta caretta caretta. The once exception was a leatherback sea turtle, Dermochelys coriacea, nest which made on the north end of the public beach on June 8. No green sea turtle, Chelonia mydas, nests were observed during the 1986 season. Nesting broken down by species is compared in Table 2 for the last three seasons.

Table 3: Nesting Broken Down By Species Compared Over The Last Three Seasons on Delray Beach (1984-86).

YEAR	No. Loggerheads	No. Greens	No. Leatherbacks
1984	218	0	1
1985	153	2	1
1986	149	0	1
TOTAL	520	2	3

Nesting activity on Delray Beach was not uniform but tended to be concentrated on the southern sections of the beach (Figure 5). As in the case of the previous seasons, nesting density was lowest in the center sections fo the public beach.

A total of 11,323 eggs were excavated from 106 nests and were translocated to the artifical hatchery. The mean nest size for this sample was 197 eggs. The range for this sample was 52 eggs for the smallest nest and 151 eggs for the largest nest. The mean, range and

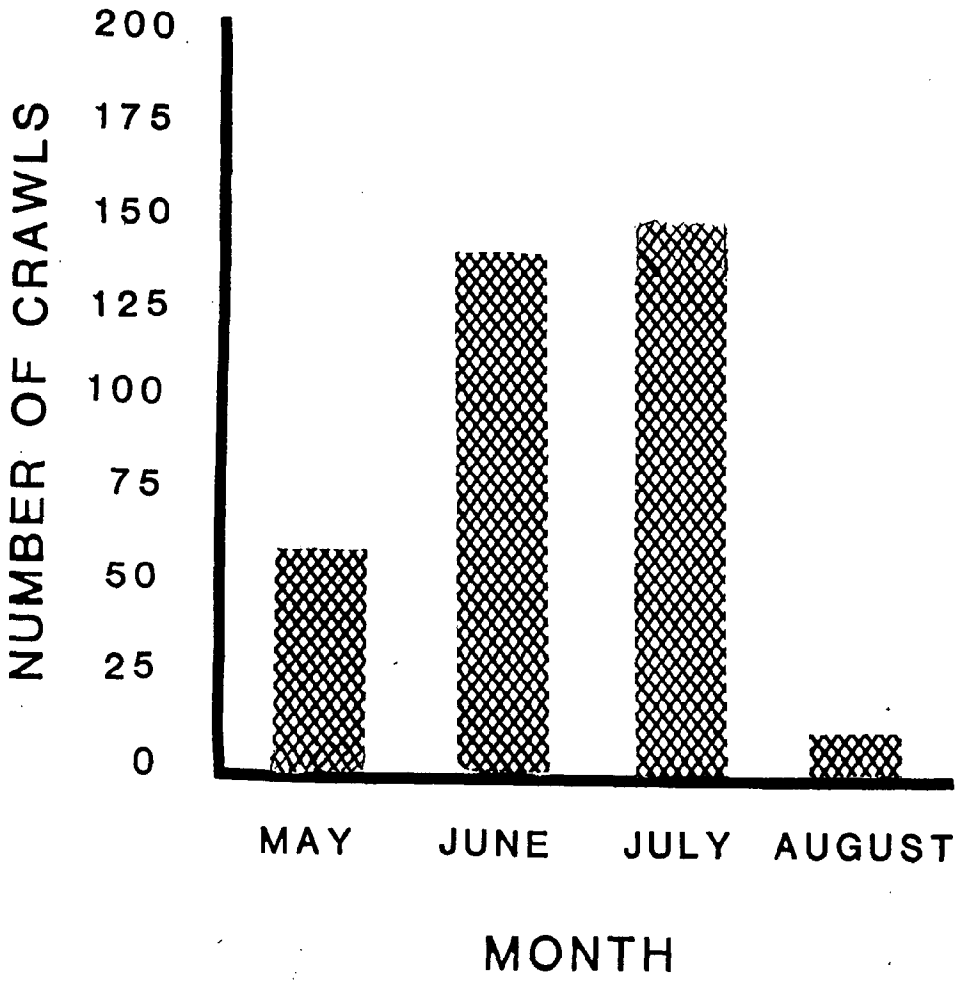
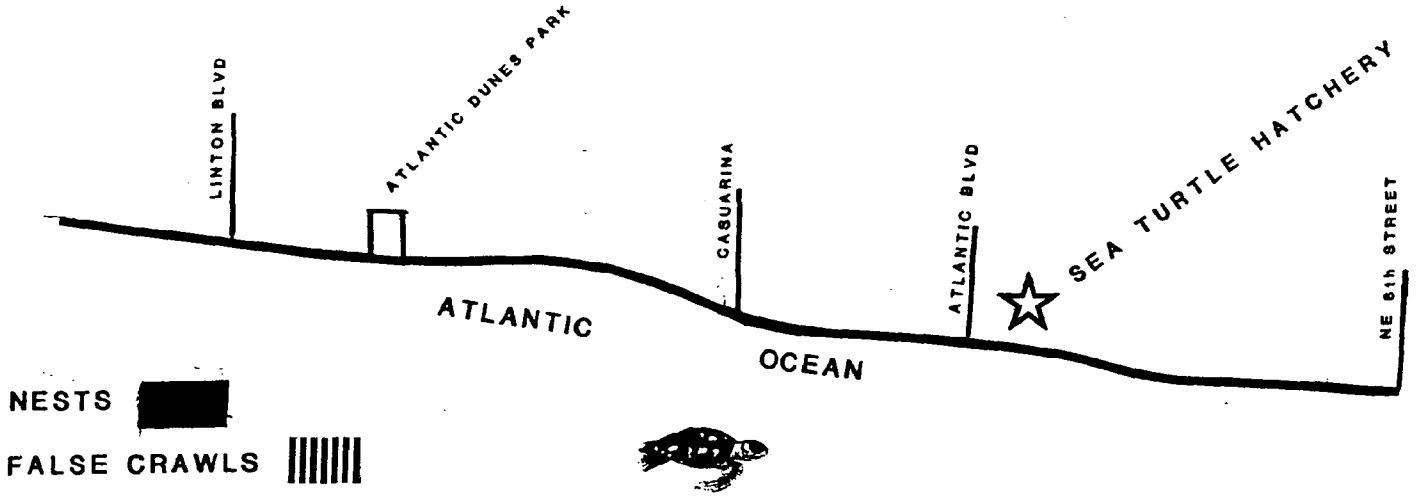


