

NPS CPSU - Technical Report

1982 Sea Turtle Project: Final Report

Canaveral National Seashore

CPSU Technical Report-4

by

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PURPOSE AND CONTENT OF THE REPORT SERIES:

In order to make data and results from managerial studies more easily and quickly available to interested scientists, the US National Park Service Cooperative Unit at the Institute of Ecology has initiated a numbered technical report series. This series produces limited printings of data matrices, bibliographies, review papers and scientific project reports concerning U.S. National Parks and park related problems. The reports are from various sources, not all federally funded, and are intended to supply scientific information rather than deal with park policy. The reports are subject to technical editing and review for scientific accuracy by Institute staff, but are not necessarily reviewed by external experts, and are not refereed in regard to overall quality or importance to the scientific community.

This report discusses several issues related to turtle management at Cape Canaveral National Seashore. It does not, however, represent official National Park Service policy nor does it represent an approved resources management plan.

ACKNOWLEDGEMENTS:

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1982 SEA TURTLE PROJECT: FINAL REPORT

CANAVERAL NATIONAL SEASHORE

INTRODUCTION

The loggerhead sea turtle (Caretta caretta) is a threatened species which lays its eggs from May through August on beaches along the Atlantic coast of the southeastern United States. Development and commercialization along the coast have caused a reduction in the number of beaches suitable for nesting loggerheads. On the Florida coast, Canaveral National Seashore remains one of the few undisturbed rookery beaches for loggerhead turtles. An occasional green turtle (Chelonia mydas), an endangered species, also visits the seashore.

Canaveral National Seashore has conducted studies of sea turtle nesting within its boundaries since 1976. These studies provide estimates of the size of the nesting population and the rate of natural nest success. In the past, workers recorded incidence of nest predation but made no attempt to protect nests. The purpose of the 1982 study was 1) to continue the tagging of nesting females to obtain an estimate of the nesting turtle population within the seashore; 2) to continue monitoring nests for estimation of natural nest success; and 3) to conduct a predation study to determine whether nest success can be improved by covering nests with screening material that excludes raccoons. This report will consider the first two aspects of

the project and only briefly mention the predation study which is presented in a separate publication (McMurtray, in prep).

STUDY SITE

The study site at Canaveral National Seashore begins at the Volusia County, Florida, line and runs 5 miles north. It is divided into 20 quarter-mile sections, each marked on its northern end by a numbered post or stake with reflective tape. The study site is a relatively isolated stretch of beach. Because of its inaccessibility, humans have relatively little impact on turtle nests. Raccoons (Procyon lotor), however, abound in the area and have a significant negative effect on turtle nesting success because they feed on both turtle eggs and hatchlings.

METHODS

From 16 May to 24 August we patrolled the beach for turtles from sunset to sunrise, as many nights as possible. Most of the summer we worked in teams of two, with each turtler responsible for half of the study site.

We filled out a data sheet for each turtle crawl seen, regardless of whether we actually encountered the turtle. When we found a turtle, we recorded her activity (approaching, nest site searching, digging a body pit, digging a nest, laying, covering, returning). We also noted time, tidal stage, cloud cover, weather, beach section number, and final outcome of the crawl (nest, false crawl, abort).

An abort signifies a nesting event in which the female deposits part of a clutch and then departs without covering the eggs. Turtles which abort are expected to return on a following night to complete the clutch.

When we encountered a nesting turtle, we first checked her for tags and/or tag scars to determine if she was new (a neophyte) or returning from a previous nesting season (a remigrant). We removed loose, faded, or illegible tags, recorded their numbers, and saved them. We attached new numbered tags to the front flippers and measured the over-the-curve carapace length. We used both Monel steel tags and yellow plastic tags, trying to secure three tags to each turtle, at least one of each type. Multiple tagging increases the probability of at least one readable tag remaining on turtles returning in future years.

