

**Sea Turtle Monitoring, Nest Evaluation & Protection Measures
for the City of Sarasota**

**Year Two Post-Construction -
New Pass Inlet Channel Maintenance Dredging with Beach
Sand Placement on Lido Key
2005**



SUBMITTED TO:
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December 2, 2005
Mote Marine Laboratory Technical Report No. 1060

TABLE OF CONTENTS

Page No.

TABLE OF CONTENTS	i
LIST OF TABLES	ii
LIST OF FIGURES	iii
LIST OF ACRONYMS AND ABBREVIATIONS.....	iii
EXECUTIVE SUMMARY.....	1
INTRODUCTION	3
BACKGROUND.....	4
SEA-TURTLE MONITORING	5
Project Location	5
PROCEDURES	5
Hatching Surveys and Nest Evaluations	6
Sea Turtle Protection Measures	7
Data Analysis.....	7
NESTING SUCCESS	8
Turtle Emergences (Nests and Non-Nesting Emergences).....	8
Categorization of Non-Nesting Emergences (NNEs).....	8
Visual Assessment of Obstructions to Nesting.....	9
Nest Site Selection	9
Nest Chamber Characteristics.....	10
2005 Study of Incubation Conditions on Sarasota County Beaches.....	10
Nests Lost to Erosion or Inundation	11
Nest Damage by Predation or Invasion	11
REPRODUCTIVE SUCCESS.....	12
Incubation period	12
Hatching Success	13
Emergence Success.....	13
Hatchling Disorientation Events.....	13
LITERATURE CITED.....	14

APPENDICES

Appendix A: Nests and Non-nesting emergences 2005

Appendix B: FWC Marine Turtle Hatchling Disorientation Incident Report Forms

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.
November, 2005

LIST OF TABLES

		<u>Page No.</u>
Table 1	Sea turtle nesting activity along the Lido Key shoreline.	15
Table 2	Nest and NNE numbers and Nesting Success (#Nests/(#Nests + #NNEs)) for sea turtles nesting for Lido Key shoreline.	16
Table 3	Categories of abandoned sea turtle nesting for Lido Key in 2005.....	17
Table 4	Obstructions to sea turtle nesting on Lido Key.....	18
Table 5	Sea turtle nesting locations by relative beach width on the Lido Key shoreline.....	18
Table 6	Nest chamber measurements of sea turtle nests on Lido Key. Values are mean measurement and range in parentheses	19
Table 7	Sea turtle nest loss on Lido Key documented through tidal activity	20
Table 8.	Nest damage due to predation or invasion on Lido Key.....	21
Table 9.	Incubation of relocated and <i>in situ</i> nests that experiencing hatch on Lido Key	22
Table 10	Hatching success for relocated and <i>in situ</i> nests within the Project shoreline on Lido Key.....	23
Table 11	Hatching success for relocated and <i>in situ</i> nests outside of the Project shoreline on Lido Key. Hatching success is calculated using rows in bold (# eggs hatched/total # eggs)	24
Table 12	Hatchling emergence success for relocated and <i>in situ</i> nests within the Project shoreline on Lido Key. Emergence success is calculated using rows in bold (hatchlings emerged/ total # of eggs).....	25
Table 13	Hatchling emergence success for relocated and <i>in situ</i> nests outside of the Project shoreline on Lido Key. Emergence success is calculated using rows in bold (hatchlings emerged/ total # of eggs)	26
Table 14	Summary of hatchling disorientation events for 2003 through 2005 on Lido Key	27

MOTE MARINE LABORATORY

LIST OF FIGURES

	<u>Page No.</u>
Figure 1	Lido Key nourishment projects prior to 2005.28
Figure 2	A non-nesting emergence with an abandoned egg chamber29
Figure 3	Sea Turtle Nest Sign.....29
Figure 4	Nesting activity located between FDEP monuments on Lido Key in 200530
Figure 5	Lido Key nest locations 200531
Figure 6	Turtle activities occurring inside the Project area on Lido Key in 2005.....32
Figure 7	Turtle activities occurring outside the Project area on Lido Key in 2005.....32
Figure 8	Adult sea turtle disorientation due to street light (seen on left) at 305 Ben Franklin Drive, Lido Key on 6/30/0533

LIST OF ACRONYMS AND ABBREVIATIONS

CITES	Convention on International Trade in Endangered Species of Flora and Fauna
cm	Centimeter(s)
ESA	U.S. Endangered Species Act
FDEP	Florida Department of Environmental Protection
ft	Feet
FWC	Florida Fish and Wildlife Conservation Commission
GPS	Global Positioning System
MML	Mote Marine Laboratory
NNE	Non-nesting emergence
No./#	Number
STCRP	Sea Turtle Conservation and Research Program

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.
November, 2005

EXECUTIVE SUMMARY

This report presents the results of sea turtle monitoring for the year 2005, the second year following construction activities, for the New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key. Monitoring data are presented for both within and outside of the Project shoreline for the year of construction (2003) and two subsequent years to evaluate potential impacts to the sea turtles on Lido Key from the Project.

For the 2005 sea turtle nesting season 27 nests and 25 non-nesting emergences (NNEs) were documented on Lido Key between May 21 to August 5. All nests and NNEs were by the loggerhead sea turtle (*Caretta caretta*). Sixteen nests and 19 NNEs were documented within the Project shoreline, and 11 nests and 6 NNEs were documented outside the Project

The nesting success (proportion of emergences that result in a nest) within the Project shoreline was 45.7% in 2005, 46.7% in 2004, and 22.2% in 2003. Nesting success outside the Project shoreline was 64.7% in 2005, 36.7% in 2004, and 44.9% in 2003.

Two turtles accessing the Lido Key shoreline were obstructed in their nesting attempts (by a sea wall and an escarpment) in 2005. In comparison, five turtles had obstructed nesting attempts in 2004. A decrease in obstructed nesting attempts can most likely be attributed to the Sarasota County Sea Turtle Protection Ordinance amendment requiring removal of beach furniture and other temporary structures nightly.

Four hurricanes and one tropical storm caused coastal erosion and/or sand accretion that impacted the Lido Key shoreline during 2005. The storms created tidal activity that caused inundation of approximately 60 % (16/27) of the total number of nests along the Lido Key shoreline. Tidal activity in 2004 impacted 54% (14/26) of the nests on Lido Key shoreline.

Predators visited 15% of nests (4/27) in 2005 and 8% of nests (2/26) in 2004. Raccoons, fire ants, and root invasions were the predators ranked least to most important. Measures taken to exclude predators included caging nests against raccoons and sprinkling approved ant bait (Amdro) around nests.

Incubation periods within the Project shoreline averaged 53.6 days and ranged from 51 to 57 days. Incubation periods outside the Project shoreline averaged 54.5 days and ranged from 49 to 61 days. *In situ* nests within the Project shoreline incubated more rapidly than those outside the Project, both in 2004 and 2005.

Comparing within the Project shoreline, hatching success declined from 2004 (75.6%) to 2005(50.0%). There was a substantial difference in 2004 in hatching success between the relocated nests (65.4%) and *in situ* nests (93.7%).

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Comparing outside the project shoreline, hatching success declined slightly from 2004 (57.5%) to 2005 (52.9%). There was a substantial difference in 2004 in hatching success for relocated nests (58.9%) and *in situ* nests (40.1%).

In situ nests within the Project had an 84.6% emergence success in 2005 whereas there was a 99.5% emergence success in 2004. *In situ* nests outside the Project had a 93.5% emergence success and the relocated nest had a 6.5% emergence success.

Four hatchling disorientations and a single adult disorientation were recorded on Lido Key in 2005. All the 2005 disorientations occurred within the Project shoreline. The five disorientation events represent a 55% decrease from eleven disorientation events on Lido Key in 2004. Frequent nighttime lighting inspections must begin early in the sea turtle nesting season, and continue until the last nest has hatched.

Although this report presents the results of sea turtle monitoring for the year 2005, the second year following construction activities, for the New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key, it is important to note that the Lido Key shoreline has experienced repeated restoration efforts from FDEP Monuments R-32 to R-44 (**Figure 1**). These restoration efforts have resulted in the placement of sand of various sources, content, and color. Comparisons of the sea turtle nesting patterns and success rates through all the years is beyond the scope of this report but are of importance in considering the shoreline a suitable habitat for sea turtles and nesting shorebirds, both of which continue to use Lido shoreline for nesting habitat.

INTRODUCTION

The Gulf of Mexico shoreline of Lido Key, Sarasota County, Florida is used as nesting habitat by loggerhead (*Caretta caretta*) sea turtles. This species is protected under the U.S. Endangered Species Act (ESA) of 1973, the Marine Turtle Protection Act Chapter 370.12 (Florida Administration Code), and local regulations. The loggerhead was listed in 1978 as a threatened species. Internationally it is considered “Vulnerable” and is listed as a species threatened with extinction in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

In addition to loggerhead turtles, green turtles (*Chelonia mydas*) occasionally nest on the Sarasota County beaches. In 2005 there were 12 green turtle nests in Sarasota County and there have been a total of 53 nests in Sarasota County since 1994. A Kemp’s ridley (*Lepidochelys kempi*) nested twice on Siesta Key in 1999. In 2001, a leatherback turtle (*Dermochelys coriacea*) deposited a clutch on Longboat Key, which marked the first documented nesting of this species on the central west coast of Florida. Juvenile Kemp’s ridley and juvenile green turtles also utilize the near-shore waters of the central Gulf coast of Florida as developmental habitat. The green turtle is listed as endangered in Florida. The Kemp’s ridley is the most critically endangered of all sea turtle species and as such is protected throughout its range in the Gulf of Mexico and northwestern Atlantic Ocean. The leatherback is listed as endangered worldwide. All sea turtles are listed in Appendix I of CITES.

Land-based threats to these protected sea turtles include beach erosion, beach armoring, beach nourishment activities, artificial lighting, beach cleaning, increased human presence, recreational beach equipment, exotic dune and beach vegetation, nest depredation, nest loss to abiotic factors, and poaching. Threats within the marine environment include, but are not limited to, dredging, marina and dock development, pollution, sea grass bed degradation, fisheries activities including hook and line fisheries, boat collisions, offshore artificial lighting, ingestion of marine debris, poaching and predation (National Marine Fisheries Service/U.S. Fish and Wildlife Service, 1991).

The Florida Fish and Wildlife Conservation Commission (FWC), National Marine Fisheries Service, and U.S. Fish and Wildlife Service evaluate data pertaining to sea turtle species that use the habitat, their nesting success, and any protection measures undertaken to protect the adult turtle, the nest, and emerging hatchlings in support of identifying appropriate construction techniques that occur in sea turtle nesting habitat.

A sand placement project on Lido Key began in 2002 and was completed in 2003. Sand placed on Lido Key was dredged from the New Pass Inlet Channel. The City of Sarasota contracted the Sea Turtle Conservation and Research Program (STCRP) of Mote Marine Laboratory (MML) to identify critical issues related to the protection of sea turtles, their nesting habitat, nests, and hatchlings on Lido Key. This 2005 report summarizes STCRP’s sea turtle monitoring, evaluation and protection efforts for the New Pass Inlet

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Channel Maintenance Dredging with Beach Sand Placement on Lido Key for the 2nd year following construction activities.

