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COLLIER COUNTY
SEA TURTLE PROTECTION PLAN
ANNUAL REPORT – 2021

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Summary

Adult loggerhead emergences were recorded on Collier County beaches from April 29th through September 1st, 2021. A total of 930 nests and 929 false crawls were identified on Barefoot, Vanderbilt, Park Shore, City of Naples, and City of Marco Island beaches. Nest hatching occurred from June 30th through October 27th. A total of 64,681 hatchlings are presumed to have entered the Gulf of Mexico. This includes 64,049 that emerged on their own and 632 that were found alive in the nest and released. A total of 24 nests disoriented with and Marco Island beaches having the most disorientations 10 nests affected. Predator depredations affected 6.4% (60) of the nests. Most of these depredations occurred on Vanderbilt beach prior to the morning survey. Raccoon and armadillo depredations were responsible for most of the egg loss accounting for 70% of the depredations that occurred. Tidal inundations caused by Tropical Storms Elsa, Fred and Ida washed over 300 nests and washed out 59 nests. A total of 43 sea turtle strandings were recorded during the year. Overall, the 2021 sea turtle season was successful, with high emergence numbers and low storm damages.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ATV	All-Terrain Vehicle
CCCL	State Coastal Construction Control Line
DNR	Florida Department of Natural Resources (now called FWC)
FWCC	Florida Fish and Wildlife Conservation Commission
GPS	Global Positioning System
HWL	High Water Line
NAD	North American Datum
NERR	National Estuarine Research Reserve
NMFS	National Marine Fisheries Service
NOV	Notice of Violation
USFWS	United States Fish and Wildlife Service

SECTION 1

INTRODUCTION

Collier County is responsible for surveying 22.5 miles (36.2 km) of beach for sea turtle activities. The Sea Turtle Protection Program within the Collier County Parks and Recreation Division (CCPRD) monitored the entire 22.5 miles (36.2 km) of shoreline on Barefoot, Vanderbilt, Park Shore, City of Naples, and Marco Island beaches. The surveyed beaches not included in this report are Delnor-Wiggins Pass State Park (monitored by State Park Staff), Keewaydin Island (monitored by the Conservancy of Southwest Florida), Cape Romano Complex (monitored by Rookery Bay NERR), Coconut and Sea Oat Islands (monitored by Rookery Bay NERR), and the Ten Thousand Islands (monitored by the US Fish and Wildlife Service).

Coastal development and natural erosion have significantly reduced the number of suitable nesting beaches. Developed beaches used by nesting sea turtles can become hazardous to emerging hatchlings. Human disturbances on nesting beaches include human activity, artificial lighting, erosion induced by shoreline hardening with seawalls, rock revetments, beach renourishment, vehicular traffic on or near the beach, beach raking, pollution, shading of beaches by large buildings and exotic vegetation, beach furniture and recreational accessories, large holes left on the beach, as well as egg and hatchling predation associated with human activities. Sea turtles have encountered some or all these problems on many of Florida's beaches, including Collier County.

The purpose of the Collier County Sea Turtle Protection Program is to protect nests and collect data on sea turtle nesting and hatching activities, to fulfill permit requirements for beach raking and beach renourishment. Protecting sea turtle nests also allows beachfront property

owners to obtain permits for certain activities seaward of the State Coastal Construction Control Line (CCCL).

This report details the methods established by the CCPRD with updates based on the Florida Fish and Wildlife Conservation Commission - Marine Turtle Conservation Handbook (Rule 68E-1.004, 2016). The report includes an analysis of sea turtle emergences, effects of beach renourishment, historical trends, nesting and hatching, depredation, beach lighting, and stranding and salvage efforts. For more information on the biology, ecology, distribution, habitat, history, educational resources, laws and regulations visit myfwc.com/wildlifehabitats/wildlife/sea-turtle.

