



Escambia County

2020 Marine Turtle Nest Monitoring Report



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ABSTRACT

In 2020, there were 15 loggerhead (*Caretta caretta*) nests, 2 Kemp's ridley (*Lepidochelys kempii*) and 1 green (*Chelonia mydas*) nest on Pensacola Beach (PB). There was also a total of 7 false crawls, with 6 of the false crawls coming from loggerhead turtles and one from a Kemp's ridley. There were 10 loggerhead nests recorded on Perdido Key (PK) along with 7 loggerhead false crawls. Tropical storms and hurricanes impacted incubating nests through the summer with over wash and erosion of nests leading to poor hatch rates for the season. The mean hatch success for all nests on Pensacola Beach, was 18% while mean emergence success was 78%. Mean hatch success for all nests on Perdido Key, was 17%, while mean emergence success was 80%. There were no nests deposited below the Most Recent High Tide Line (MRHTL) on PB or PK, so 0 nests were relocated, in compliance with FWC guidelines. Artificial lighting negatively affected 43% of applicable Pensacola Beach nests (n = 3 of 7); 11 nests were not applicable due to the absence of viable offspring (0% hatch success). Artificial lighting impacted 67% of applicable Perdido Key nests (n=2 of 3); 7 nests were not applicable due to the absence of viable offspring (0% hatch success). The low nest hatching success rates are attributed to turtles frequently nesting above the Most Recent High Tide Line (MRHTL) but below normal storm tide lines. Nests cannot be relocated, per the Florida Fish and Wildlife Commission (FWC) guidelines, if laid low unless they are below the MRHTL. As a result, tropical storms negatively impact most nests. A total of 11 marine turtle strandings were documented throughout 2020 in Escambia County (6 loggerhead, 2 green and 3 Kemp's ridley).

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INTRODUCTION

The Pensacola Beach area of Santa Rosa Island encompasses approximately 8.1 miles of Northwest Florida's gulf coast, providing nesting habitat suitable to marine turtles. Historically, loggerhead (*Caretta caretta*; CC) and green (*Chelonia mydas*; CM) turtles are the two species documented to nest at this site. Additionally, Kemp's ridley (*Lepidochelys kempii*; LK) nesting was confirmed at this site for the third consecutive season. Pensacola Beach has averaged 14 nests per season (SD \pm 9) since annual surveys began, with 2020 exhibiting a nest count of 18 (Fig. 1).

The Perdido Key area is 6 miles in length and is utilized by loggerhead turtles. Historically this area was patrolled by the FL State Park personnel, until the 2018 season. For the 2020 season, Escambia lands on Perdido Key were covered under permit #032. Perdido Key has averaged 8.6 nests per season (SD \pm 4.3) since 2009, with 2020 exhibiting a nest count of 10. (Fig. 2).

Volunteers are used extensively in this documentation and monitoring effort. These volunteers are greatly appreciated, and the program could not function without this group of people.

METHODS

Survey Area

The Pensacola Beach turtle patrol is delineated on the west end by the Fort Pickens area of GUIS and on the east end by the Santa Rosa area of GUIS. The PB patrol utilized a UTV beginning between 0500 – 0600 hours, or first light, and lasting 2-3 hours.

The PB morning patrols began at boardwalk 22C located immediately east of White Sands condos, advanced to the designated eastern limit, and then progressed west to complete the survey at Park West.

Perdido Key is delineated on the west end by the Florida-Alabama state line. The east end is the boundary with the Gulf Islands National Seashore Perdido Key Area. A center 2-mile portion is Florida State Park land and nesting data is handled by the state park staff. Perdido Key utilized two UTV's this season, one going east and one going west. This was done to complete patrols earlier to allow beach vendors to begin set up earlier.

Crawl Identification and Data Collection

Daily morning patrols were conducted between 01 May and 16 September 2020 on Pensacola Beach and Perdido Key. Patrols were completed by permitted staff and volunteers.

During a collaborative pre-season meeting, it was decided to continue asking chair and umbrella vendors to install white boards to be initialed daily by patrol after one pass to ensure set-ups were not occurring prior to clearance. White boards were located at Margaritaville, core Casino Beach public access between Holiday Inn and Hilton, Portofino and Gulf Winds. This was later changed to a green/red placard. White boards were not utilized on Perdido Key.

Data was collected for each nesting and non-nesting emergence event (i.e. false crawl) on nest survey field sheets. This data was then entered into an excel database for storage and analysis. Nest numbers were denoted numerically following the sequence in which they were discovered, e.g. the first nest laid on Pensacola Beach was denoted as 'PB01' while the second nest encountered by patrol on Perdido Key was denoted as 'PK02', with a W for the western side and an E for the eastern side; PK02W and PK02E. Data collected for each emergence included species, incident type (nest or false crawl), distance of the body pit to both the water line and the vegetation lines, whether the nest was relocated, distances from the egg cavity to the nest sign and reference stakes, whether a predator screen was deployed and date if applicable, and location defined as 1) proximity to notable landmarks such as boardwalks and 2) GPS positioning of all nests at the clutch location. GPS positions were also taken for false crawls. Crawls that contained loops, meandered parallel to the shoreline greater than 100 feet, and/or traveled inland post-nesting were indicative of disorientation. Maps containing point data for each nest were generated using Google Earth. A diagram was also illustrated for each emergence event. Daily logs were filled out to document survey completion.

Nest Marking and Monitoring

After nests were located, nests were marked with a sign, a square enclosure, and two reference stakes. Nest relocation for conservation purposes did not occur on PB nor on PK during the 2020 season due to no opportunistic encounters of nests laid below the Most Recent High Water Line (MRHWL).

Nests were monitored throughout the incubation period and checked daily by morning patrol for evidence of predation, over wash, erosion, and other disturbances. Additionally, nests were monitored for signs of hatching during morning surveys beginning day 50-55 of the incubation period to determine

the precise duration of incubation, and to gather data on hatchling emergence, predation, and to document disorientation events. Visual emergence signs include a collapse or depression over the egg cavity and a cluster of small, approximately 2” wide tracks radiating from the nest site.

Nighttime nest monitoring (spot checking) was conducted for the 2020 season.

Assessments

Nests were assessed 72 hours after the initial hatching event. Nests that were flooded and where emergence signs were not evident were assessed at day 80 of the incubation period. During assessment, nests were excavated and the number of hatched (defined as an intact shell greater than 50%), unhatched and pipped eggs was recorded, along with the number of live and dead hatchlings found in the nest at the time of excavation (Appendix B). Unhatched eggs were opened, and the presence or absence of development was noted. All contents were reburied in the nest chamber. Any hatchlings alive in the nest were released to crawl into the Gulf of Mexico (hereafter referred to as the Gulf) prior to 0900 if ≤ 10 hatchlings were present. In the event > 10 hatchlings were located in the nest during assessment they were either 1) held in a container with 1” of moist sand and kept in a cool, dark place until released that night, or 2) reburied with nest contents and allowed an additional 48 – 72 hours to emerge prior to assessment.

Analyses

Beach success, reproductive success and productivity were determined for the 2020 season. Beach success was defined as the proportion of nests to all emergences:

$$\text{Beach Success \%} = \text{Nests} / (\text{Nests} + \text{False Crawls})$$

Mean hatch and emergence success rates were calculated for assessed nests on Pensacola Beach as follows:

$$\text{Mean Hatch Success \%} = \text{Total \# Hatched Eggs All Nests} / \text{Total \# Eggs Laid All Nests}$$

$$\text{Mean Emergence Success \%} = \text{Total \# Emerged Hatchlings All Nests} / \text{Total \# Eggs Laid All Nests}$$

Nest success was defined as the proportion of nests yielding hatch success $\geq 10\%$. Productivity was defined as the total number of emerged hatchlings estimated from all nests during the 2020 season. Observed egg loss, hatchling loss and percentage of hatchlings and/or tracks witnessed entering the Gulf was evaluated.

RESULTS AND DISCUSSION

Crawl Activity and Beach Success

Nesting occurred between 31 May and 12 August on PB and between 10 June and 20 August for PK. The 2020 season witnessed 18 nests and 7 false crawls on Pensacola Beach, yielding a beach success of 72% compared to the 23-year average beach success of 65% (Fig. 8; Fig 10.). Two Kemp's ridley nests were identified confirming continued utilization of this site as nesting habitat. One green turtle nested on PB. The remaining nesting and non-nesting emergences were identified as loggerheads. There were no nests this season on the University of West Florida (UWF) property.

The 2020 season witnessed 10 nests and 7 false crawls on Perdido Key, yielding a beach success of 59%. (Fig. 9; Fig 11.)

All 28 nests in Escambia County remained *in situ* upon initial location.

Missed Nests

No unknown or "missed" nests, defined as a nest unidentified on patrol the morning after deposition but located some time during incubation or hatch, were documented this season.

Reproductive Success and Productivity

In 2020, a total of 15 loggerhead nests, 1 green and 2 Kemp's ridley nests were laid on Pensacola Beach and monitored throughout incubation. Due to very low hatching success, only 5 of those nests provided incubation lengths. The average length of incubation on PB was 61 days ($n = 5$), with the shortest incubation period observed at 59 days for PB05 and PB06. The longest incubation length was for PB18 at 66 days.

