# Loggerhead Sea Turtle In Situ vs Relocated Nest Success in Charleston County, South Carolina

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## Background

- Loggerhead Sea Turtles (*Caretta caretta)* are found worldwide primarily in subtropical and temperate ocean waters.
- This federally threatened species is the most abundant sea turtle species in the United States; nesting primarily along the Atlantic and Gulf Coasts.
- Cape Romain Wildlife Refuge in Charleston County, South Carolina consists of 4 islands: Bull, Cape, Lighthouse and Raccoon Key.
- This Nest Recovery Project launched in 1979 with the federal listing of the species which includes: predator-proofing nests, relocating nests in danger of erosion or wash over, and inventorying nests post hatching (USFW).
- This study analyzes the hatching success of in situ vs relocated nests.

## Methods

Nest Location

- Each day during nesting season (May – August) the Turtle Crew traveled to the islands to conduct nest surveys, relocation, caging and monitoring.
- Nests were located by following crawls and locating potential body pits created by the female in attempt to lay her eggs.
- Clutches were located by carefully probing the area (Figure 1).
- When each clutch was located, a GPS location and genetic sample were collected; decided whether to keep or relocate was based on US Fish and Wildlife protocol (USFW).
- If clutch was kept in the original location (in situ), the center was located and marked with a stick, then a metal cage was placed around the nest for predator protection.
- A numbered stake was inserted 1 probe length from the center of the clutch.

Relocation

- If nests were laid in an unsafe location, they were carefully removed, placed in buckets with sand to keep cool, and moved to a safer location as quickly as possible.
- New "nests" were dug with a post hole digger and hollowed using hands, shells, and shovels (Figure 2).
- The clutch was carefully placed into the new nest in the orientation in which they were originally laid, covered with cool, damp sand, and covered with chicken wire for predator protection (Figure 3).

Inventories

- Nests were checked daily for emergence after 40 days of incubation; 3 days after emergence nests could be inventoried (Figure 4).
- Inventories consisted of excavating each nest and counting the number of hatched eggs, unhatched eggs, live and dead hatchlings.

Study

- This study was conducted using data collected from 5.5 miles of beach on Cape Island during the years 2015-2019.
- The hatching success of in situ vs relocated clutches is compared in this study.

Figure 1. Refuge Manager, Sarah Dawsey locating clutch via probing

Figure 2. Sea Turtle Crew relocating nests on Cape Island

## Abstract

The Loggerhead Sea Turtle (*Caretta caretta)* is federally threatened species whose US nesting grounds are primarily along the Atlantic and Gulf Coast. Currently in the southeastern U.S., major nest protection efforts and beach habitat protection are underway for most of the significant nesting areas, one of which being Cape Romain National Wildlife Refuge in South Carolina. The refuge consists of four islands; this study focuses the island with historically the largest amount of nests, Cape Island. This study compares the hatching success rates of in situ vs relocated nests from 2015 through 2019. Each day during the nesting season, a team of U.S. Fish & Wildlife employees, interns, and volunteers would conduct conduct nest surveys, relocation, caging and monitoring. After hatching, each nest was inventoried to gauge success of the clutch. The mean hatching success of in situ nests was significantly greater that that of relocated nests in years 2018 (5.4%) and 2019 (5.1%). As sea levels and temperatures rise, it is vital that research is conducted on this species (Hawkes).