SECTION 2

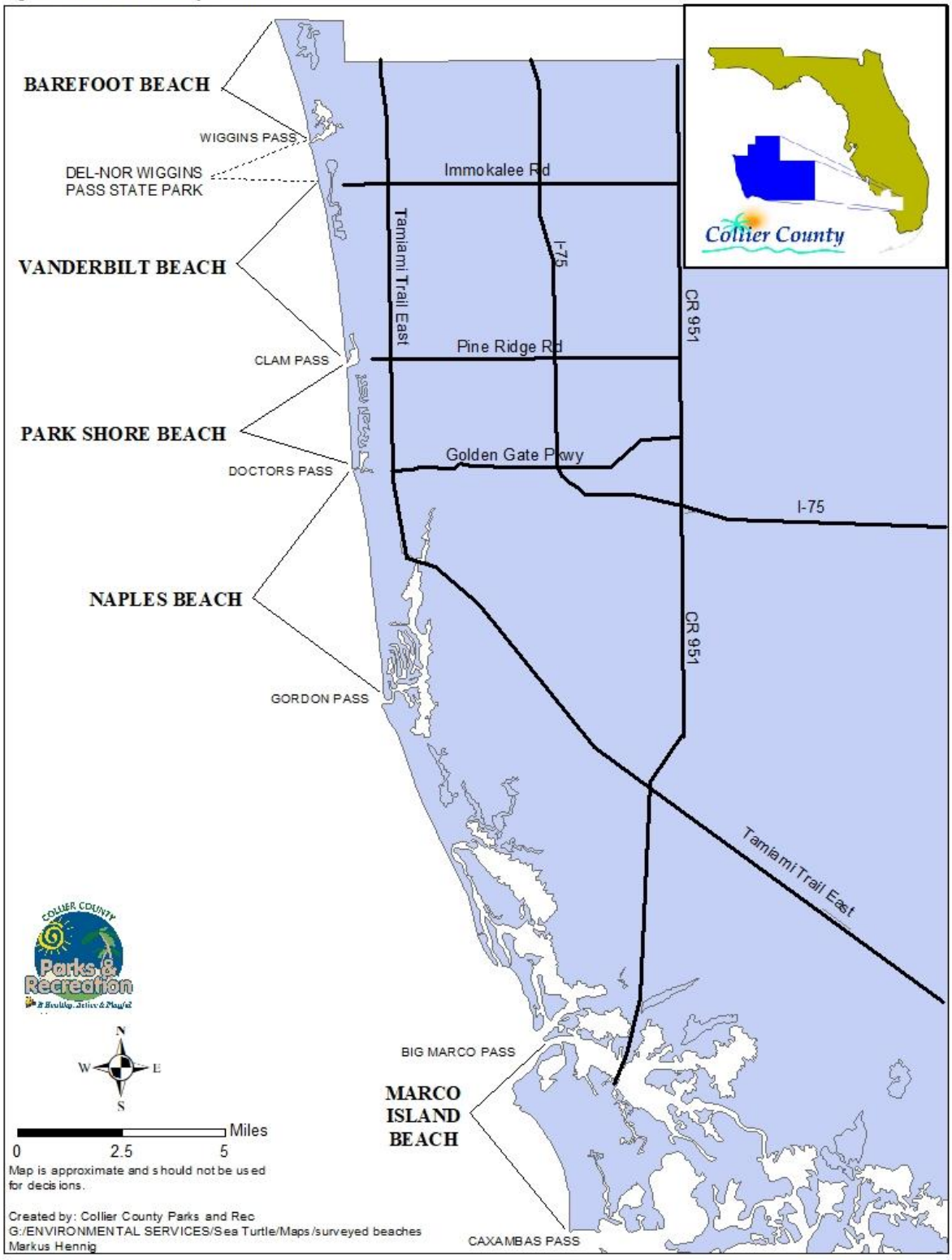
SEA TURTLE MONITORING PROGRAM

2.1. STUDY AREA

Collier County, Florida is the southern terminus of the southwest barrier island chain that begins at Anclote Key in Pasco County, 175 miles (282 km) to the north. The Collier barrier island coastline extends 37 miles (60 km) from the Lee/Collier County line, southward to Cape Romano. The beaches comprise a wide variety of physiographic types including a coastal headland, barrier beach ridge, barrier islands, migrating over-wash ridges, and a coastal cape. Ten major barrier beach units are recognized in the County, separated by nine tidal passes. Five of the ten barrier beach units are surveyed daily (May 01–October 31) for sea turtle activities including Barefoot, Vanderbilt (including Delnor-Wiggins Pass State Park), Park Shore, City of Naples, and City of Marco Island beaches (Figure 2.1.1.).

Since 1990, beach renourishment activities have occurred in Collier County. The following sections outline the renourishment areas which are reported to FWC and DEP as a permit requirement for beach renourishment. The reports include the last three years of data, DNR monument location, and sand source (hydraulic, mechanical, or upland) for each renourishment event. Hydraulic sand is transported by pipe from an offshore sand source or from a pass, with seawater as a transport medium. Mechanical sand is excavated from a pass, stockpiled, and spread onto the beach. Upland sand is trucked from an inland quarry source and spread onto the beach.

Figure 2.1.1. Collier County Beaches 2020



2.1.1. Barefoot Beach

Barefoot Beach is the northern-most beach unit in Collier County, which encompasses 3.1 miles (5.0 km) of barrier beach extending from the County line south to Wiggins Pass (DNR monument R-1 to R-16). The Barefoot Beach unit is surveyed for sea turtle activities in compliance with the Wiggins Pass Inlet Management Plan and to assist in the permitting process for the maintenance of Wiggins Pass. Table 2.1.1.1. summarizes the renourishment area currently reported on for Barefoot Beach.

Table 2.1.1.1. Barefoot Beach Renourishment.

Year	DNR Location		Sand Source	Cubic Yards	Linear Feet of Beach
2013	R-12 to R-15.5		Hydraulic	50,000	3,500

2.1.2. Vanderbilt Beach

The Vanderbilt Beach coastal barrier unit includes 4.7 miles (7.6 km) of beach from Wiggins Pass south to Clam Pass (DNR monument R-17 to R-41.5). The northern most mile of the Vanderbilt Beach unit, Delnor-Wiggins Pass State Park (R-17 to R-22.5), is surveyed for sea turtle activities by park staff. Vanderbilt Beach is surveyed for sea turtle activities to meet the permit requirements for beach restoration and beach raking. Table 2.1.2.1 summarizes the renourishment activity of Vanderbilt Beach currently being reported on.

Table 2.1.2.1. Vanderbilt Beach Renourishment.

Year	DNR Location	Sand Source	Cubic Yards	Linear Feet of Beach
2017	R-40 to R-41	Mechanical		1,000
2020	R-40+800 to Clam Pass	Mechanical		500
2021	R-40+800 to Clam Pass	Mechanical		500

2.1.3. Park Shore Beach

The Park Shore coastal barrier unit extends 3.2 miles (5.1 km) from Clam Pass south to Doctors Pass (DNR monument R-41.5 to R-57). Clam Pass County Park extends from Clam Pass southward approximately 2,000ft (640 m) to the Naples Cay development (R-42 to R-44.5). Park Shore Beach is monitored for sea turtle nesting activities to comply with beach renourishment and beach raking permit requirements. Table 2.1.3.1 summarizes the renourishment activity of Park Shore beach currently being reported on.

Table 2.1.3.1. Park Shore Beach Renourishment.

Year	DNR Monument	Sand Source	Cubic Yards	Linear Feet of Beach
2017	R-42 to R- 43	Mechanical		1,000
2018	R-42 to R-43.5	Hydraulic	8,500	1,500
2019	R-42 to R 54 + 400’	Upland	4,133	12,400

2.1.4. City of Naples Beach

The City of Naples beach unit encompasses approximately 5.6 miles (9.0 km) of shoreline from Doctors Pass south to Gordon Pass (DNR monument R-57 to R-89). To meet the beach renourishment program permit requirements, Collier County Parks and Recreation Division monitored the City of Naples beach for sea turtle activities for the 2021 season. Table 2.1.4.1. summarizes the renourishment history of the City of Naples beach.

Table 2.1.4.1. City of Naples Beach Renourishment.

Year	DNR Location	Sand Source	Cubic Yards	Linear Feet of Beach
2018	R57 to R61 + 800	Hydraulic	38,604	4,880
2020	R57 to R61 + 850	Upland		4,930
2021	R61 + 700 to R74 +400	Upland		12,700

2.1.5. City of Marco Island Beach

The City of Marco Island coastal barrier unit encompasses 7.1 miles (11.4 km) of beach, from inside Big Marco Pass [Hideaway Beach (DNR monument H-16 to H-1)] south to Caxambas Pass (DNR monument R-131 to R-148). The City of Marco Island is a highly developed beach with high-rise condominiums and hotels. This beach has been monitored for sea turtle activities since 1990 to comply with the permit requirements for beach renourishment and raking. Table

2.1.5.1. summarizes the renourishment activity of the City of Marco Island currently being reported on.

Table 2.1.5.1. City of Marco Island Beach Renourishment History.

Year	DNR Monument	Sand Source	Cubic Yards	Linear Feet of Beach
2019	H1 to H12 R135 to R141	Hydraulic Mechanical		11,000 6,000
2020	R 146 to R 148 to Caxambas Pass	Hydraulic		2,000

* Indicates an area within Hideaway Beach were the H-monuments are numbered consecutively from southwest to northeast.

2.2. METHODS AND MATERIALS

2.2.1. Reconnaissance Surveys and Beach Zoning

Pre-season reconnaissance surveys of the monitored beaches were conducted in April 2021. The objective of the surveys was to develop daily monitoring strategies, note the condition of the beaches, zone the beaches for management purposes, and conduct cone penetrometer readings to determine if the beaches required tilling pre-season.

Metal signs on 6’ metal posts were placed within the dune area in approximately 1,000 ft. increments from the Lee/Collier County line south to Marco Island at corresponding DNR survey markers. In addition, wooden stakes were installed 500 ft south of every DNR marker. Beaches were measured along the high tide line using a Rolatape measuring wheel.