Many nests were lost to erosion, and assigned the "114" egg value that FWC recommends, resulting in an average clutch size of 115 eggs, ranging from 91 -143 (Table 1). Of the 18 monitored nests, 8 were assessed and 10 were completely lost to erosion.

In 2020, a total of 10 loggerhead nests occurred on PK. The average length of incubation on PK was 59 days ($n = 2$). The average clutch size was 111 eggs, ranging from 94 -142 (Table 2). Of the 10

monitored nests, 5 were assessed and 5 were completely lost to erosion. Two nests were identified as infertile, and 0 experienced egg predation by a source other than ghost crab.

A total of 7 nests produced viable offspring during the 2020 season on Pensacola Beach. Perdido Key had 3 of the 10 nests produce hatchlings. Mean hatch success for PB was 18.3% (SD \pm 33%) and PK was 17.3% (SD \pm 31%) Compared with historical data obtained annually on PB since 1996, hatch success was very low this year compared to the 25 year average of 66%. (Figure 12).

Hatching success is linked to the location of the nests on the beach. Nests laid lower on the beach, typically have lower success rates. Nests laid in positions that are prone to flooding, have been impacted by storms regularly for the last 4 seasons and have seen a significant decline in hatching success. (Figure 12) This hatching success can vary somewhat, depending on when the first storms of the season arrive. Nests laid low on the beach that hatch pre storm, will do well. This occurred in 2018 and 2017. However, if storms arrive early, as in 2020, many low nests will be lost before hatching, and only the nests laid high on the beach are successful.

Seasons that had lower tropical activity, typically witnessed higher success rates of nests: such as 2000 and 2002. Other seasons that had high success rates, had a large percentage of nests relocated higher on the beach above lines of swash impacts from tropical storms, such as 2006, 2009, 2013 and 2016. The 2015 season had low tropical activity but had 3 nests fail, with none of the eggs developing, indicating they were not fertile. This lowered the hatch success rate for that season substantially. The 2020 season was the lowest hatching success for PB since surveys were begun in 1996. (Figure 12)

The total number of hatchlings witnessed entering the Gulf from PB was approximately 291. (Figure 13) Another 150 hatchling tracks were observed making it to the Gulf. PK had 54 hatchlings witnessed entering the Gulf.

Perdido Key had 2 nests with 0% development, and other nests on PK and PB had high numbers of eggs that failed to develop, even though they were not impacted by high water from tropical systems; ie over washed or flooded. PB05, loggerhead, never received high water from storms but only hatched at 16%. There were 120 eggs without development. PB18, green, hatched at only 40% despite being laid well above any of the storm waters through the summer. This could possibly indicate a fertility issue in the area and warrants further examination.

Effects of Erosion, Inundation and Tropical Weather

Direct impact of tides on a large number of incubating nests this season may be due to a high number of low beach nests. Zero nests were located below the MRHTL so zero nests were relocated higher on the beach this season.

Several named storms adversely impacted marine turtle nests this season. In early June, TS Cristobal storm surge eroded a total of 2 nests on PB and flooded several others. This storm also over washed the Kemp's nest, PB03, just several days after it was laid. This nest failed to develop. PK also had flooded nests from Cristobal. PB and PK had further erosion problems from Hanna in June and both beaches lost one loggerhead nest. TS Marco impacted nests and Hurricane Laura eroded several others. Hurricane Sally in September later eroded out a total of 8 nests.

In total, 13 of 18 nests on PB experienced tidal impacts to include erosion, repeated wash over and/or inundation. Of these 13 impacted nests, 10 experienced total loss of the eggs. (Table 1).

In total, 9 of 10 nests on PK experienced tidal impacts to include erosion, repeated wash over and/or inundation. Of these 9 impacted nests, 5 experienced total loss of the eggs. (Table 2).

PB nests hatched at a rate of 18.3%, down from the average of 72%. PK hatch success was only 17.3%.

Predation

Predation did not occur in 2020. Canine, feline, armadillo, ghost crab, raccoon and various avian tracks were observed on Pensacola Beach in the 2020 season.

FWC removed 2 coyotes from PB ahead of the season and several from PK State Park ahead of the 2020 season.

While egg and hatchling predation by ghost crabs was only observed at two nests, it is likely greater loss occurred that was not observed and can be attributed to ghost crabs. Burrows were noted in close proximity to several of the nest sites, however, loss sub-surface cannot be accurately confirmed. Data sheets include field notes regarding ghost crab activity. Missing eggs/hatchlings could be attributed to either unknown predation events or heavy rain that may have washed out tracks from daytime and nighttime rainfall emergencies.

Nest Relocations

The average distance of nests on PB to the water line was 79 feet (SD \pm 52.7 feet). For PK it was also 79 feet (SD \pm 28.5 feet). Variance was high for both locations. No nests were relocated upon initial discovery during 2020 due to guidelines outlined in the FWC Marine Turtle Handbook stating only nests deposited seaward of the MRHTL are candidates for relocation (FWC 2016).

Light Pollution and Disorientation

Hatchling disorientation was defined as > 5 hatchlings from a given nest orienting > 45° from the most direct path to the Gulf post-emergence (FWC 2016). Artificial lighting negatively affected 43% of applicable Pensacola Beach nests (n = 3 of 7; Fig. 15); 61% of total nests (n = 18) were not applicable due to the absence of viable offspring (0% hatch success) and one nest had 0% emergence due to mortality of hatchlings from flooding. Four nests (47% of total hatched nests) did not experience hatchling disorientation this season. (Figure 15)

Artificial lighting negatively affected 67% of applicable Perdido Key nests (n = 2 of 3); 67% of total nests (n = 6) were not applicable due to the absence of viable offspring (0% hatch success) and/or lack of evidence of hatchling orientation due to high winds, rain and tides. One nest (33% of total nests that hatched) did not experience hatchling disorientation this season

Adult and hatchling disorientation reports are provided annually to FWC for evaluation. The most commonly noted sources of disorientation on reports provided to FWC during the 2020 season were interior and exterior lighting of various homes and condominiums.

Obstructed Nesting Events

There were no obstructed nesting attempts on PB or PK in 2020. These typically involve beach furniture, or boardwalks.

Strandings

There were 11 reported strandings in Escambia County in 2020; 6 loggerhead, 3 Kemp's ridley and 2 greens. The Escambia County Ambassador Program initiated increased presence on the PB Fishing Pier. The objectives include increasing public education and pier signage, scheduling routine piling and on deck clean-ups, providing nets so operators can assist hooked or entangled turtles, and to provide proper training so reporting and transport of hooked turtles to rehabilitation facilities occurs.

CONCLUSIONS AND RECOMMENDATIONS

The largest impact to incubating nests in 2020 were tropical storms. Numerous nests were lost to erosion or over washed/flooded with low hatching success. Disorientation events were lower this season due to most nests being eroded by tropical storms thus never hatching. However, nests that did hatch under new or less than half moon conditions did witness disorientation. Coastal lighting which contributes to point source and non-point source (sky glow) continues to be an issue.

Limiting Disruption

Human and vehicular presence on nesting beaches during nighttime hours has the ability to disrupt nesting turtles and their hatchlings. Encountering an emerged turtle by happenstance can cause her to abandon nesting or choose a less suitable site. While vehicles are operated at night for public safety, some of the vehicles present are removing trash and debris in support of the County's 'Leave No Trace' ordinance. Further evaluation into whether the benefits of current 'Leave No Trace' operations outweigh the risks to marine turtles may be warranted due to possible conflicts with nesting marine turtles. Human disturbances on the beach after dark are excessive and include flashlight usage, and cell phone lights to illuminate the beaches. The 2020 season witnessed excessive use of lighting by beach goers. This continues to present hurdles for females wishing to emerge and nest on these beaches. The Escambia County's Sea turtle Ambassador program began to educate beach goers on this issue, however the problem presents unique challenges to changing visitor behavior, partly in due to the high number of short-term and day-use visitors on Pensacola Beach. The COVID-19 pandemic also greatly reduced the Ambassador's ability to engage beachgoers in person, on the beach. Volunteers provided red flashlight and cell phone filters to the beach visitor centers and participating hotels to help reduce the amount of white light being cast on the beaches at night by beach goers.

Volunteer Time

Volunteers collectively submitted approximately 700 hours for conducting marine turtle nesting surveys and another 150 hours on monitoring activities. Key issues that require dissemination to the public include how to reduce disorientation caused by artificial lighting, strandings caused by fisherman on and off piers, and improper waste disposal. Continuing to utilize permitted volunteers for stranding response and transport will be a beneficial use of volunteer resources and increase chances of survival for sick and injured marine turtles.

Training

Training is recommended for employees of Escambia County public works and vendors prior to commencement of the 2021 nesting season. Training provided by the 2021 marine turtle permit holder should include 1) crawl and nest identification, 2) how to respond to and report nests, injured wildlife, and stranded turtles (hooked turtles and those washed ashore), and 3) who to report events to for proper response.