When we encountered a turtle returning to the sea, we slowed her down or stopped her to check for tags. If tagless, we applied new tags, which required flipping her onto her back to immobilize her during the tagging operation. "Flipping" is a disruptive activity which we kept to a minimum, and we noted on the data sheet whether a turtle had been flipped. We labeled a crawl for which we saw no turtle a "miss" and recorded available information about the crawl. We also recorded any unusual characteristics about a turtle, such as a cracked shell, missing or injured flippers, odd behavior, or interesting flora and fauna on the carapace.

We marked each nest with a stake identified with the corresponding data sheet number and the date the nest was laid. The stakes enabled us to relocate the nests and periodically check them

for predation, flooding, or hatching.

The predation study ran from 19 June to 16 August. We chose nests randomly by flipping a coin for each nesting turtle. We covered the nests receiving "tails" with a 4 x 4 foot screen of 2 x 4 inch welded dog wire secured at the corners with 30-inch reinforcing rods. The screens were left in place for the 55-day incubation period or longer, the 2 x 4 inch mesh being small enough to keep out raccoons yet large enough to allow hatchlings to pass through during emergence. If raccoons got to a nest meant to be screened before we did, we recorded the number of eggs eaten, re-covered the nest, and screened it to protect the remaining eggs.

We marked the exact location of the nest while the turtle was laying by drawing lines in the sand with our feet which intersected at the nest. If the turtle obscured our lines while returning to sea or if we hadn't drawn lines, we located the nest by probing the sand with a 3/8 inch diameter reinforcing rod.

We determined an effective 4-step screening method: 1) level mounded sand in the nest area with a hoe before installing the screen; 2) center the screen perfectly over the nest; 3) pull the screen taut before driving the steel rods into the corners; 4) push sand back over the nest, partially or fully burying the screen. We did not break the nest's seal while partially burying the screen. We tied the screen to the marking stake with string and secured flagging to the stake.

We checked nests periodically throughout the summer for flooding and predation. We noted flooded nests but left their stakes in place until the incubation period ended, on the chance that the nest would hatch despite flooding. We excavated depredated nests to locate

remaining undisturbed eggs. We re-covered the nests still containing eggs; if the remaining eggs were too deep, we moved them closer to the surface before re-covering. We recorded the number of eggs destroyed and noted the predator responsible.

After a nest hatched, or shortly after it was due to hatch, we excavated the nest and analyzed its contents. We counted the number of hatched shells, live hatchlings, dead hatchlings, and unhatched eggs. We opened all the unhatched eggs to record the number of midterm fetuses, undeveloped yolks, infertile eggs, and any developmental abnormalities, such as albinos. We noted any evidence of predation and other possible causes for undeveloped eggs.

RESULTS AND DISCUSSION

Total crawls for the 1982 season were 1008, including 992 loggerhead crawls, 15 green crawls, and 1 hawksbill (Eretmochelys imbricata) crawl (Table 1). Five hundred and seventeen of the loggerhead crawls resulted in nests, 3 were aborts, and 472 were false crawls. Seven green crawls were nests and 8 were false crawls. The hawksbill crawl resulted in a nest. Total nests were 525 (Figures 1 and 2). Three hundred and twenty-one crawls were made by untagged turtles (318 loggerheads, 2 greens, 1 hawksbill). These crawls may have represented the turtles' first time nesting, or the turtles may have nested previously outside the study site and, hence, were not tagged on their first nesting visit. Two hundred and thirty-six of the crawls were made by tagged turtles. We had tagged 153 of these earlier in the summer, and 83 were turtles which had been tagged while

Table 1. Summary Of Turtle Activity. Canaveral National Seashore 1982.