Figure 3. Loggerhead clutch post-relocation

Figure 4. Caged relocated nest post-hatching

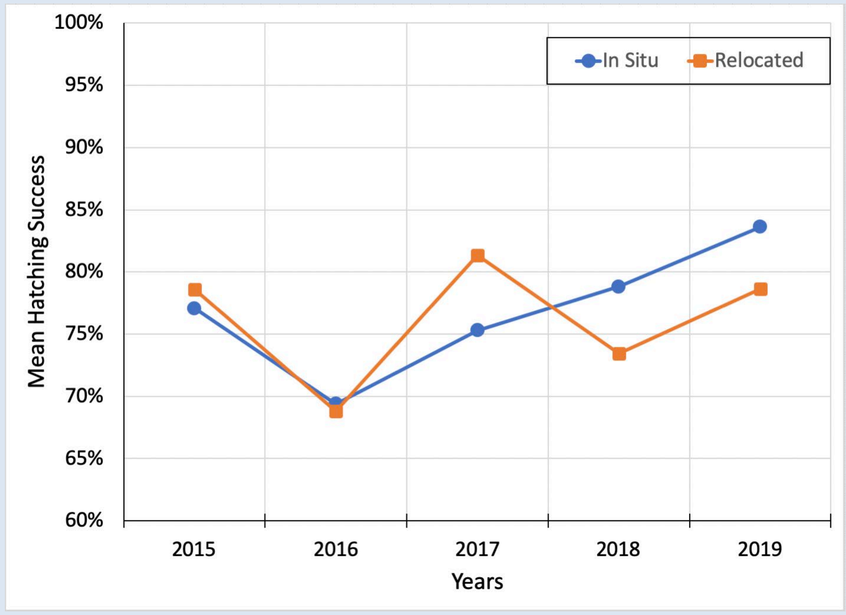


Figure 5. Comparison of mean hatching success in situ vs relocated nests on Cape Island during the years 2015-2019.

## Results and Discussion

- Overall, relocated nests had similar success rates to in situ nests (relocated=76.1%, in situ=76.8%).
- The number and success of nests varied greatly among the years.
- The sample size of nests per year were: 2015 = 1278, 2016 = 1411, 2017 = 1134, 2018 = 540, and 2019 = 1549.
- Average number of eggs laid per clutch per year ranged from 110-117.
- There was no significant difference in hatching success in 2015 (1.5%) or 2016 (0.5%) (Figure 5).
- Hatching success of relocated was significantly greater than that of in situ nests in 2017 (6%).
- Hatching success of in situ nests was significantly greater that that of relocated nests in 2018 (5.4%) and 2019 (5.1%).
- An increase in the frequency and magnitude of storms may significantly impact nest success as storms may degrade and alter nesting habitat, and inundate nests (Fish et al. 2005)
- Predicted rise in sea levels can lead to compromise of nesting beaches; research and conservation efforts are vital for the future of all marine turtles (Hawkes).

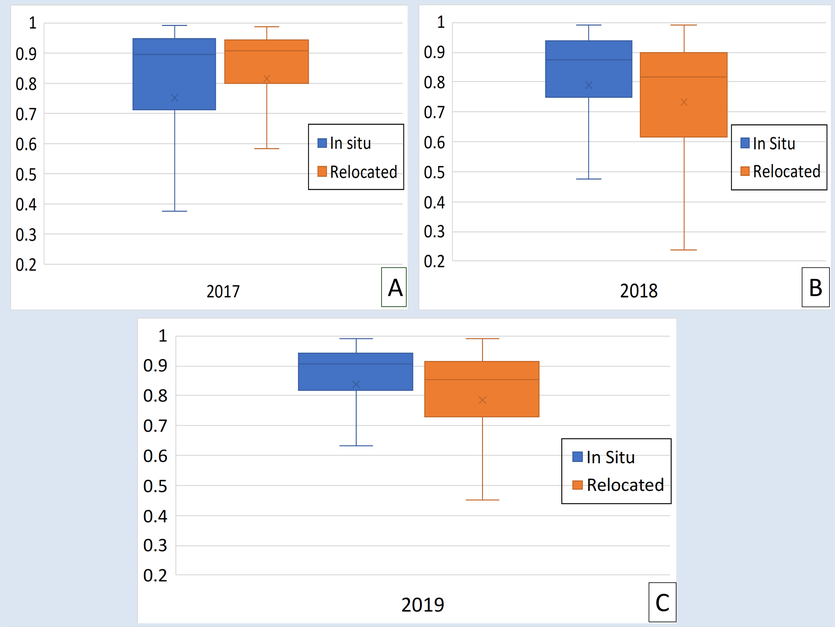


Figure 6. Comparison of hatching success of in situ vs relocated nests in 2017 (A), 2018 (B), and 2019 (C).

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