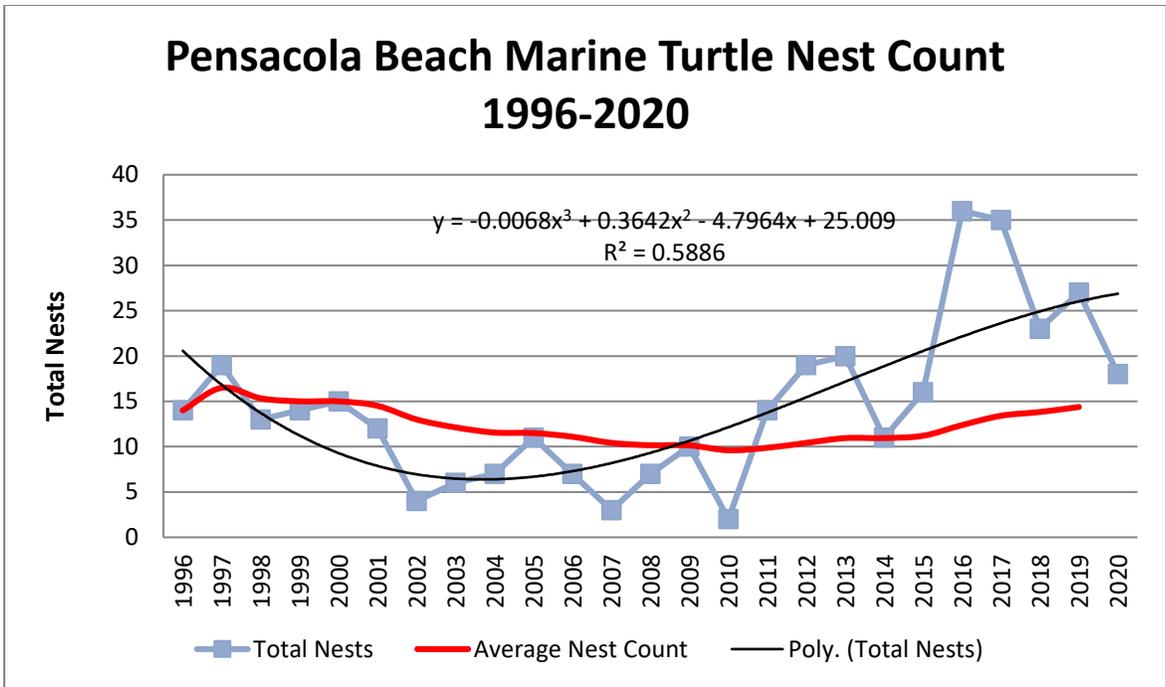


Figure 1: Pensacola Beach annual marine turtle nest count trend from the 1996 - 2020 seasons. Pensacola Beach has averaged 14.5 nests per season (SD ± 8.9) since annual surveys began, with 2020 exhibiting a nest count of 18. The best-fit trend line is displayed (polynomial; $R^2 = 0.5886$).

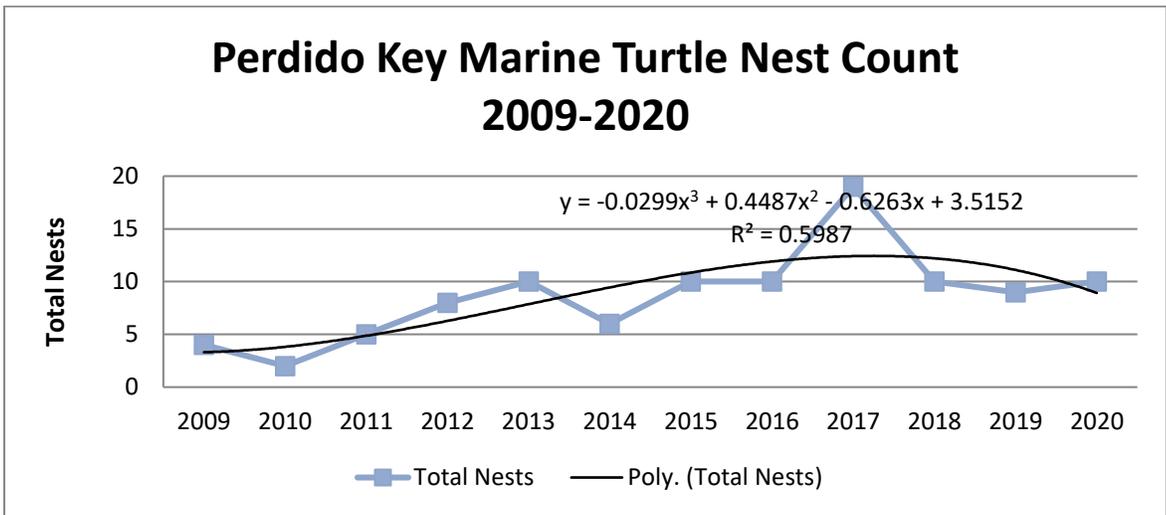


Figure 2: Perdido Key annual marine turtle nest count trend from the 2009 - 2020 seasons. Perdido Key has averaged 8.6 nests per season (SD ± 4.3) since 2009. The best-fit trend line is displayed (polynomial; $R^2 = 0.5987$).

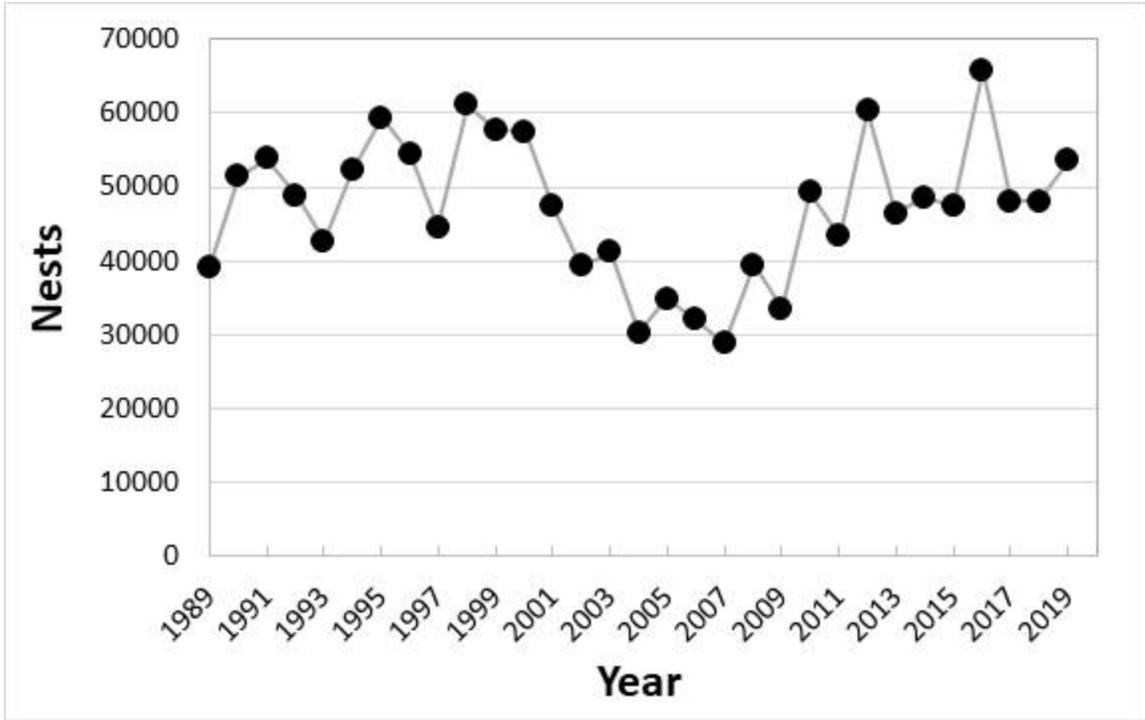


Figure 3: Statewide nesting loggerhead trend data, 1987 – 2019. Total of 27 core index nesting beaches across Florida follow standardized data collection methods to represent statewide trends.

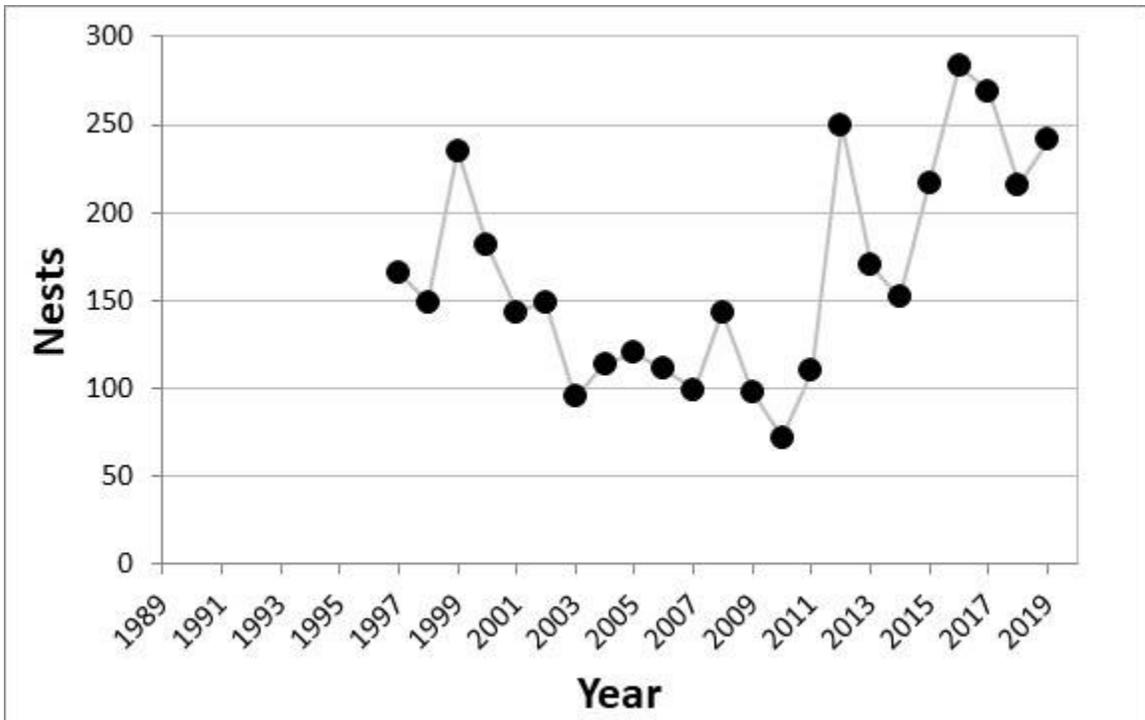


Figure 4: Florida panhandle nesting loggerhead trend data, 1997 – 2019. Panhandle index beaches are excluded from the set of core index nesting beaches throughout the rest of the state (FWC 2019).