	<u>Nests</u>	<u>False Crawls</u>	<u>Aborts</u>	<u>Total Crawls</u>
Loggerhead	517	472	3	992
Green	7	8	0	15
Hawksbill	1	0	0	1
	525	480	3	1008

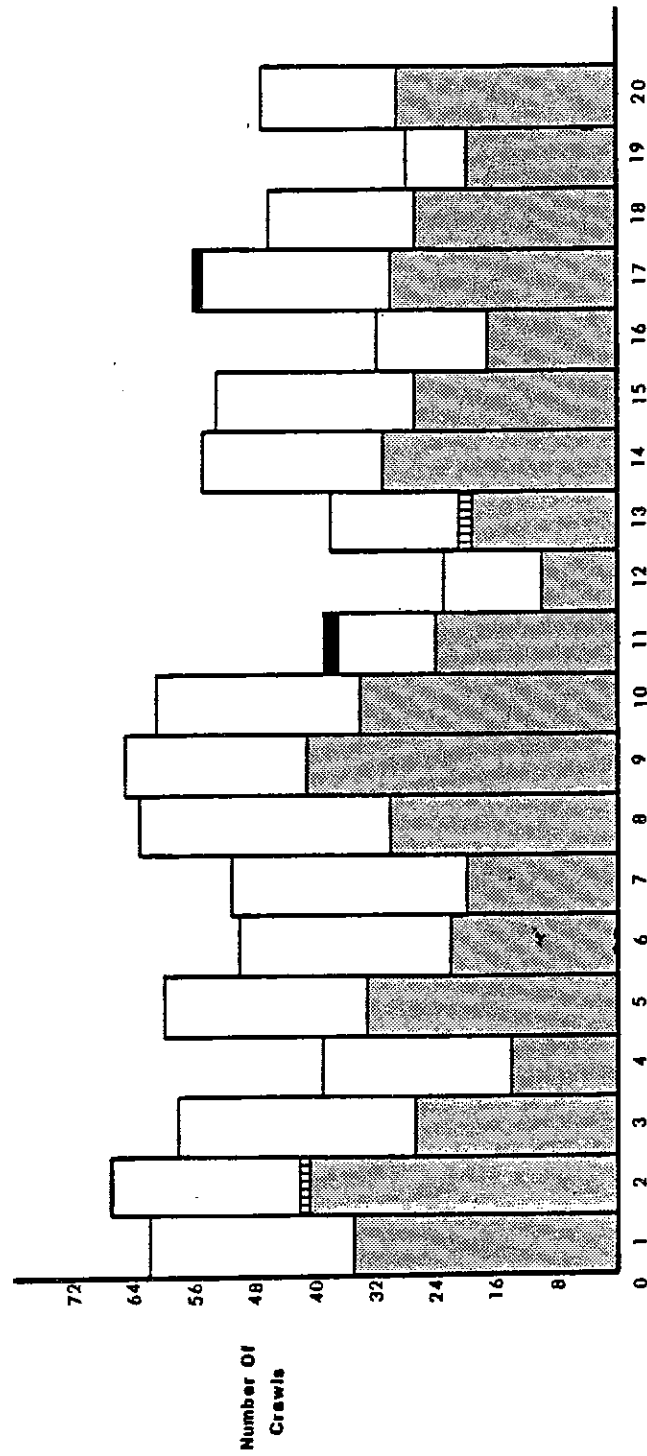


Figure 1. Total Number Of Nests, False Crawls, Aborts, & Unknowns Per Section
Canaveral National Seashore 1982