2.2.2. Daily Monitoring

Daily surveys for sea turtle emergence activity were performed along the high-water line (HWL) utilizing all-terrain vehicles (ATVs) equipped with low-pressure tires. Upon discovery of an emergence, staff visually determined if the emergence resulted in a nest or a false crawl (non-

nesting emergence). A GPS reading was taken for each emergence location. Nests and false crawls were sequentially numbered and mapped on aerial photographs. Characteristics and measurements of the emergences were recorded on data sheets for evaluation.

All nests were marked with stakes, flagging tape, and a sign to provide protection and facilitate evaluations. Four 36-inch (91 cm) long wooden stakes were placed in the corners of each disturbed area. Yellow ribbon with the word "caution", was then placed around the stakes and a Sea Turtle Nest Sign (Figure 2.2.2.1.) was affixed to alert and direct beach rakers and the public away from nests. In addition, the stakes were marked with their direction (SW, NW, SE, NE) to facilitate clutch location if stakes were lost during storms.

Nests laid in areas known for high depredation, such as the undeveloped portions of Barefoot, Vanderbilt, and the Clam Pass Park area of Park Shore beach were covered with a protective screen or cage. Screening involved securing a four-foot (1.2 m) square wire mesh screen over the clutch with metal tent stakes. The 2 by 4-inch screen openings (5.1 by 10.2 cm) were large enough to allow the natural escape of hatchlings but were small enough to prevent most mammalian depredation. Nest cages were deployed on Barefoot and Vanderbilt beaches providing additional protection to the nests, by preventing predators from digging under the screen. Although cages cannot protect nests from inundation by high tides or fire ant predation, the incorporation of caging efforts has proven to be the most effective nest protection. Screened and caged nests were observed daily for evidence of predation. If a predator disturbed the sand under the screen, the sand was replaced, the area flattened out, and the event recorded. If fire ants were observed, they were gently swept off the nest.

2.2.3. Nest Monitoring and Evaluation

Daily monitoring for hatched nests began as the first nest approached the expected hatch date (approximately 60 days). All nests were observed for signs of hatching, such as an obvious depression in the sand or hatchling tracks around the nest. Each nest was excavated for evaluation approximately 72 hours (3 days) following signs of the first emergence, or in the case of unhatched nests, 70 days from deposition or 80 days if the nest was inundated from high surf, excessive rainfall, or shading.

Upon excavation, all contents of the egg cavity were removed by hand. The depth and width of the egg cavity was measured and recorded. Data from each nest evaluation was recorded on CCPRD Sea Turtle Nesting Forms. Empty eggshells accounted for live hatchlings that escaped from the nest and/or dead turtles, found within the nest. Unhatched eggs included undeveloped eggs, dead embryos, and eggs depredated prior to hatching. Pipped eggs refer to hatchlings (dead or alive) that puncture the eggshell but did not fully emerge from the shell. Unhatched eggs were opened and inspected to determine the stage of embryonic development at the time of death. If live hatchlings were found in the nest, they were either released immediately or transferred to a bucket of moist sand for night release, depending on the time of the day and the presence or absence of predatory birds in the area. Hatchling releases were conducted according to the Florida Fish and Wildlife Conservation Commission - Marine Turtle Conservation Handbook (Rule 68E-1.004, 2016).

Nests were also inspected for evidence of predation. If signs of predation were discovered, the information was recorded. The collection of predator data aids in quantifying and determining the extent of nest predation in Collier County. The data also helps to identify

ways to mitigate predation. Washed out nests and inundations were also recorded after storm events and extreme high tides.

2.2.4. Data Analysis

Sea turtle emergence and hatchling data were compiled using the relational database Microsoft Access. Maps were produced using ArcGIS10.1 and Collier County Property Appraiser's aerial photographs taken in 2021. Shoreline data and emergence locations were collected with a Garmin GPS 76 marine navigator. Graphs and plots were created using Microsoft Excel. Data was analyzed with personal computers utilizing Microsoft Excel and Microsoft Access.

Data was analyzed at each study area for factors relating to both nest and hatching characteristics. Nesting factors included nests per emergences (nesting success), emergences per mile (e/mi.), and nest placement characteristics. Factors relating to hatching success included location, incubation duration, egg counts, inundation, and depredation. Linear regression analysis was used to search for any factors directly affecting hatching success. Plots were prepared showing comparisons between and within study areas.

2.3. RESULTS AND DISCUSSION

2.3.1. Emergences

Sea turtles emerged on Collier County beaches from April 29, 2021, through September 1, 2021. A total of 1,859 emergences (930 nests and 929 false crawls) occurred along the 22.5 miles (36.2 km) of the daily surveyed shoreline. A breakdown of emergence activity for each beach is listed in Table 2.3.1.1. Aerial maps showing emergence location by beach are available as an additional appendix separate from this report. A comparison of nests and false crawls for each

beach segment is given in Figure 2.3.1.1. A breakdown of emergences per mile on each beach is illustrated in Table 2.3.1.1. Barefoot Beach had the most sea turtle activity with an average of 175 emergences per mile. Marco Island beach received the least activity with an average of 83 emergences per mile.

Table 2.3.1.1. Emergences, 2021.

	Barefoot	Vanderbilt	Park Shore	Naples	Marco	Total
Total Nests	266	209	141	215	99	930
Total False Crawls	276	222	135	135	161	929
Total Emergences	541	431	276	350	260	1859
Nest / Emergence (%)	49.1	48.5	51.1	61.4	38.1	50.0
Beach Length (mi.)	3.1	3.5	3.2	5.6	7.1	23.7
Emergences / mi.	175	123	86	62	37	83
Nests / mi.	86	60	44	38	14	41
False Crawls / mi.	89	63	42	24	23	41

Figure 2.3.1.1. Sea Turtle Emergences in Collier County, 2021.