BACKGROUND

The U.S. Army Corps of Engineers conducted a maintenance dredging of the New Pass inlet channel beginning in 2002 and completed in the spring of 2003. The project was authorized under permit IFB Number (No.) DACW17-02-B-0020 and consolidated joint coastal permit No. 0039755-001-JC. During the dredging 125,000 cubic yards of dredged sand was stockpiled on North Lido Key. The stockpile location was approximately 5,000 feet (ft) south of the entrance to New Pass and sand was placed along the shoreline for approximately 3,000 ft (T-36 south to approximately R-39). The sand from New Pass, which is fine-grained and white in appearance, was mechanically spread over the Lido shoreline to form a “white cap” over the darker sand of the renourished beach. The White Sand Project occurred between Florida Department of Environmental Protection (FDEP) reference monuments T-36 and R-44. To accomplish the white sand layering, the City skimmed sand off the top of the existing beach that had been renourished in 1998 and 2001, and replaced it with the white sand from the inlet dredging. For purposes of this report the New Pass Inlet Channel Maintenance Dredging and White Sand Project is referred to hereafter as the Project.

The Lido Key shoreline is used as nesting habitat by sea turtles that are protected by the ESA of 1973, the Marine Turtle Protection Act Chapter 370.12 (Florida Administrative Code) and the Sarasota County Sea Turtle Protection Ordinance (No. 97-082). Beach nourishment, or restoration, can result in changes such as sand density, beach shear resistance, moisture content, beach slope, sand color, grain size, and shape. These changes may affect the nesting activity of sea turtles, and the hatch and subsequent emergence success of the nests. Consequently, special sea turtle conditions are included in beach construction permits to minimize impacts to the turtles, nests, and hatchlings.

The special permit conditions for the Project included fill material composition requirements, permitted construction material and machinery locations, and requirements for escarpment formation surveys, post-construction beach compactness monitoring, and sea turtle activity monitoring. STCRP personnel documented sea turtle activity and nest protection and evaluation measures. Special permit conditions pertaining to sea turtle monitoring activities included:

- Daily early morning sea turtle nest surveys of the beach in the vicinity of the Project were to be conducted starting May 1 and continue through the end of the sea turtle nesting season October 31. Only those nests that were in danger of loss were to be relocated. Those nests that required relocation were to be moved no later than 9 a.m. in the morning following deposition, or were relocated at a later date when they were found to be in immediate danger of washing out. All nests, relocated and in situ, were to be marked and the actual location of the clutch determined.

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.
November, 2005

- All nesting surveys, nest relocations, nest caging activities, and nest success evaluations were to be conducted by persons with prior experience and training in these activities and duly authorized to conduct such activities through FWC Marine Turtle Permits #054 and #126, both current and valid permits issued by FWC, Imperiled Species Management, pursuant to Florida Administrative Code Rule 62R-1.
- Monitoring of nesting activity following construction was to include daily surveys and any additional measures authorized by the FWC. The required report included nesting success rates, hatching success of all in situ and relocated nests, and names of all personnel involved in nest surveys and relocation activities. The data was to be reported separately for filled areas and non-filled areas. Permit Conditions require sea turtle monitoring and reporting for the initial nesting season following completion of the beach placement of maintenance-dredged material (2003) and for a minimum of two additional nesting seasons (2004-2005).

This report summarizes the data collected in 2005, the second year following construction activities. The report is being submitted to the City of Sarasota Engineering Department, Coastal Planning and Engineering, Inc., and the FWC Imperiled Species Management Division.

SEA TURTLE MONITORING

Project Location:

The Project shoreline extends from FDEP Monument T-36 south to approximately R-44 on Lido Key in Sarasota County (**Figure 1**). The north end of the Project, T-36, corresponds to the address 101 Ben Franklin Drive. The southern end of the Project located at approximately R-44 corresponds to a location in South Lido Park approximately 300 ft south of 2150 Ben Franklin Drive. The FDEP monuments are numbered from R-30 in New Pass at the north end of Lido to R-44 in South Lido Park near Big Sarasota Pass.

The Lido shoreline has been restored during previous dredging and nourishment in 1998, 2001, and 2003. The shoreline is characterized by high density residential development and high-rise condominiums and hotels.

Procedures

Monitoring for the Project began May 1, 2005 as personnel began daily surveys of the entire Lido Key shoreline including the Project shoreline. The surveys were conducted in accordance with FWC permit conditions to Mote Marine Laboratory for Lido Key under 2005 Marine Turtle Permits #054 and #126.

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Personnel monitored for turtle nesting activity by walking the Project shoreline daily at dawn above the mean high water line. Permitted personnel determined visually whether each emergence was a nest or a non-nesting emergence (also known as a false crawl). A *non-nesting emergence* (NNE) was defined as an emergence that did not result in egg deposition. A body pit refers to the sandy depression cleared by a sea turtle's front flippers and a nest chamber is excavated by a turtle's rear flippers. The following are examples of NNEs: 1) a turtle that emerged on the beach but did not body pit or excavate a nest chamber and returned to the water, or 2) a turtle that emerged and made one or more body pits but did not excavate a nest chamber, or 3) a turtle that emerged, created a body pit and excavated a nest chamber but did not deposit any eggs (often these aborted nest excavations are left uncovered by the turtle). **Figure 2** illustrates a NNE where the turtle excavated a nest chamber but returned to the water without depositing any eggs. A *nest* was defined as a turtle emergence that resulted in the turtle successfully depositing eggs. During the survey down the beach, NNEs and nests were recorded on MML Nest Data Forms. Nest or nesting success is defined as the proportion of nesting attempts by a sea turtle (emergences onto the beach) that result in eggs being deposited. Nesting success is calculated as (# nests) / (#nests + # NNEs).

If a nest location was judged to be imminently threatened by tidal overwash, it was carefully excavated by hand. The eggs were removed individually and care was taken to avoid rotation of the egg. Eggs were placed in a bucket lined with sand and were transported higher on the beach into an artificially produced nest chamber closely resembling the original nest chamber in shape, size and depth. All nests, whether relocated or left *in situ* (not relocated), were marked and encircled by four wooden stakes connected with yellow flagging tape and signage identifying the site as a protected sea turtle nest. A nest marking sign is shown in **Figure 3**. Each nest was additionally marked with the date the nest was laid and the original location of the nest. Nest location was documented by two methods. In the field, monitoring personnel located nests by relative position to the nearest street address, building, or other landmark. These descriptions were checked in the STCRP office against annotated aerial photographs to associate the locations to the nearest FDEP coastal construction control line monuments.

Hatching Surveys and Nest Evaluations:

After 45 days incubation, nests were monitored in the early morning and occasionally again in the evening. Observance of one or more of the following was used to determine the first day of hatch to calculate incubation periods:

- 1) A hatchling or hatchlings present at the surface
- 2) A hatchling crawl or crawls in the sand leading out from the nest area, and/or
- 3) A depression or emergence hole in the sand directly over the nest.

Each nest was excavated three days after the initial hatch to enumerate the contents for hatch success. The delayed nest excavation allows the majority of hatchlings to emerge from the nest on their own. Hatchlings that emerge independently are more vigorous and capable to cross the beach to the water. Once in the water these hatchlings also have a

better chance at survival as their external yolk sacs have been completely absorbed allowing the hatching to dive more readily and to swim more vigorously.

Nest evaluations were recorded on field data forms. Upon excavation, the number of *hatched* eggs was calculated from the number of empty eggshells found in the nest. *Pipped* eggs referred to either live or dead hatchlings that had punctured the eggshell but had not fully emerged from the egg. The number of *unhatched* eggs refers to unopened eggs remaining in the nest at excavation. Hatch success is defined as the proportion of eggs in a nest that produce live hatchlings. It is calculated as the number of hatched shells divided by the sum of all eggs in the clutch. Emergence success is to adjust for within nest mortality of hatchlings and actually evaluate the number of hatchlings that leave the nest. Emergence success represents the number of hatchlings that *emerged* independently from the nest prior to nest excavation:

$$\frac{\# \text{ hatched shells} - (\text{live hatched} + \text{dead hatched in nest chamber})}{\# \text{ total clutch size}}$$

Any live hatchlings within a nest were either released immediately, or were transferred to a bucket containing moist sand. These buckets of hatchlings were kept in a warm darkened location until their release on the beach that same evening. Nest excavations and hatchling releases were conducted according to FWC Marine Turtle Conservation Guidelines

<http://www.myfwc.com/psm/turtles/Guidelines/MarineTurtleGuidelines.htm>.

Sea Turtle Protection Measures:

Sea turtle protection measures implemented during the 2005 season followed protocols dictated by FWC Marine Turtle Conservation Guidelines and included:

- Relocating endangered nests
- Caging nests with self-releasing cages when nests were threatened by predators
- Placing Amdro around nests when fire ants (*Solenopsis invicta*) were observed
- Communicating with the Sea Turtle Protection Program at Sarasota County Coastal Resources regarding artificial illumination of the beach and hatchling disorientation events due to non-compliant lighting

Nests that were initially placed (by the turtle) at or below the mean water line, were found washing out, or found to be in immediate danger of washing out, were relocated higher on the beach near the original location.

Data Analysis:

Marine turtle emergence and hatching data were compiled in a Microsoft Access database. Figures and Tables were created in Microsoft Access, Excel, or Word.

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

NESTING SUCCESS

Turtle Emergences (Nests and Non-Nesting Emergences):

Beach monitoring documented a total of 27 nests and 25 NNEs along the Lido Key shoreline in 2005 (**Table 1, Appendix A**). Loggerhead sea turtles accounted for all of the sea turtle activity on Lido Key in 2005. The FWC reports (which were standardized for effort in 1991) that nesting densities of loggerheads on Lido Key range between 3.0-11.9 nests per km and nesting density for Lido in 2005 was 5.1 nests per km.

During 2005, 16 nests and 19 NNEs were documented within the Project shoreline, and 11 nests and 6 NNEs were documented outside the Project. All nest locations along the Lido Key shoreline, within and outside of the Project, were documented using a Global Positioning System and are mapped in **Figure 4**.

The nesting success within the Project shoreline was 0.457 in 2005, 0.467 in 2004, and 0.222 in 2003. Nesting success outside the Project shoreline was 0.647 in 2005, 0.367 in 2004, and 0.449 in 2003. Within the Project shoreline, nesting activity was observed from May 31 to July 13 (**Figure 5**). Outside of the Project shoreline, nesting was observed between June 3 and July 30 (**Figure 6**).

The 2005 nesting data for the Lido Key shoreline represent a marginal increase (one nest) from the 2004 season. An overall trend in Longboat Key nesting from 1982 through 2005 shows a decline in nesting numbers since the high of 59 nests in 2000 (**Table 2**). This decline in loggerhead nesting is consistent with a general downward trend in loggerhead nesting documented throughout the southeastern U.S. (B. Witherington - FWC, pers. comm.). FWC reported that the 2005 season was going to be below average even before any hurricanes struck. Possible causes for a declining trend in loggerhead nesting numbers include long-line fishing techniques, coastal development, and beach armoring. Another more temporary cause may be pockets of colder-than-average water in the Atlantic that affect the metabolism and feeding routine of turtles, that in turn affects their reproduction cycles. (B. E. Witherington- FWC, pers. comm., 2004).

