

**St. Andrew Bay
RESOURCE MANAGEMENT ASSOCIATION**
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13 November 2017

Kennard Watson, Turtle Watch Director
St. Andrew Bay Resource Management Association
6509 Palm Court
Panama City Beach, Florida 32408

Dan Rowe, Executive Director
Bay County Tourist Development Council
17001 Panama City Beach Parkway
Panama City Beach, Florida 32417

Dear Mr. Rowe:

This letter provides results for the 2017 sea turtle nesting season on Panama City Beach. The information is submitted by the Turtle Watch program of the St. Andrew Bay Resource Management Association to fulfill requirements of our contract with the Bay County Tourist Development Council. Highlights of the 2017 season include:

- Largest number of nests (57) and non-nesting crawls (47) since monitoring began in 1991.
- First recorded nesting of 3 sea turtle species (loggerhead, leatherback, green) during the same season.
- Reduced hatching success due to numerous storms which flooded or washed out 36 nests. The nests still produced over 2000 hatchlings, and hatching success was within historical ranges.
- Continued high rates of disoriented hatchlings (72%) affected by lights from beachfront development. Sea Turtle Conservancy is working to retrofit condo lights using oil spill grant funds.
- Record number of strandings (22), although the high number partly reflects improved coordination with the City and County pier attendants, who reported half of the incidents.
- Public nest excavations attended by 1651 residents and tourists.

Major results are summarized below. The attachments contain forms submitted to the Florida Fish and Wildlife Conservation Commission (FWC) as part of reporting requirements under our State Permit No. 038.

Survey Area and Nourishment Activities. Turtle Watch monitors sea turtle activity along 17.5 miles of Gulf beach between St. Andrews State Park and Camp Helen State Park. Portions of the survey area were nourished in 2017 with sand pumped onto the beach from an off-shore source. Figure 1 is a map of the survey area showing the four construction sites totaling 4.13 miles located at Treasure Island Condo, M.B. Miller County Pier, Russell-Fields City Pier, and Pinnacle Port Condo. Nourishment began in March and finished in May.

Nest Identification and Relocation. All nests laid within the nourished sections were left in place per FWC guidelines. FWC also specified “control areas” adjacent to each nourished section where nests were left in place and could not be moved for any reason. These areas have equivalent total length to the

nourished sections and are shown in Figure 1. In addition to these requirements, we implemented two changes to our nest identification and relocation procedures at the direction of FWC. Nests were identified solely from the physical evidence left in the sand by the nesting turtle (body pit and sand mound created by flippers). In the past, we verified that the turtle nested by digging to locate the eggs. The second change is that nests found outside of the nourished sections and control areas could be moved only if near a storm drain or below the daily high tide line. Moving nests from storm drains is unchanged, but FWC previously allowed more flexibility to move nests found near the water. Both changes were made to minimize possible adverse affects caused by disturbance of the clutch during verification and damage to the eggs during relocation.

Nesting and Hatchling Production. We found 57 nests and 47 non-nesting emergences (false crawls) during 2017. Both are records for our beach which has been monitored since 1991. Of the 57 nests, 48 were made by threatened loggerheads, 5 by threatened greens, and 4 by endangered leatherbacks. Of the 47 false crawls, 44 were made by loggerheads, 2 by greens, and one by leatherbacks. Figure 2 shows nest and false crawl locations on a map of the survey area, with each column of symbols representing crawls on a 0.5 mile section of beach. Tables 1-2 provide detailed information on each nest and false crawl, including the location and date found. Additional key findings are as follows:

- Loggerhead nests produced 2240 hatchlings from 3316 eggs, giving overall emergence success of 68% (35 evaluated nests). Average nest size was 98 eggs (range 52-143), and average incubation period was 63 days (range 54-71). See Figures 3-4 and Table 3.
- Green nests produced 285 hatchlings from 391 eggs, giving an overall emergence success of 73% (4 evaluated nests). See Figure 3 and Table 4.
- Leatherback nests produced no hatchlings from 4 nests. One nest was evaluated and revealed 105 unhatched eggs with no embryonic development (other nests washed out by storms).
- All of the nests were left in place when originally found. Three loggerhead nests were salvaged during storms and the recovered eggs moved higher on the beach.
- Storms washed out 18 nests and flooded an additional 18. While the storms reduced overall hatching success, 9 flooded nests appeared to suffer no adverse affects, with emergence success exceeding 80% for these nests.
- Four nesting turtles, 2 leatherbacks and 2 loggerheads, were encountered at night by cleaning crews during Leave No Trace ordinance enforcement. We tagged the two loggerheads.
- Eggs were not found at excavation attempts for 3 loggerhead nests and one green nest. It is possible that eggs were present and we simply missed them, or we may have incorrectly identified these nests which were actually false crawls. Their designation as nests was not changed per FWC guidelines.

