

**Marine Turtle Monitoring and Management at Gulf Islands
National Seashore, Florida District**
2021 Annual Report



ON THE COVER

Green Marine Turtle Nest at Gulf Islands National Seashore

Photography by NPS Volunteer/Lauren Campanella

Marine Turtle Monitoring and Management at Gulf Islands National Seashore, Florida District

2021 Annual Report

Jennifer Manis and Kelly Irick

National Park Service
Gulf Islands National Seashore
1801 Gulf Breeze Parkway
Gulf Breeze, FL 32563

Please cite this publication as:

Manis, J. and K. Irick. 2021. Marine Turtle Monitoring and Management at Gulf Islands National Seashore: 2021 Annual Report. National Park Service, Gulf Islands National Seashore, Gulf Breeze, FL.

December 2021

U.S. Department of the Interior
National Park Service

Table of Contents

.....	1
Executive Summary	5
Acknowledgements	6
Introduction	6
Protection and Monitoring Methods.....	7
Results and Discussion	9
2021 Park Totals and Historical Context.....	9
COVID-19.....	15
Tropical Weather	16
Depredation and Predation Management	17
Obstructed Nesting Attempts.....	19
Disorientations and Lighting Issues	20
Strandings	23
Roadways and Roadkill	24
Outreach	24
Management Recommendations	24
Maps	27
Literature Cited	36

Executive Summary

The Florida District of Gulf Islands National Seashore (GUIS) manages federally protected marine turtle species that nest within the coastal dune system, and persist within the waters managed by the park. There are four Endangered Species Act (ESA) listed marine turtle species that occur in northwest Florida; loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*) and leatherback (*Dermochelys coriacea*). While all four may be present within the waters at any given time of the year, historically, the majority of nests laid at GUIS are loggerhead. Greens and Kemp's ridleys have regularly been documented nesting in lower numbers, and leatherbacks are extremely rare. Nesting generally occurs from May 15 through August 30, and hatchlings are possible on the landscape until October 31.

Loggerhead:

- 33 nests were observed along with 52 false crawls
- 16 nests were inventoried, with a 53% hatchling emergence rate park-wide
- 15 nests were completely washed away by storms, 1 nest was lost to predation, and 1 nest could not be relocated for inventory due to sediment accretion
- Predominant nest predators were ghost crab and coyote
- Disorientations were documented on 9 adult nesting emergence events, and 4 nest hatchling events, impacting approximately 107 hatchlings overall
- 4 strandings were documented in park waters adjacent to managed lands
- 3 Obstructed Nesting Attempts were documented

Green:

- 9 nests were observed along with 4 false crawls
- 3 nests were inventoried, with a 30% hatchling emergence rate park-wide
- 6 nests were completely washed away by storms, and no nests were lost to predation
- No nest or egg predators were documented
- No disorientations were documented on green adult nesting females or hatchlings
- 4 strandings were documented in park waters adjacent to managed lands

Kemp's Ridley:

- No nests or false crawls were observed this season
- 4 strandings were documented in park waters adjacent to managed lands

Leatherback:

- No nests or false crawls were observed this season
- No strandings were observed within park waters
- Only 2 nests have been confirmed within the FL district since surveys began in the mid-1980s

In Total:

- 42 nests were observed along with 56 false crawls
- 19 nests were inventoried, with a 50% hatchling emergence rate park-wide
- 21 nests were completely washed away by storm events, 1 nest was completely predated, and only 1 nest could not be located to inventory due to sand accretion
- 9 adult nesting emergence events, and 4 nest hatchling events were documented as disoriented
- 12 strandings were documented in FL district waters adjacent to managed lands

Acknowledgements

Special thanks are given to Science and Resource Stewardship staff (SRS) for their continued dedication to the protection and monitoring of marine turtle nesting at the park. Their morning patrols and time spent documenting marine turtle activity allowed for invaluable data to be gathered and used towards marine turtle conservation, management and education. Special thanks go to SRS Volunteers-in-Parks (VIPs) who donated 1,248 hours of their time during the 2021 season: Tom Anderson, Kim Carmody, Cindy Marvel, Robin Marvel, Cheryl Mannel, Wendy Hoeflich, Melanie Waite, DJ Zemenick, Lauren Campanella, Emily Hoeflich, and Clifford Richardson.

A special note of recognition to the SRS Scientists-in-Park (SIP) Interns, Jordan Wingate and Philip Iversen, who worked with complete commitment to marine turtle conservation and data collection. University of West Florida intern Madison Richert was also a substantial help in filling the gaps between SIP interns and VIPs on morning surveys. Thanks should also be extended to NPS employees that assisted this season, including Joseph Burgess, Ashley Warren, Kris Dudus and Kacey Srubas.

Introduction

Gulf Islands National Seashore (GUIS) Florida District is located in the northeastern portion of the Gulf of Mexico and provides miles of prime beach nesting habitat for federally protected marine turtles. These turtle species include the loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) which are federally-designated as threatened under the U.S. Endangered Species Act (ESA), and less commonly the Kemp's ridley (*Lepidochelys kempii*) and leatherback (*Dermochelys coriacea*) marine turtles, which are federally-designated as endangered. In Florida, the Florida Fish and Wildlife Conservation Commission (FWC) issues permits for activities involving interactions or research with marine turtles, their nests, eggs, hatchlings, or their parts under the Marine Turtle Protection Act, Florida Statute 379.2431 (1). FWC also has authority granted to them through a Cooperative Agreement with the U.S. Fish and Wildlife Service (USFWS) under Section 6 of the ESA for such authorizations. The conservation activities specified within this report were authorized under Marine Turtle Permit (MTP) 240.

Loggerhead marine turtles are by far the most common nesting turtle species found at GUIS. The genetic population utilizing park lands and waters has been designated as the Northwestern Florida Genetic Subunit. While overall numbers of nests are low in the panhandle in comparison to peninsular Florida, this genetic diversity is crucial to preserve an overall healthy and resilient population in the Atlantic Ocean (Shamblin et. al, 2010). Currently, only the Perdido Key Johnson Beach unit is designated as Nearshore Critical Habitat by USFWS for the loggerhead, even though comparable nesting is documented at the two other coastal Florida units.

Green turtles are the next most common nesting marine turtle species in the Florida District. The animals nesting at the park belong to a population classed as the Northwest Florida Genetic Subunit. Even though numbers are low, this genetic population is vital to the overall recovery goals outlined for the species. The Nearshore Critical Habitat outlined by USFWS is in the process of being updated and may or may not include park lands in the future. While other marine turtles occasionally nest on park beaches, this report will focus on the two species that nested in 2021, which only includes the loggerhead and green turtles.

The Gulf Islands SRS Team has the primary responsibility for the conservation, protection and documentation of nesting and hatching marine turtles within the delegated boundaries of the seashore. The Marine Turtle Program, comprised each year of staff, interns and volunteers, has tracked and documented marine turtle nesting beginning in the mid-1980s and attempts at systematic daily nesting season surveys began in 1994. This document summarizes biological data and associated management actions in 2021 for all nesting marine turtles and strandings documented at the park.

Protection and Monitoring Methods

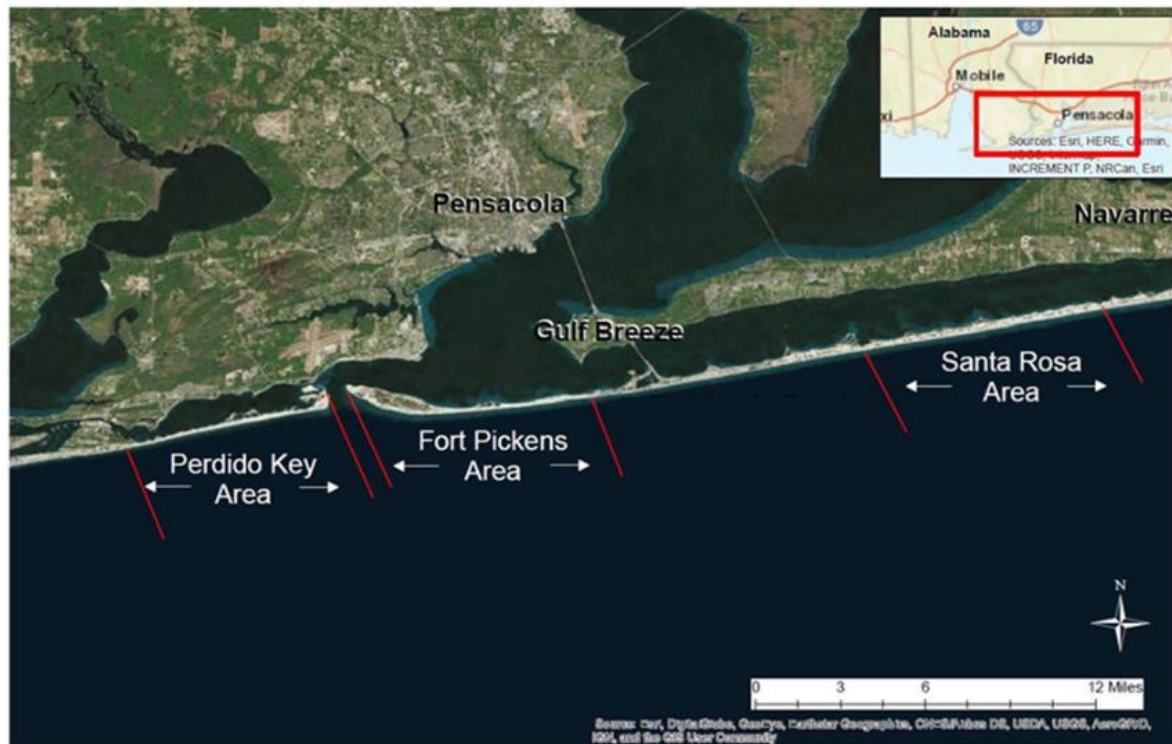


Figure 1: Site Map of Marine Turtle Study Areas.

The GUIS Marine Turtle Program followed the monitoring and protection methods outlined in FWC's *Marine Turtle Conservation Handbook* (2016) in addition to the *Marine Turtle Training and Protocol Manual Gulf Island National Seashore Florida Unit 2021 Edition*, and Scientific Collection and Research Permit #GUIS-2021-SCI-0013. All methods outlined in park specific documents followed FWC's conservation handbook to remain in compliance with the permitting guidelines.

GUIS conducted authorized marine turtle activities along approximately 35.7 kilometers (22.2 miles) of shoreline within the Florida District of the park. This district is located near Pensacola Beach, Florida along the northeast Gulf of Mexico and is comprised of three distinct units: Perdido Key, Johnson Beach (PK), Fort Pickens (FP), and Santa Rosa (SR) (Figure 1). The PK unit is approximately 11.2 kilometers (7 miles), the SR unit is approximately 12.2 kilometers (7.6 miles), and the FP unit is approximately 12.3 kilometers (7.6 miles) in length. All of the above-described units are part of the FWC Fish and Wildlife Research Institute (FWRI) Statewide Nesting Beach Survey program (SNBS) and SR is also part of the Index Nesting Beach Survey (INBS) program. Each program has specific training, guidance, and reporting

requirements from the FWC's Marine Turtle Protection Program. SNBS and INBS surveys have different goals and different approaches as specified.

Under SNBS, daily morning surveys were conducted at the three units seven days a week except for official park closures due to hurricane impacts or storm related road closures. A typical morning survey consisted of two surveyors arriving at each unit prior to first light and being on the beach with the UTV as soon as the sun was beginning to rise. Authorized drivers would begin their search for turtle crawls by driving east until they hit the eastern park boundary, then back west to survey the remaining park lands, then back east to the shop to clean equipment. The only discrepancy is PK, where the western section is completed first to catch tracks prior to visitor footprints erasing the crawl evidence. These surveys, depending on what tasks were being completed, lasted anywhere from 2 to 4 hours. On occasion, weather conditions including rough surf and high tides prevented surveyors from completing portions of their route or the entire survey itself. Missed days were documented with FWC at the end of the season for SNBS, and monthly for INBS protocols. Proper INBS protocols were followed to compensate for missed survey data at Santa Rosa.

In the 2021 season, surveys to document nests and false crawls began May 1 which is FWC's recommended start date for the Florida panhandle. Beginning the first week of August, hatchling tracks and evidence of nest hatching events were also documented by morning surveyors. These efforts represent a substantial amount of time, on average 1200 hours by VIPs alone over roughly 140 days. In 2021, VIPs logged 1248 hours with a majority of that time spent on morning surveys, nest inventories and the documentation of disorientation events. Daily surveys officially ended September 1, and Monday, Wednesday, Friday surveys took place from September 2 through October 14. As all nesting at a site was confirmed as complete, surveys would end as morning patrols were no longer necessary. FWC's recommended earliest end date for the Florida panhandle is August 31 with the season officially ending October 31.

Data this season was collected using Samsung tablets and the program Survey 123 through ArcGIS Online (AGOL) for each nest, false crawl, and nest inventory that was conducted. Information collected for each emergence included species, incident type (nest or false crawl), crawl width, and location defined as 1) proximity to beach markers and 2) GPS positioning of all nests at the clutch location using an R1 Trimble receiver. GPS positions were also recorded for unusually long, obstructed or disoriented crawls through the Collector App. All Survey 123 and Collector data was populated on AGOL weekly so biologists could see what nests or false crawls happened where in relative real time. New this season, FWC shifted their data collection for disorientations and obstructed nesting attempts (ONA) from paper data sheets that needed to be emailed to the MTP@myfwc.com email address, to Survey 123. Stranding reports also were shifted to a virtual data sheet through an FWC run website: seaturtlestranding.com. Because staff and VIPs were already comfortable with utilizing Survey 123 from last season, this shift in data collection methods was seamless for the monitoring team.

Temporary posting to protect turtle nests in 2021 consisted of four wooden posts (1"x 2"x 5') and hemp rope installed as soon as the clutch location was identified. Clutches were not confirmed through digging, but through educated guesses based on the turtle's crawl and camouflaging evidence. To keep posting consistent, all nests were marked in a square shape with the front right post containing a GUIS approved sign, and sharpie notes documenting the assigned nest number. No dates were written anywhere visible to the public to avoid potential nest sitting activities (Figure 2). Rope and wooden posting supplies were donated by USFWS to bolster the park's supply cache, and signs were donated by FWC.



Figure 2: Example of temporary posting used to protect marine turtle nests in 2021.