Categorization of Non-Nesting Emergences (NNEs):

Marine turtles searching the shoreline for a suitable nesting site may abandon a nesting attempt and return to the water without depositing a clutch. The NNEs can be categorized by the stage at which the turtle abandoned or terminated nesting (**Table 3**). In 2005, the 19 NNEs documented within the Project were categorized as: 1) 18 emergences with no digging, and 2) one emergence with a minimum of one abandoned egg chamber. The six NNEs outside of the Project were categorized as: 1) five emergences with no digging of body pit or nest chamber, and 2) one emergence with a minimum of one body pit. The 2005 data are similar to the 2004 data with the

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

predominant category of abandoned nesting as emergences without digging of body pit or nest chamber.

Based on FWC data collected throughout Florida's nesting beaches, the proportions of nests and NNEs should be relatively similar (i.e., 0.5 is an equal numbers of nests and NNEs) and the balance between the two serves as an indicator of a beach's nesting suitability. When NNE numbers substantially exceed the nest numbers, it typically indicates that some combination of factors deters the turtles from nesting. The factors can be associated with natural causes (such as escarpments, beach compactness, or flooding) or human-related factors (such as increased beach lighting, beach armoring structures, beach furniture, or physical harassment).

On Lido Key, NNEs correlated with the onset of nesting activity with the first NNE documented on May 21. The nesting success percentages for the 2005 nesting season was 0.519. I.e., 52% of turtle emergences resulted in nest deposition and 48% were NNEs. Within the Project shoreline 54% of the total activity resulted in NNEs and outside of the Project shoreline NNEs resulted in 35% of the activity.

Visual Assessment of Obstructions to Nesting:

Two turtles on Lido were obstructed within the Project in their nesting attempts in 2005, and no turtles were obstructed outside the Project (**Table 4**). The 2005 obstructions were a seawall and an escarpment. During 2004, five turtles encountered obstructions: three obstructions were within the Project (due to beach furniture) and two obstructions were outside the Project (due to escarpments) (**Table 4**). A decrease in obstructed nesting attempts can potentially be attributed to the Sarasota County Sea Turtle Protection Ordinance amendment. The amendment requires removal of beach furniture and other temporary structures nightly, and 2005 was the first season it was in action.

Nest Site Selection:

Monitoring personnel measured the beach width on the morning after nest deposition by measuring from the nest up to the closest upland vegetation or barrier and from the nest down to the day's mean high water line. By dividing the available beach into thirds, a determination could be made on the turtle's preference for nesting on the upper, middle or lower third of the beach, regardless of beach width (**Table 5**).

Inside the Project, 50% of nests were in the upper third, 25% in the middle third, and 25% in the lower third of the beach profile. Outside the Project, 60% of nests were in the upper third, 30% were in the middle third, and 10% of nests were in the lower third of the beach profile.

These data are important because research has shown that nesting sea turtles have limited amount of energy resources to utilize when ascending a beach (Wood and Bjorndal, 2000). These limited resources cause them to nest closer to the high water line in

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

beaches, such particularly as recently nourished renourished beaches, that are wider and have more escarpments. This is troublesome because nests close to the high water line have higher chances of being inundated or washed out during storms.

Nest Chamber Characteristics:

Nest chamber measurements were collected for nests within and outside of the Project during 2005 (Table 6). Only nests for which both measurements from the ground surface to the top of clutch and chamber depth were evaluated. The five evaluated nests within the Project shoreline averaged 47 cm in depth (range 34-60 cm) and the distance from the sand surface to the top of clutch averaged 16 cm (range 5-26 cm). The five evaluated nests outside the Project shoreline averaged 52 cm in depth (range 40-69 cm) and the distance from the sand surface to the top of clutch averaged 19 cm (range 10-32cm). The mean surface to top of clutch measurement was less in 2005 than in 2004 both within (16 cm and 34 cm respectively) and outside of the Project (19 cm and 40 cm respectively). Although the average distance to the top of the clutch is marginally shallower both within and outside of the Project in 2005, it appears to be a function of a lower number of nests being evaluated rather than a physical characteristic of the beach or the turtle.

2005 Study of Incubation Conditions on Sarasota County Beaches:

The detailed outcomes of sea turtle nesting are directly associated with the physical properties of beach sediments. Beach nourishment, through a change in sediment properties, is widely acknowledged to affect a turtle's choice of nesting beach and hatching success of the nest. Nourished sand differs from native sand in many properties such as compactness, shear resistance, grain size, temperature, moisture content, calcium carbonate and gas diffusion rates. These factors influence incubation conditions and are critical to monitor because the sex of turtle hatchlings is determined during incubation.

Three of six Sarasota County beaches are nourished (Longboat Key, Lido, and Venice) and others are expected to be in the near future (Siesta, potentially in 2006). To address these concerns, the STCRP conducted pilot studies of thermal profiles on nourished and non-nourished beaches in 2004. Follow-up studies were completed in 2005. Further studies on beach thermal profiles will expand for 2006 to evaluate the 2005 nourishment projects on Venice and Longboat Key.

Representative nourished and non-nourished sections were selected on five beaches: Longboat Key, Lido Key, Siesta Key, Casey Key, and Venice Beach. Manasota Key will be sampled in 2006. Thermal data loggers (I-button 1921H, Dallas Semiconductors) were deployed in a sealed plastic bag and tethered near selected nests, at typical nest depths (40 cm). The loggers were placed adjacent to a nest to monitor ambient beach temperatures, rather than within a nest to track incubation temperature. The intended experimental design was to place a minimum of five data loggers per beach, or if a beach had both nourished and non-nourished sections (Longboat, Lido, Venice), then data

MOTE MARINE LABORATORY

loggers apportioned within each beach type. However, inevitable changes in the nourishment schedule and storm-related erosion caused some delays or loss of instruments, which made minor compromises to the planned design.

For loggerhead turtles, sex is determined by the thermal conditions in the middle third of incubation around a pivotal temperature of 84.2°F (29°C) which theoretically produces equivalent numbers of male and female hatchlings. Warmer conditions produce more females and cooler conditions result in more male offspring. In the 2005 study the thermal traces during the middle third of incubation suggested that nests on nourished beaches were likely producing predominantly or exclusively female offspring. This is in contrast to middle incubation conditions on non-nourished beaches which generally produced incubation conditions approximately 5.4°F cooler on average. We interpret the warmer incubation conditions on nourished sections of beach to be a result of darker sand color, possibly from admixture of fine clay particles, relative to native beaches, which have high quartz content and overall lighter colored sands.

This preliminary report is subject to more thorough evaluation as new data are collected and evaluated in 2005 and 2006. The 2005 data are currently being analyzed by Jenny Estes, Ph.D. student under Dr. Thane Wibbels at the University of Alabama.

Nests Lost to Erosion or Inundation:

Four hurricanes and one tropical storm caused coastal erosion and/or sand accretion that impacted the Lido Key shoreline during 2005. Some nests were affected by multiple storms, e.g., a nest washed first by Arlene that was also washed by Dennis. The storms created tidal activity that caused inundation of approximately 60 % (16/27) of the total number of nests along the Lido Key shoreline (**Table 7**). Tropical Storm Arlene (6/11) affected 3 nests, Hurricane Dennis (7/9-10) affected 14 nests, Hurricane Katrina (8/28-29) affected 3 nests, Hurricane Rita (9/21-23) affected 0 nests, and Hurricane Wilma (10/24) affected 0 nests.

Two nests were relocated higher on the beach after threats of beach erosion or imminent tidal inundation. The same two nests partially washed away and seven clutches could not be found after the nest marking stakes washed away. Tidal activity during the summer of 2005 impacted Lido Key nests to a greater extent than during 2004 when 54% (n=14) of the total number of nests along the Lido Key shoreline were inundated

Eleven nests were exposed to tidal inundation within the Project shoreline and five inundated nests were outside the Project shoreline. Outside of the Project five nests were inundated. Two of the five nests had some hatch success and two could not be found after the nest marking stakes washed away.

Nest Damage by Predation or Invasion:

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Fifteen percent (4/27) of nests on Lido Key were damaged by predation in 2005 (**Table 8**). The predators included raccoons (1), fire ants (1), and roots (2). The incidences of predation were documented and the broken eggs were counted and removed along with sand contaminated by the egg destruction. The documented incidence of predation increased from 2004 when 8% (2/26) of the nests were depredated by raccoons or were vandalized by humans.

Self-releasing box cages of 2" x 4" wire mesh with bottom flanges were placed over four nests to guard against depredation by raccoons. Two caged nests were within the Project and two were outside the Project in South Lido Park. Before caging a nest, the exact location of the clutch was determined in order to situate the cage without damaging the clutch.

Four nests were treated with an FWC approved fire ant control (Amdro) when fire ants (*Solenopsis invicta*) were observed in or near the nests during 2005. All four of the treated nests subsequently produced hatchlings. In 2005, two nests were excavated early to prevent fire ants from colonizing the nests. Fire ants may invade nests during incubation, hatching, or emergence. It remains unclear whether fire ants on the beach are encouraged by an abundance of dead fish on the beach after red tide events. However, given that most of Lido's shoreline is raked to remove dead fish, there seems little evidence to support that assertion. A rising incidence of fire ant predation may be a more general trend across all coastal zones of Sarasota County.

REPRODUCTIVE SUCCESS

Incubation period:

Calculations of mean incubation period were limited to only include nests for which both an exact emergence date and the hatch date were known (**Table 9**).

Within the Project shoreline, the mean incubation period was calculated for seven of 27 nests. Six *in situ* nests had an mean incubation period of 53.2 days and a range of 51 to 57 days. One relocated nest had an incubation period of 54 days. Incubation periods within the Project shoreline averaged 53.6 days and ranged from 51 to 57 days. The mean incubation period in 2005 was shorter than in 2004 when the mean incubation period was 56.9 days.

Outside of the Project shoreline, the mean incubation period was calculated for five of eleven nests. Four *in situ* nests had an average incubation period of 56.0 days and a range of 49 to 61 days. One relocated nest had an incubation period of 53 days. Incubation periods outside the Project shoreline averaged 54.5 days and ranged from 49 to 61 days. The mean incubation period outside the Project in 2005 was shorter than in 2004 when the incubation average was documented at 59.3 days.

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

In situ nests within the Project shoreline incubated more rapidly than those outside the Project, both in 2004 and 2005. Relocated nests tended to show the opposite pattern with relocated nests within the project incubating marginally more slowly, but a more rigorous interpretation is precluded by the small sample sizes that were represented. Since temperature is the acknowledged major influence determining the incubation period, a broad interpretation is that *in situ* nests within the Project shoreline recorded shorter incubation periods, as a result of the beach substrate being relatively warmer than the substrates outside the Project.

Hatching Success:

Hatching success was calculated from evaluated nests, both relocated and *in situ*, for the Project shoreline and outside of the Project. Again, only nests for which MML had complete data were evaluated. Eight *in situ* nests within the Project shoreline had a hatching success of 50% (**Table 10**). Hatching success could not be calculated for two relocated nests that had partial hatches as they both experienced partial washout. Comparing within the Project shoreline, hatching success declined from 2004 (75.6%) to 2005(50.0%). There was a substantial difference in 2004 in hatching success between the relocated nests (65.4%) and *in situ* nests (93.7%).