= Nest
 = Unknown
 = False Crawl
 = Abort

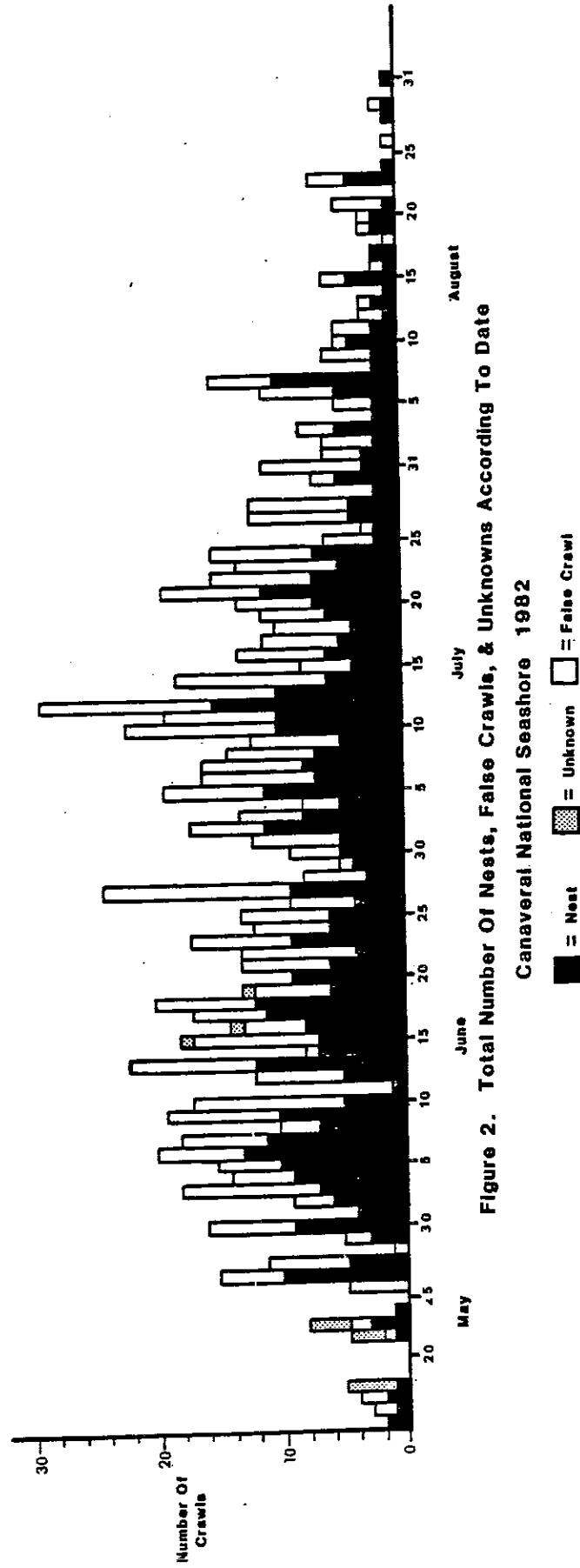


Figure 2. Total Number Of Nests, False Crawls, & Unknowns According To Date
Canaveral National Seashore 1982

■ = Nest ▨ = Unknown □ = False Crawl

nesting at Canaveral in previous years.

The nesting hawksbill surprised and delighted us. To date only 6 hawksbills have been reported nesting in the continental United States. The Canaveral hawksbill not only adds another U.S. record but also establishes the northernmost point in the species' nesting range. We took 6 slides of the hawksbill and will provide copies for the park. This represents the first photographic record of a nesting hawksbill within the continental U.S.

We had at least 3 different green turtles. One neophyte appeared and went on to lay 4 nests. Two greens had been tagged previously and laid 3 and 4 nests, respectively. We did not encounter five greens that came ashore without laying and do not know if they were tagged.

Three loggerheads nesting at Canaveral in 1982 were later killed by shrimpers; one each in Georgia, South Carolina, and North Carolina. South Florida loggerheads are thought to commonly move south to the Bahamas or Gulf of Mexico after the laying season, yet these 3 were traveling north. Shrimpers have reported the deaths of 30 loggerheads which had been tagged in Georgia during the 1982 nesting season. Apparently, Georgia turtles experience a greater frequency of interaction with man than do Florida turtles.

We screened 80 of 525 nests. At the end of the season, we relocated 310 unscreened nests to be used for comparison. Flooding took 1 screened nest and 8 unscreened nests (2 percent) and, therefore, was not a significant cause of nest loss. Of the 310 unscreened, natural nests, only 4 escaped raccoon predation. These hatched, with a mean hatching success of 90 percent (range 80-97). We found 100 percent predation on 96 nests (31 percent), suspected total

predation on 114 nests (37 percent), and could not determine the extent of predation in the remaining 96 nests (31 percent). Seven of the undetermined 96 nests would have been lost to flooding had they not been depredated by raccoons. Only 1 percent of the observed unscreened nests hatched. We strongly suspect that the 125 nests not located at the end of the summer were also depredated by raccoons, so actual nest success is likely to be lower than 1 percent.