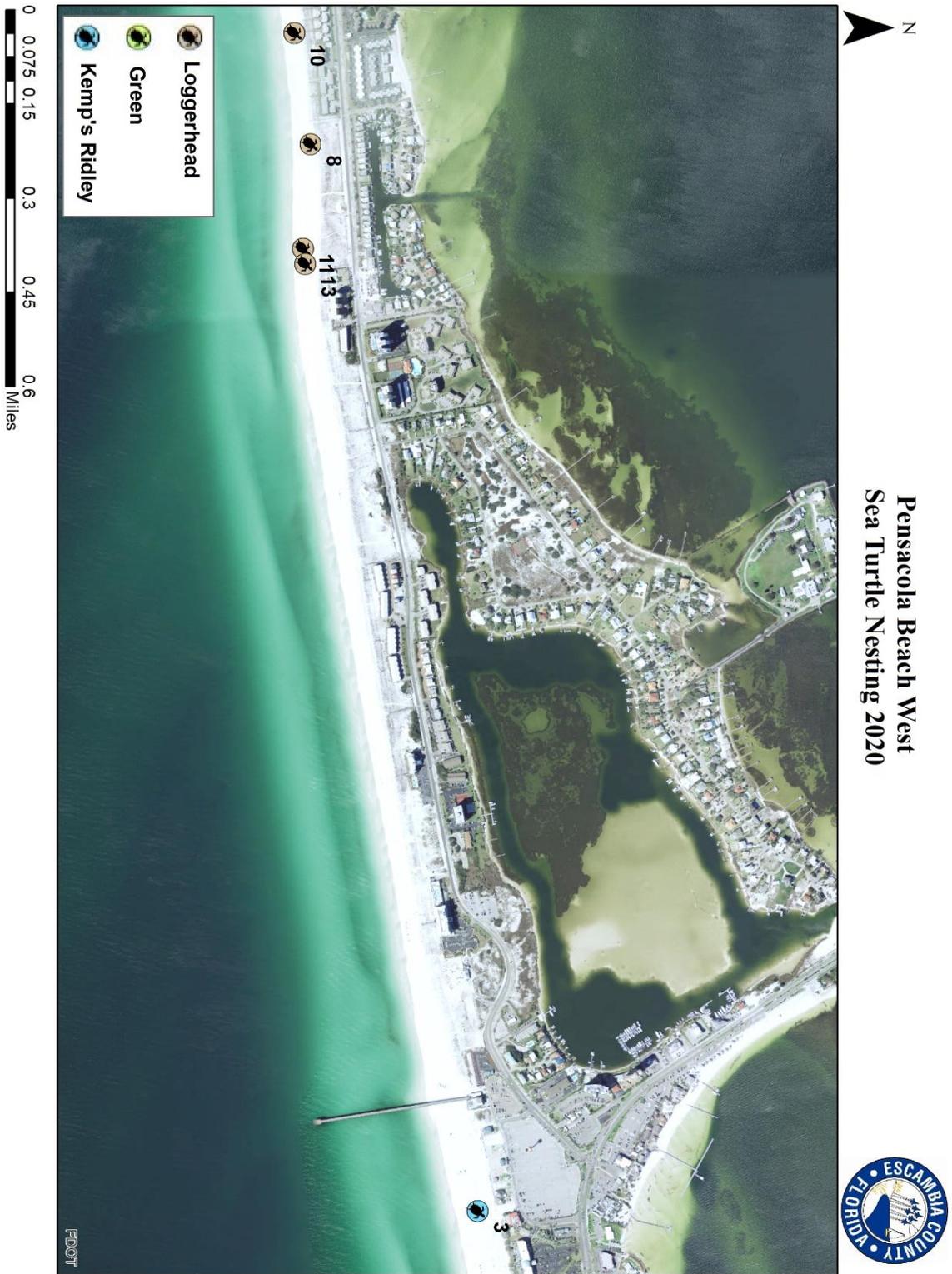


Figure 5: GIS map displaying Pensacola Beach west side marine turtle nest locations for the 2020 season.



Figure 6: GIS map displaying Pensacola Beach east side marine turtle nest locations for the 2020 season.



Figure 7: GIS map displaying Perdido Key marine turtle nest locations for the 2020 season.

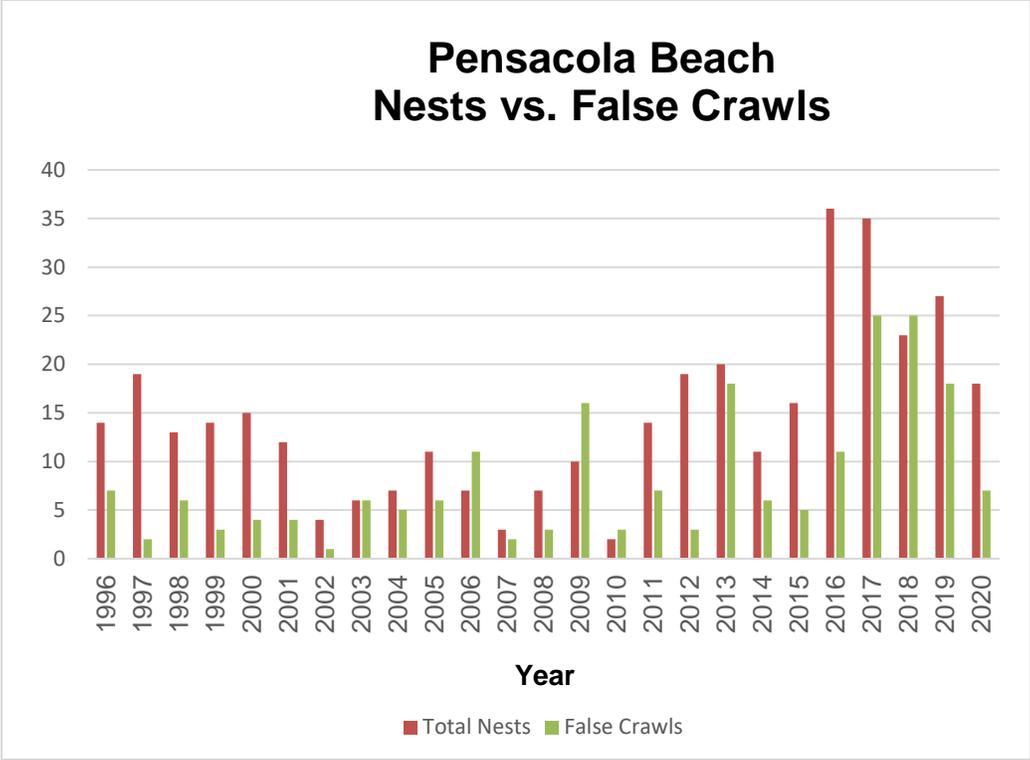


Figure 8: Marine turtle emergence data from Pensacola Beach including the number of nests compared to the number of non-nesting emergences (i.e. false crawls), 1996 - 2020.