COVID-19 impacted marine turtle nesting training by preventing large in-person gatherings. Trainings where all volunteers and staff can gain hands on experience at the survey sites were avoided to maintain the safety of personnel. Three remote training classes were conducted in mid-April where methodologies were reviewed through a PowerPoint slide show and team discussion. An updated field guide was also provided as a reference for volunteers and staff members to have in hand while in the field (*Gulf Islands National Seashore, Marine Turtle Monitoring Field Guide, 2021*). Volunteers new to the program received additional one on one training by SRS staff in the field at survey sites throughout the season. To further comply with COVID protocols, all surveyors were required to use face coverings, utilize hand sanitizer, and follow UTV cleaning protocols to lessen exposure risks while conducting surveys.

Results and Discussion

2021 Park Totals and Historical Context

Patrols for the 2021 season began May 1 and ended parkwide October 14 providing a total of 42 documented nests within the GUIS boundary. For loggerhead nesting, PK recorded 21, FP recorded 5 and SR recorded 7 nests. Green turtle nests were recorded at all locations this season with PK recording 1, FP with 2, and SR with 6 as seen on Table 1. All nests recorded were left in situ, and no nest relocations were conducted in 2021.

The average number of nests for GUIS since daily surveys began in 1994 is 44.3 nests per season. A positive linear trendline indicates that the amount of nesting at GUIS is predicted to increase over time, but the low R2 value shows little confidence in that trendline fit (Figure 3). As these species continue to recover Atlantic wide, it is assumed that nesting numbers will increase over time at all Florida beaches.

Species	Study Area			Total
	PK	FP	SR	
Loggerhead Nests	21	5	7	33
Green Nests	1	2	6	9
Kemp's Ridley Nests	0	0	0	0
Leatherback Nests	0	0	0	0
Total	22	7	13	42

Table 1. 2021 nesting numbers by species at each GUIS study area in FL. In total, 42 nests were documented this nesting season.

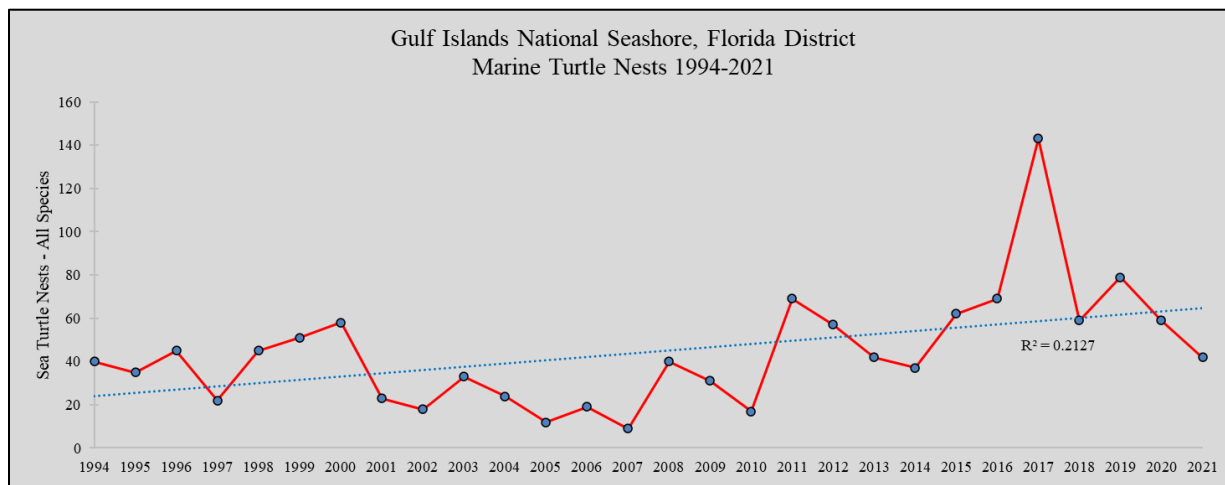


Figure 3. Marine turtle nesting (all species) in FL at GUIS over time starting 1994. The linear trendline indicates that nesting will increase over time but the confidence in this R2 value is low. With such limited numbers of nests each year, this data set cannot be used with confidence to predict future nesting at the park.

Breaking the data down further by species shows that Loggerhead nesting accounts for the vast majority of the nests documented at GUIS since regular surveys began in 1994. Figure 4 shows the proportion of nesting species over time at GUIS separated by species.

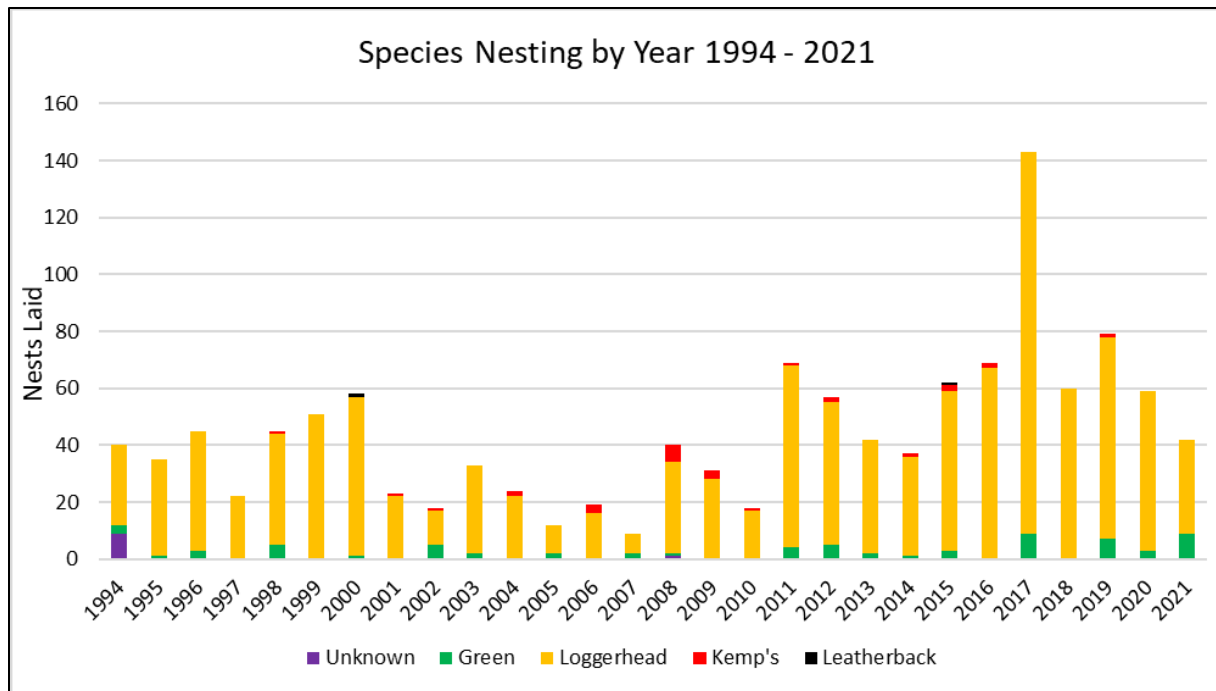


Figure 4. Species nesting by year at GUIS from 1994 to 2021. Loggerheads make up the majority of nesting at the park every year.

A total of 42 nests were documented this season along with 56 false crawls, yielding a beach success of 43% (Figure 5). The beach success average since 2000 is 49.3%, therefore 2021 provided a somewhat below average year. A high beach success percentage is anticipated for a National Seashore that is maintained to be as natural as possible, therefore a beach success percentage over 50% is ideal for this property. This would mean that false crawls would be equal to, or less than the total amount of nests laid. Unfortunately, we documented more false crawls than nests this season, and found no glaring reasons for this increased number of false crawls.

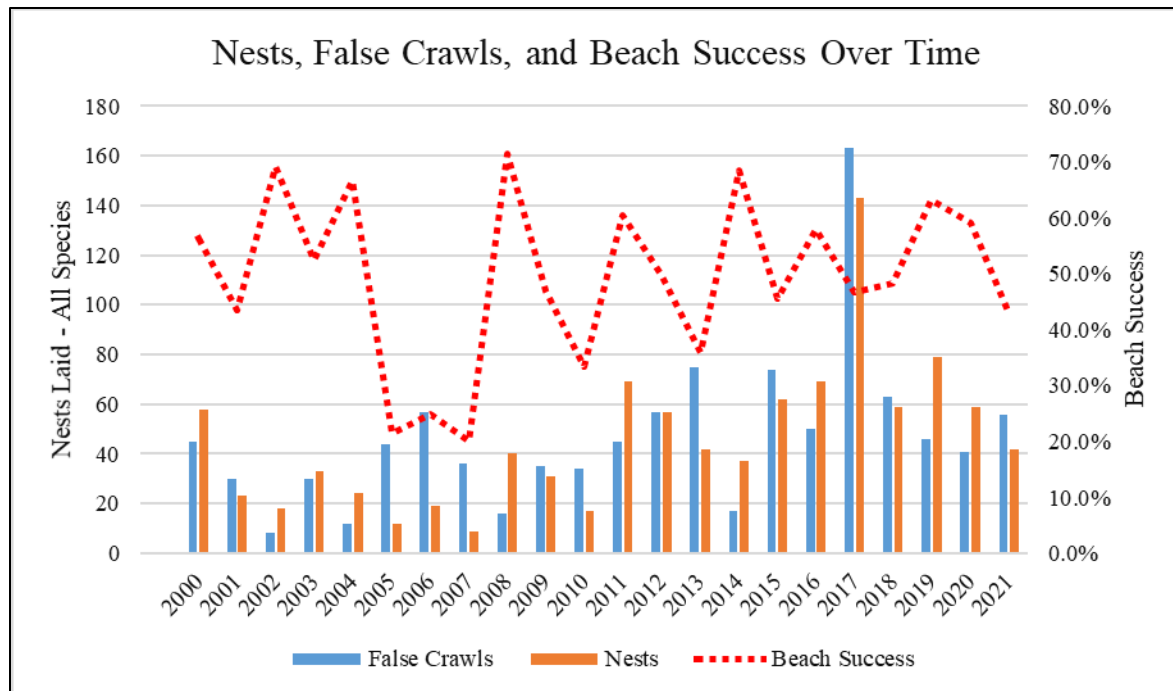


Figure 5. Nests and false crawls over time, with beach success percentages shown with the dotted red line dating back to 2000. This success percentage is calculated as $(\text{Nest}/(\text{Nests} + \text{False Crawls}) = \text{Beach Success})$.

The first nests of the season were laid at PK and FP on May 27. The final documented nest of the season was laid on August 14 at PK. Based on historical data seen in Figure 6, to capture the majority (86%) of the earliest and latest marine turtle nests at the park, daily surveys should begin May 15 and end August 31. To capture 93% of the historical first and last nests laid, surveys would need to begin May 9 and end Sept. 3. Lastly, to record 100% of all historical nests documented at the park starting in 1994, surveys would need to begin May 3 and end Sept. 6. Based on information gathered the past three years, it seems to best benefit the park if surveys begin on May 1 as outlined by FWC, and end either August 31, or when all identified nests at the park are documented as complete. This not only ensures that all nests are captured in our data collection period, it also allows for surveyors to become familiar with their sites and equipment before the season becomes busy with turtle crawls.

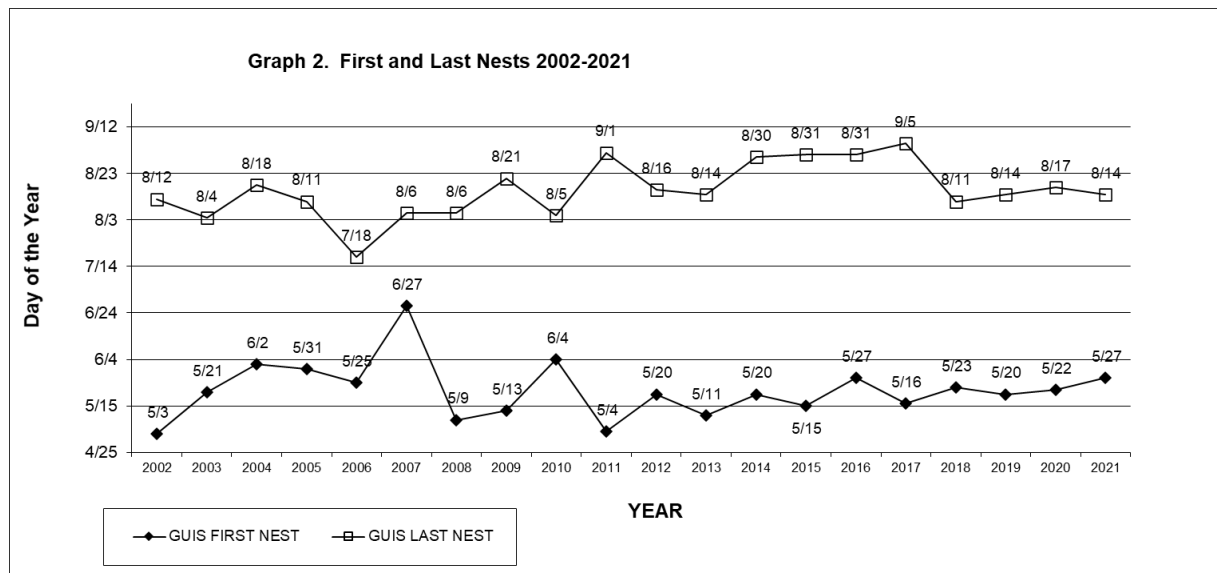


Figure 6. Historical nesting dates from 2002 to 2021. The data set goes back to 1994 but is best visualized with 20 years of data.

The average clutch size of all assessed nests this season (19 total) was 106 eggs, ranging from 75 – 154 eggs per nest. Broken down by species, only 3 inventoried nests were from green marine turtles with an average of 136 eggs per nest. Loggerheads account for 16 of the inventoried nests and have an average clutch size of 101 eggs. On average for the species, greens lay 110-115 eggs per clutch and loggerheads will average 100-126 eggs per clutch (NMFS and USFWS 1991), therefore the number recorded at GUIS are average. One large green nest (154 eggs) skewed the green clutch size average, but the loggerhead numbers fall within the normal range.