Outside of the Project shoreline seven *in situ* and one relocated nest were excavated for evaluation (**Table 11**). Hatching success was 91.2% for the relocated nest and 47.8% for nests left *in situ*. The overall hatching success was 52.9% for both relocated and *in situ* nests. Comparing outside the project shoreline, hatching success declined slightly from 2004 (57.5%) to 2005 (52.9%). There was a substantial difference in 2004 in hatching success for relocated nests (58.9%) and *in situ* nests (40.1%).

Emergence Success:

Eight *in situ* nests within the Project shoreline produced 351 independently emerged hatchlings and an additional 35 live hatchlings and 29 dead hatchlings found during nest excavation (**Table 12**). Emergence success could not be calculated for two relocated nests that had partial hatches because they were partially washed away. *In situ* nests within the Project had a 42.3% emergence success in 2005 whereas there was a 93.2% emergence success in 2004.

Seven *in situ* nests and one relocated nest outside of the Project shoreline produced 349 independently emerged hatchlings from 460 hatched eggs; and an additional 100 live hatchlings and 11 dead hatchlings found during nest excavation (**Table 13**). *In situ* nests outside the Project had a 44.7% emergence success and the relocated nest had a 5.9% emergence success. The overall emergence success was 40.2% for all nests combined. The emergence success of the one relocated nest is low and that was due to invasion by fire ants.

Hatchling Disorientation Events:

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Four hatchling disorientations and a single adult disorientation were recorded on Lido Key in 2005 (**Table 14**, and **Appendix B**). All the 2005 disorientations occurred within the Project shoreline. The crawl of the disoriented adult turtle and an unshielded streetlight responsible for the disorientation are shown in **Figure 8**. In each instance the STCRP staff communicated with the owners or managers at the disorientation event locations to try to correct non-compliant lighting issues. In addition, MML was in frequent communication with the Sarasota County Code Enforcement Officers regarding artificial illumination of the beach and disorientation events due to non-compliant lighting.

The five disorientation events represent a 55% decrease from eleven disorientation events on Lido Key in 2004 (**Table 14**). A decrease in overall disorientation events coincides with more frequent nighttime lighting inspections by the Code Enforcement Officers prior to and during the 2005 sea turtle nest/hatch season. Nevertheless, a review of the disorientations allows some tentative conclusions to be drawn. First, there appear to be a few consistent problem spots within a given year, but these spots may not be the same across years. On the other hand, a disorientation problem can be persistent at the same street address if corrective actions are not taken. For example, 1800 Ben Franklin Drive was a disorientation location in both 2004 and 2005, though different reasons were given on various occasions as a probable cause of the disorientation. The latter is a strong argument for the ongoing public education efforts to “keep the beach dark” as emphasized by the Sarasota County Sea Turtle Protection Ordinance..

Evidence documented from past Florida beach renourishment projects has demonstrated that nourished beaches are taller and wider thus allowing more light to be visible for a greater distance along the beach axis. To reduce the potential impacts from the current renourishment project, the Lido Key lighting ordinance must be regularly enforced in 2006. As always, frequent nighttime lighting inspections must begin early in the marine turtle nesting season, and continue until the last nest has hatched.

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.
November, 2005

Table 1. Sea turtle nesting activity along the Lido Key shoreline.			
	Project Shoreline	Outside Project Shoreline	Total Shoreline
2005 Year Two Post-Construction			
# Nests	16	11	27
# NNE	19	6	25
Nesting Success 2005	0.457	0.647	0.519
2004 Year One Post-Construction			
# Nests	15	11	26
# NNE	17	19	36
Nesting Success 2004	0.469	0.367	0.419
2003 Year of Construction			
# Nests	10	22	32
# NNE	35	27	62
Nesting Success 2003	0.222	0.449	0.340

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 2. Nest and NNE numbers and Nesting Success (#Nests/(#Nests + #NNEs)) for sea turtles nesting for Lido Key shoreline.

Year	Nests	NNE	Nest Success	Km	Nest density	Activity density
1982	0	5	0.00	1.5	0.00	3.33
1983	2	0	1.00	2.2	0.91	0.91
1984	2	1	0.67	2.2	0.91	1.36
1985	6	2	0.75	2.2	2.73	3.64
1986	3	4	0.43	1.5	2.00	4.67
1987	2	5	0.29	1.5	1.33	4.67
1988	3	0	1.00	2.6	1.15	1.15
1989	7	11	0.39	2.6	2.69	6.92
1990	12	13	0.48	2.6	4.62	9.62
1991	23	31	0.43	4.2	5.48	12.86
1992	32	42	0.43	4.2	7.62	17.62
1993	35	35	0.50	4.2	8.33	16.67
1994	37	34	0.52	4.2	8.81	16.90
1995	34	50	0.40	4.2	8.10	20.00
1996	50	35	0.59	4.2	11.90	20.24
1997	45	44	0.51	4.2	10.71	21.19
1998*	42	94	0.31	4.2	10.00	32.38
1999	48	57	0.46	4.2	11.43	25.00
2000	59	52	0.53	5.3	11.13	20.94
2001*	16	55	0.23	5.3	3.02	13.40
2002	31	29	0.52	5.3	5.85	11.32
2003*	32	62	0.34	5.3	6.04	17.74
2004	26	36	0.42	5.3	4.91	11.70
2005	27	25	0.52	5.3	5.09	9.81

* indicate the years of nourishment projects on Lido Key

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 3. Categories of abandoned sea turtle nesting for Lido Key in 2005.		
NNE Type	Project Shoreline	Outside Project Shoreline
2005 Year Two Post-Construction		
# Emergence-no digging	18	5
# With preliminary body pit	0	1
# With abandoned egg chamber	1	0
Total # NNEs	19	6
2004 Year One Post-Construction		
# Emergence-no digging	13	14
# With preliminary body pit	3	4
# With abandoned egg chamber	1	1
Total # NNEs	17	19
2003 Year of Construction		
# Emergence-no digging	31	18
# With preliminary body pit	3	6
# With abandoned egg chamber	1	3
Total # NNEs	35	27

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 4. Obstructions to sea turtle nesting on Lido Key.		
Cause of Obstruction	Project Shoreline	Outside Project Shoreline
2005 Year Two Post-Construction		
Escarpment	1	0
Seawall	1	0
2004 Year One Post-Construction		
Beach furniture	3	0
Escarpment	0	2
2003 Year of Construction		
Beach furniture	6	0
Escarpment	4	4
Seawall	1	0

Table 5. Sea turtle nesting locations by relative beach width on the Lido Key shoreline.				
	Upper Beach	Middle Beach	Lower Beach	Total # Nests With Known Shoreline Location
2005 Year Two Post-Construction				
# Nests within Project	8 (50%)	4 (25%)	4 (25%)	16
# Nests outside of Project	6 (60%)	3 (30%)	1 (10%)	10
2004 Year One Post-Construction				
# Nests within Project	0 (0%)	1 (8%)	12 (92%)	13
# Nests outside of Project	3 (27%)	6 (55%)	2 (18%)	11
2003 Year of Construction				
# Nests within Project	3 (30%)	1 (10%)	6 (60%)	10
# Nests outside of Project	9 (41%)	8 (36%)	5 (23%)	22

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 6. Nest chamber measurements of sea turtle nests on Lido Key. Values are mean measurement and range in parentheses.

Nest Chamber Measurements	Project Shoreline	Outside Project Shoreline
2005 Year Two Post-Construction		
Surface to top of clutch	16 cm (5-26 cm)	19 cm (10-32 cm)
Nest chamber depth	47 cm (34-60 cm)	52 cm (40-69 cm)
2004 Year One Post-Construction		
Surface to top of clutch	34 cm (17-52 cm)	40 cm (33-45 cm)
Nest chamber depth	51 cm (44-60 cm)	50 cm (40-60 cm)
2003 Year of Construction		
Surface to top of clutch	23 cm (15-31 cm)	32 cm (20-49 cm)
Nest chamber depth	46 cm (30-61 cm)	52 cm (39-58 cm)

Table 7. Sea turtle nest loss on Lido Key documented through tidal activity.

Cause of Nest Loss	Project Shoreline	Outside Project Shoreline
2005 Year Two Post-Construction		
Overwash = nests negatively affected by inundation/erosion	4(4*)	3(2*)
Lost markers/fate of clutch unknown	5	2
Washed out	2	0
2004 Year One Post-Construction		
Overwash = nests negatively affected by inundation/erosion	4 (4*)	5 (2*)
Lost markers/fate of clutch unknown	0	1
Washed out	1	3
2003 Year of Construction		
Overwash = nests negatively affected by inundation/erosion	6 (5*)	12 (8*)
Lost markers/fate of clutch unknown	0	1
Washed out	0	1

** Number of nests exhibiting some hatch*

Table 8. Nest damage due to predation or invasion on Lido Key.			
Nest Damage due to:	Project Shoreline	Outside Project Shoreline	Total # of Nests
2005 Year Two Post-Construction			
Ants	0	1(1*)	1
Raccoons	1(1*)	0	1
Roots	2(2*)	0	2
2004 Year One Post-Construction			
Unknown	1 (*1)	0	1
Human disturbance (removed stakes)	1 (*1)	0	1
2003 Year of Construction			
Unknown	1 (1*)	1 (1*)	2
Human disturbance (removed stakes)	1 (1*)	1 (1*)	2
Raccoon	0	2 (1*)	2
Roots	1** (1*)	1 (0*)	2
Ants	0	1 (0*)	1
Crab	0	1 (1*)	1

** Number of nests exhibiting some hatch ** Same nest also experienced unknown depredation*

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Table 9. Incubation of relocated and *in situ* nests that experiencing hatch on Lido Key.

2005 Year Two Post-Construction			
Project Shoreline	Relocated	<i>In situ</i>	Total
# of Nests	1	6	7
Average Incubation (days)	54	53.2	53.6
Range of Incubation (days)	54	51 – 57	51 – 57
Outside of Project Shoreline			
# of Nests	1	4	5
Average Incubation (days)	53	56.0	54.5
Range of Incubation (days)	53	49 - 61	49 - 61
2004 Year One Post-Construction			
Project Shoreline			
# of Nests	8	4	12
Average Incubation (days)	54.3	59.5	56.9
Range of Incubation (days)	52 - 56	58 - 61	52 - 61
Outside of Project Shoreline			
# of Nests	1	2	3
Average Incubation (days)	51	63.5	59.3
Range of Incubation (days)	51	60-67	51 - 67
2003 Year of Construction			
Project Shoreline			
# of Nests	6	2	8
Average Incubation (days)	54	54	54
Range of Incubation (days)	50-58	52-56	50-58
Outside of Project Shoreline			
# of Nests	1	7	8
Average Incubation (days)	55	56.4	56.2
Range of Incubation (days)	55	49-63	49-63

Table 10. Hatching success for relocated and *in situ* nests within the Project shoreline on Lido Key.