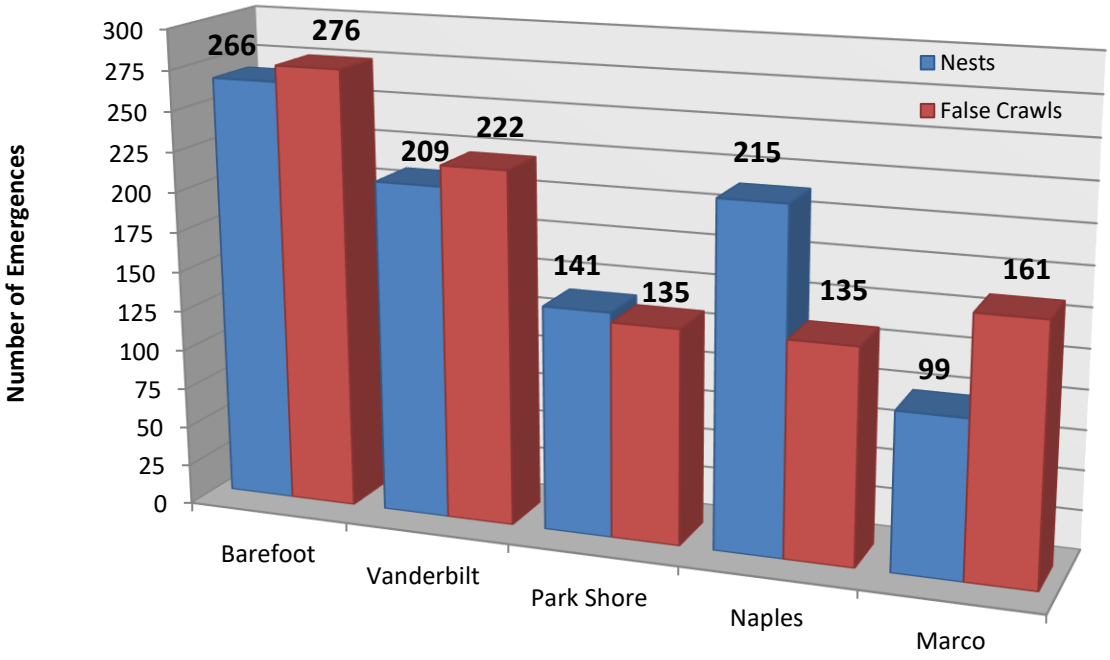


Figure 2.3.1.1. shows some variation in total nests and false crawls between beaches. This variation is difficult to explain since nest-site selection of the female turtle is still poorly understood. Some important factors include, but are not limited to beach compaction, artificial lighting, human activity, structures on the beach, and scarps.

Above normal beach compaction can impede nest excavation contributing to the rejection of a nesting site, thus increasing the number of false crawls and aborted egg cavities on renourished beaches (Raymond, 1984a; Nelson, 1991). Witherington (1991) found that the "presence" of lights in beach areas "sharply reduce" the number of sea turtles that emerge to nest. Human activities on the beach can also contribute to the disruption of nest site selection by adult sea turtles (LeBuff, 1990; Kraus, 1992). Obstacles in the paths of emerging turtles may contribute to the failure of a nesting attempt. These obstacles include, but are not limited to scarps, beach furniture, seawalls,

boardwalks, stairs, fences, pilings, groins, sandcastles, sand pits, standing water on the beach, dense roots, and boats stored on the beach.

Abandoned nesting attempts (false crawls) are a common occurrence for loggerheads and have been recorded at all nesting beaches (Dodd, 1988). Raymond (1984b) reported that on natural beaches, 38.6% to 61.9% of emergences resulted in false crawls. The 929 false crawls in Collier County, represents 50.2% of the total emergences.

It is possible that a limited number of false crawls occur from the female's instinctive preferences for a specific site. These are false crawls not provoked by human disturbance and interference; but by physical factors such as temperature, sand composition, and possibly other unknown characteristics.

2.3.2. Historical Trends

Marco Island beach was first surveyed for sea turtle activities in 1990, followed by Barefoot in 1991, and Clam Pass Park (from Clam Pass south to Seagate beach access) in 1992. In 1994, the "Collier County Sea Turtle Protection Program" was developed to survey mainland beaches in response to area-wide beach renourishment. Consecutive years of consistent data collection will assist biologists in detecting local population trends of sea turtles, and the local impacts of beach renourishment. Historical sea turtle emergences are presented in Table 2.3.2.1. and Figures 2.3.2.2. – 2.3.2.6. for all beaches.

Figure 2.3.2.1. Historical Trends of Sea Turtle Nests and False Crawls (FCs), 1994 – 2021.

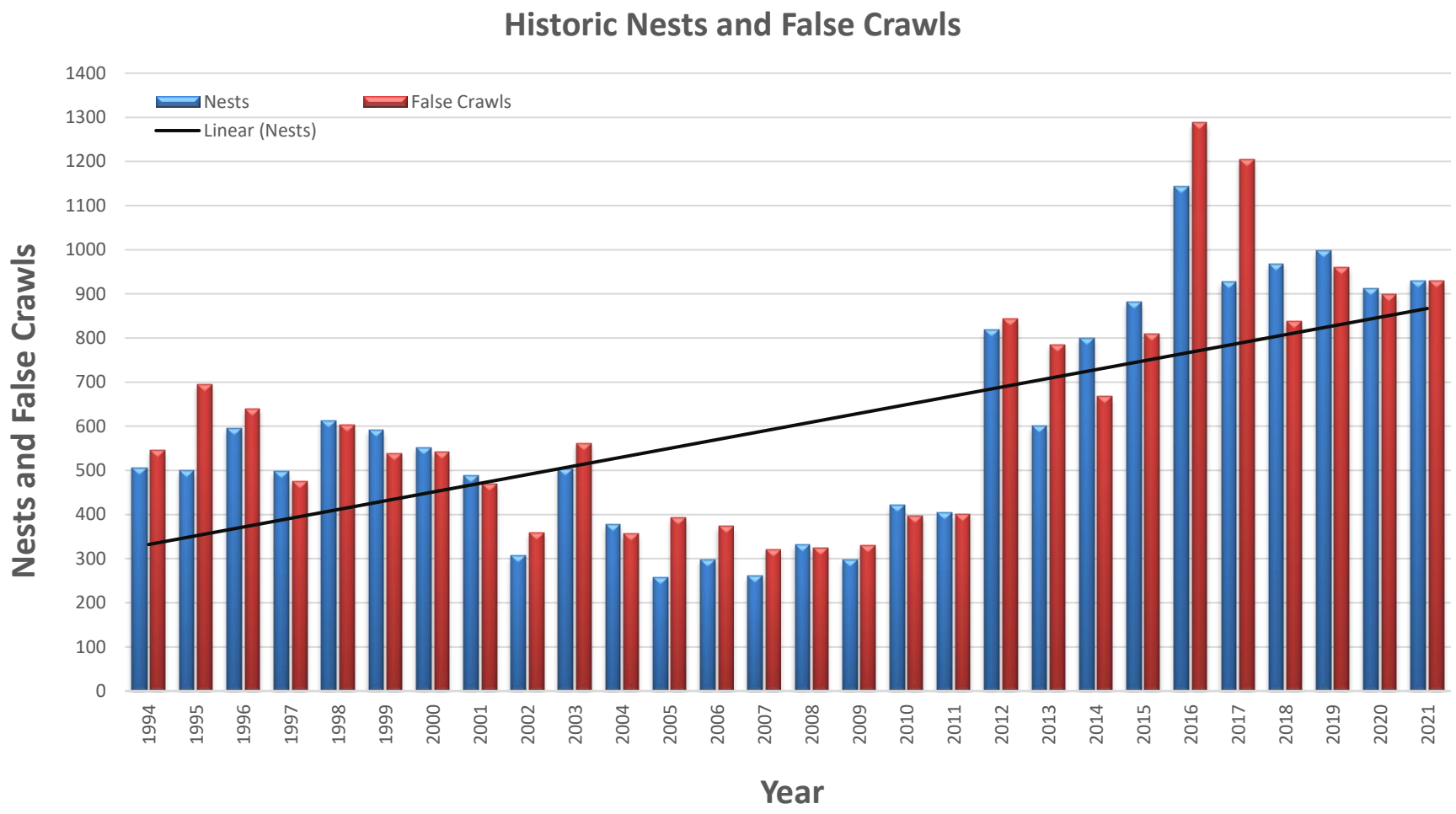


Figure 2.3.2.2. Barefoot Annual Emergences, 2011 – 2021.