Documenting dates nest are laid plus when hatchlings first emerge allows for program staff to determine incubation rates for the nests that successfully hatch on our beaches. The mean incubation rate is of interest due to the context of global climate change and overall increasing air temperatures over time. In 2021, staff were able to record the incubation time of 10 nests and documented an average incubation of 65 days. This average does not include nests that were left until the 70-day mark for inventory. This subset only includes known hatch days where staff could accurately determine total incubation time for a nest, meaning they recorded a hatching event and knew when the nest was laid. As seen in Figure 7, incubation times for nests laid at GUIS have fluctuated over time. Because incubation times are directly related to temperature, it is assumed that increased air temperatures will lessen incubation times. A linear trendline on this dataset shows a progressive downward slope of incubation days albeit poorly fit with an R2 value of 0.18. With a small dataset, it's difficult to determine future incubation rates for the species overall based solely on GUIS nesting, but it is generally thought that incubation times will decrease as air temperatures increase. Because marine turtles have temperature-dependent sex determination (TSD), it is possible that more female hatchlings will be present as air temperatures rise globally.

It's possible that incubation times were higher this year than 2020 due to the amount of rain received in June, July, and August. Currently 2021 is sitting at 20" over the average rainfall amount for the year, and that's not including the month of December (Figure 8). Increased rainfall can lengthen the incubation time of turtle nests due to lowered temperatures experienced by the eggs (Laloë J-O et. al, 2021). In the

face of climate change and higher air temps, extreme rain events may combat the future anticipated issue of all female clutches due to these extreme temperatures.

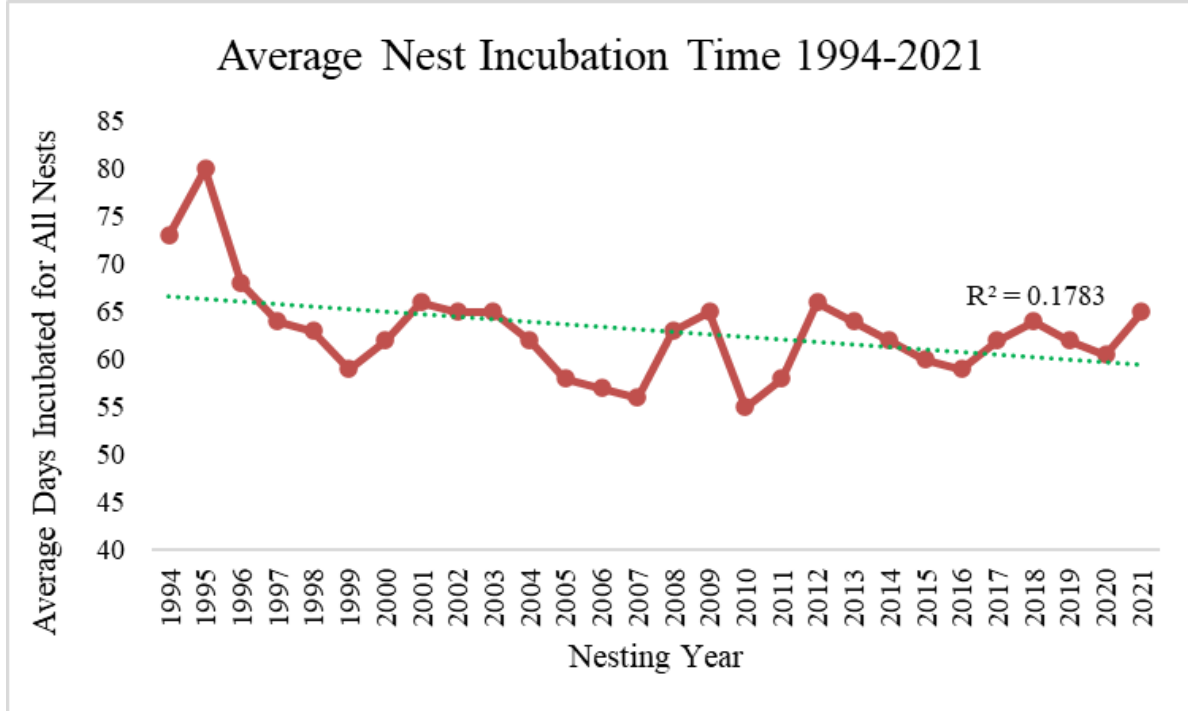


Figure 7. Average incubation times for all species at all locations at GUIIS. Each year provided between 6 to 102 nests to calculate averages from. A poorly fitted linear trendline shows a gradual decrease in incubation days over time.

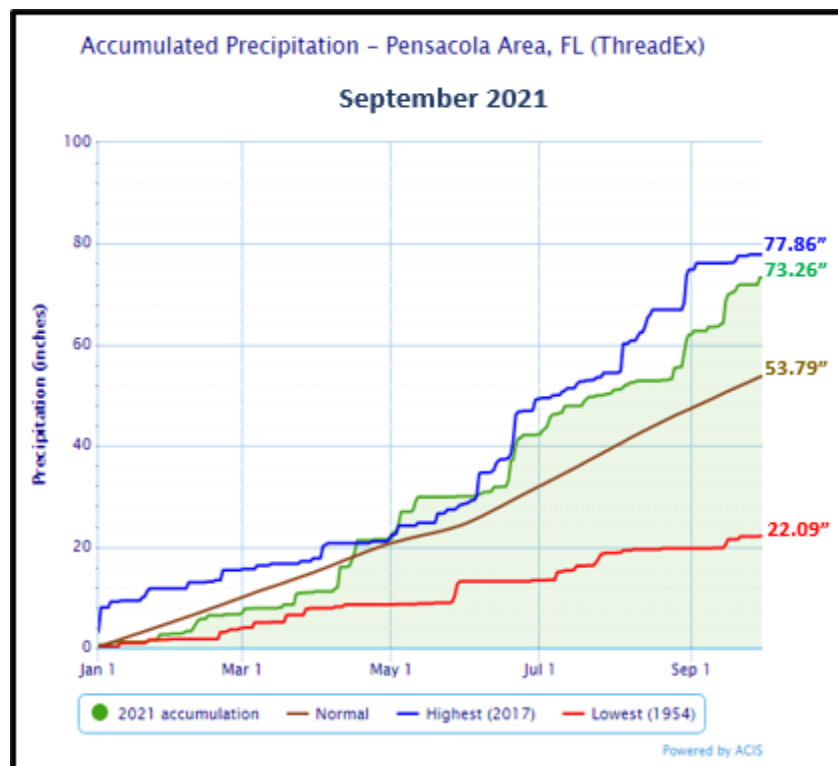


Figure 8. 2021 Accumulated Precipitation in Pensacola Area. The brown line is the climate normal period, and is calculated from 1991-2020 rainfall, and the climate record period is from 1879-2021.

The mean hatch success rate of inventoried nests was 56% for 2021 (Figure 9). This annual hatch rate is slightly below the GUIS average of 60%, stretching back to 1996 when consistent inventories began. While only 19 of the 42 nests on GUIS were inventoried due mainly to storm washouts, the nests that made it through the storm laden season had fairly good odds of a successful hatching. The emergence success rate was lower at 50%, likely due to multiple nests becoming inundated by storm high tides as they were hatching. Broken down by species, loggerheads experienced a 61% hatchling success rate and a 53% emergence success rate while greens only documented a 29% hatchling and emergence success rate.

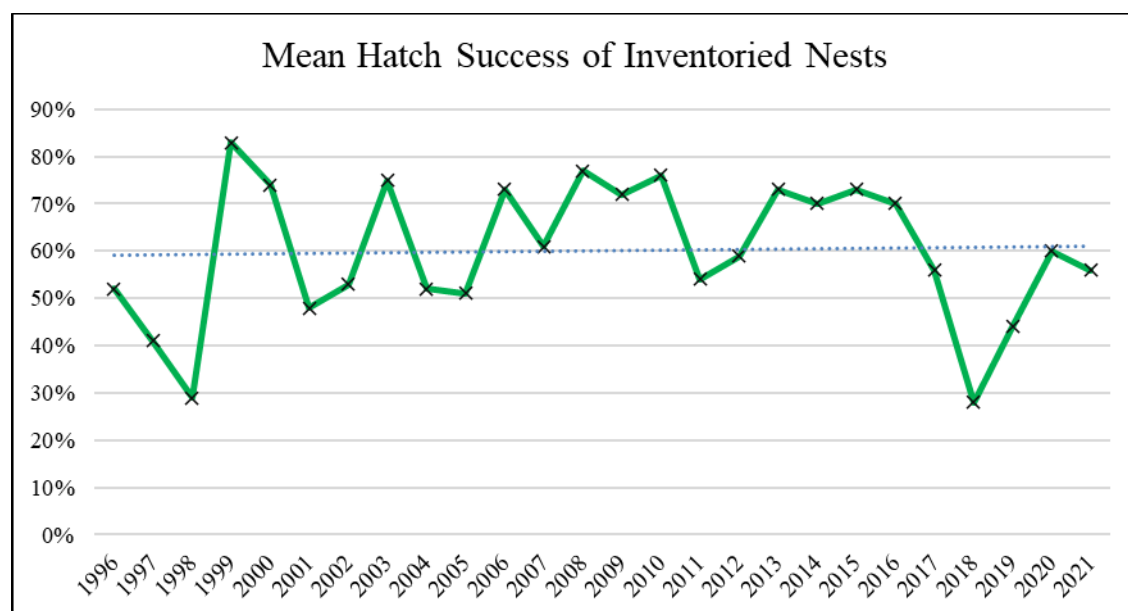


Figure 9. Hatch success percentages of nesting turtles over time, with 56% documented for 2021. A linear trendline shows an ever so slight positive slope, with the average since 1996 sitting at 60%.

It should be noted that protocols for marine turtle management and documentation have changed over the years. GUIS no longer conducts nest relocations, therefore data should be viewed with the knowledge that management and documentation techniques have not remained constant through time. GUIS now follows FWC recommendations on survey techniques and data collection needs, with no additional research being conducted by the park.

COVID-19

While there were no park closures during the 2021 nesting season due to COVID-19, mitigations to ensure the safety of our program personnel was continued from 2020. This included surveyors wearing face coverings in federal buildings and while riding in vehicles. Group meetings to conduct hands on training were replaced with online webinars to avoid any potential impacts to our VIPs and staff members. UTV cleaning procedures were also enacted and enforced to disinfect high touch surfaces on machines and regularly used equipment.

Even with our cleaning protocols and masking, issues still came about with VIPs coming in contact with COVID-19 cases outside of the park, and surveys were rearranged and rescheduled to allow a full quarantine of potentially infected team members. With constant communication through these instances, we were able to work through all COVID cases as they occurred. No major incidents tied to COVID-19 were reported from our turtle program, and we believe our cleaning protocols and open communication led to our group's overall safety through these unprecedented times.

Tropical Weather

GUIS was impacted by three named storms, and multiple no-name storms in 2021. The most impactful storms this season were Tropical Storm Fred and Hurricane Ida. Both events impacted nesting marine turtles through shoreline erosion, and extensive loss of the flat swash zones that had already been weakened by storms in 2020. Surveyors documented up to 80 feet of erosion in some hard-hit areas, and many nests were lost (Table 2). Although a majority of this shoreline loss was recovered as the season progressed, any nests laid low on the shoreline were completely washed out during these high-water events. Nests deposited farther upland were often times inundated for multiple days, and occasionally left with 2-4 feet of sediment accretion over their nest cavities (Figure 10).

Location	Nest Lost	Storm
PK	PK11	Hurricane Ida
PK	PK15	Tropical Storm Fred
PK	PK17	Hurricane Ida
PK	PK18	Hurricane Ida
PK	PK20	Hurricane Ida
PK	PK21	Unnamed Storm
PK	PK22	Tropical Storm Fred
SR	SR01	Unnamed Storm
SR	SR02	Tropical Storm Claudette
SR	SR03	Tropical Storm Claudette
SR	SR05	Hurricane Ida
SR	SR06	Hurricane Ida
SR	SR07	Tropical Storm Fred
SR	SR08	Tropical Storm Fred
SR	SR10	Tropical Storm Fred
SR	SR11	Hurricane Ida
FP	FP03	Hurricane Ida
FP	FP04	Tropical Storm Fred
FP	FP05	Tropical Storm Fred
FP	FP06	Hurricane Ida
FP	FP07	Hurricane Ida

Table 2. 21 total nests were washed out due to storm events in the 2021 season. 2 from unnamed storms, 2 from Tropical Storm Claudette, 7 from Tropical Storm Fred, and 10 from Hurricane Ida.



Figure 10. Example of accretion over nest PK14 caused by overwash from Hurricane Ida. This nest cavity was not located for inventory due to 4 feet of sand over the clutch.

6/10 – 6-11 – Heavy rain and winds washed out early nests, but no closures took place

6/18 – 6/25 - National Seashore Closed for Tropical Storm Claudette

8/16 – 8/18 – National Seashore Closed for Tropical Storm Fred

8/21 – 8/23 - Heavy rain and winds washed out low lying nests

8/26 – 9/2 - National Seashore Closed for Hurricane Ida

The 2022 season will have higher precision GPS technology to acquire accurate shoreline location data. The GUIS SRS team recently received a Leica GG04 unit from the regional GIS group and have been learning how to use this equipment properly. In tandem with our newly installed NTRIP base station, staff will be able to accurately document shoreline locations pre- and post- hurricane season to better track this loss and growth over time. Our 2021 methods and workloads did not allow for this high precision data collection to occur this nesting season, but we have plans to bolster this data gap with no time or effort increases to base funded staff in 2022.

Depredation and Predation Management

Fortunately, predators were not a major problem for nesting marine turtles this season at GUIS, with only minimal predation documented (Figure 11). In the past, predation from coyotes had been documented and self-releasing screens were utilized to protect eggs by placing 2-inch by 4-inch chicken wire on the sand's surface over the clutch. The park also previously contracted predation management out to USDA, who was successful at removing targeted individual coyotes from the landscape. This year's Marine Turtle Permit from FWC included the use of self-releasing screens, but we agreed to only use them when predation became a documented impact on the nests. With no substantial predation observed this season, screens were not implemented.

In total, SR recorded one nest with negative impacts from ghost crabs prior to hatching. This evidence is documented during the nest inventory process and is easily distinguished by the pincher snipping slit found on predated eggs. No nests were predated at FP, which could be due to limited nest predators on the landscape, or due to the fact that only 7 nests total were laid and 5 of those were completely washed away from storm events. Only the first 2 nests laid this season remained on the beach, therefore it's likely that there were not enough egg clutches in that unit to attract coyotes or raccoons to search for eggs.