	Relocated	<i>In situ</i>	Total
2005 Year Two Post-Construction			
# of Nests	n/a*	8	8
# Eggs Destroyed	n/a*	2	2
# Eggs Hatched	n/a*	415	415
# Eggs Unhatched	n/a*	368	368
# Live Pipped	n/a*	1	1
# Dead Pipped	n/a*	14	14
Total # of Eggs	n/a*	830	830
Hatch Success (%)	n/a*	50.0	50.0
2004 Year One Post-Construction			
# of Nests	8	4	12
# Eggs Destroyed	0	3	3
# Eggs Hatched	553	443	996
# Eggs Unhatched	277	27	304
# Live Pipped	1	0	1
# Dead Pipped	14	0	14
Total # of Eggs	845	473	1318
Hatch Success (%)	65.4	93.7	75.6
2003 Year of Construction			
# of Nests	6	4	10
# Eggs Destroyed	11	0	11
# Eggs Hatched	331	204	535
# Eggs Unhatched	299	200	499
# Live Pipped	0	0	0
# Dead Pipped	11	0	11
Total # of Eggs	652	404	1056
Hatch Success (%)	50.8	50.1	50.1

*Two relocated nests hatched, but experienced partial washouts and totals eggs could not be calculated.

MOTE MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 11. Hatching success for relocated and *in situ* nests outside of the Project shoreline on Lido Key. Hatching success is calculated using rows in bold (# eggs hatched/total # eggs).

	Relocated	<i>In situ</i>	Total
2005 Year Two Post-Construction			
# of Nests	1	7	8
Eggs destroyed	0	8	8
Eggs hatched	93	367	460
Eggs unhatched	4	377	381
Live pipped	5	0	5
Dead pipped	0	15	15
Total # of eggs	102	767	869
Hatch Success (%)	91.2	47.8	52.9
2004 Year One Post-Construction			
# of Nests	2	4	6
Eggs destroyed	0	0	0
Eggs hatched	99	238	337
Eggs unhatched	68	167	235
Live pipped	0	1	1
Dead pipped	1	10	11
Total # of eggs	168	416	584
Hatch Success (%)	58.9	40.1	57.7
2003 Year of Construction			
# of Nests	6	10	16
Eggs destroyed	33	23	56
Eggs hatched	65	467	532
Eggs unhatched	457	355	812
Live pipped	0	0	0
Dead pipped	75	91	166
Total # of eggs	630	936	1566
Hatch Success (%)	9.8	49.9	34.0

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 12. Hatchling emergence success for relocated and *in situ* nests within the Project shoreline on Lido Key. Emergence success is calculated using rows in bold (hatchlings emerged/ total # of eggs).

	Relocated	<i>In situ</i>	Total
2005 Year Two Post-Construction			
# of Nests	n/a*	8	8
# Eggs hatched	n/a*	415	415
Live in nest	n/a*	35	35
Dead in nest	n/a*	29	29
# Hatchlings emerged	n/a*	351	351
Total # of eggs	n/a*	830	830
Emergence Success (%)	n/a*	42.3	42.3
2004 Year One Post-Construction			
# of Nests	8	4	12
# Eggs hatched	553	443	996
Live in nest	30	1	31
Dead in nest	4	1	5
# Hatchlings emerged	519	441	960
Total # of eggs	845	473	1318
Emergence Success (%)	61.4	93.2	72.8
2003 Year of Construction			
# of Nests	6	4	10
# Eggs hatched	331	204	535
Live in nest	11	4	15
Dead in nest	3	0	3
# Hatchlings emerged	317	200	517
Total # of eggs	652	404	1056
Emergence Success (%)	48.6	49.5	49.0

*Two relocated nests hatched, but experienced partial washouts and totals eggs could not be calculated.

Table 13. Hatchling emergence success for relocated and *in situ* nests outside of the Project shoreline on Lido Key. Emergence success is calculated using rows in bold (hatchlings emerged/ total # of eggs).

	Relocated	<i>In situ</i>	Total
2005 Year Two Post-Construction			
# of Nests	1	7	8
# Eggs hatched	93	367	460
Live in nest	87*	13	100
Dead in nest	0	11	11
# Hatchlings emerged	6	343	349
Total # of eggs	102	767	869
Emergence Success (%)	5.9*	44.7	40.2
2004 Year One Post-Construction			
# of Nests	2	4	6
# Eggs hatched	99	238	337
Live in nest	0	4	4
Dead in nest	0	0	0
# Hatchlings emerged	99	234	333
Total # of eggs	168	416	584
Emergence Success (%)	58.9	56.3	57.0
2003 Year of Construction			
# of Nests	6	10	16
# Eggs hatched	65	467	532
Live in nest	1	8	9
Dead in nest	0	4	4
# Hatchlings emerged	64	455	519
Total # of eggs	630	936	1566
Emergence Success (%)	10.2	48.6	33.1

*Nest was excavated early due to ants in the nest.

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.

November, 2005

Table 14. Summary of hatchling disorientation events for 2003 through 2005 on Lido Key.

Nest Location:	Hatchlings attracted to:	Minimum # Disoriented	Probable Light Type
2005 Year Two Post-Construction			
BFD	and BFD	2	Restaurant/Bar/Condominium
BFD	BFD	1	Condominium
BFD	BFD	2	Bonfire
BFD	and BFD	UNK	Unknown
BFD	BFD	1 (adult)	Street light
2004 Year One Post-Construction			
BFD	BFD	36	Sky Glow
BFD	BFD	50	Parking Lot
BFD	BFD and 1050 BFD	25	Condominium Interior/Exterior
BFD	BFD	89	Condominium Exterior
BFD	BFD and BFD	50	Pool, Condominium Interior/Exterior
BFD	BFD and BFD	8	Too many lights present
BFD	BFD and BFD	3	Condominium Interior/Exterior
BFD	BFD	72	Condominium Interior /Sky Glow
BFD	BFD, BFD, BFD	5	Dune Crossover, Landscape, Parking Lot
BFD	BFD	UNK	Unknown
BFD	BFD	1	Condominium Interior/Exterior, Construction Lights
2003 Year of Construction			
BFD	BFD	64	Condominium Interior
BFD	BFD	1	Unknown
BFD	BFD	23	Pool Lights
BFD	BFD	18	Condominium Interior
BFD	BFD	34	Condominium Interior

BFD = Ben Franklin Drive

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November, 2005

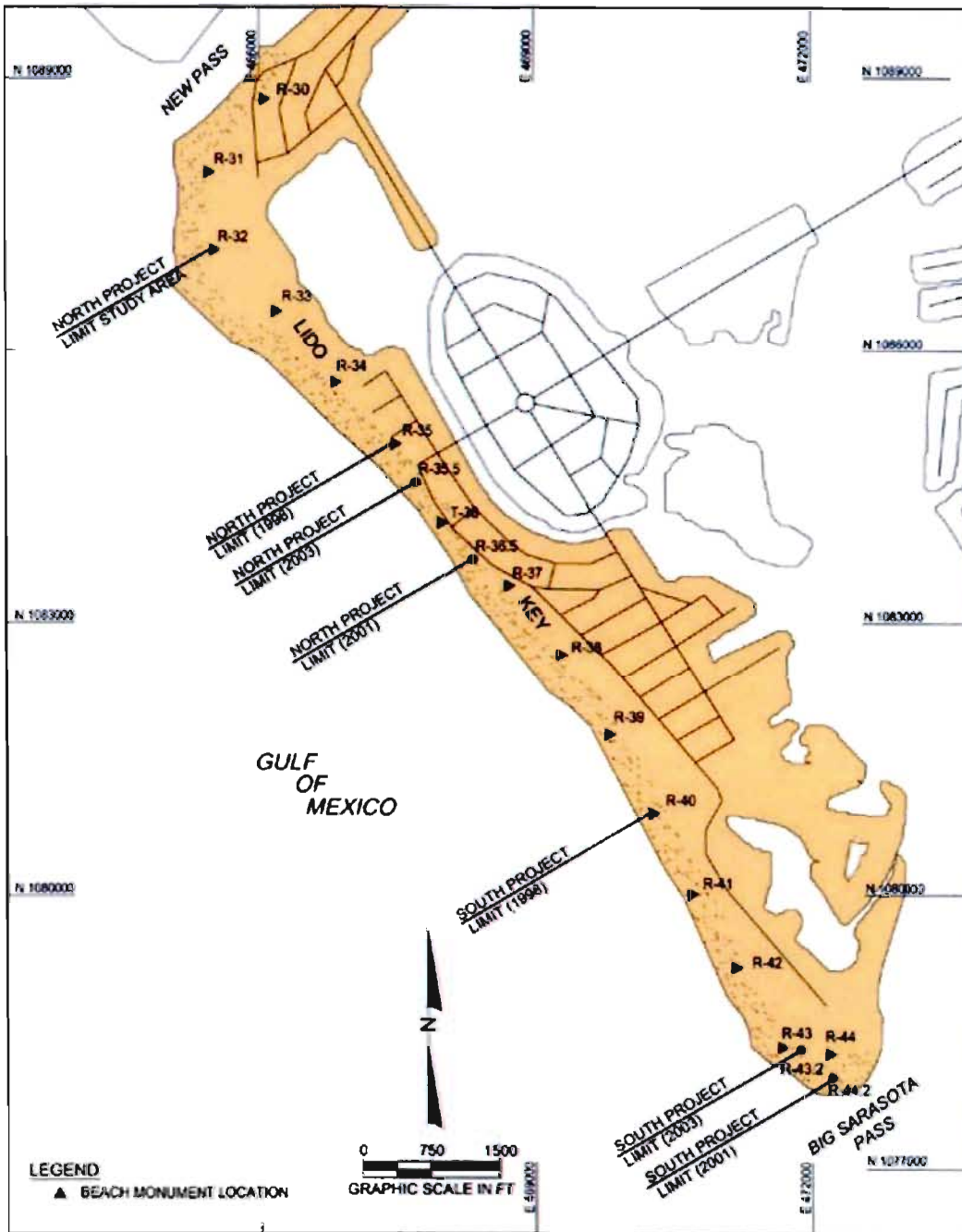


Image copyright 2003 Beaches and Shores Resource Center, Florida State University
 <beaches10.beaches.fsu.edu/index.html>

Figure 1. Lido Key nourishment projects prior to 2005.

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 November, 2005



Figure 2. A non-nesting emergence with an abandoned egg chamber.



Figure 3. Sea Turtle Nest Sign.