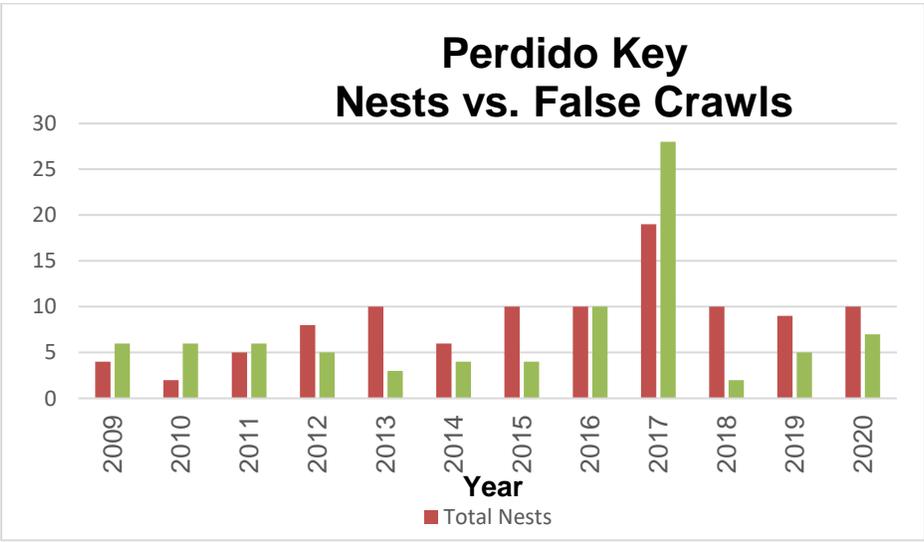
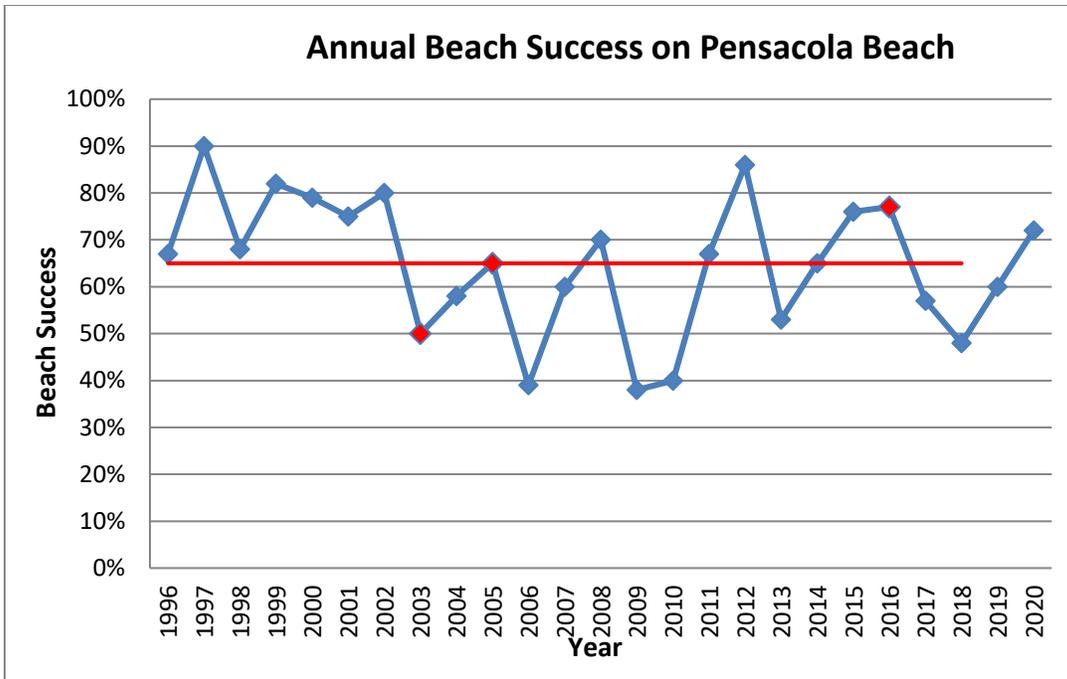
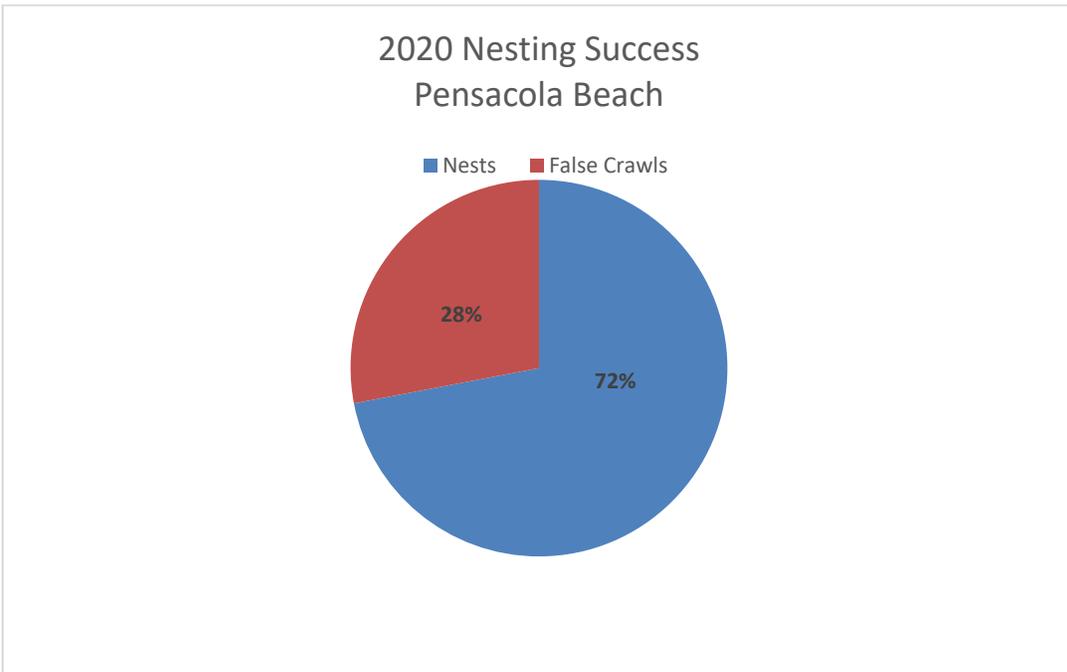


Figure 9: Marine turtle emergence data from Perdido Key including the number of nests compared to the number of non-nesting emergences (i.e. false crawls), 2009 - 2020.



a.



b.

Figure 10: Annual beach success data from Pensacola Beach, 1996-2020 (a). Beach success is defined as the proportion of nests laid to the total number of crawls. Beach nourishment project years are represented by red data points (2003, 2005, and 2016). Beach success for 2020 was 72%, compared to the 23 year average of 65%. (b). Proportion of nests to false crawls for 2020.

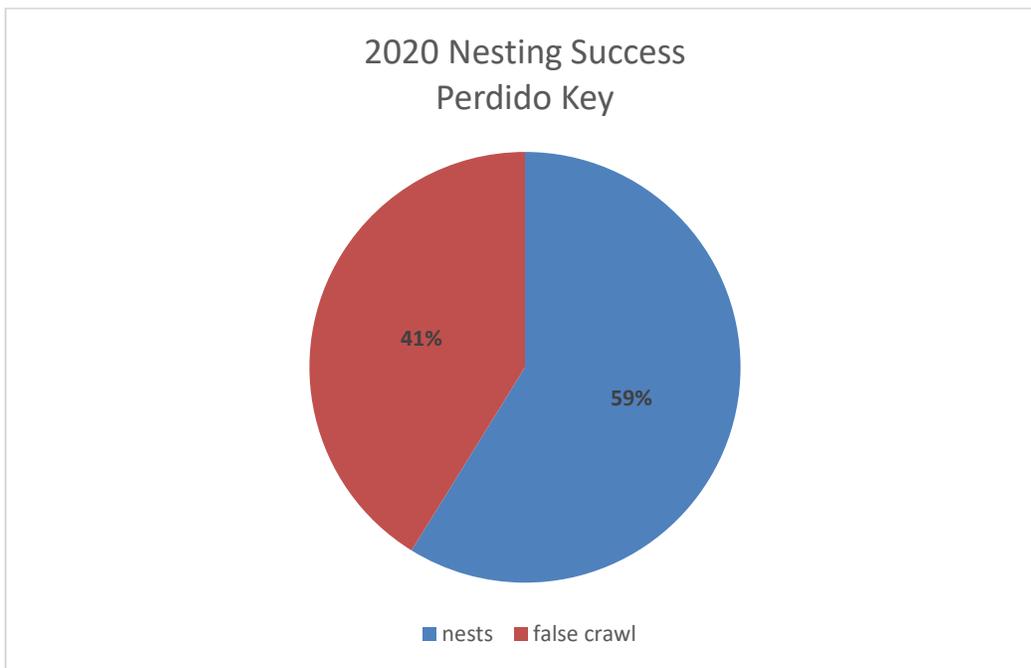
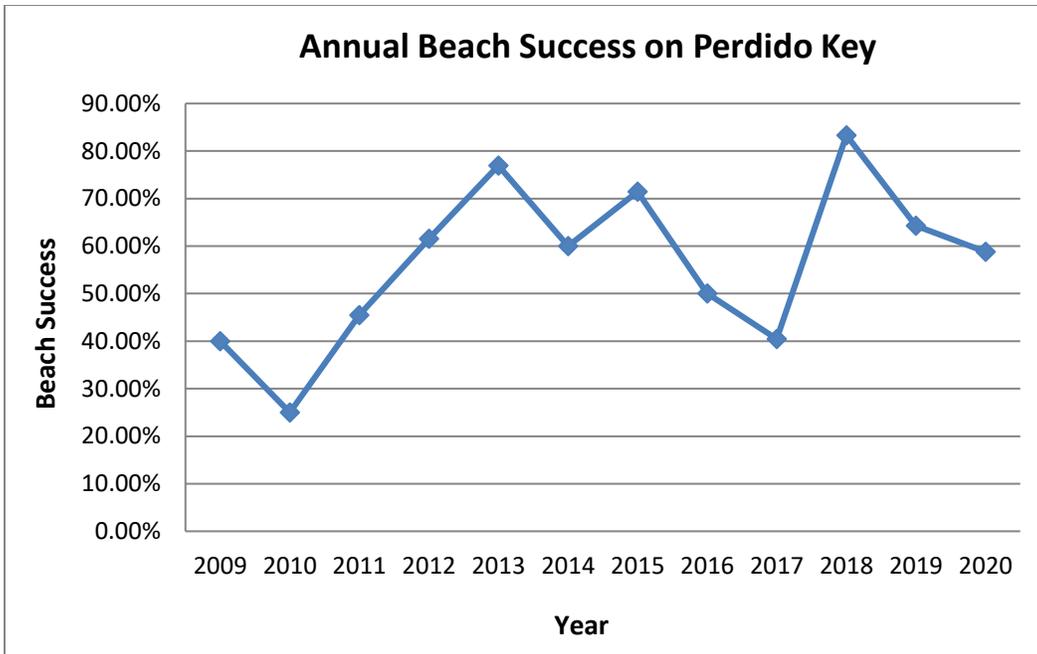


Figure 11: Annual beach success data from Perdido Key, 2009-2020 (a). Beach success is defined as the proportion of nests laid to the total number of crawls. Beach success for 2020 was 59%. Proportion of nests to false crawls for 2020 is also depicted (b). Proportion of nests to false crawls for PK in 2020.