PK had the majority of the documented nest predation events. PK06 was the only completely predated nest this season at the park (Figure 12). The main predator was coyote, but ghost crab impacts were also documented in the scattering of dug up eggshells. 2 other nests were predated after the first sign of emergence, one by a coyote and another by a raccoon. Evidence from these nests point to a successful hatching event followed by predator interactions.

To reduce predation of the Park's ground nesting birds, experienced predator biologists from FWC assist GUIs with predator management. While the funding for these predation management biologists comes from shorebird focused sources, their impact benefits marine turtles as well. Predation management was employed this year at FP and SR with one coyote being removed from FP and 2 raccoons being removed from SR.

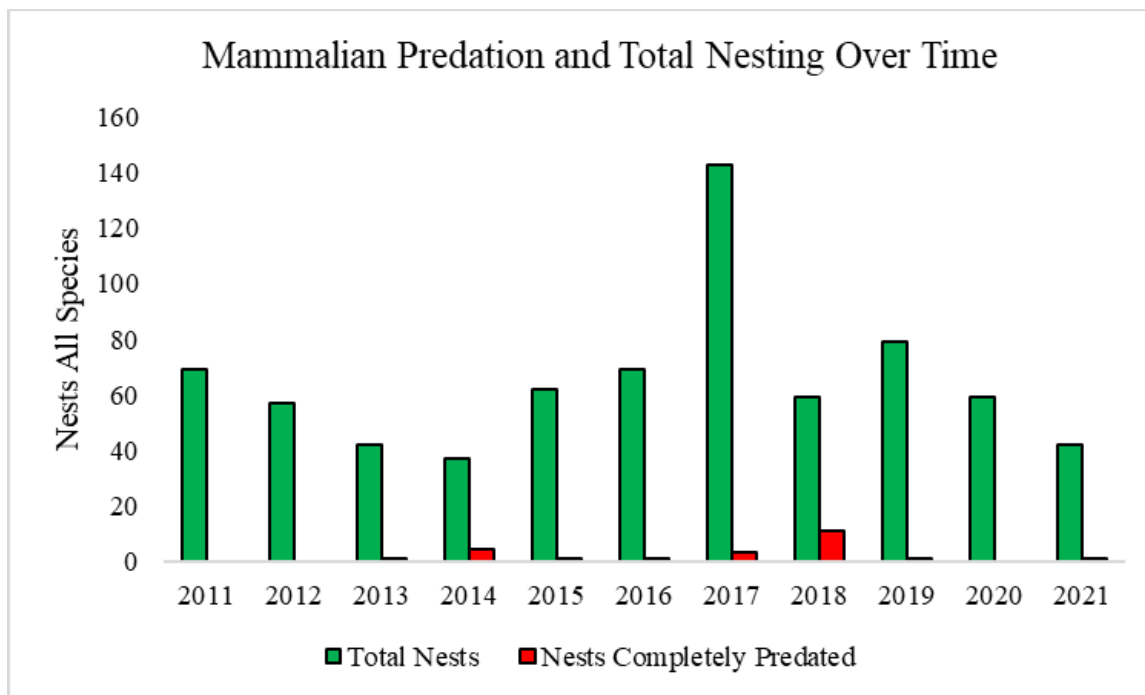


Figure 11. Nesting numbers of all species overtime paired with complete nest predations over time. Only 1 nest was documented as completely predated in 2021.



Figure 12. Nest PK06 which was completely predated by a coyote at Perdido Key.

Obstructed Nesting Attempts

Three Obstructed Nesting Attempts (ONAs) were documented this season, and all of them occurred at Perdido Key (Figure 13). FWC considers an ONA to be when a nesting female encounters a natural or manmade obstacle on the beach, regardless if the attempt results in a nest or false crawl. One of our ONAs was caused by a naturally occurring scarp on the beach. These scarps are considered for ONAs when they are over 18" in height and over 100' in length. The other two ONAs are from artificial barriers on the beach, one being the remnants of a beach boardwalk (walkover K) and the other occurring at the east pavilion at the Johnson Beach Parking Lot. This last ONA was also tied to a disorientation that was caused by lights being left on at the pavilion bathrooms. Both a disorientation report and ONA was filed for this nesting attempt, per the FWC protocols. As with disorientations and strandings, ONA reporting has moved to Survey123, and was completed by program personnel from their cellphone or from the park provided tablet. Data submitted to the Survey123 was then immediately available on FWC's ArcGIS Online account that is visible to the public. Not all information is viewable to the public through this program, but permit holders have access to all of the submitted data for ONAs.

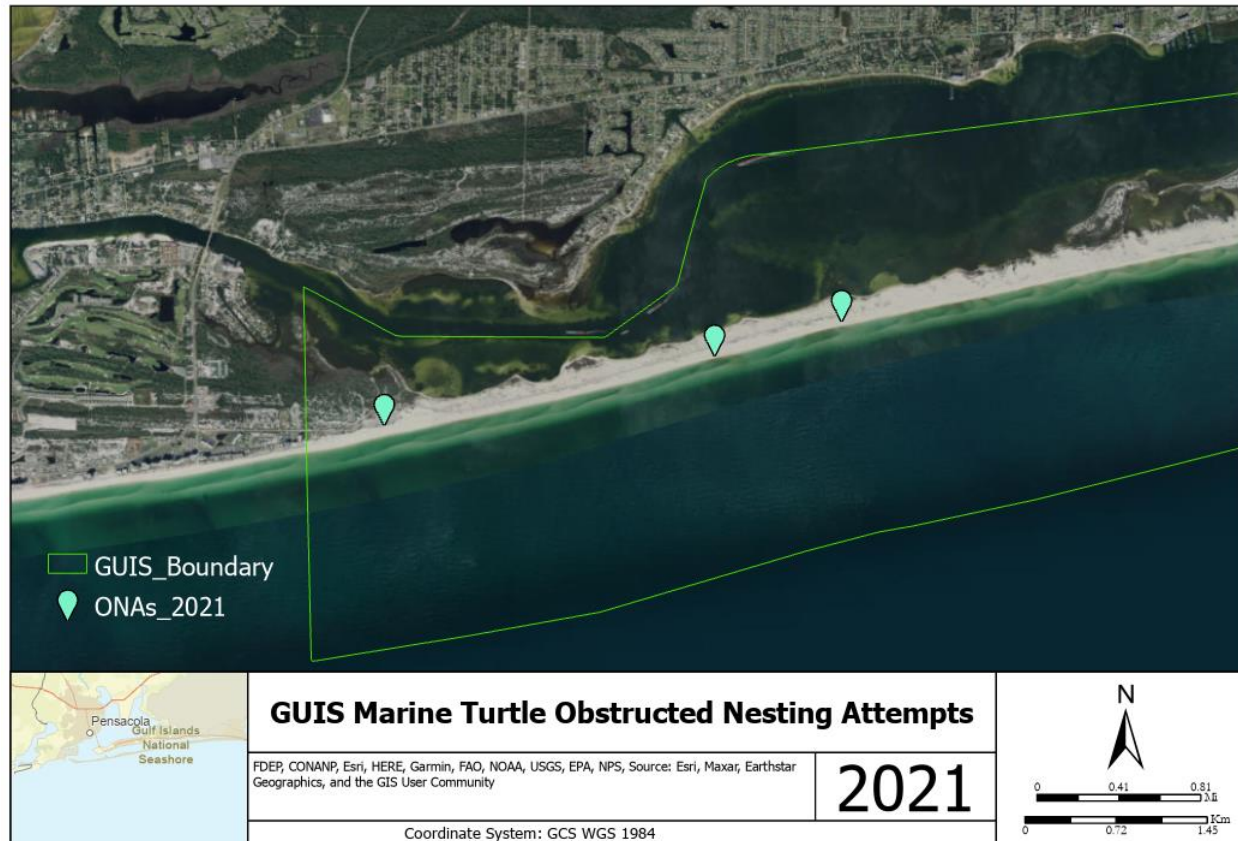


Figure 13. Obstructed Nesting Attempts in the 2021 season, all of which occurred at Perdido Key.

Disorientations and Lighting Issues

Both hatchlings and nesting adults exposed to artificial lighting can be led in the wrong direction (become misoriented) or meander and circle (become disoriented). Both misorientation and disorientation indicate that the turtle was unable to properly orient towards the ocean and these events are documented by trained park staff and volunteers. Hatchling disorientation is defined as > 5 hatchlings from a given nest orienting $> 45^\circ$ from the most direct path to the Gulf post-emergence, while adult disorientations are determined by experienced personnel (FWC 2016). One of the negative anthropogenic impacts to nesting marine turtles is artificial light sources. Lights can be seen directly or indirectly from all park beaches as point light sources (Pensacola Naval Air Station lighthouse, gas dock) or as urban sky glow (cumulative lights from cityscapes). While sand dunes and vegetation can block out some of the direct light sources in certain pockets of the property, the sky glow is visible from all areas of the seashore.

In 2021, adult turtle disorientations occurred again as they have in previous years. Figure 14 displays where adult false crawl, adult nesting and hatchling disorientation events occurred. The majority of our events, 8 of the 13 total, were documented at Perdido Key.

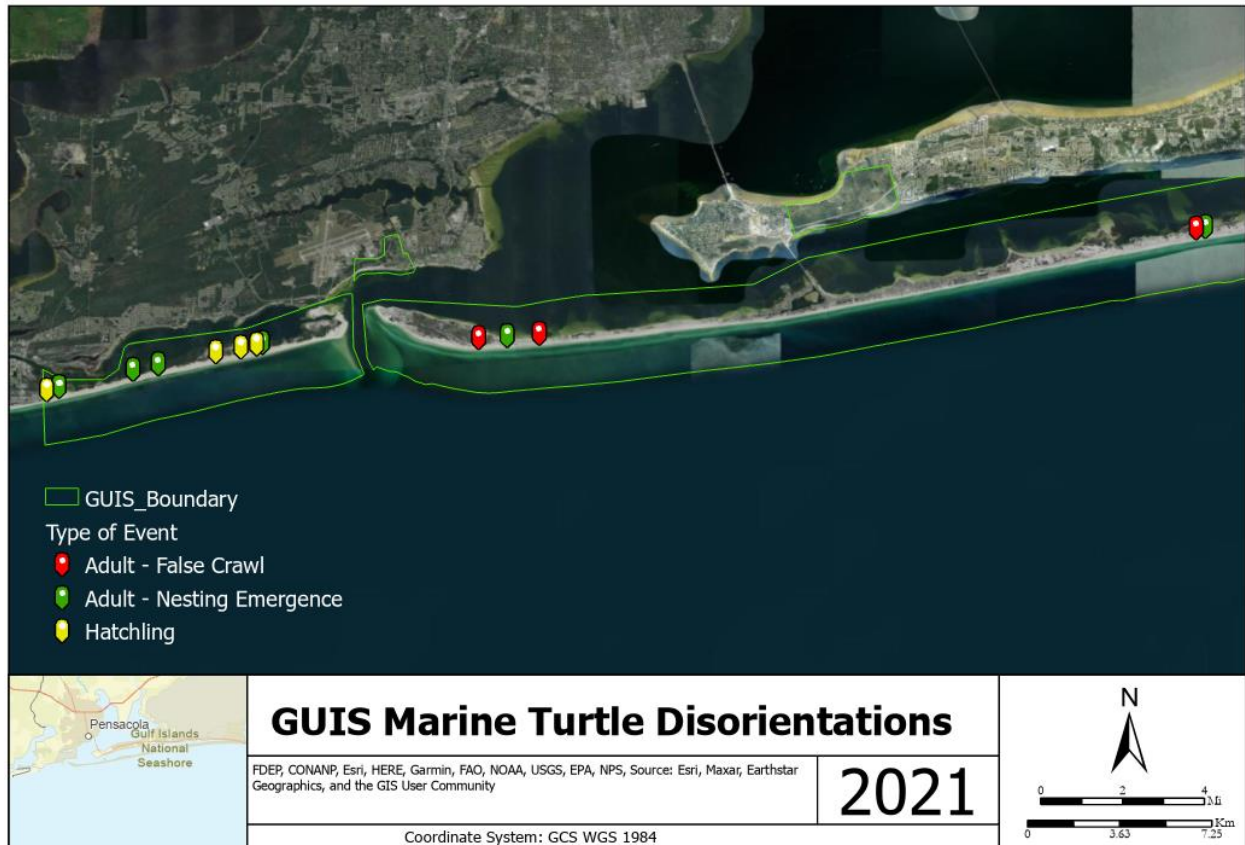


Figure 14. Location and types of disorientation events that occurred in the 2021.

Of the 11 nests that hatched with directional data of hatchlings, disorientation was noted for 4 (36%) of the nests (Figure 15). Disorientations have been an ongoing negative impact to marine turtle reproduction at GIS, as the historical average of disorientations since 1996 sits at 50%. The park has previously taken action to retrofit all NPS structures with wildlife friendly lighting to lessen the impact to nesting turtles but making large changes to the Naval Air Station and surrounding cityscapes is a challenge.