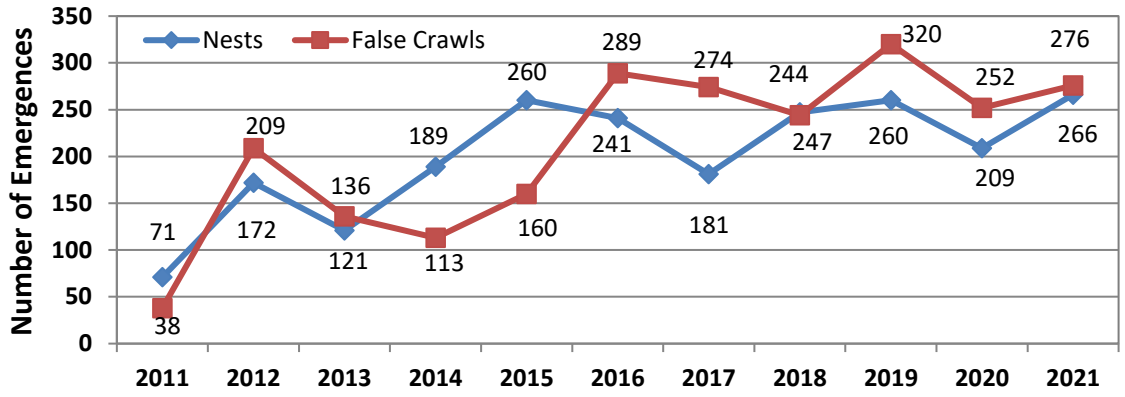


Figure 2.3.2.3. Vanderbilt Beach Annual Emergences, 2011 – 2021.

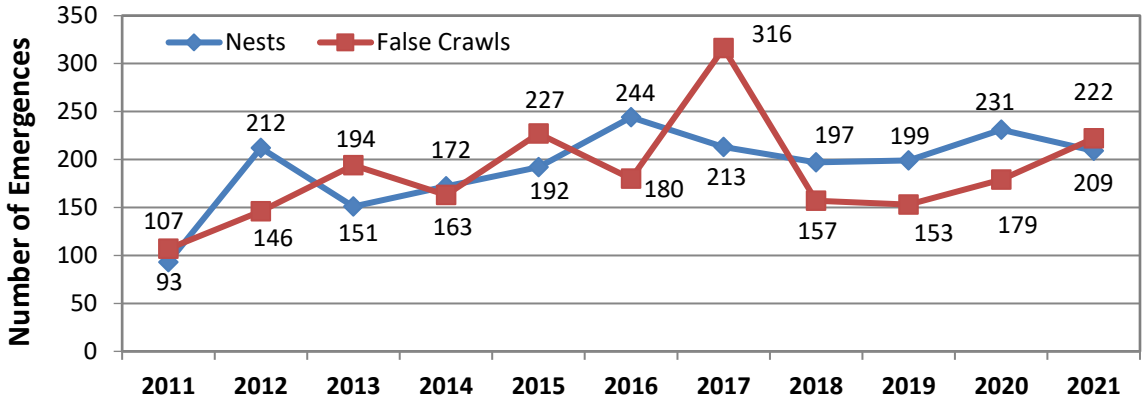


Figure 2.3.2.4. Park Shore Beach Annual Emergences, 2011 – 2021.

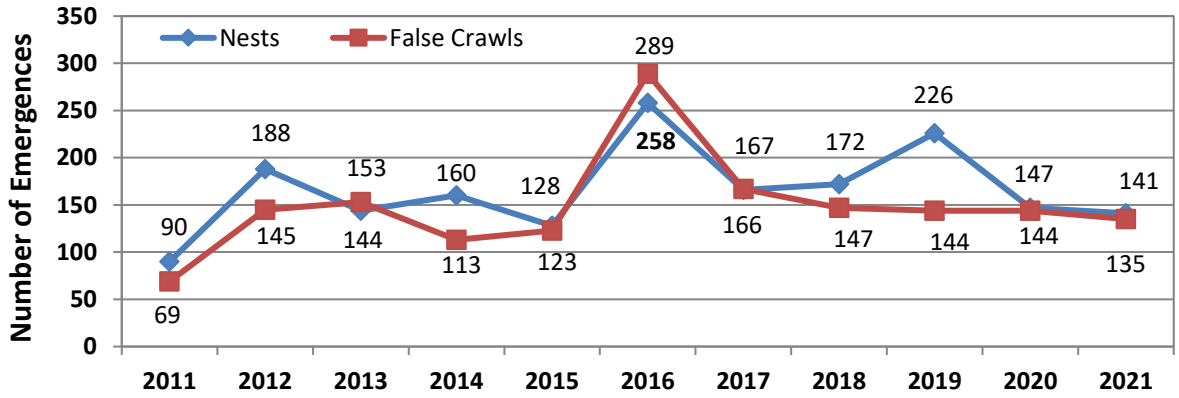


Figure 2.3.2.5. City of Naples Annual Emergences, 2011– 2021.

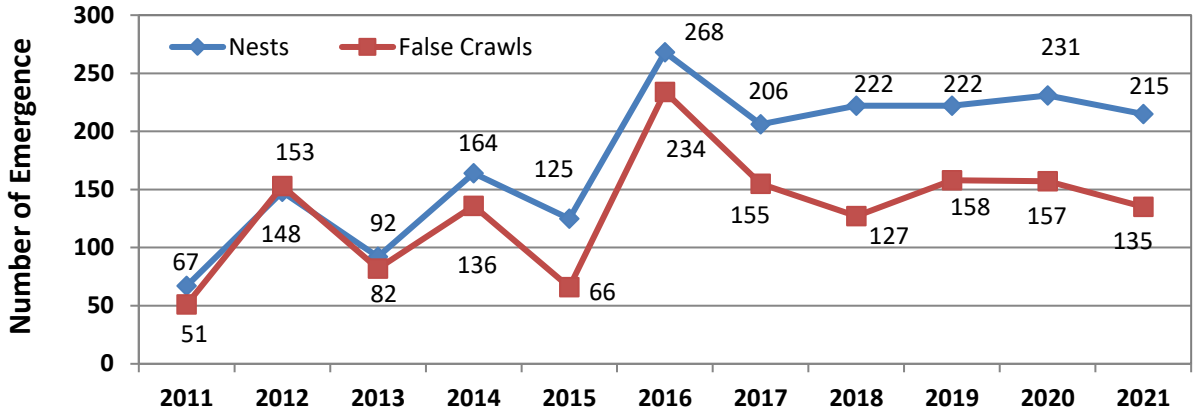
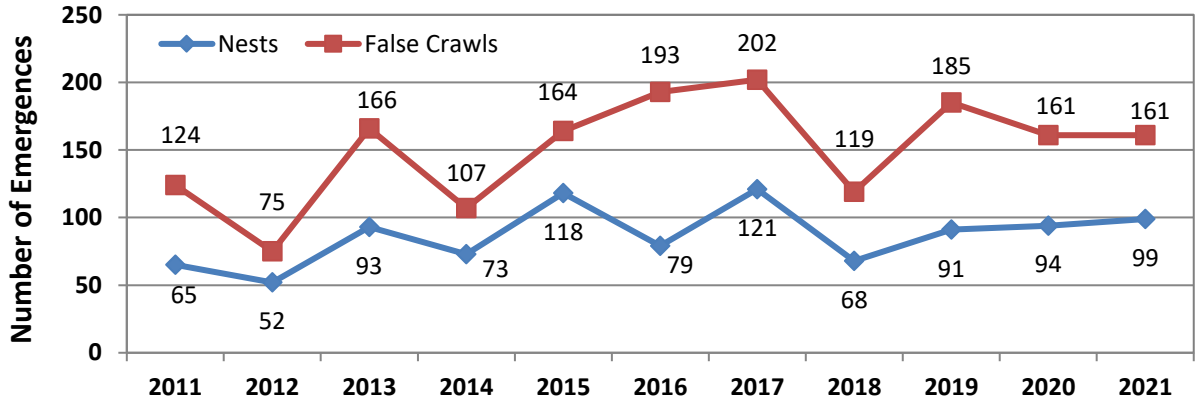