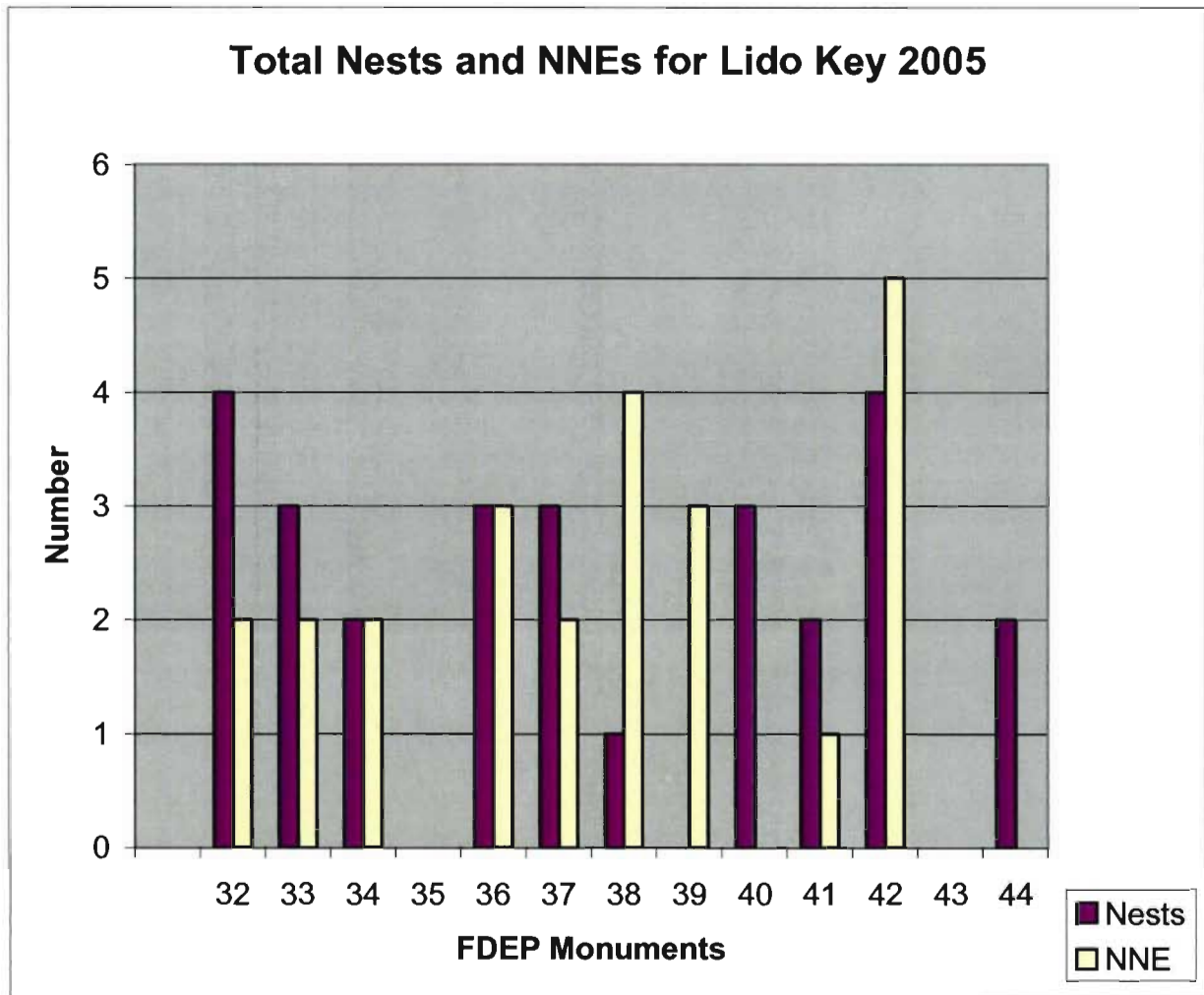


Figure 4. Nesting activity located between FDEP monuments on Lido Key in 2005.

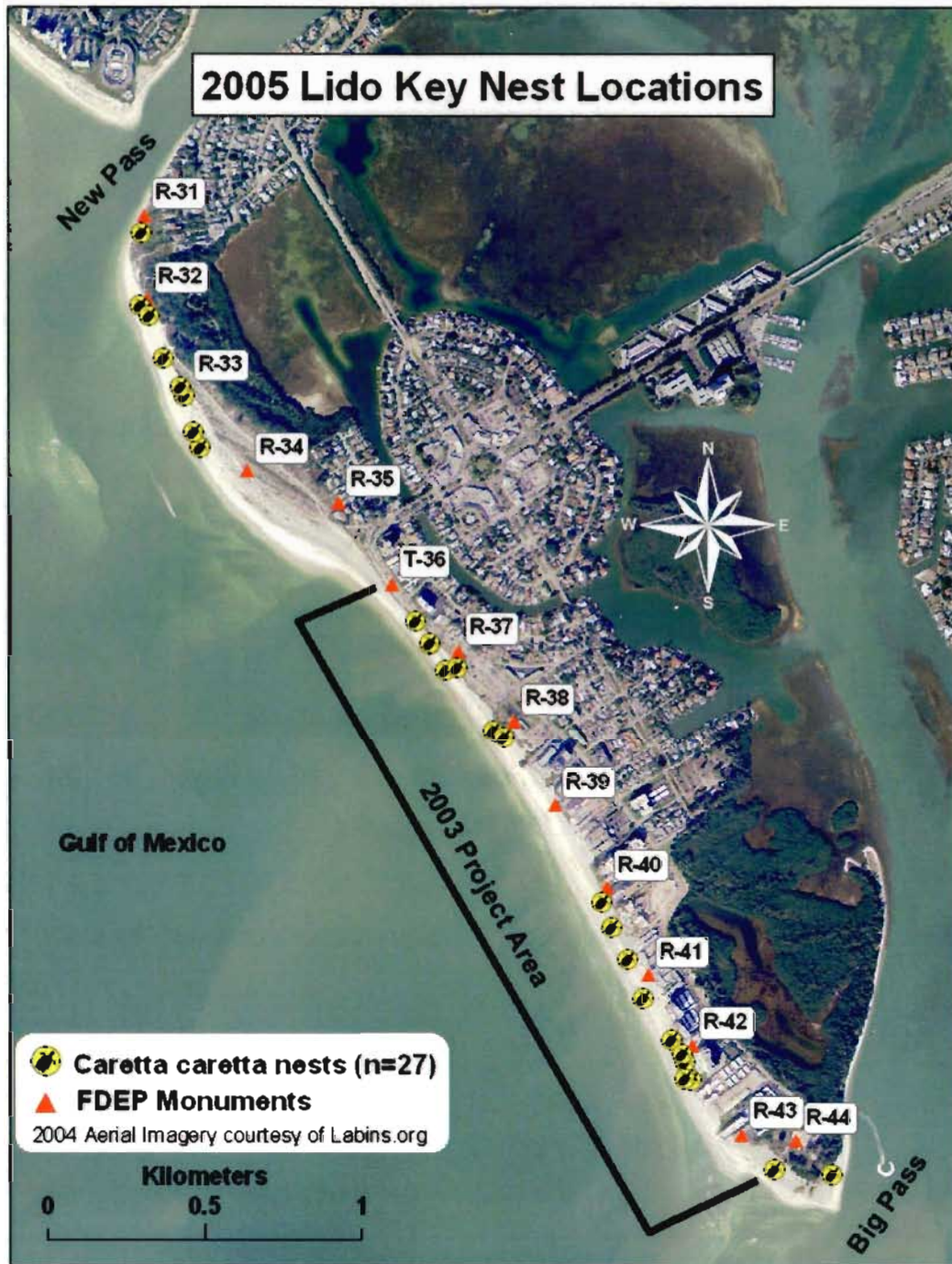


Figure 5. Lido Key nest locations 2005.

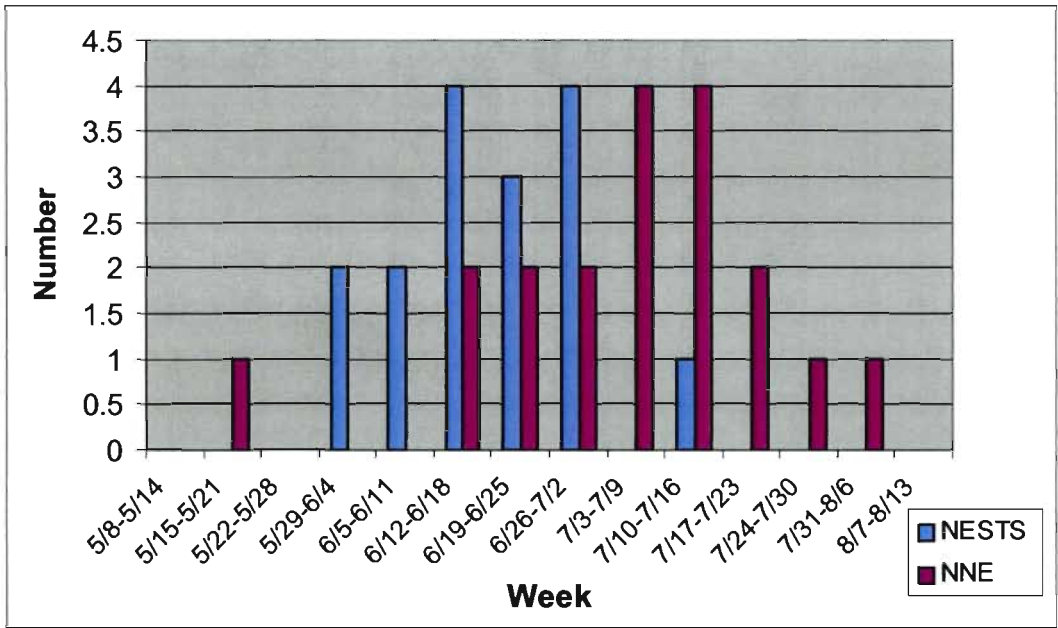


Figure 6. Turtle activities occurring inside the Project area on Lido Key in 2005.

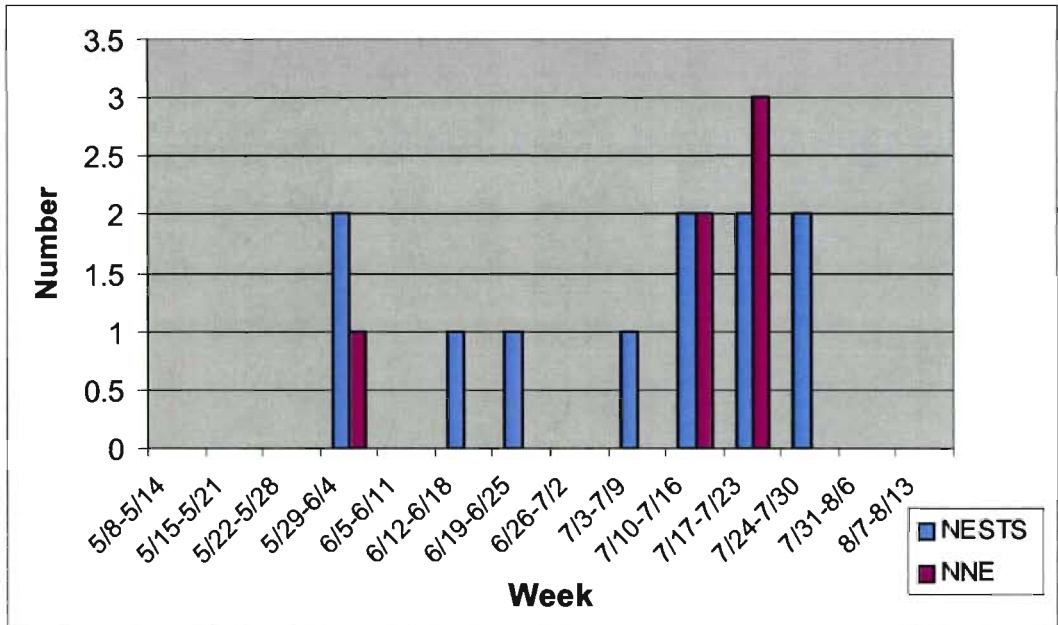


Figure 7. Turtle activities occurring outside the Project area on Lido Key in 2005.