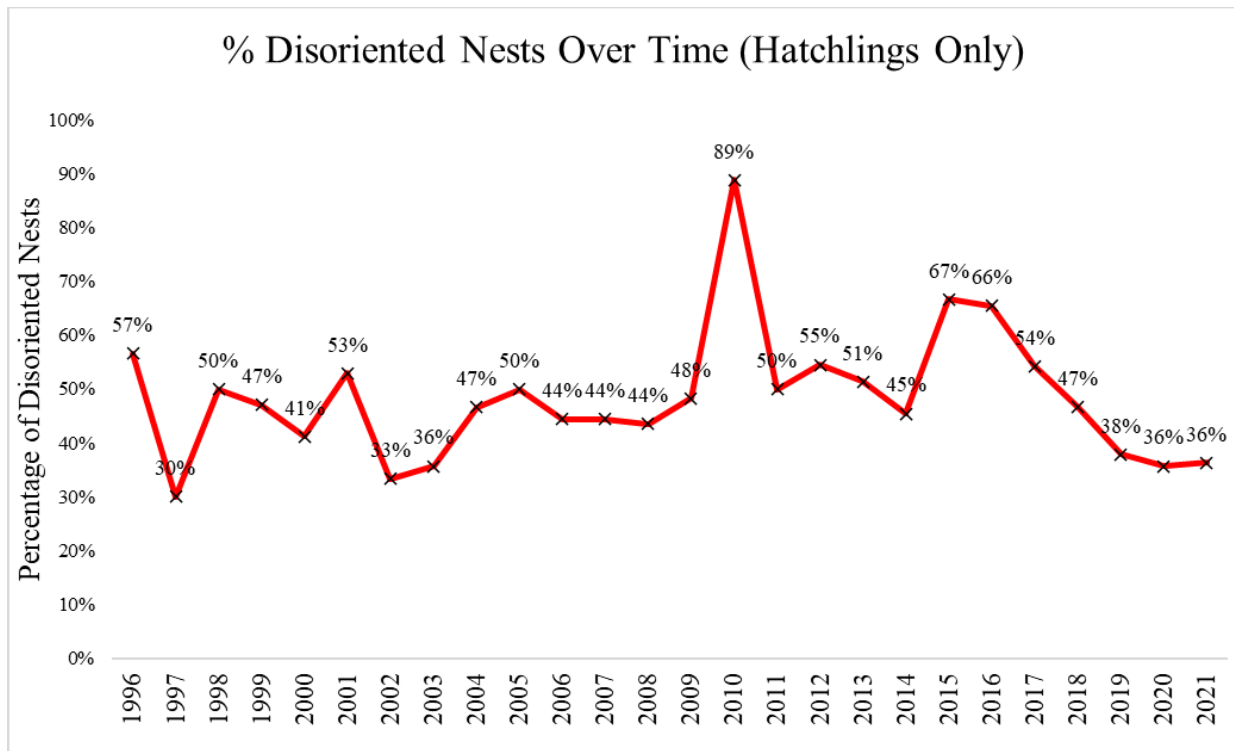


Figure 15. Disorientation data displayed as the percentage of nests becoming disoriented each season. This is calculated from the number of disorientations reported divided by the total nests where orientation is known. In 2021, 4 nests became disoriented out of 11 nests where the orientation was known.

Changes in protocols could also have an impact on the number of disorientations documented at the park. Prior to 2018, volunteers were allowed and encouraged to perform an activity known as “nest sitting.” This activity required a surveyor be at the nest site during night/early morning hours to witness the hatching event. By having people at the nest site during hatching there is a potential to skew disorientation data. Volunteers being at a large proportion of the hatching events increases the documentation of hatchings and could alter how the animals react or orient as they exited the nest cavity. There is also a potential that volunteers intervened earlier than necessary, and hatchlings would have eventually oriented in the correct direction towards the Gulf of Mexico. This last scenario would result in an overestimation of disorientation events.

Major changes to the disorientation data collection protocol were made in 2021. FWC created a publicly available Survey 123 datasheet for all disorientation reporting. Instead of the typical paper data sheet that is filled out in the field and then emailed to FWC, USFWS and other local municipalities, now the data is entered on a phone or tablet, and then that data is available online in real time. Permit holders can access all of the collected data including GPS points, while anyone in the public with the link to FWC’s AGOL sea turtle page can see the basic information showing about where the incident happened, and what the contributing light source may have caused the disorientation.

Strandings

In 2021, 12 strandings occurred adjacent to managed lands at GUIS. Of the 12, 10 were traditional strandings of deceased individuals washed up on park lands, and 2 were found alive. Of the 2 alive strandings, 1 was caught on the Fort Pickens fishing pier and was immediately released, and the other animal was found on the Gulf shoreline during morning surveys, and was taken to Gulfarium Marine Adventure Park (authorized rehab facility) with blunt force trauma to the head. This animal later died due to its injuries, and no cause for the trauma was ever identified. All strandings were reported to FWC using the newly updated seaturtlestranding.com website that has taken the place of the previous paper datasheets. There was an even split of species reported with 4 greens, 4 loggerheads and 4 Kemp's ridley turtles becoming stranded at the park this season. Four of the strandings were found at PK, 5 at FP, 1 at Naval Live Oaks (NLO) and 2 at SR. Only 2 of the strandings were documented in Big Lagoon, while the other 6 were within the Santa Rosa Sound. Shorelines facing the Gulf of Mexico documented 5 total strandings over the course of 2021 (Figure 16).

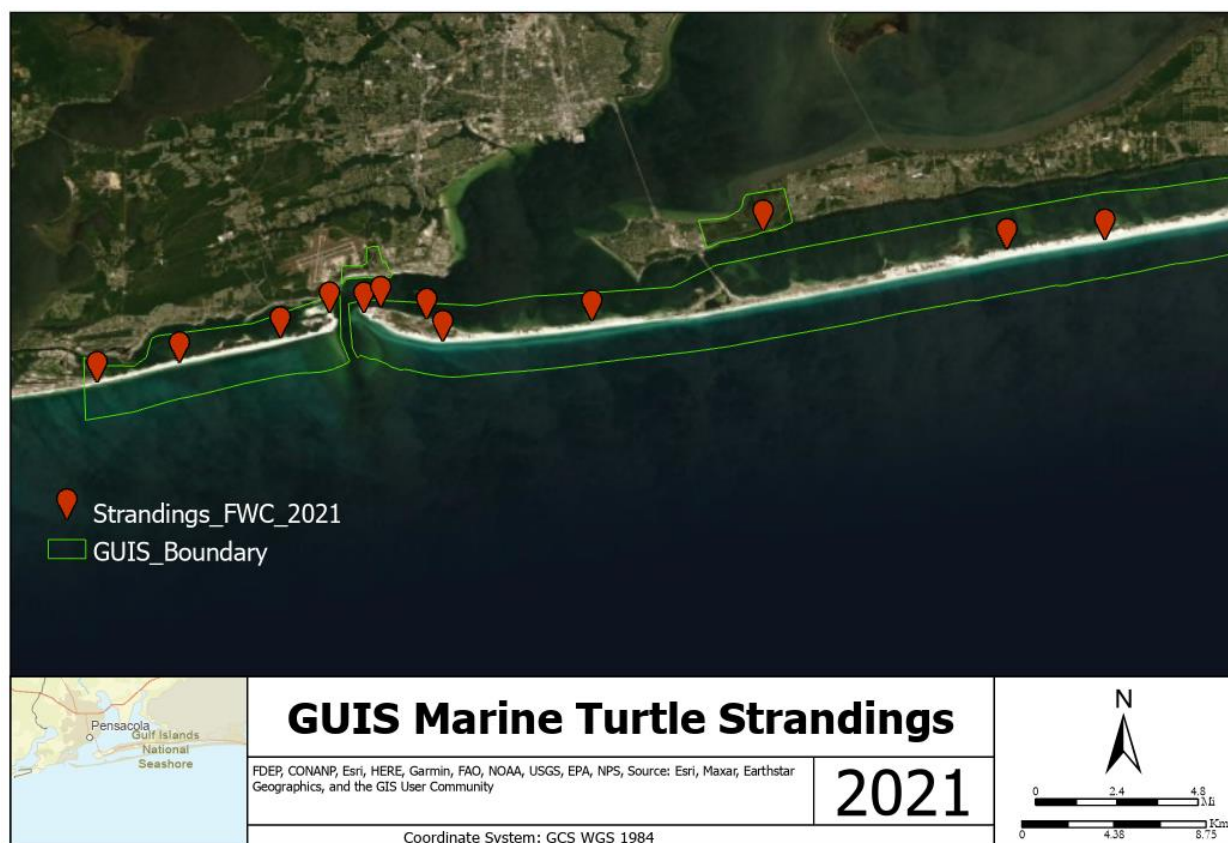


Figure 16. 2021 documented marine turtle strandings at GUIS.

All stranded turtles were scanned for external and Passive Integrated Transponder (PIT) tags, but no tags were identified. Zero cold stun turtles have been reported in 2021 thus far, and with mild temperatures predicted for the remainder of the year, it is anticipated that number will remain at 0.

Roadways and Roadkill

Each beach area contains a roadway bisecting the coastal dune habitat. The Santa Rosa area is the most problematic with State Road 399 connecting Pensacola Beach and Navarre Beach with 24-hour access. The speed limit is 35 mph but is reduced to 25 mph during the summer months for shorebird management. The Fort Pickens road also contributes to road killed turtles, but the speed limit is 25 mph and is only accessible after sunset by those staying in the campground. The Perdido Key area also has a roadway, but it encompasses a smaller amount of nesting habitat and historically has not proven to be a significant problem for nesting turtles. Various methods have been implemented to attempt to mitigate road kills during the summer, including seasonal speed limit reductions, flashing radar speed limit signs, reader boards, speed humps, increased law enforcement, and public outreach.

Roadkill surveys were completed opportunistically as staff encountered dead animals on the roadways. A total of 16 individuals of imperiled species were found dead on roadways in the park, and 1 of those was a loggerhead hatchling. The remaining imperiled species found of roadways include 1 snowy plover and 14 least terns. The roadkill turtle was from the only successful hatch at Fort Pickens, and was not associated with a disorientation event as less than 5 hatchlings crawled north towards the roadway.

Outreach

A press release and multiple social media posts were made to the public throughout the marine turtle nesting season. After the first two turtle nests were found on 27 May, a press release went out notifying the public of the beginning of the marine turtle nesting season. It mentions the species that commonly nest on the seashore, and the impact of artificial lighting at night. No press releases were made to conclude the nesting season as many of our nests were lost to Hurricane Ida.

Each year, GUIS distributes decorative car magnets at the entrance fee stations promoting sea turtle awareness and the impacts of nighttime lighting on the coastal system. This year, being the 50th year GUIS has been in operation, the magnet had a unique 50th anniversary design displaying the 1971-2021 dates. All 11,000 of the purchased magnets were distributed over the course of 2021.

Outreach by field staff and VIPs is conducted informally and opportunistically with the public. Staff, VIPs and interns are regularly approached by inquisitive visitors. Our personnel do their best to inform visitors of the current status of the nesting marine turtles and basic sea turtle facts such as when nesting commonly takes place, how many eggs are laid, and how long the eggs incubate under the sand. Most often, the visitors ask when/how/where to see a nesting female or a nest hatching event. We explain that it's best to avoid these events, as the human presence could negatively impact the adult and hatchlings.

Management Recommendations

There are 3 main recommendations to management based on information gathered in the 2021 season in order from lowest to highest priority:

- Continue to consider marine nesting turtles when looking at road feasibility studies.
- Prepare for continued extreme storm events.
- Push for already funded largescale lighting surveys to occur.

Shoreline loss is documented every nesting season in conjunction with tropical storms in the Gulf of Mexico. Barrier islands are an ever shifting, dynamic ecosystem that move in response to weather events over time. As the sands on our islands migrate north, the permanent infrastructure such as roads, beach parking lots, and pavilions remain constant in their location (Figure 17). As the Gulf chews away at the shoreline, buildings and roads become vulnerable to flooding and eventual loss to the shifting sediment. As this shoreline is lost, the nesting habitat is lost with it. Hurricane Sally in 2020 flattened many sections of Gulf facing coastal dunes, and it was observed this season that flat beaches closely adjacent to roadways at FP and PK were not utilized by nesting turtles (Figure 18). As more attention is paid to road feasibility studies in the near future, the lack of suitable beach nesting habitat south of these roads due to erosion should be noted.

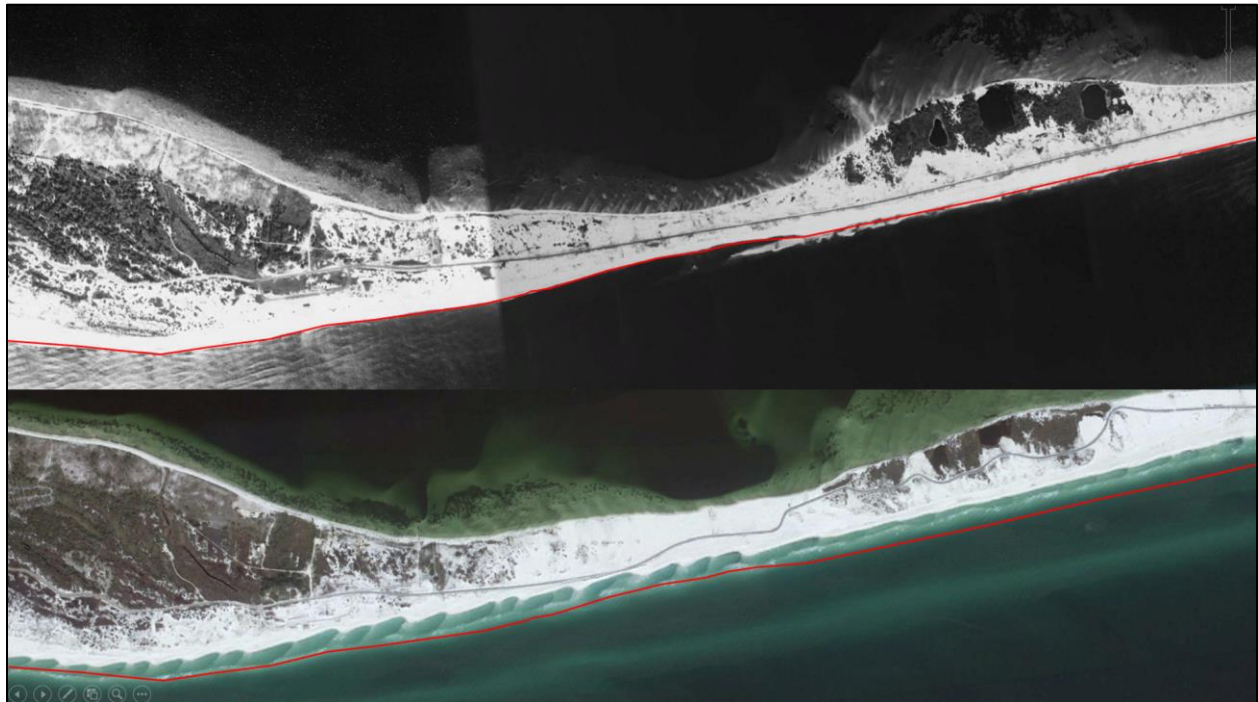


Figure 17. Example of shifting barrier islands. The top photo was taken January 1994, and has the shoreline denoted with a red line. The bottom picture was taken November 2020 with the 1994 shoreline in red showing more than 300 feet of shoreline loss over time.