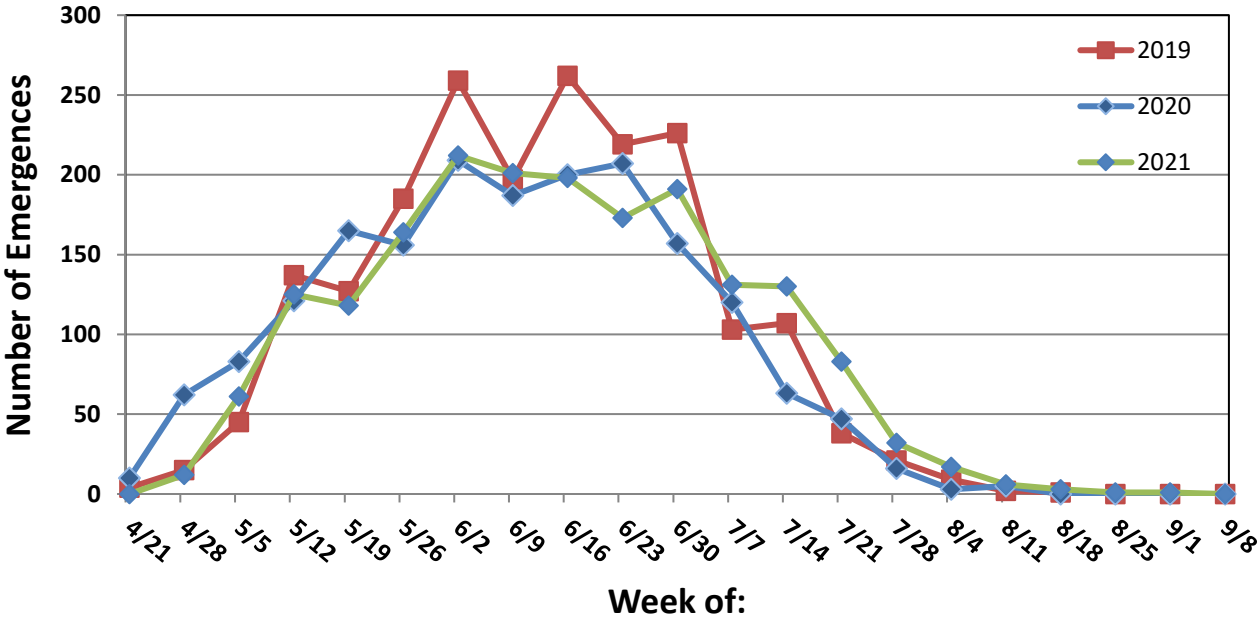
Figure 2.3.2.6. City of Marco Island Annual Emergences, 2011 – 2021.



2.3.3. Weekly Emergence Analysis

Sea turtle weekly emergence (nest and false crawls) trends are depicted in Figure 2.3.3.1. for 2019-2021. There are typically two peaks of sea turtle emergences for each season. This season's peaks occurred in the first and the second week of June.

Figure 2.3.3.1. Collier County Emergences per Week, 2019– 2021



2.3.4. Hatching Evaluation

In 2021, 930 nests were marked for evaluation. Of these nests, the CCPRD evaluated 806. Fifty-nine (6.3%) were lost due to storms during the 2021 season. Tidal flooding inundated 300 (32.2%) nests. Tidal flooding and washed-out nests combined accounted for 359 (38.6%) of all nests compared to 34.1% in 2020.

The average number of eggs per nest (clutch size) was 101 (range = 26 –166). Loggerhead sea turtles average 110 to 120 eggs per nest throughout their range, but the clutch size is highly variable (Ernst *et al.*, 1994).

Table 2.3.4.1. Collier County Mean Clutch Size, 2021.

	Barefoot	Vanderbilt	Park Shore	Naples	Marco
Mean Egg Count / Nest	103	100	97	102	106

A total of 81,766 eggs were deposited into the evaluated nests and 63,6781 hatchlings are presumed to have entered the Gulf of Mexico (Table 2.3.4.2.). The total number of hatchlings that entered the Gulf of Mexico includes 63,049 that emerged on their own and 632 that were found alive in the nest cavity.

Table 2.3.4.2. Nest / Hatchling Evaluations by Beach Unit, 2021.

	Barefoot	Vanderbilt	Park Shore	Naples	Marco	Total
Total Nests	266	209	141	215	99	930
Lost Nests	3	8	15	24	9	59
Total Eggs	26,318	19,109	11,275	16,992	8,072	81,766
Emerged Hatchlings	20,944	12,636	9,035	13,765	6,669	63,049
Hatchlings Alive in Nest	276	97	70	135	54	632
Hatchlings Dead in Nest	147	260	61	71	204	743
Undeveloped Eggs	2,383	2,188	942	1,432	521	7,466
Dead Embryos	2,395	1,673	946	1,182	455	6,651
Predated Eggs	36	2,208	26	134	11	2,415
Pipped Live Eggs	14	6	7	10	2	39
Pipped Dead Eggs	118	37	85	278	156	674
Total Hatch Success	81%	68%	82%	82%	86%	78.9%
Total Hatchling Emergence Success	80%	66%	80%	81%	83%	77%

Unhatched eggs (14,117) were opened to identify fertility and embryonic development. Dead embryos (651) comprised 47.1% of the unhatched eggs, depredated eggs (2,415) made up 17.1%, and the remaining 35.8% were labeled as undeveloped (7,466) due to lack of evidence of

embryological development. The undeveloped eggs may be a result of infertility or early embryological death

Table 2.3.4.3. Hatching and Emergence Success in Natural and Renourished Sand, 2021.