Raccoons were the only observed predator on turtle nests. Occasionally we saw opossums (Didelphis virginianus), armadillos (Dasypus novemcinctus), and mice (Peromyscus sp.) on the beach, but they seemed oblivious to the nests, and we never saw evidence of these species depredating turtle nests. Ghost crabs (Ocypode quadrata) entered raccoon-depredated nests and fed on egg debris, but they did not seem to disturb unopened eggs at the study site. Ghost crabs did, however, take a proportion of hatchlings crawling toward the sea.

Our observations of raccoon predation at Canaveral National Seashore followed those of raccoon predation noted elsewhere (Hopkins et al. 1978). Most loggerhead clutches were taken within their first 2 nights on the beach. Green nests seemed more immune to raccoon predation initially, but became susceptible near emergence. The raccoons seemed to become more efficient later in the summer, attacking every nest within hours of its appearance.

Screen success was 54 percent. Screens were most effective when centered properly and pulled taut. The success of screens on nests could have been improved had we not screened nests laid in the dunes or below spring tide level or nests partially depredated by raccoons.

CONCLUSIONS

Raccoons limit sea turtle production at Canaveral National Seashore by eating eggs and hatchlings. Even if one prevents raccoons from consuming an entire nest, the remaining eggs have a reduced probability of surviving (McMurtray, 1983). It's hard to imagine that the turtle breeding stocks are being maintained under these circumstances, especially considering that any hatchlings that do manage to develop and emerge must then face numerous other predators, both on the beach and in the sea. With 525 nests laid during the 1982 nesting season, the potential for turtle production at Canaveral National Seashore was tremendous, yet natural nest success was 1 percent using a liberal estimate, and very probably less.

RECOMMENDATIONS FOR FUTURE STUDIES AND MANAGEMENT

Because all sea turtles are considered either threatened or endangered, and because raccoons severely limit potential turtle production, we recommend screening all sea turtle nests and selectively removing raccoons that learn to break into screened nests. While the screening of nests does improve hatching success, screens, by themselves, are not sufficient long-term protection against raccoon

predation since some raccoons will learn to get past the screens.

We recommend euthanasia for raccoons removed from the beach rather than translocation because translocation of raccoons is not wise wildlife management. Such a practice creates problems in itself. Although a demand for raccoons for hunting clubs does exist in some states, we discourage transportation of raccoons across state lines because of the potential for introduction of diseases not present in the new areas. Rabies, in particular, is far more prevalent in coastal populations than inland populations. Similarly, we view transportation of raccoons within the state as poor management.

Moving raccoons from the nesting beach to other areas of Canaveral, where other raccoons already have established territories, would be equally unwise and could cause unmeasured stress on the adjacent populations.

We recognize that park administration is concerned about public reaction to raccoon destruction, but we contend that it is necessary for turtle production. Removing a few problem individuals will not hurt the raccoon population, yet it may cause a significant increase in turtle production.

Raccoons are an important part of the Canaveral ecosystem. Although no quantitative data exists, we noticed an abundance of raccoons at Canaveral. Many looked unhealthy, with coats in poor condition and ears drooping, possibly mite-infested. It may be that a study of the raccoon population, including raccoon predation on turtle nests, other food habits, and disease, is in order. It may be the raccoons themselves that are in need of management, rather than the satellite species they affect.

Literature Cited

- Hopkins, S. R., T. M. Murphy, Jr., K. B. Stansell and P. M. Wilkinson. 1978. Biotic and abiotic factors affecting nest mortality in the atlantic loggerhead turtle. Proc. Ann. Conf. S.E. Assoc. Fish and Wildl. Agencies 32:213-223.
- McMurtray, J. D. 1983. Hatching success of eggs remaining in loggerhead sea turtle nests partially depredated by raccoons. Assoc. S.E. Biol. Bull. 30:71.

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