The park must continue to look at beach nourishment, retreat of coastal development, sediment management and moving at-risk critical infrastructure northward to avoid impacts to marine turtles and their nesting habitat. During the winter/spring of 2021/2022, a sand placement project associated with maintenance dredging of Pensacola Pass will occur along the eastern end of PK. Sediment placement at PK has been conducted in the past but direct beach placement has not occurred since 2011 due to funding and cultural resource compliance issues. This project, in conjunction with U.S. Army Corps of Engineers, may pave the path forward to continue placing sand on our beaches from the Pensacola Pass. More sediment budget studies are being completed in partnership with US Geological Survey to determine the volume and extent of sediment that should be placed on park beaches, and where the park should focus efforts on future nourishment projects or retreat of coastal development. In addition, Escambia County and the Florida Department of Environmental Protection will be undertaking an Inlet Management Plan that will look at updrift and downdrift impacts of Pensacola Pass.

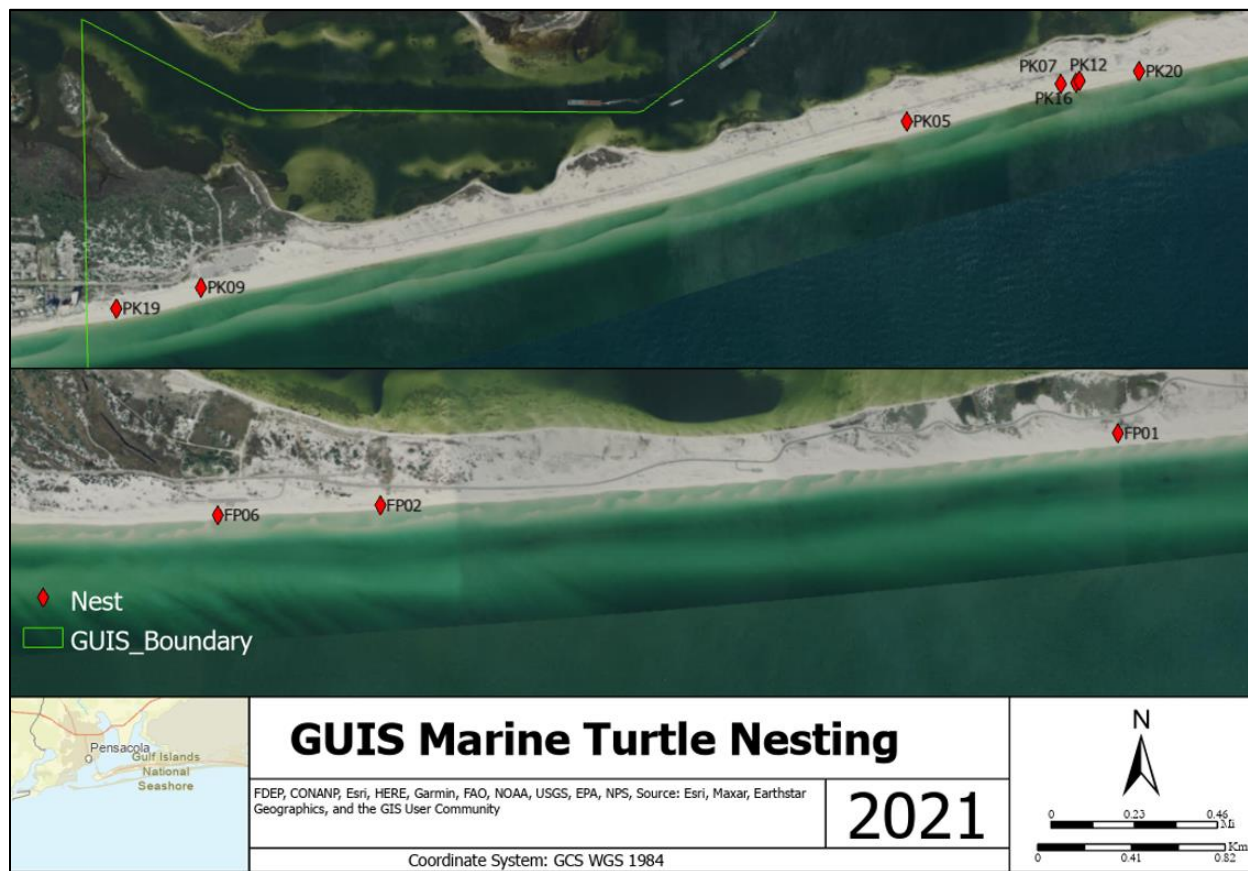


Figure 18. Marine turtle 2021 nesting maps showing areas with narrow, flat beaches adjacent to roadways were not utilized by nesting turtles this season at PK (top map) and FP (bottom map).

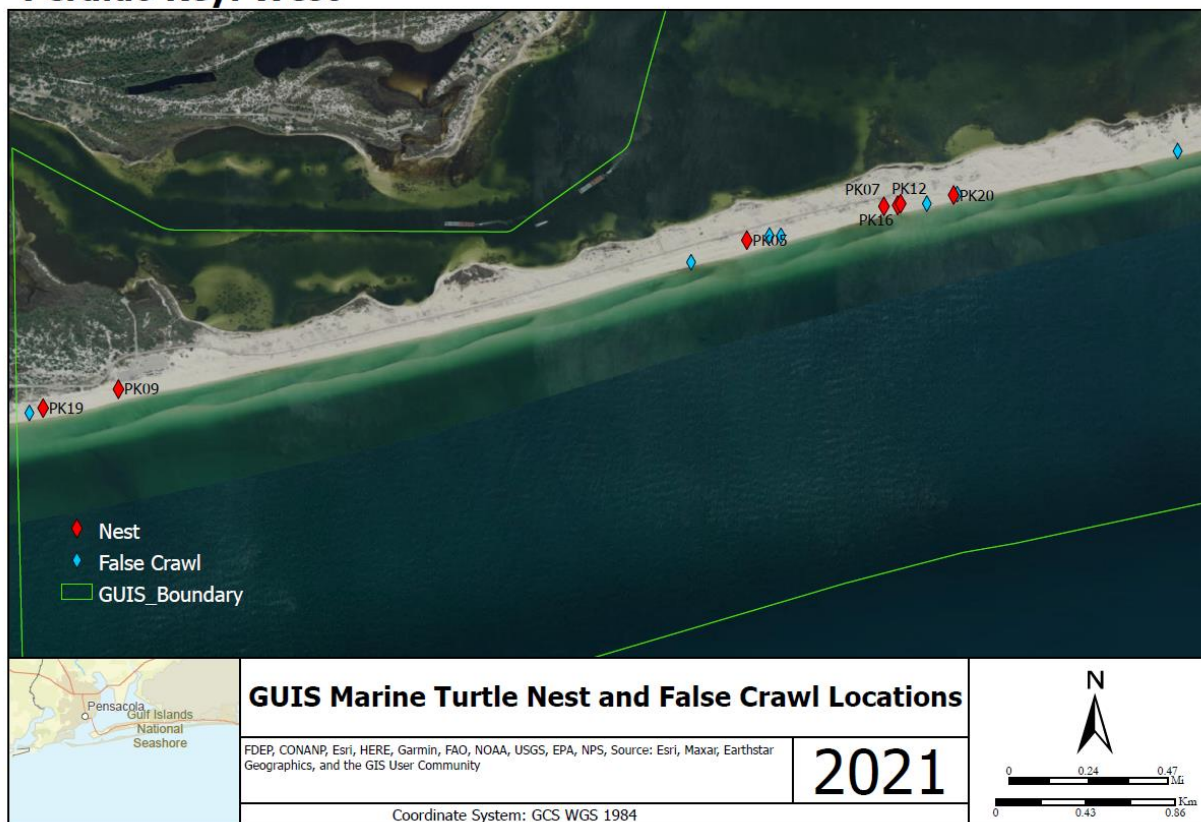
With increasing ocean temperatures, meteorologists generally agree that tropical storms will be more frequent and more intense as global climate change occurs (Wuebbles et al, 2017). With this knowledge, the park needs to prepare for more frequent catastrophic losses to the barrier island shorelines. To better document shoreline loss created by these storm events, the SRS program is prepared to use state of the art survey tools and methods to accurately depict just how much shoreline is lost or gained from storms in the Gulf of Mexico.

Lastly, the park has received funding to implement a project to measure the amount and sources of nighttime light pollution. This project, named GUIS-Florida Night Sky Restoration Phase 1, will at least inform the park of the major light sources off property that are causing disorientations to marine turtles. Ideally, the next step would be to help the surrounding community use more wild-life friendly lighting to lessen the impacts of this pollution at the park. While this is a lofty, long-term goal, this seems to be the only long-term solution for the lighting issues at GUIS. The first step is knowing the problem, and documenting the current levels of nighttime light.

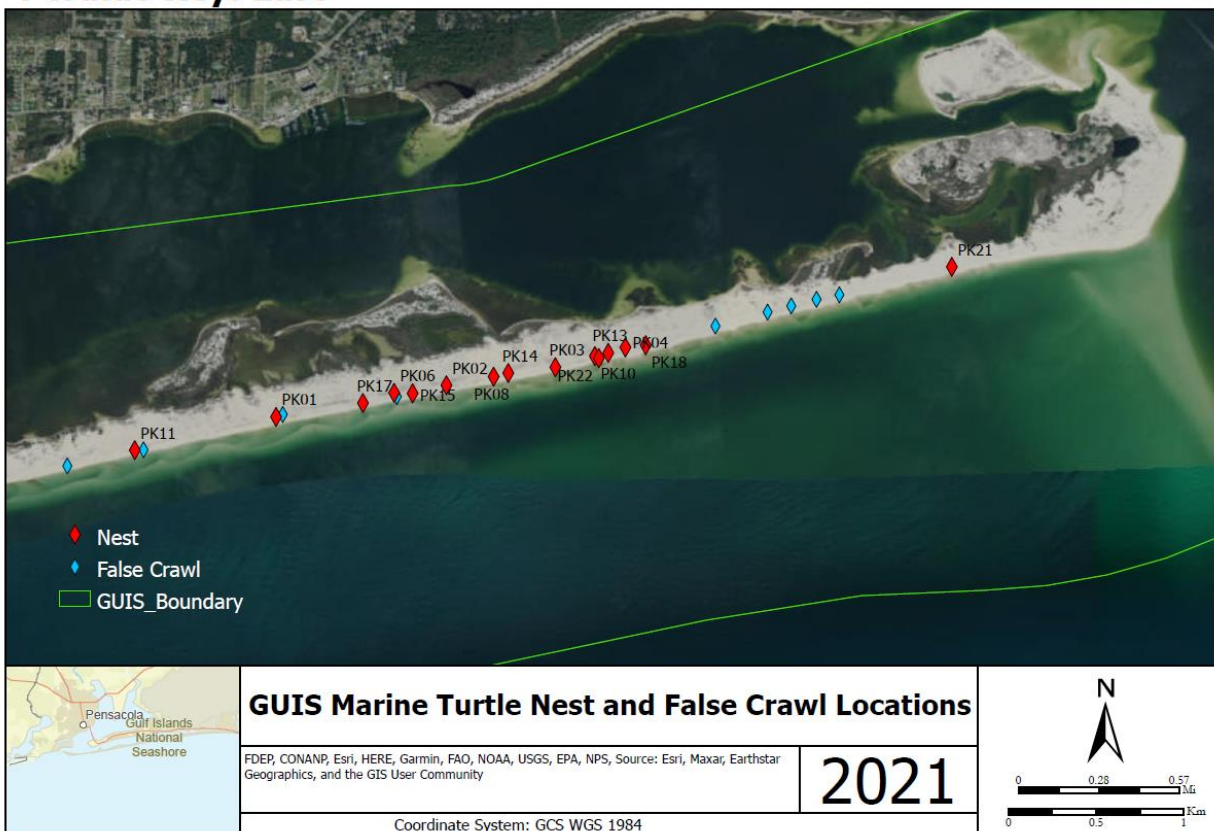
This project is slated to being in 2022, but with oversight from park staff, we can ensure the work actually begins, and data is collected in a way that is meaningful. With no changes in the surrounding light pollution sources, staff anticipate an increase in disorientations over time as the population of Escambia and Santa Rosa counties grow.