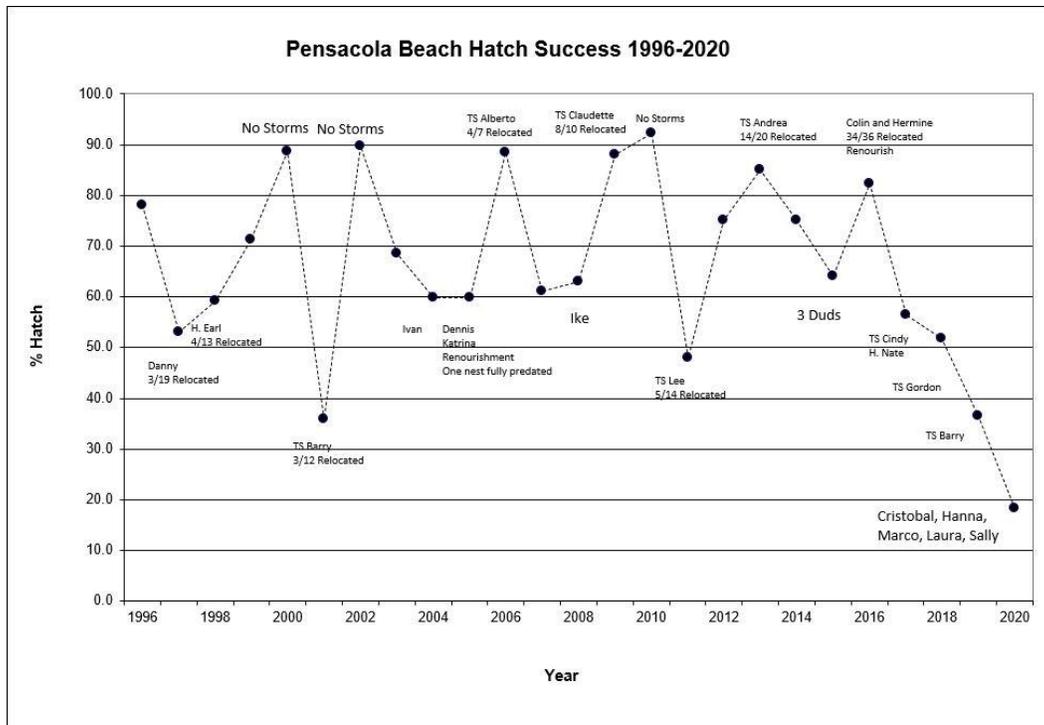


Figure 12: Annual mean hatch success (% hatch) from the 1996 - 2020 nesting seasons on Pensacola Beach. Mean hatch success for the 2020 season was 18.3% (SD ± 33%). Long-term monitoring efforts have established a 24 year mean hatch success of 66.0% (SD ± 19.1%).

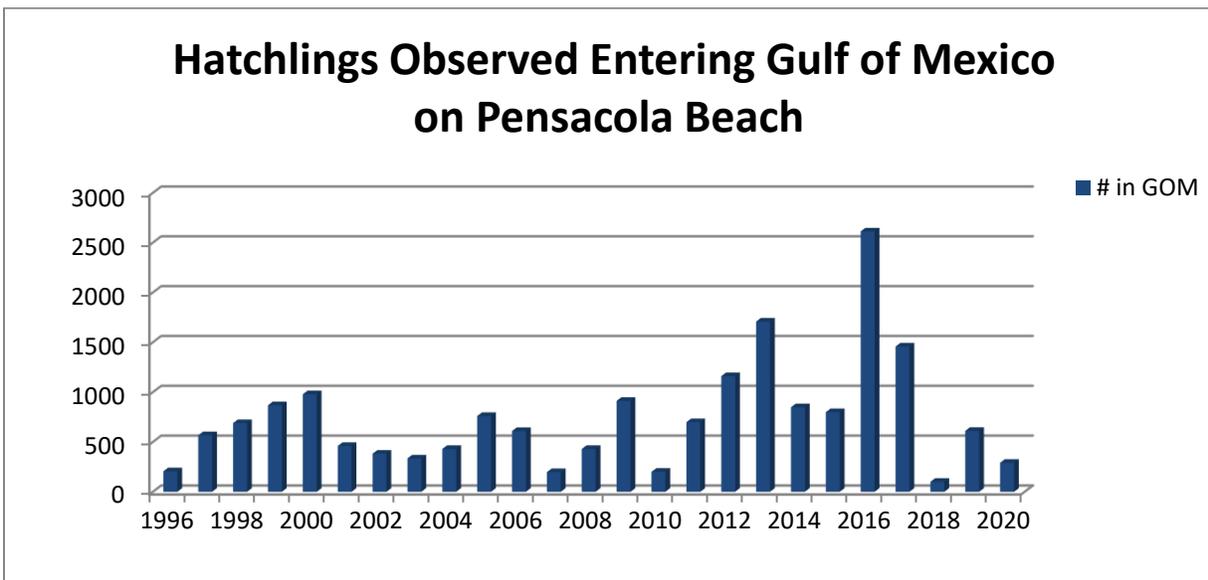
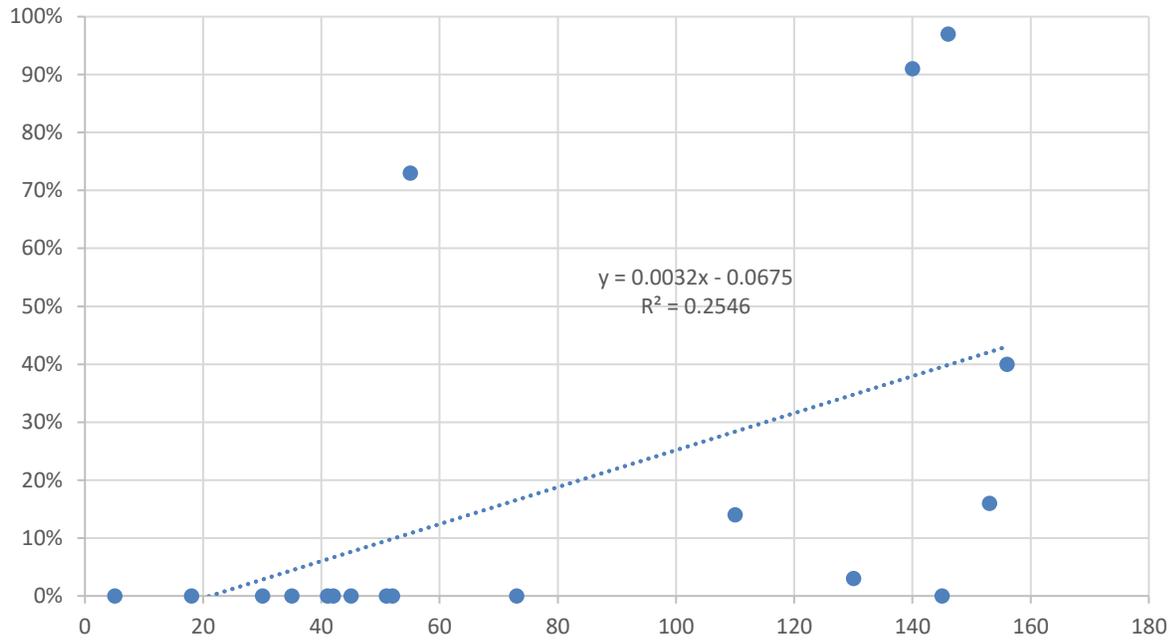
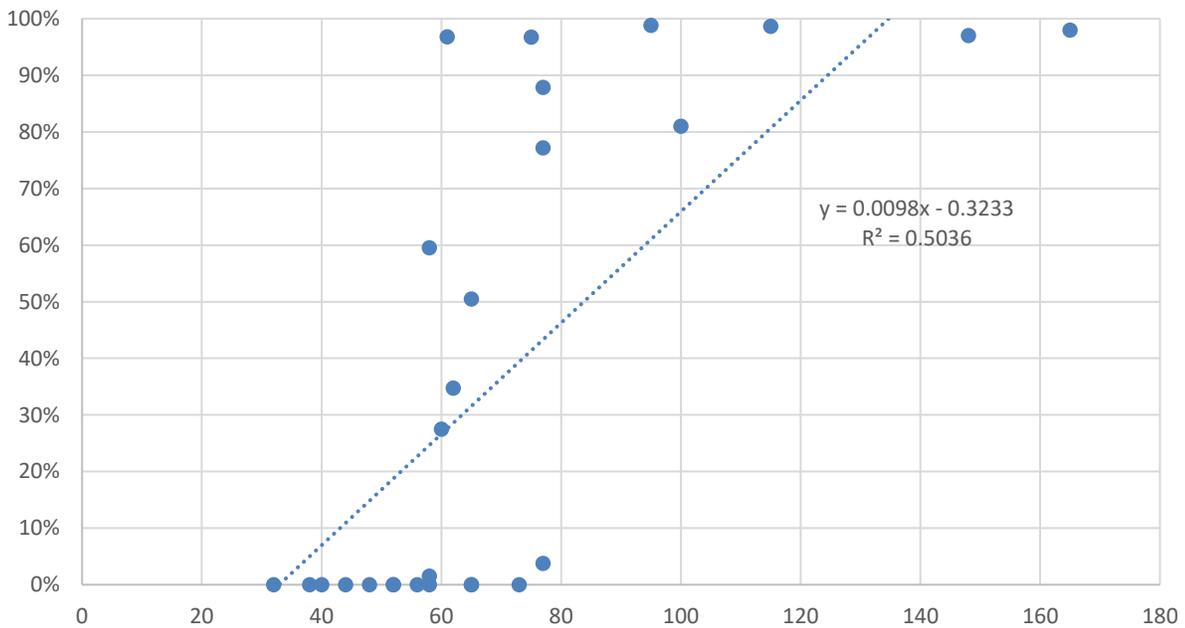