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Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key. Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005.



Figure 8. Adult sea turtle disorientation due to street light (seen on left) at 305 Ben Franklin Drive, Lido Key on 6/30/05.

Appendices

APPENDIX A NESTS AND NON-NESTING EMERGENCES 2005

APPENDIX B 2005 MARINE TURTLE DISORIENTATIONS

APPENDIX A

Appendix A. Marine Turtle nesting activity, Lido Key, Sarasota FL, 2005

DATE	NEST/ NNE	ADDRESS	ADDRESS DESCRIPTION	FDEF	PT. SO.	LOCATION ON BEACH	RELOCATED	TYPE SCREEN	TYPE DISTURBANCE	HATCH DATE	HATCHED # EGGS	TOTAL # EGGS
5/31/2005	NEST	267 BFD	SFR	36		BCH			WASHED OVER 6/11,7/10			
6/3/2005	NEST	2201 BFD	SOUTH LIDO PARK	44		BCH	RELOCATED	BOX	WASHED OVER 7/11	7/26/2005	93	102
6/4/2005	NEST	57 S R-32	NORTH LIDO PARK	32	57	BCH			WASHED OVER 6/11,7/9-10			
6/4/2005	NEST	1800 BFD	L'ELEGANCE	42		VEG		BOXa	WASHED OVER 7/9-10, DEP/ROOTS (-2 EGGS) 7/31, DIS 7/31	7/31/2005	110	122
6/9/2005	NEST	1234 BFD	RITZ-CARLTON BEACH CLUB	40		BCH	RELOCATEDa		PARTIAL WASHOUT 7/9	8/1/2005		
6/9/2005	NEST	1540 BFD	HILMSLEY	41		ESC			WASHED OVER 6/11,7/10			
6/13/2005	NEST	507 S R-32	NORTH LIDO PARK	32	500	VEG			WASHED OVER 7/9			
6/13/2005	NEST	400 BFD	LIDO BEACH PAVILLION	37		BCH			WASHED OVER 7/10, DEP/ROOTS 8/8, DIS 8/5	8/5/2005	64	88
6/13/2005	NEST	1336 BFD	MARK TWAIN CONDOMINIUM	40		BCH			WASHED OVER 7/10, DIS 8/6	8/4/2005	64	134
6/14/2005	NEST	1750 BFD	KEY TOWERS SOUTH	41		BCH	RELOCATEDa	BOXa	PARTIAL WASHOUT 7/9, DEP/RAC (-124 EGGS) 7/11		8	
6/15/2005	NEST	1800 BFD	L'ELEGANCE	42		BCH			WASHED OVER 7/9-10, DIS 8/6	8/6/2005	53	117
6/20/2005	NEST	1800 BFD	L'ELEGANCE	42		BCH			WASHED OVER 7/9			
6/22/2005	NEST	267 BFD	SFR	36		BCH			WASHED OVER 7/10			
6/23/2005	NEST	R-34	NORTH LIDO PARK	34		BCH			WASHED OVER 7/9,7/11,8/27,8/29		0	83
6/25/2005	NEST	1130 BFD	RITZ-CARLTON BEACH CLUB	40		BCH			WASHED OVER 7/10	8/18/2005	5	85
6/28/2005	NEST	233 BFD	HOLIDAY INN	36		VEG						
6/28/2005	NEST	400 BFD	LIDO BEACH PAVILLION	38		VEG				8/18/2005	76	84
6/30/2005	NEST	323 BFD	SFR	37		VEG			ADULT DIS 6/30		4	110
6/30/2005	NEST	1800 BFD	L'ELEGANCE	42		BCH			WASHED OVER 7/9-10			
7/8/2005	NEST	925 S R-33	NORTH LIDO PARK	33	925	VEG			WASHED OVER 8/27,8/29			
7/13/2005	NEST	323 BFD	SFR	37		VEG					39	90
7/14/2005	NEST	195 S R-33	NORTH LIDO PARK	33	195	VEG					37	152
7/15/2005	NEST	1175 R-32	NORTH LIDO PARK	32		SW			WASHED OVER 8/29	9/14/2005	139	149
7/18/2005	NEST	144 S R-32	NORTH LIDO PARK	32	144	BCH			WASHED OVER 8/29	9/16/2005	25	96
7/21/2005	NEST	95 S R-33	NORTH LIDO PARK	33	95	VEG				9/13/2005	85	95
7/25/2005	NEST	R-34	NORTH LIDO PARK	34		BCH			WASHED OVER 8/27, DEP/ANTS (-8 EGGS) 9/21		4	93
7/30/2005	NEST	2201 BFD	SOUTH LIDO PARK	44		BCH		BOX		9/17/2005	77	99
5/21/2005	NNE	101 BFD	ST. ARMANDS TOWERS	36		BCH						
6/4/2005	NNE	407 S R-32	NORTH LIDO PARK	32	400	BCH						
6/15/2005	NNE	800 BFD	LIDO AMBASSADOR	38		ESC						
6/16/2005	NNE	800 BFD	LIDO AMBASSADOR	38		BCH						
6/20/2005	NNE	1104 BFD	LIDO SURF AND SAND	39		BCH						
6/22/2005	NNE	257 BFD	SFR	36		BCH						
6/28/2005	NNE	475 BFD	LIDO DORSET	37		BCH						
6/28/2005	NNE	700 BFD	LIDO BEACH CLUB	38		BCH						
7/3/2005	NNE	101 BFD	ST. ARMANDS TOWERS	36		BCH						
7/7/2005	NNE	101 BFD	ST. ARMANDS TOWERS	36		BCH						
7/7/2005	NNE	700 BFD	LIDO BEACH CLUB	38		VEG						
7/7/2005	NNE	2050 BFD	ORCHID BEACH CLUB	42		BCH						
7/12/2005	NNE	1800 BFD	L'ELEGANCE	42		BCH						
7/13/2005	NNE	1050 BFD	LIMETREE BEACH RESORT	39		BCH						
7/13/2005	NNE	1700 BFD	LIDO REGANCY	41		BCH						
7/13/2005	NNE	2050 BFD	ORCHID BEACH CLUB	42		BCH						
7/15/2005	NNE	220 S R-32	NORTH LIDO PARK	32	220	BCH						
7/15/2005	NNE	33 S R-34	NORTH LIDO PARK	34	33	BCH						
7/17/2005	NNE	R-34	NORTH LIDO PARK	34		VEG						
7/20/2005	NNE	507 S R-33	NORTH LIDO PARK	33	500	BCH						
7/20/2005	NNE	R-33	NORTH LIDO PARK	33		BCH						
7/20/2005	NNE	1148 BFD	SUN & SURF COLONY INC	39		BCH						
7/22/2005	NNE	1800 BFD	L'ELEGANCE	42		BCH						
7/26/2005	NNE	1800 BFD	L'ELEGANCE	42		BCH						
8/8/2005	NNE	363 BFD	SFR	37		BCH						

KEY:
BOLDED ROWS = Inside Project Area
 BFD = Ben Franklin Drive
 SFR = Single Family Residence
 LNE = Litarrintation
 BOXa = Boxed cage in place after production
 RELOCATEDa = Relocated after originally left in place
 NNE = Non-nesting emergence
 DEP = Depredation
 BCH = Open Beach
 ESC = Escarpment
 VEG = Vegetation
 RAC = Racoon

MOTU MARINE LABORATORY

Sea Turtle Monitoring, Nest Evaluation & Protection Measures for the Town of Lido Key, Year Two Post-Construction -New Pass Inlet Channel Maintenance Dredging with Beach Sand Placement on Lido Key 2005. November, 2005

APPENDIX B

DMC 05 06 30 01 542

Permit Holder Initials Year Month Day Dis. # by Day County Code

FWC MARINE TURTLE ~~PERMITTING~~ DISORIENTATION INCIDENT REPORT FORM

✓ FWI
✓ SRQ

If you have any questions please contact FWC at the Tequesta Field Laboratory (561) 575-5407 or in Tallahassee (850) 922-4330

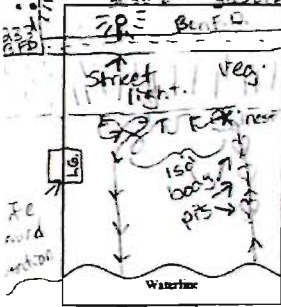
Turtle Permit #: 054 Date of Incident: 6/30/2005
 Observer's Name: Kaseen N. Darwin
 Telephone (include area code): _____
 Location of incident (address of source, beach name and/or nearest landmark): Ben Franklin Linc. through Ben Franklin Drive.
 City and County: (Lido Key) Sarasota, Sarasota County.
 Local nest ID# &/or zone nest was located in: 6/30 BFDW / zone 2
 Address/landmark ~~hatchlings~~ disoriented towards: She disoriented towards street light at BFD.

Was a probable/possible lighting source identified? YES NO
 If so, what type(s) of light(s) were identified? (please circle)
 parking lot _____ street light circled condominium (interior) _____
 dune crossover _____ single family home (interior) _____ condominium (exterior) Holladay I
 restaurant/bar _____ single family home (exterior) _____ sky glow/urban glow 233 BFD
 pier _____ other: _____

*If not, why?: (please circle) Too many lights present to determine No possible lights observed

Describe light source(s); include number & type of lights observed: There was one UN shielded street light at BFD was in front of where she tried to move landward. There were two exterior lights on the Holladay Inn to the north, but in street light.

Incident was documented during (circle one): morning survey night survey _____
 Was this a caged nest? YES _____ NO If yes, what type of cage? _____
 Was a temporary light barrier used (i.e. Silt screen)? YES _____ NO and in _____
 Was this a relocated nest? YES _____ NO tents;
 Was the incident photographed? YES NO _____ relative
 Was the nest located? YES NO _____ the area
 Was the nest excavated? No, Adult disoriented YES _____ NO
 If yes, how many hours after emergence? N/A



	LOGGERHEAD	GREEN	LEATHERBACK	UNIDENTIFIED
No. OF HATCHLINGS DISORIENTED	N/A	N/A	N/A	N/A
No. OF HATCHLINGS FOUND DEAD				
No. OF HATCHLINGS FOUND ALIVE				
No. OF DISORIENTED HATCHLINGS REACHING WATER				

Additional comments (please elaborate and use back if necessary): Turtle came up to the vegetation, nested, turned north and headed towards the street light crawling back and forth. She then turned back towards the water and looped around and went past towards the vegetation. She tried to enter the vegetation and a second time street light twice before the

Was local authority provided a copy of this report? YES NO _____
 If yes, please indicate person and city/county/state department report was copied to: Kenya Leonard, Sarasota, Sarasota County, FL.