Maps

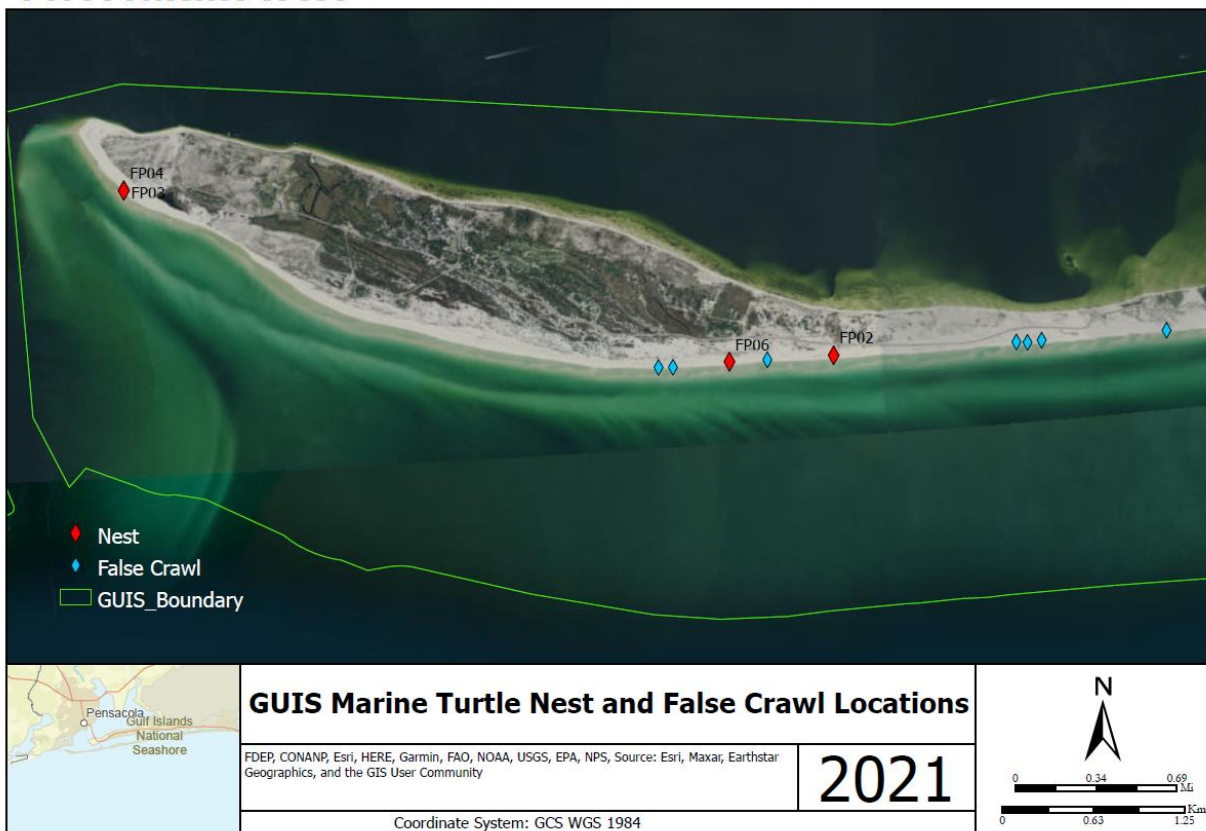
Perdido Key: West



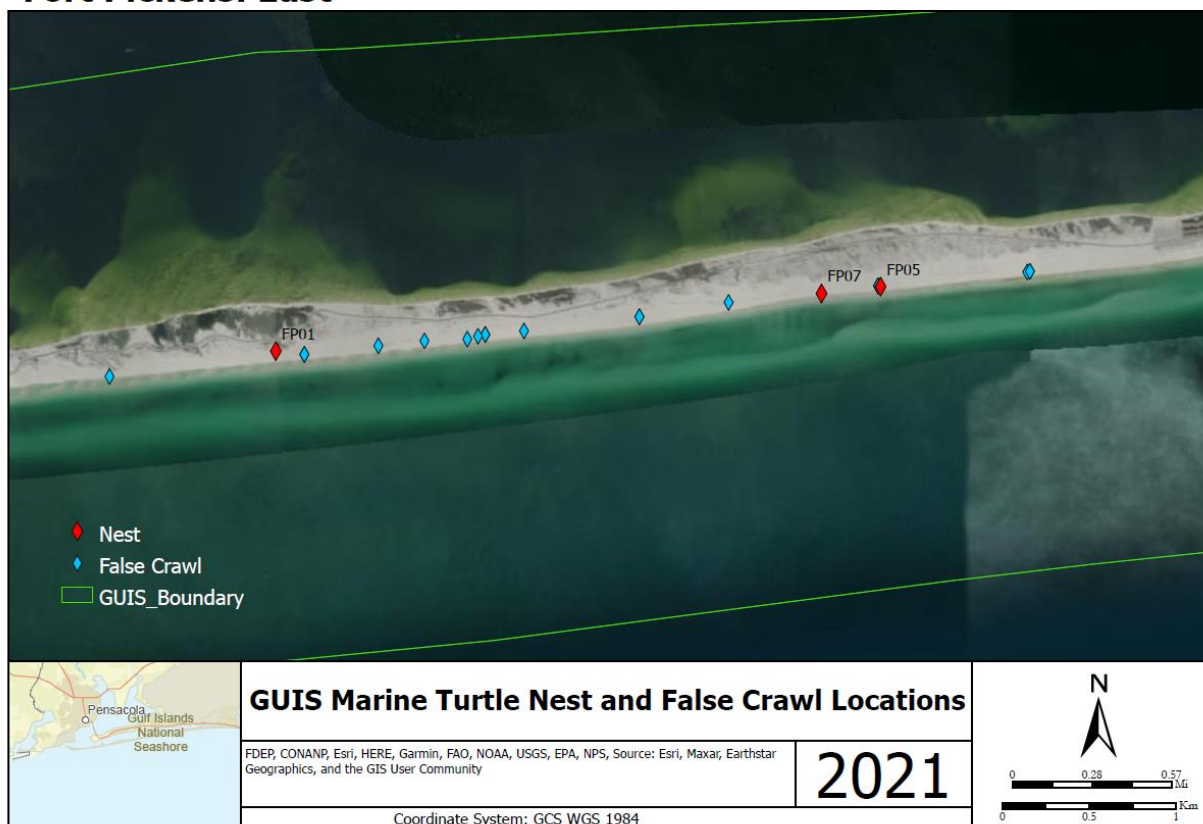
Perdido Key: East



Fort Pickens: West



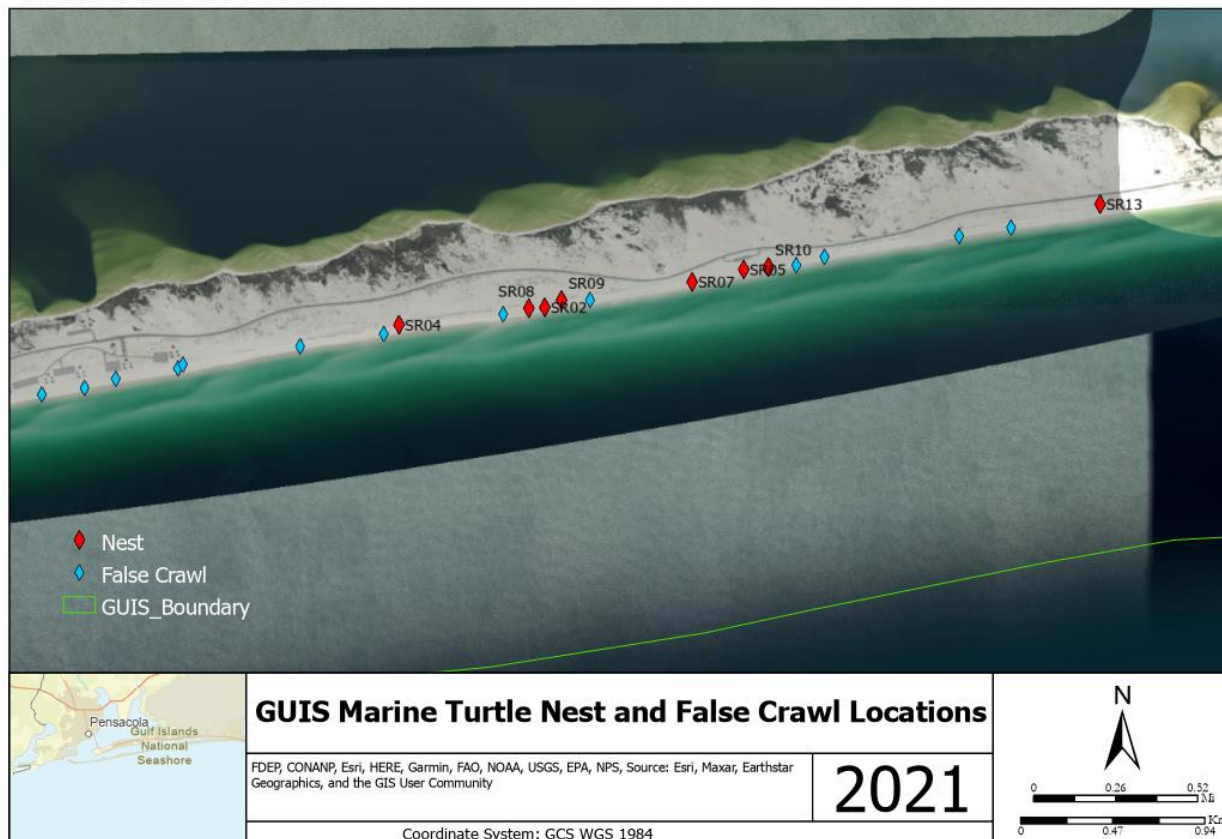
Fort Pickens: East



Santa Rosa: West



Santa Rosa: East





Marine Turtle Permit

Florida Fish and Wildlife Conservation Commission
Imperiled Species Management Section-Tequesta Field Lab, 19100 SE Federal Highway
Tequesta, FL 33469
(561) 882-5975

Permittee: Jennifer Manis Permit#: MTP-21-240
GULF ISLANDS NATIONAL SEASHORE Effective Date: 01/11/2021
1801 GULF BREEZE PARKWAY Expiration Date: 12/31/2021
GULF BREEZE, FLORIDA 32563
UNITED STATES
Principal Officer: Jennifer Manis
Qualified Individual: Jennifer Manis

Is Authorized to:

1. conduct nesting surveys;
2. conduct stranding/salvage activities;
3. outfit nests with self-releasing screen/cage;
4. conduct hatch success evaluations; and
5. outfit nests with light-blocking shield/screen - see Conditions.

Authorized Nesting Survey

Area:
1. Gulf Island National Seashore - Perdido Key;
2. Gulf Islands National Seashore - Ft. Pickens; and
3. Gulf Islands National Seashore - Santa Rosa.

Principal Officer
Signature:

Date: 03/25/2021

Not valid unless signed by the Principal Officer. By signature, the Principal Officer confirms that all information provided to issue the permit is accurate and complete, and indicates acceptance and understanding of the provisions and conditions listed below. **Any false statements or misrepresentations when applying for this permit may result in felony charges and will result in revocation of this permit.**

By signature, I acknowledge that I have read and understand this permit. Signature of this permit indicates that I, the Qualified Individual and all authorized personnel listed below have read and agree to abide by all Florida Fish and Wildlife Conservation Commission (FWC) Marine Turtle Conservation Handbook sections that pertain to the authorized activity(s) listed on this Marine Turtle Permit. I understand that it is my responsibility to transmit all future information updates to all authorized personnel listed on my permit. Principal Officer must provide a signed copy of this permit to the FWC (address above or MTP@MyFWC.com) to activate this permit.

Authorized By: ROBBIN TRINDELL

Authorized for: Eric Sutton, Executive Director

Authorizing Signature:

Date: 01/11/2021

Marine Turtle Permit

Authorized Research Projects: None.

Authorized Monitoring Projects: None.

Authorized Personnel:

Kelly Irick; Joseph Burgess; Ashley Warren; Kris Dudus; Kacey Srubas; Jordan Wingate; Melanie Waite; Thomas Anderson; Debora Zemenick; Cindy Marvel; Wendy Hoeflich; Mary Kimberly Carmody; Lauren Campanella; Cathryn DeLong; Cheryl Mannel; Philip Iversen; Bruce Leutscher.

PERMIT CONDITIONS AND PROVISIONS:

- 1 Permitted individuals must adhere to the FWC Marine Turtle Conservation Handbook developed under a Section 6 Cooperative Agreement between FWC and the U.S. Fish and Wildlife Service.
- 2 All transfers of marine turtles or specimens into or out of the State of Florida must be accompanied by a specific consent permit from FWC.
- 3 The following conditions are associated with outfitting nests with a light-blocking shield/screen.
 1. For each nest to be fitted with a shield/light-blocking screen due to immediate proximity to an operational roadway, the permittee must notify FWC (MTP@MyFWC.com) no less than 7 days prior to proposed screen installation. FWC shall acknowledge receipt of the correspondence and request any additional clarifications required.
 2. An annual report related to this activity shall be submitted to FWC (MTP@MyFWC.com) no later than December 1st. This report must include, minimally: a list of each nest outfitted with a shield/light-blocking screen due to immediate proximity to an operational roadway; the date the nest was deposited; the date the shield/screen was installed; a picture of the installed shield relative to the nest and adjacent roadway; a report of the fate of the nest (e.g., disoriented - report submitted, oriented properly towards ocean, oriented properly towards ocean prior to disorienting - report submitted, no signs of emergence noted); and any other observations/comments related to the screen/shield installation.

A person whose substantial interests are affected by FWC's action may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. A person seeking a hearing on FWC's action shall file a petition for hearing with the agency within 21 days of receipt of written notice of the decision. The petition must contain the information and otherwise comply with section 120.569, Florida Statutes, and the uniform rules of the Florida Division of Administration, chapter 28-106, Florida Administrative Code. If the FWC receives a petition, FWC will notify the Permittee. The attached Explanation of Rights statement provides additional information as to the rights of parties whose substantial interests are or may be affected by this action.



Marine Turtle Permit Personnel Amendment
Florida Fish and Wildlife Conservation Commission
Imperiled Species Management Section-Tequesta Field Lab, 19100 SE
Federal Highway
Tequesta, FL 33469
(561) 882-5975

Permittee: Jennifer Manis Permit#: MTP-21-240
GULF ISLANDS NATIONAL Effective Date: 01/11/2021
SEASHORE Expiration Date: 12/31/2021
1801 GULF BREEZE PARKWAY
GULF BREEZE, FLORIDA 32563
UNITED STATES

As of date below, the following personnel are authorized to perform the activities listed on Marine Turtle Permit # MTP-21-240.

Authorized personnel:

Kelly Irick; Joseph Burgess; Ashley Warren; Kris Dudus; Kacey Srubas; Jordan Wingate; Melanie Waite; Thomas Anderson; Debora Zemenick; Cindy Marvel; Wendy Hoeflich; Mary Kimberly Carmody; Lauren Campanella; Cheryl Mannel; Philip Iversen; Bruce Leutscher; Leah Vickery; Robin Marvel; Emily Hoeflich; Madison Richert; Clifford Richardson.

This personnel authorization supersedes all others and must be attached to the FWC Marine Turtle Permit of most recent issue. This is not a permit and cannot be used as such.

Authorized By: Meghan Koperski

Authorizing
Signature:

A handwritten signature in blue ink that reads "Meghan E. Koperski".