Natural Sand or Renourishment Type	Natural	Renourished	Overall
Mean Hatching Success	77.5%	80.1%	77.9%
Mean Emergence Success	75.7%	78.2%	76.1%

Table 2.3.4.4. Summary of Natural Beaches vs Renourished Beach Areas, 2021

	Natural Beaches	Renourished Beaches	All Beaches
Beach Length (mile)	15.15	7.35	22.5
Nests	774	156	930
Nests Per Mile (mean)	47	21.5	41.3
False Crawls	745	184	929
False Crawls Per Mile (mean)	45.3	25.4	41.3
Mean Incubation (days)	64	64	64

2.3.5. Nest Predation

Depredation by raccoons (*Procyon lotor*), ghost crabs (*Ocypode quadrata*), armadillos (*Dasypus novemcintus*), roots and crows affected 6.5 % of all nests (n=60). Most depredations occurred on Vanderbilt Beach, where 39 nests (18.6%) were depredated. Of the 81,766 eggs deposited in 2021, 2,415 (2.9%) were lost to predators, which represents an increase in overall percentage from 2,187 (2.8%) in 2020. Table 2.3.5.1 provides a breakdown of egg predation during 2021.

Table 2.3.5.1. Egg Depredation in Collier County, 2021.

Predator(s)	Number of Eggs Taken	Percentage By Predator
Armadillos	1,251	51.8
Raccoons	635	26.3
Armadillos and Raccoon	250	10.4
Crow	141	5.8
Unknown	100	4.1
Roots	30	1.2
Ghost Crabs	8	0.4
Total	2,415	100

SECTION 3

BEACH LIGHTING

Artificial lighting on nesting beaches, distant sources of illumination ("city glow") and other sources of light pollution can interfere with the normal nesting behavior of sea turtles and cause hatchling orientation problems. Light pollution has been proven to discourage sea turtles from emerging out of the water to nest (Witherington, 1996). The negative effects of artificial lights on hatchling sea turtles are well documented (Daniel and Smith, 1974; Dickerson and Nelson, 1989; Witherington, 1990). Artificial lighting interferes with a hatchling sea turtle's ability to correctly orient, causing them to crawl towards sources of the light pollution (disorientations). Disorientations affect sea turtles by leaving them vulnerable to dehydration, exhaustion, and predation (Witherington, 1999). Hatchling loggerhead turtles appear to be more susceptible to disorientation on wider beaches where nests are placed further from the vegetation, implying a protective benefit of the dune vegetation, by shading landward light sources.

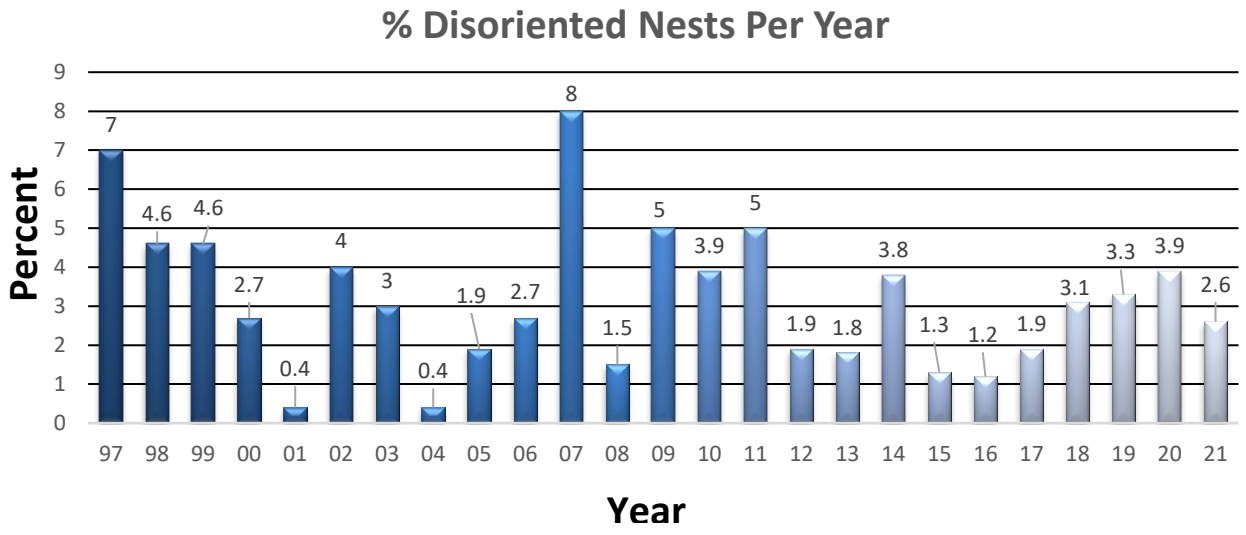
In accordance with the Collier County Land Development Code Sec. 3.04.00 "Protection of Endangered, Threatened or Listed Species", CCPRD manages a beach lighting compliance program developed to minimize the damages caused by light pollution. The program is composed of an annual mail-out prior to season, night lighting compliance inspections, violation notices, and code enforcement action. The City of Naples and Marco Island manage similar programs in accordance with Code of Ordinances Chapter 52 and Chapter 54 respectively.

Throughout sea turtle nesting season (May 01 – October 31), the CCPRD, Collier County Code Enforcement, City of Naples and Marco Island staff conduct monthly lighting compliance

inspections. When a violation is identified, efforts are made to work with the property managers and owners to correct the problem. Violations with no attempt to correct are sent to Collier County's Code Enforcement Department for formal action.

By working with property owners, managers, and renters, the beach lighting program decreased the amount of hatchling sea turtles affected by light pollution. In 1996, County staff documented 42 disorientations (7% of the nests), since that time the number of disorientations has decreased. In 2021, there were 24 disorientations (2.6 % of the nests).

Figure 3.1. Disoriented Nests per Year by Percent in Collier County, 1997–2021.



In addition to documenting lighting violations, CCPRD staff also recorded objects left on the beach that could be an obstacle to nesting and hatchling sea turtles. The Collier County Land Development Code section 10.02.06 requires that any structure such as beach umbrellas and furniture not requiring a building permit, be removed nightly from the beach. Objects left on the beach over-night were documented and a NOV sticker adhered to the object to inform the owner of the need for furniture or equipment to be removed.

SECTION 4

SEA TURTLE STRANDING AND SALVAGE PROGRAM

Stranded sea turtles are those which wash ashore or are found floating, dead, or alive in a weakened condition. In 2021, 43 sea turtles were reported stranded along the Collier County coastline (Figure 4.2). Strandings occurred from January to December except for October and November where no strandings were reported (Figure 4.1).

Figure 4.1. Collier County Monthly Sea Turtle Strandings, 2021.