Figure 4: Comparion of the monthly Sea Turtle crawl activity on the Delray Project area during the 1986 nesting season.

DELRAY SEA TURTLE MONITORING STUDY (1986)



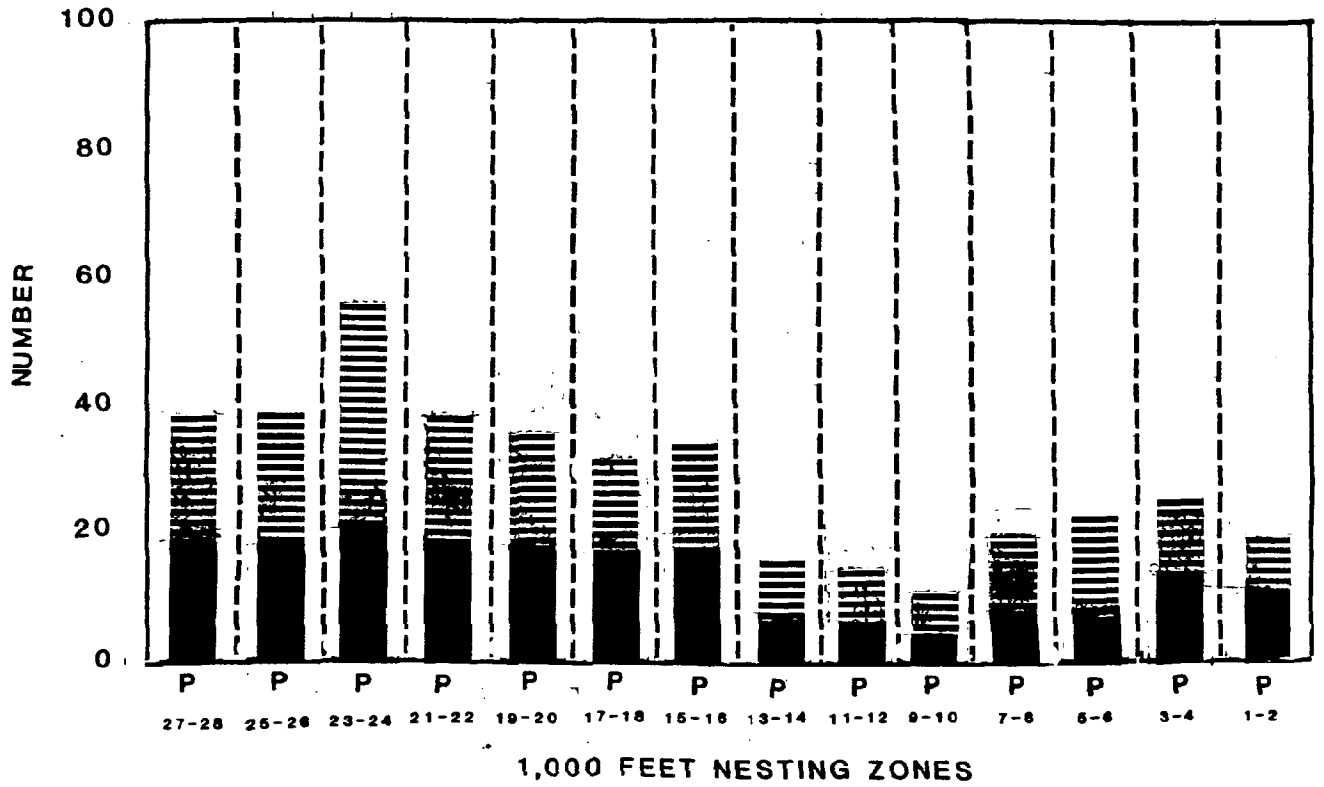


FIG.4: CRAWL DENSITIES COMPARED OVER 1,000' SECTIONS OF BEACH

incubation time for the past three seasons is presented in table 4.

Table 4: Mean nest size, range of nest size and mean incubation time compared over the last three seasons (1984-86).

Year	Mean Nest Size	Smallest Nest	Largest Nest	Mean Incubation Time (Days)
1984	114	49	160	54
1985	109	60	158	53
1986	108	52	151	53

A comparison between the hatching success of the natural nest sample and the artifical hatchery nest sample is similar. This suggest that the nests which were excavated were not signifcantly impacted. The hatching success for the natural nests was 78.4% and the hatching success for the artificial hatchery nests was 80.4%. Last season the hatching success for the natural nests was 77.5% and 74.6% for the artificiallyl incubated nests.

Summary

The 1986 Delray Sea Turtle program consisted of two parts--nest relocation and public education.

The 1986 season lasted 107 days. During this time 150 nests were observed on the public beach. All but one nest were made by loggerhead sea turtles. The exception was a leatherback sea turtle. A total of 106 of these nests were removed to the hatchery. From these nests a totalof 9,100 hatchlings were released into the sea.

The hatching success percentage for the hatchery nests was similar to the natural nests. This indicated that the relocation program was successful. A regression analysis comparing the nesting activity over the last three seasons on Delray Beach suggests a slight decrease in activity. However, based on confidence level value, this trend was not considered to be highly signifcant.

Because of the many human disturbances impacting sea turtle nesting observed during the past three seasons, both investigators reccommend that this program be continued.

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