Date: 4/15/2021 9:47:57 PM

 SCIENTIFIC RESEARCH AND COLLECTING PERMIT Grants permission in accordance with the attached general and special conditions United States Department of the Interior National Park Service Gulf Islands	Study#: GUIIS-00297 Permit#: GUIIS-2021-SCI-0013 Start Date: May 01, 2021 Expiration Date: May 01, 2022 Coop Agreement#: Optional Park Code:
---	--

Name of principal investigator: Name: Mrs Jennifer Manis Phone: 8509342604 Email: jennifer_manis@nps.gov																																						
Name of institution represented: National Park Service																																						
Additional investigators or key field assistants: <table border="0"> <tr> <td>Name: Joseph Burgess</td> <td>Phone: 850-777-6935</td> <td>Email: Joseph_Burgess@nps.gov</td> </tr> <tr> <td>Name: Ashley Warren</td> <td>Phone: 850-232-3640</td> <td>Email: Ashley_Warren@nps.gov</td> </tr> <tr> <td>Name: Kacey Srubas</td> <td>Phone: 850-382-0584</td> <td>Email: Kacey_Srubas@nps.gov</td> </tr> <tr> <td>Name: Kris Dudus</td> <td>Phone: 850-393-7610</td> <td>Email: Kris_Dudus@nps.gov</td> </tr> <tr> <td>Name: Jordan Wingate</td> <td>Phone: 706-993-8084</td> <td>Email: jrw91@students.uwf.edu</td> </tr> <tr> <td>Name: Philip Iversen</td> <td>Phone: 850-293-1208</td> <td>Email: philip.iversen1@gmail.com</td> </tr> <tr> <td>Name: Cindy Marvel</td> <td>Phone: 321-501-6360</td> <td>Email: cindymarvel850@gmail.com</td> </tr> <tr> <td>Name: Deborah Zemenick</td> <td>Phone: 850-375-8115</td> <td>Email: djzztops@yahoo.com</td> </tr> <tr> <td>Name: Emily Hoeflich</td> <td>Phone: 850-776-2633</td> <td>Email: emilyhoeflich@gmail.com</td> </tr> <tr> <td>Name: Kim Carmody</td> <td>Phone: 850-375-4940</td> <td>Email: Kim_Carmody@hotmail.com</td> </tr> <tr> <td>Name: Lauren Campanella</td> <td>Phone: 850-291-7451</td> <td>Email: lauren.d.campanella@gmail.com</td> </tr> <tr> <td>Name: Tom Anderson</td> <td>Phone: 850-377-1045</td> <td>Email: tlanderson@mindspring.com</td> </tr> </table>			Name: Joseph Burgess	Phone: 850-777-6935	Email: Joseph_Burgess@nps.gov	Name: Ashley Warren	Phone: 850-232-3640	Email: Ashley_Warren@nps.gov	Name: Kacey Srubas	Phone: 850-382-0584	Email: Kacey_Srubas@nps.gov	Name: Kris Dudus	Phone: 850-393-7610	Email: Kris_Dudus@nps.gov	Name: Jordan Wingate	Phone: 706-993-8084	Email: jrw91@students.uwf.edu	Name: Philip Iversen	Phone: 850-293-1208	Email: philip.iversen1@gmail.com	Name: Cindy Marvel	Phone: 321-501-6360	Email: cindymarvel850@gmail.com	Name: Deborah Zemenick	Phone: 850-375-8115	Email: djzztops@yahoo.com	Name: Emily Hoeflich	Phone: 850-776-2633	Email: emilyhoeflich@gmail.com	Name: Kim Carmody	Phone: 850-375-4940	Email: Kim_Carmody@hotmail.com	Name: Lauren Campanella	Phone: 850-291-7451	Email: lauren.d.campanella@gmail.com	Name: Tom Anderson	Phone: 850-377-1045	Email: tlanderson@mindspring.com
Name: Joseph Burgess	Phone: 850-777-6935	Email: Joseph_Burgess@nps.gov																																				
Name: Ashley Warren	Phone: 850-232-3640	Email: Ashley_Warren@nps.gov																																				
Name: Kacey Srubas	Phone: 850-382-0584	Email: Kacey_Srubas@nps.gov																																				
Name: Kris Dudus	Phone: 850-393-7610	Email: Kris_Dudus@nps.gov																																				
Name: Jordan Wingate	Phone: 706-993-8084	Email: jrw91@students.uwf.edu																																				
Name: Philip Iversen	Phone: 850-293-1208	Email: philip.iversen1@gmail.com																																				
Name: Cindy Marvel	Phone: 321-501-6360	Email: cindymarvel850@gmail.com																																				
Name: Deborah Zemenick	Phone: 850-375-8115	Email: djzztops@yahoo.com																																				
Name: Emily Hoeflich	Phone: 850-776-2633	Email: emilyhoeflich@gmail.com																																				
Name: Kim Carmody	Phone: 850-375-4940	Email: Kim_Carmody@hotmail.com																																				
Name: Lauren Campanella	Phone: 850-291-7451	Email: lauren.d.campanella@gmail.com																																				
Name: Tom Anderson	Phone: 850-377-1045	Email: tlanderson@mindspring.com																																				
Study Title: Monitoring Marine Turtle Nesting and Stranding Events																																						
Purpose of study: The purpose of this permit is to monitor and manage marine turtles within the Florida district of Gulf Islands National Seashore (GUIIS). This district of the park, which includes Perdido Key (PK), Fort Pickens (FP) and Santa Rosa (SR) regularly documents marine turtle nesting within the coastal dune system from May 1 through September 30. The main activity to be conducted for nesting includes daily morning surveys during the summer months to document and mark nests. Documentation is also collected for false crawls, disorientations, misorientations, and obstructed nesting attempts during these morning surveys. After nests are laid, the next step in documentation pertains to hatching success evaluations. After 70 days since the nest was laid, or 72 hours since the first emergence was observed, nest evaluations are completed. This entails digging up the nest cavity and documenting the hatchling success of the eggs laid. Hatchling disorientations will also be documented appropriately when conducting nest assessments. The third purpose of this permit is to allow for stranding response associated with marine turtles. Being a coastal park within the range of multiple marine turtle species, dead and injured turtles regularly wash up on shore. Documentation of dead and injured turtles are covered under this permit, as well as the end result of marking deceased animals, or transporting injured animals to approved facilities.																																						
Subject/Discipline: Herpetology (Amphibians / Reptiles) Threatened / Endangered / Rare Species																																						
Locations authorized: Florida District of GUIIS including Perdido Key, Fort Pickens, and Santa Rosa. This permit also covers stranding activities that may occur at Naval Live Oaks.																																						
Transportation method to research site(s): Activities may occur on foot, by UTV or by vessel. All UTV operators will be approved by the division chief prior to operating machinery, and all OHV SOP guidelines will be followed. Vessel operators will be MOCC certified. Training documents for UTV use																																						

will be kept by the permit holder, and GUIIS safety manager.

Collection of the following specimens or materials, quantities, and any limitations on collecting:

GPS data and pictures will be collected under this permit.

Non-viable eggs, eggshells or dead hatchlings of anticipated Green, Kemp's Ridley, and Leatherback sea turtles will be sent into FWC following the Marine Turtle Handbook guidelines.

Name of repository for specimens or sample materials if applicable:

Repository type: Temporarily captured or handled (may include marking) and then released undamaged in place

Objects collected:

Hatchlings may need to be temporarily handled or detained. All protocols outlined in the Marine Turtle Handbook and GUIIS Marine Turtle Protocol will be followed. This entails releasing hatchlings prior to 0900 when able to do so, or holding hatchlings in moist sand in a temperature controlled area until nightfall.

Repository type: Will be destroyed through analysis or discarded after analysis

Objects collected:

Non-viable eggs for species identification will be sent to FWC for analysis and destruction. This portion of the permit follows FWC handbook guidelines for Green and Kemp's Ridley turtles in the panhandle of Florida.

NPS General Conditions for Scientific Research and Collecting Permit (available at the RPRS HELP page) apply to this permit. The following specific conditions or restrictions, and any attached conditions, also apply to this permit:

ADDITIONAL CONTACTS

- Research Permit Coordinator - GUIIS_Research@nps.gov
- Curator - GUIIS_Compliance@nps.gov
- Natural Resource Specialist - Jennifer Manis, Jennifer_Manis@nps.gov, 850-232-3619

GENERAL

- Group leader must be named on the permit, and must have a copy of permit and attached conditions/restrictions in possession during field activities.
- All personnel associated with the project activity must be clearly identifiable as project participants. The vehicles or vessel(s) used during collection operations must be clearly marked as a research vehicle or vessel. This will allow the public and park personnel to identify a permitted research activity.
- Access is not allowed into or through areas closed for endangered species protection, nesting activity, hurricane preparations or recovery, or other management or administrative purposes.

REPORTS

- Provide status of project findings during field work to the Natural Resource Manager at GUIIS_Research@nps.gov.
- Provide a short report with analysis and data specific to Gulf Islands National Seashore.
- Draft and final reports of project findings, will be submitted to the Research Permit Coordinator within one month of completion of each season of field work.
- Final copies of data, reports, and publications derived from the permitted activity, including thesis or dissertation, will be submitted in electronic format and/or hard copy to the Superintendent of Gulf Islands National Seashore, Attn: Research Permit Coordinator, at the email address GUIIS_Research@nps.gov, within 1 month of publication. Results may be made available to the public.
- Copies of research, photographs, and final report, etc will be uploaded into the RPRS system to be included in NPS archives.
- Submit an Investigator's Annual Report (IAR) in the RPRS system by the end of December each year. Attach all data to the IAR.
- Future permits are dependent upon submission of requested reports.

LEAVE NO TRACE

It is important to familiarize yourself with the plants and wildlife, changing weather patterns, and lay of the land before your trip.

Practice Leave No Trace:

- Plan ahead and prepare, bring water to drink
- Travel on durable surfaces
- Dispose of waste properly, pack it in pack it out.
- Leave what you find as you found it
- Be considerate of other visitors
- Respect wildlife

UTV OPERATIONS

- All UTV operators need to read and sign the NPS Appendix F. A copy of the NPS GUIS UTV Use Policy will be provided during the permitting process. This completed form needs to be returned to the NPS. ATVs are not permitted on the National Seashore.
- All UTV operators need to have completed a UTV safety course, through their place of employment. If a UTV course has not been provided, at a minimum, each individual needs to complete training at <https://cbr.rohva.org/>
- UTV operations are not permitted during darkness.

VESSEL OPERATIONS

- The boundary of Gulf Islands National Seashore extends one mile from the shorelines of the Barrier Islands and includes water as well as land.
- The shoals along the north shore (depths of 10 feet or less) of the islands are sensitive seagrass habitat. Foot traffic should be routed around seagrass beds. Vessels should be anchored outside of seagrass beds. Vessel operators must operate their vessels to minimize disturbance to the sea bottom.
- All interior lakes, ponds, and lagoons are closed to the use of all motorized vessels, (combustion and electric) except that vessels with motors are not prohibited if the motor(s) are turned off and tilted up so as to be out of the water, or removed from the transom or gunnels. Paddling and poling are permitted.
- If a vessel is beached for access, the vessel will be pushed offshore manually rather than be powered off, thus preventing bottom scouring. Vessel operators should trim their motors up to prevent disturbance of bottom sediment and seagrass habitat. During shallow water operations, a deck observer should not see a sand plume suspended into the water column.
- Tide and weather will greatly influence vessel accessibility along the shoreline. The accessibility of some segments of shoreline will change daily and can change within an operational period. Pre-planning around these conditions is critical to avoid grounding and stranding of vessels.

Summary of permitted field methods and activities:

All field methods and activities will follow Florida Fish and Wildlife Conservation Commission rules and regulations. The Fish and Wildlife Conservation Commission (FWC) issues permits for activities involving interactions or research with marine turtles, their nests, eggs, hatchlings, or parts under the Marine Turtle Protection Act, Florida Statute 379.2431 (1). FWC also has authority granted to the state through a Cooperative Agreement with the U.S. Fish and Wildlife Service (USFWS) under Section 6 of the U.S. Endangered Species Act (ESA) for such authorizations.

GUIS staff will follow the "Marine Turtle Conservation Handbook" (2016) for all activities pertaining to marine turtles. The park is also required to obtain a Marine Turtle Permit to authorize the park in conducting certain activities (attached). In 2021, Jennifer Manis acquired MTP 21-240, which allows for 1) Nesting surveys, 2) Stranding/salvage activities, 3) Outfitting nests with self-releasing screens for predator protection, 4) Conducting hatch success evaluations, and 5) Outfitting nests with shade cloth/light blocking shield/screens.

GUIS staff will also follow the 2021 Marine Turtle Protocols outlined and approved by the park's management team for specifics on how exactly to conduct all of these activities. Trained staff, interns and VIPs will be conducting all of the authorized work under FWC and the park.

Recommended by park staff (name and title):

BRUCE LEUTSCHER Digitally signed by BRUCE LEUTSCHER
Date: 2021.06.29 10:52:58 -05'00'

Reviewed by Collections Manager:

Yes _____ No X

Approved by park official:

STEVEN MCCOY Digitally signed by STEVEN MCCOY
Date: 2021.06.29 13:50:29 -05'00'

Date Approved: _____

Title:

Deputy Superintendent

I Agree To All Conditions And Restrictions Of this Permit As Specified
(Not valid unless signed and dated by the principal investigator)

(Principal Investigator's signature)

06/29/2021

(Date)

THIS PERMIT AND ATTACHED CONDITIONS AND RESTRICTIONS MUST BE CARRIED AT ALL TIMES WHILE CONDUCTING RESEARCH ACTIVITIES IN THE DESIGNATED PARK(S)

Literature Cited

Florida Fish and Wildlife Conservation Commission (FWC), *Marine Turtle Conservation Handbook*. 2016. Section 2: Nesting Beach Survey Activities, pp 2-34 and 2-39. Available from: <http://myfwc.com/media/4112794/fwc-mtconservationhandbook.pdf>

Gulf Islands National Seashore, Marine Turtle Training and Protocol Manual, 2021. Available at https://doimsp.sharepoint.com/:w:/r/sites/nps-gulf-islands/SRS%20Documents/Marine%20Turtles/2021%20Season/Marine%20Turtle%20Training%20and%20Protocol%20Manual_2021.docx?d=w7ecf6f7bc364ec6aedb78a410abc820&csf=1&web=1&e=6dlrSN

Gulf Islands National Seashore, Marine Turtle Monitoring Field Guide, 2021. Available at <https://doimsp.sharepoint.com/:w:/r/sites/nps-gulf-islands/SRS%20Documents/Marine%20Turtles/2021%20Season/Field%20Protocol.docx?d=wec1e932718ce40cebd01d45566897fa1&csf=1&web=1&e=IYmH2r>

Laloë J-O, Tedeschi JN, Booth DT, et al. *Extreme rainfall events and cooling of sea turtle clutches: Implications in the face of climate warming*. 2021; *Ecol Evol*.11:560–565.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. *Recovery Plan for US Population of Atlantic Green Turtle*, 1991. National Marine Fisheries Service, Washington, D.C.

Shamblin, B.M., M.G. Dodd, D.A. Bagley, L.M. Ehrhart, A.D. Tucker, C.Johnson, R.R. Carthy, R.A. Scarpino, E. McMichael, D.S. Addison, K.L. Williams, M.G. Frick, S. Ouellette, A.B. Meylan, M.H. Godfrey, S.R. Murphy, C.J. Nairn. *Genetic structure of the southeastern United States loggerhead turtle nesting aggregation: evidence of additional structure within the peninsular Florida recovery unit*. Nov, 2010. Available at http://gtmnerr.org/documents/Research_Publications/2010.Shamblinetal.pdf

Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.).USGCRP (U.S. Global Change Research Program). 2017. *Climate science special report: Fourth National Climate Assessment*, volume I. <https://science2017.globalchange.gov>. doi:10.7930/J0J964J6.