Figure 13: Number of hatchlings observed entering the Gulf of Mexico from the 1996 - 2020 nesting seasons on Pensacola Beach.

2020 Marine Turtle Nests



2019 Marine Turtle Nests



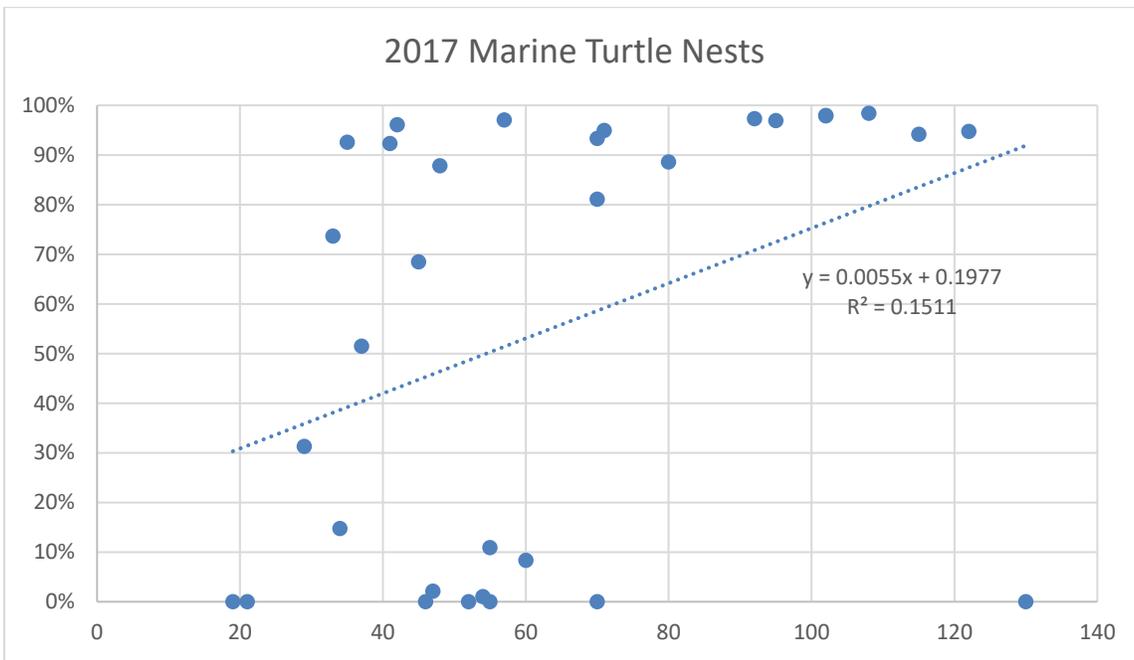
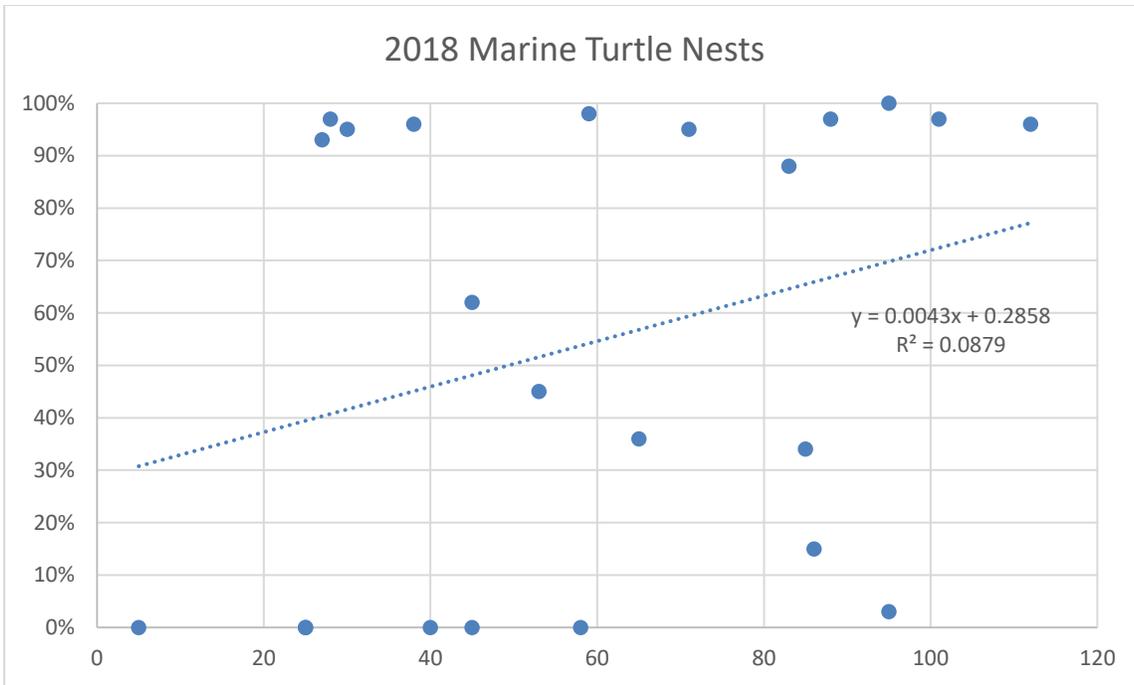


Figure 14: 2020 plus previous three years of data for Pensacola Beach plotting nest hatching success versus distance nests are laid upland from the Gulf of Mexico.

Pensacola Beach Disoriented Nests 1996 - 2020

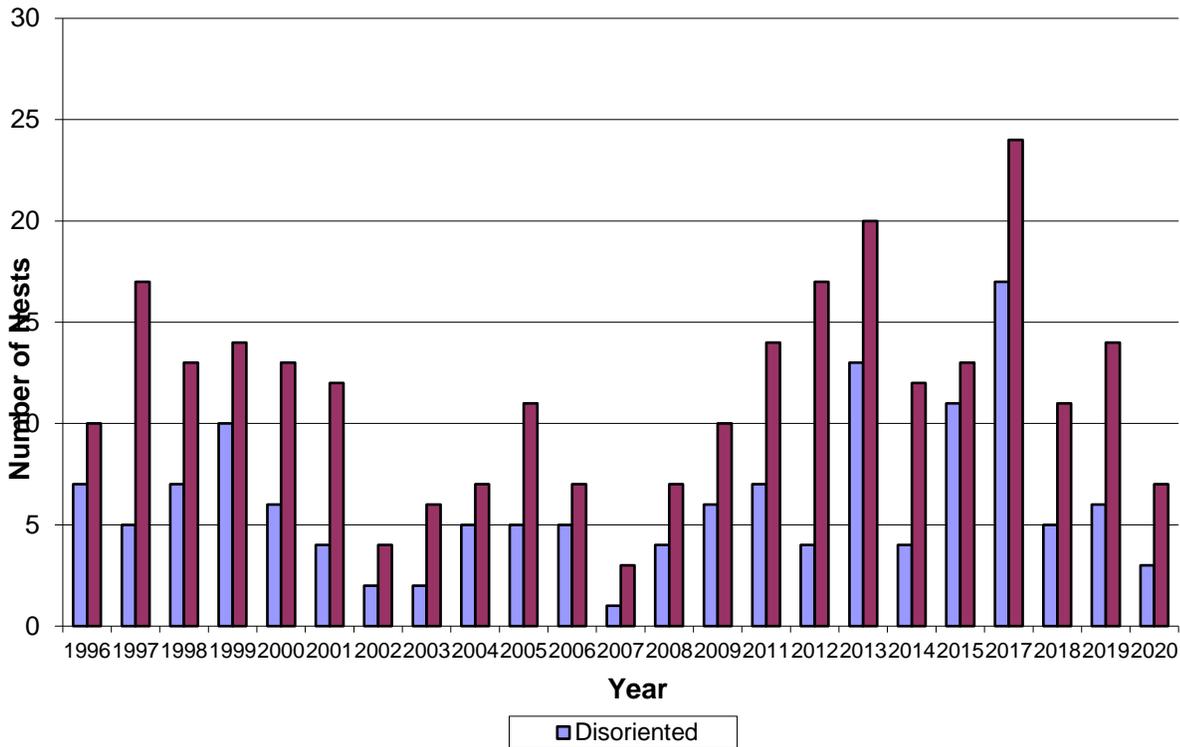


Figure 15: Comparison of marine turtle nests with hatchling disorientation to the total number of nests per season from 1996-2020 on Pensacola Beach. Disorientation data is not shown for the 2010 and 2016 seasons due to relocation of all incubating nests offsite during the 2010 Deepwater Horizon oil spill and 2016 nourishment project. Hatchling disorientation was defined as nests with ≥ 5 hatchlings crawling at $> 45^\circ$ angle from the direct path to the water. Hatchlings were required to crawl ≥ 10 feet to be classified as disoriented.