Signature of Observer: Kaseen N. Darwin Date: 6/30/2005

DNR FWC 55-714 Revised 6/29/92, 11/22/94, 9/97, 1/99, 3/01, 11/01



P M C 05 07 31 01 STAR

Permit Holder Initials Year Month Day Dis. # by Day County Code

FWC MARINE TURTLE HATCHLING DISORIENTATION INCIDENT REPORT FORM

If you have any questions please contact FWC at the Tequesta Field Laboratory (561) 575-5407 or in Tallahassee (850) 922-4330

✓ FWC
✓ SRQ

Turtle Permit #: 054 Date of Incident: 7/31/05

Observer's Name: DRU LIEBLER

Telephone (include area code): _____

Location of incident (address of source, beach name and/or nearest landmark): _____

BEN FRANKLIN DRIVE (L'ELEGANCE)

City and County: SARASOTA SARASOTA

Local nest ID# &/or zone nest was located in: L100 ZONE 3 NEST# 6/4 1200BFDH

Address/landmark hatchlings disoriented towards: 1770 BEN FRANKLIN DRIVE AND SOUTH OF

NEST AREA AT 1700 BEN FRANKLIN DRIVE

Was a probable/possible lighting source identified? YES _____ *NO X

If so, what type(s) of light(s) were identified? (please circle)

parking lot _____ street light _____ condominium (interior) _____

dune crossover _____ single family home (interior) _____ condominium (exterior) _____

restaurant/bar _____ single family home (exterior) _____ sky glow/urban glow _____

pier _____ other: _____

*If not, why?: (please circle) Too many lights present to determine No possible lights observed

Describe lighting source(s); include number & type of lights observed: NO LIGHTS ON DURING

MORNING SURVEY

Incident was documented during (circle one): morning survey night survey

Was this a caged nest? YES ✓ NO _____ If yes, what type of cage? SELF-RELEASING

Was a temporary light barrier used (i.e. Silt screen)? YES _____ NO X

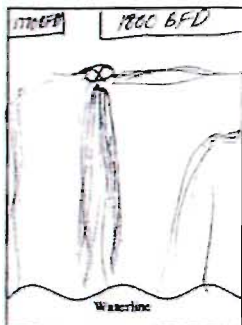
Was this a relocated nest? YES _____ NO X

Was the incident photographed? YES _____ NO X

Was the nest located? YES X NO _____

Was the nest excavated? YES X NO _____

If yes, how many hours after emergence? ~8



Sketch

	LOGGERHEAD	GREEN	LEATHERBACK	UNIDENTIFIED
No. OF HATCHLINGS DISORIENTED	UNKNOWN			
No. OF HATCHLINGS FOUND DEAD	2			
No. OF HATCHLINGS FOUND ALIVE	0			
No. OF DISORIENTED HATCHLINGS REACHING WATER	UNKNOWN - TOO MANY TRACKS OF TURTLES (CRABS, RACCOON)			

Additional comments (please elaborate and use back if necessary): FILE ANTS WERE INVADING BY
MORNING SURVEY AND EVIDENCE OF RACCOONS DIGGING AROUND CAGE.
111 EGG SHELLS COUNTED - 112 EMERGED ON THEIR OWN.

Was local authority provided a copy of this report? YES X NO _____

If yes, please indicate person and city/county/state department report was copied to: _____

MATE MUSTER, KENYA LEONARD (SARASOTA COUNTY), MEGAN (ANTI-FWC)

Kristal Johnson FOR DRU LIEBLER

Signature of Observer

7/31/05
Date

✓ FWC
✓ SAR



PMC-05-08-05-01-SAR

Permit Holder Initials Year Month Day Dis. # by Day County Code

FWC MARINE TURTLE HATCHLING DISORIENTATION INCIDENT REPORT FORM

If you have any questions please contact FWC at the Tequesta Field Laboratory (561) 575-5407 or in Tallahassee (850) 922-4330

Turtle Permit #: 054 Date of Incident: 8/5/05

Observer's Name: D. Leibler

Telephone (include area code): 407 388-4441 or 388-4331

Location of incident (address of source, beach name and/or nearest landmark):
Ben Franklin Drive

City and County: Sarasota, Sarasota

Local nest ID# &/or zone nest was located in: 413 FDAD

Address/landmark hatchlings disoriented towards:
Ben Franklin Drive

Was a probable/possible lighting source identified? YES *NO

- If so, what type(s) of light(s) were identified? (please circle)
- parking lot
 - dune crossover
 - restaurant/bar
 - pier
 - street light
 - single family home (interior)
 - single family home (exterior)
 - other: Bonfire
 - condominium (interior)
 - condominium (exterior)
 - sky glow/urban glow

*If not, why?: (please circle) Too many lights present to determine No possible lights observed

Describe lighting source(s); include number & type of lights observed:
remnants of bonfire

Incident was documented during (circle one): morning survey night survey

Was this a caged nest? YES NO If yes, what type of cage?

Was a temporary light barrier used (i.e. Silt screen)? YES NO

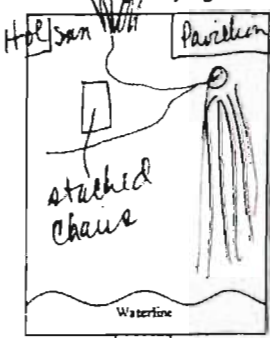
Was this a relocated nest? YES NO

Was the incident photographed? YES NO

Was the nest located? YES NO

Was the nest excavated? YES NO

If yes, how many hours after emergence?



Sketch

	LOGGERHEAD	GREEN	LEATHERBACK	UNIDENTIFIED
No. OF HATCHLINGS DISORIENTED	2			
No. OF HATCHLINGS FOUND DEAD	0			
No. OF HATCHLINGS FOUND ALIVE	0			
No. OF DISORIENTED HATCHLINGS REACHING WATER	0			

Additional comments (please elaborate and use back if necessary): No other visible light to the north. Hatchlings traveled north & after they departed at a stake on chair. One hatchling went into vegetation, another fell into water which was observed. Later in the day, a hatchling was found in the public pool at Aldo Parish and returned to beach as noted.

Was local authority provided a copy of this report? YES NO

If yes, please indicate person and city/county/state department report was copied to:

FWC, Meghan Conk
SAR, Kerissa Leonard

Signature of Observer: Ann Leibler et Date: 8/5/05



FWC
SAR

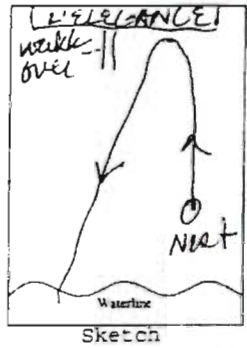
PME 09 08 06 02 SAR
Permit Holder Initials Year Month Day Dis. # by Day County Code

FWC MARINE TURTLE HATCHLING DISORIENTATION INCIDENT REPORT FORM

If you have any questions please contact FWC at the Tequesta Field Laboratory (561) 575-5407 or in Tallahassee (850) 922-4330

Turtle Permit #: 054 Date of Incident: 8/6/05
 Observer's Name: D. Liebler
 Telephone (include area code): 941 388-4331 or 588-4441
 Location of incident (address of source, beach name and/or nearest landmark): Ben Franklin Drive
 City and County: Santa Rosa County
 Local nest ID# &/or zone nest was located in: 41151800 BF-DAD
 Address/landmark hatchlings disoriented towards: same address due east of nest
 Was a probable/possible lighting source identified? YES X *NO
 If so, what type(s) of light(s) were identified? (please circle)
 parking lot street light condominium (interior)
 dune crossover single family home (interior) condominium (exterior)
 restaurant/bar single family home (exterior) sky glow/urban glow
 pier other:
 *If not, why?: (please circle) Too many lights present to determine No possible lights observed
 Describe lighting source(s): include number & type of lights observed:

Incident was documented during (circle one): morning survey night survey
 Was this a caged nest? YES NO If yes, what type of cage?
 Was a temporary light barrier used (i.e. Silt screen)? YES NO
 Was this a relocated nest? YES NO
 Was the incident photographed? YES NO
 Was the nest located? YES NO
 Was the nest excavated? YES NO
 If yes, how many hours after emergence?



	LOGGERHEAD	GREEN	LEATHERBACK	UNIDENTIFIED
No. OF HATCHLINGS DISORIENTED	1			
No. OF HATCHLINGS FOUND DEAD	0			
No. OF HATCHLINGS FOUND ALIVE	0			
No. OF DISORIENTED HATCHLINGS REACHING WATER	1			

Additional comments (please elaborate and use back if necessary):

Was local authority provided a copy of this report? YES NO
 If yes, please indicate person and city/county/state department report was copied to:
Melvin Cox FWC
Kristina Reynolds SAR
Paula Clark
 Signature of Observer Date 8/10/05

FWC
SAR



FWC 05 08 01 SAR

Permit Holder Initials Year Month Day Dis. # by Day County Code

FWC MARINE TURTLE HATCHLING DISORIENTATION INCIDENT REPORT FORM

If you have any questions please contact FWC at the Tequesta Field Laboratory (561) 575-5407 or in Tallahassee (850) 922-4330

Turtle Permit #: 054 Date of Incident: 8/6/05
Observer's Name: D. Kuebler
Telephone (include area code): 941 388-4441 or 388-4331
Location of incident (address of source, beach name and/or nearest landmark): _____

City and County: Sarasota, Sarasota
Local nest ID# &/or zone nest was located in: 6113 BFD PL
Address/landmark hatchlings disoriented towards: Toward Ben Franklin - 1

Was a probable/possible lighting source identified? YES *NO
If so, what type(s) of light(s) were identified? (please circle)
parking lot street light condominium (interior) *proach*
dune crossover single family home (interior) condominium (exterior)
restaurant/bar single family home (exterior) sky glow/urban glow
pier other: _____

*If not, why?: (please circle) Too many lights present to determine No possible lights observed
Describe lighting source(s); include number & type of lights observed: 1 could not see in AM but there are lights @ Tiki bar at Ritz. Possible interior lights at condo.

Incident was documented during (circle one): morning survey night survey
Was this a caged nest? YES _____ NO If yes, what type of cage? _____
Was a temporary light barrier used (i.e. Silt screen)? YES _____ NO
Was this a relocated nest? YES _____ NO
Was the incident photographed? YES _____ NO
Was the nest located? YES NO _____
Was the nest excavated? YES _____ NO



If yes, how many hours after emergence?

	LOGGERHEAD	GREEN	LEATHERBACK	UNIDENTIFIED
No. OF HATCHLINGS DISORIENTED	<u>2</u>			
No. OF HATCHLINGS FOUND DEAD	<u>0</u>			
No. OF HATCHLINGS FOUND ALIVE	<u>0</u>			
No. OF DISORIENTED HATCHLINGS REACHING WATER	<u>0</u>			

Sketch
Additional comments (please elaborate and use back if necessary): see reverse

Was local authority provided a copy of this report? YES NO _____
If yes, please indicate person and city/county/state department report was copied to: Meghan Court, FWC
Kendya Rowland, SAR

Signature of Observer: D. Kuebler / Paula Clark Date: 8/6/05

Ritter Bar
Tubi Bar
1234 BFD

the following
the following ground
no watching ground

marked
nest

wood
wall

fence

110000
1336 BFD
accused

back
were not
coming out of
nest - when
seen it had
gone up to
accused - had
walk and then
climbed up on
other side to end
and then turned
back north and
circled along wall
watching nest from