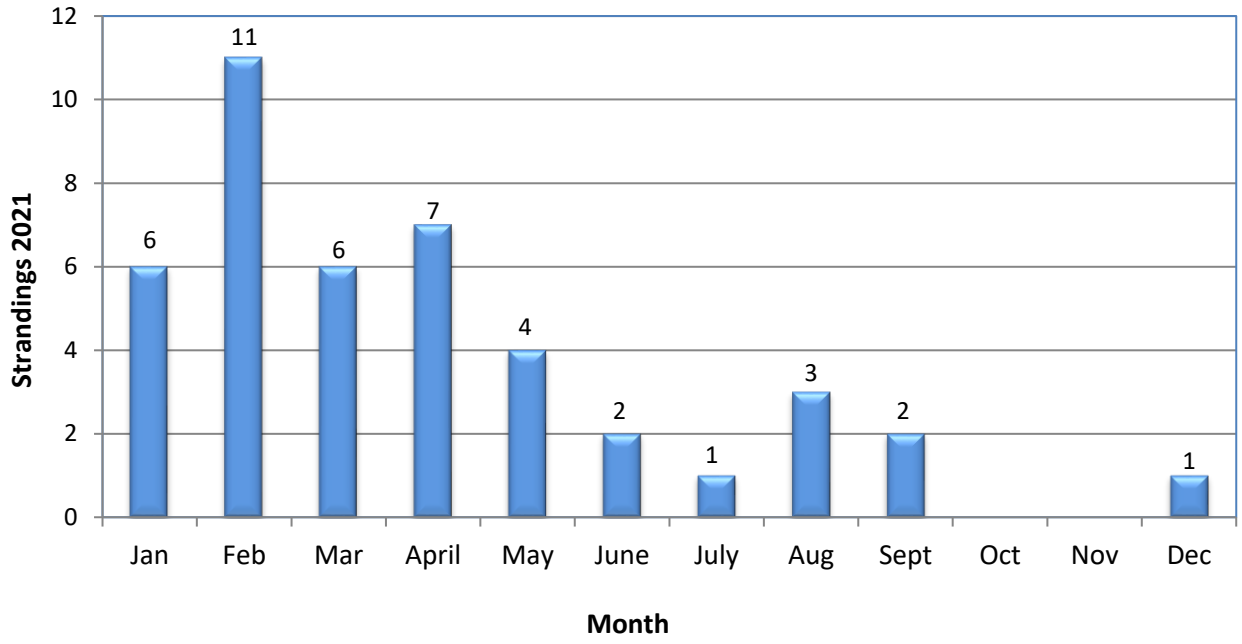
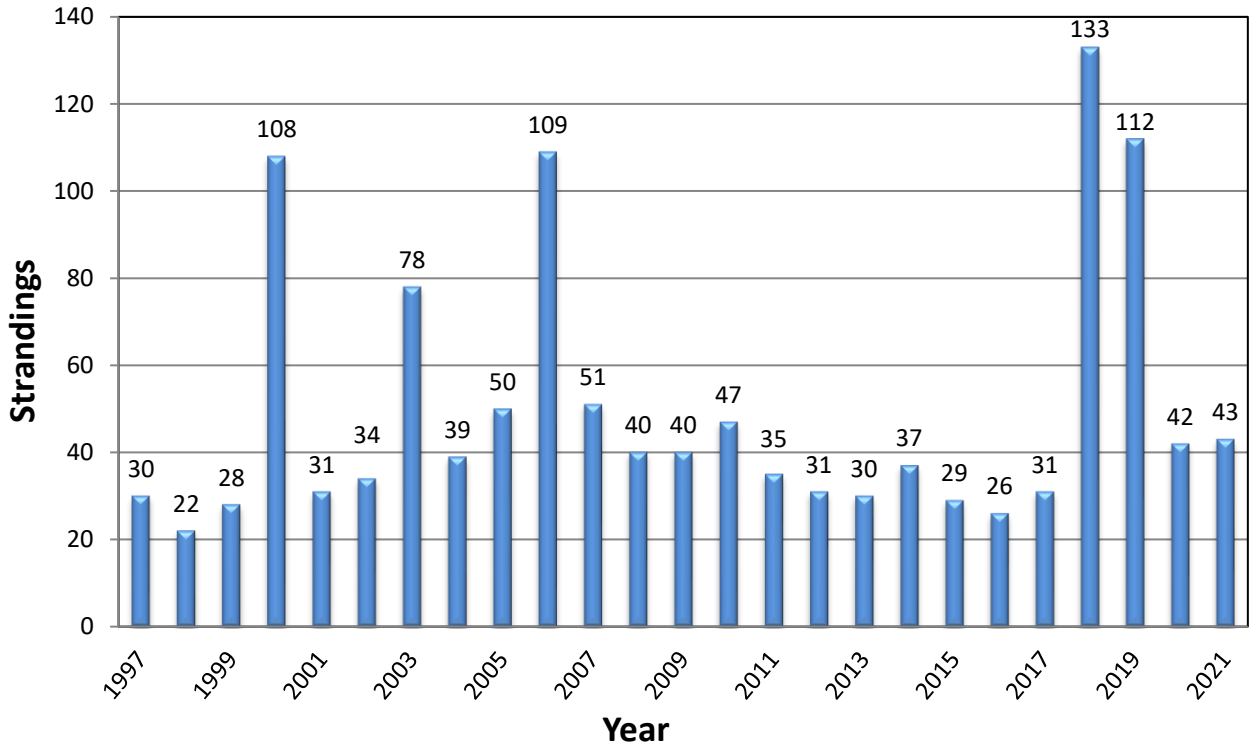


Figure 4.2. Collier County Sea Turtle Strandings, 1997-2021.



Strandings in 2021 included loggerheads (27), Kemp's ridleys' (5), green sea turtles (9), hawksbill (1) and one unidentifiable due to decomposition and missing body parts. Injuries and abnormalities of dead and live sea turtles ranged from boat and/or obvious propeller damage with visible markings or hull paint (6), shark bites (11), boat and shark (2), fishing line and cast net entanglement (2), boat and fisheries interaction (1) and injuries due to dredging operation interactions (3). The remaining turtles either had no obvious cause of death or were too decomposed to assess.

Sea turtle strandings occurred throughout coastal Collier County on beaches (37) including Barefoot Beach (7), Vanderbilt Beach/ Delnor Wiggins (5), Park Shore/Clam Pass Park (8), City

of Naples (8), Marco Island (9), Keewaydin Island (2), the Cape Romano Complex (1) and 10,000 Islands (1). Six (6) were found, floating inshore, in bays or canals.

Increased public awareness of the reporting requirements may result in better coverage for the STSSN. Stranding and salvage personnel are not in the field daily outside of the nesting season and rely on the FWCC and the public for stranding locations. Stranded sea turtles outside the developed beaches may not be found or reported, some are lost at sea, and others buried by persons unfamiliar with the reporting procedures.

The Collier County Parks and Recreation Division responded to 39 of the 43-sea turtle strandings. Rookery Bay NERR responded to 3 strandings, and the Conservancy of Southwest Florida staff responded to 1 stranding,

SECTION 7

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