Figure 16: Hurricane Sally



Figure 17: Photograph of Kemp's ridley female nesting on Pensacola Beach on 02 June, 2020.



Figure 18: Nest PB03 was afforded additional protection due to it's location on the main beach. Storm surge resulting from Tropical Storm Cristobal flooded the nest in mid June. This nest had a zero percent hatch.



Figure 19: Photograph illustrating light pollution issues near nesting beaches.



Figure 20: Green hatchling from PB18 located during nest assessment.



Figure 21: Photograph of a Kemp's ridley stranding on the shoreline of Perdido Key.



Figure 22: Photograph of damage from a vessel strike on a loggerhead turtle stranding, MAN20200406-01.



Figure 23: Photograph of live loggerhead rescued from the PB Fishing Pier. PB lifeguards were able to secure the turtle and volunteers transported the turtle to Gulfarium. It was later released after recovery.



Figure 24: Photograph of live green turtle observed from Pensacola Beach fishing pier.

Table 2: 2020 Perdido Key marine turtle nesting data summary.

Period	Nest #	Date	Species	Nest Depth	# Eggs	# Eggs Predicted	# Hatchlings	# Hatchlings Predicted	# Hatched (including pipped)	# Hatched Emerged	% Hatched Emerged	% Adults (MN)	Hatching Date (MN)	Tail Impact (MN)	# Inwater Witnessed Tracks (approx)	Rechecked (MN)	Crawl width (ft)	Distance from water >10' scrape (ft)	Distance (ft)	Latitude	Longitude				
Key/2020																									
1w	610	01	Co	NA	114	0	114	0	0	0	0%	N	NA	N	0	N	36	0	120	30.281616	-87.512075				
2w	624	01	Co	NA	96	0	96	0	0	0	0%	N	NA	Y	0	N	33	30	67	30.281122	-87.497148				
3w	625	01	Co	NA	94	0	4	77	13	0	14%	N	NA	Y	0	N	39	200	52	30.281149	-87.517388				
4w	627	01	Co	826	80	142	0	3	112	86	78%	N	Y	Y	2	N	33	85	76	30.282278	-87.507194				
1E	713	01	Co	830	38	35	0	21	67	67	71%	N	Y	Y	52	N	33	33	90	30.294500	-87.440200				
5w	719	01	Co	NA	114	0	NA	NA	0	0	0%	N	NA	Y	0	N	36	0	110	30.283300	-87.491300				
6w	710	01	Co	NA	114	0	NA	NA	0	0	0%	N	NA	Y	0	N	36	60	26	30.283000	-87.491300				
7w	724	01	Co	NA	114	0	NA	NA	0	0	0%	N	NA	Y	0	N	28	18	89	30.284400	-87.489100				
2E	806	01	Co	NA	114	0	NA	NA	0	0	0%	N	NA	Y	0	N	39	41	62	30.285651	-87.491384				
8w	820	01	Co	NA	114	0	NA	NA	0	0	0%	N	NA	Y	0	N	42	65	100	30.283844	-87.498947				
1E	10				2		10	10			10	10	3	10		10	10	10							
SUM					1111	0	241	82	0	192	133		0	2	9	54	0	0							
MEAN					59	111					17.3%	79.7%					35	53	79			0			
SD					14.1						0.3113	0.37891					4.02	58.47	28.45						
					114	Eggs assigned to Florida's last season																			

Table 4: Hatchling disorientation events on Pensacola Beach in 2020.

Nest ID	Location/Landmark	Date of Event	Moon Phase	# Disoriented hatchlings (observed)	# of Non-disoriented hatchlings (observed)	# Disoriented hatchlings witnessed emerging GOM	Probable/Possible Source	Comments
PB06	1106 Arnie Dr.	21-Aug	12% waxing crescent	4 hatchlings	0	4 hatchlings	Sky glow from Pensacola and Pensacola Beach	Kemps tidey nest hatched at 2300 hours and all 4 hatchlings travelled NW. Staff ensured they entered the Gulf.
PB14	Dune Crossover 25C	22-Sep	39% waxing crescent	13 hatchlings	0	13 hatchlings	Sky glow from Pensacola and Pensacola Beach	Staff ensured hatchlings entered the Gulf. Required repeated releases due to north bound travel post swash placing hatchlings back on shore.
PB18	4/10's of a mile east of Perdido	17-Oct	2% waxing crescent	52 hatchlings	0	52 hatchlings	Sky glow from Pensacola and Pensacola Beach	Staff ensured hatchlings entered the Gulf. Required repeated releases due to north bound travel post swash placing hatchlings back on shore.

Table 5: Hatchling disorientation events on Perdido Key in 2020.

Nest ID	Location/Landmark	Date of Event	Moon Phase	# Disoriented hatchlings (observed)	# of Non-disoriented hatchlings (observed)	# Disoriented hatchlings witnessed entering GOM	Probable/Possible Source	Comments
PK01 E	La Riva Condo, 14239 Perdido Key Dr., Pensacola FL 32507	30-Aug		52 to N towards La Riva Condo	0	52	La Riva Condo	Hatchlings had to be placed lower on the beach until they established a southerly course to the Gulf of Mexico.
PK04W	Shipwreck Condo, 15727 Perdido Key Dr., Pensacola FL 32507	26-Aug		90 hatchlings jammed out from 295 to 13 degrees	0	0	Perdido Beach and Yacht Club, San Perdido Condo	2 hatchlings found dead, one found alive

APPENDIX A

MARINE TURTLE MONITORING REPORT

CIRCLE: PK PB

NEST NUMBER _____

REPORTED BY: _____
DATE: _____ TIME: _____ AM/PM
WEATHER _____

LOCATION: _____ YARDS/MILES EAST/WEST OF
MARKER: _____
DESCRIPTION: _____

SPECIES: (circle one)
Cc = Loggerhead
Cm = Green
Dc = Leatherback
Lk = Kemp's Ridley

INCIDENT TYPE:
NEST
FALSE CRAWL

**MOST RECENT
HIGH TIDE LINE:**
ABOVE
BELOW

**DISTANCE OF BODY PIT
FROM:** (feet/ meters)
WATER LINE: _____
VEGETATION LINE: _____

SIGNS/STAKES: from
center of body pit/egg cavity
(feet / meters)
Sign: _____
From the sign:
1st stake _____
2nd stake _____

CRAWL MEASUREMENTS:
ALTERNATING
SYMMETRICAL
WIDTH: _____ IN/CM

PREDATOR SCREENED: ___ YES ___ NO _____ DATE

RELOCATED: ___ YES ___ NO **If YES Proceed to back of form**

ADDITIONAL COMMENTS:

PLEASE DRAW A DIAGRAM BELOW

APPENDIX B
Nest Assessment Data Sheet
SEA TURTLE NEST ASSESSMENT REPORT

v.09.13.2017

DATE:	TIME:	NEST NUMBER:
LOCATION:	REPORTED BY:	

RELOCATED: Y / N <12 HOURS / > 2 WEEKS

PREDATION:

NEST: _____

HATCHLING: _____

DISORIENTATION:

ADDITIONAL COMMENTS:

TOTAL EGGS FOUND	_____	LIVE IN NEST	_____
HATCHED EGGS	_____	DEAD IN NEST	_____
UNHATCHED W/ DEVELOPMENT	_____	% HATCH SUCCESS	_____
UNHATCHED W/O DEVELOPMENT	_____	DAYS INCUBATED	_____
PIPPED ALIVE	_____	WITNESSED ENTERING GULF	_____
PIPPED DEAD	_____	EMERGED	_____
		GHOST CRAB PREDATION	_____

- The # of hatched eggs + unhatched eggs + pipped alive & dead = # of eggs in nest
- Hatched eggs do not include "pipped" eggs

HATCHING (please initial all entries)

DATE	TIME in GOM	#HATCHLINGS	DISORIENTED	UNDER SCREEN	ROOTS	OBSERVER	COMMENTS

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