Stranding Activities. Twenty two (22) sea turtles stranded within the survey area between May and October (Table 5). Fourteen (14) were threatened loggerheads, 4 were threatened greens, and 4 were endangered Kemp's ridleys. This is a record for our beach, but it partly reflects improved coordination with pier attendants at the City and County piers. Turtle Watch has teamed with Gulf World Marine Institute and other organizations to educate pier attendants and life guards on the proper response when sea turtles are accidentally hooked by fishermen. The efforts include quarterly checks by Turtle Watch and Gulf World staff to ensure that the piers have proper signage and monofilament bins for the disposal of fishing line. The outreach appears to be working, as the 2 piers reported 50% of the strandings this season, including 9 turtles hooked at the piers and taken to Gulf World for treatment.

Beachfront Lighting Affecting Nesting and Hatchling Turtles. Artificial lights from beachfront development continue to be a serious threat to sea turtles on this urban beach. Attachment 3 has more discussion on this subject, including methodology and copies of the disorientation reports. Key results are as follows:

- Lights affected 72% of hatchlings that emerged at night (1294 of 1808) from 23 loggerhead nests and one green nest. This percentage is nearly identical to that recorded last year.
- Indirect lighting from urban glow was the largest contributor to hatchling disorientations. As shown in Figure 5, urban glow contributed 24%, followed by exterior condo lights (17%), parking lot lights (16%), and street lights (16%). Unshielded lights at Carillon Beach walkovers have caused problems in the past and continued to do so this season, contributing to one disorientation incident.
- Hatchling mortality was documented at 4 nests with disoriented turtles lost in the dunes, taken by ghost crabs, or found dead on the road. Most mortality estimates were documented by tracks ending in the dune or on the beach at crab holes. One dead loggerhead hatchling was found in the road at nest 49 and one dead green hatchling in the dune at nest 50.
- Adult females became disoriented at 12% of the loggerhead nests (6 of 48) and 40% of the green nests (2 of 5). Four loggerheads became disoriented without nesting.

Beach Furniture Affecting Nesting Turtles. Nesting loggerheads encountered obstructions on the beach at night at 23% of the nests (11 of 48 nests) and 7 false crawls. Additionally, green turtles were obstructed at 2 nests and one false crawl. Referring to Table 6 and Figure 6, the obstructions were almost exclusively vendor-owned lounge chairs left on the beach at night, often in tightly spaced rows near the shoreline. These items pose numerous risks for nesting turtles. The Leave No Trace ordinance should be amended to require stacking of vendor-maintained items at the base of the dune (or off the beach) nightly during the nesting season.

Beach Cleaning Coordination. Turtle Watch provided Wildlife Observers as part of nighttime enforcement of the Leave No Trace ordinance. Coastal Parasail operated small vehicles on the beach at night between May 22 and October 31, removing tents and other personal gear covered by the ordinance. The Wildlife Observer's role was to ride with the crew and watch for nesting and hatchling sea turtles. Crews were advised to halt operations and turn off vehicle lights when turtles were observed, as happened on 4 occasions when nesting loggerheads and leatherbacks were encountered. Turtle Watch personnel responded to tag the turtles and mark the nests. Additionally, the morning surveys used walking surveyors along with riders on all-terrain vehicles to accommodate beach cleaning by Coastal Parasail. Surveyors notified the beach cleaner by text message when beach sections were cleared or nests identified. Surveys normally were done by 7 am or earlier each morning.

Other Management Issues. (1) The hatching season volunteer program is under strain due to an increasing number of nests with continued high hatchling disorientation rates. Paid surveyors may be needed to assist volunteers with night monitoring if nesting activity remains high and lighting issues aren't resolved. Night monitoring is needed solely because of the serious lighting problem on our beach. (2) Severe impacts to nesting shorebirds occurred this season. FWC personnel posted two nesting areas at Sunnyside Beach and an undeveloped beachfront parcel near the Chateau Motel. Least terns and black skimmers nested in these areas, but no chicks successfully fledged at the Chateau site and only 3 tern chicks and no skimmers fledged at Sunnyside. Unleashed dogs damaged the Sunnyside nests, and the Chateau site was harmed by someone entering the posted area and harassing flightless chicks. (3) One poaching attempt of a loggerhead nest was reported to FWC where digging was observed inside the marked area. No eggs were taken. (4) One loggerhead nest was vandalized with all stakes knocked down, and minor depredation occurred from ghost crabs and ants. (5) 1651 residents and tourists attended our public nest excavations this summer.

If you have questions, please contact me during business hours at (850) 238-9895 or at pcbturtle@yahoo.com. Thanks.

Sincerely,

KENNARD WATSON

Kennard Watson
Turtle Watch Director

cc: Robbin Trindell (FWC Tallahassee), Meghan Koperski (FWC Tequesta), Beth Brost (FWRI St Petersburg), Kimberly Middlebrooks (FWC Panama City), Lisa Yarbrough (FWS Panama City), Robert Majka Jr. (Bay County Manager), Martin Jacobson (Community Development Manager), Kathi Ashman (Bay County Code Enforcement), Cecilia James (Bay County Code Enforcement), Mario Gisbert (Panama City Beach City Manager), James Tindle (Panama City Beach Code Enforcement), Lisa Armbruster (Sustainable Beaches), John Ackerman (RMA), Jeff Whitton (RMA), Secret Holmes (Gulf World Marine Institute), Lauren Albrittain (Gulf World Marine Institute), Bonnie Sammuelson (Florida Audubon), Lauryn Wright (Sea Turtle Conservancy)

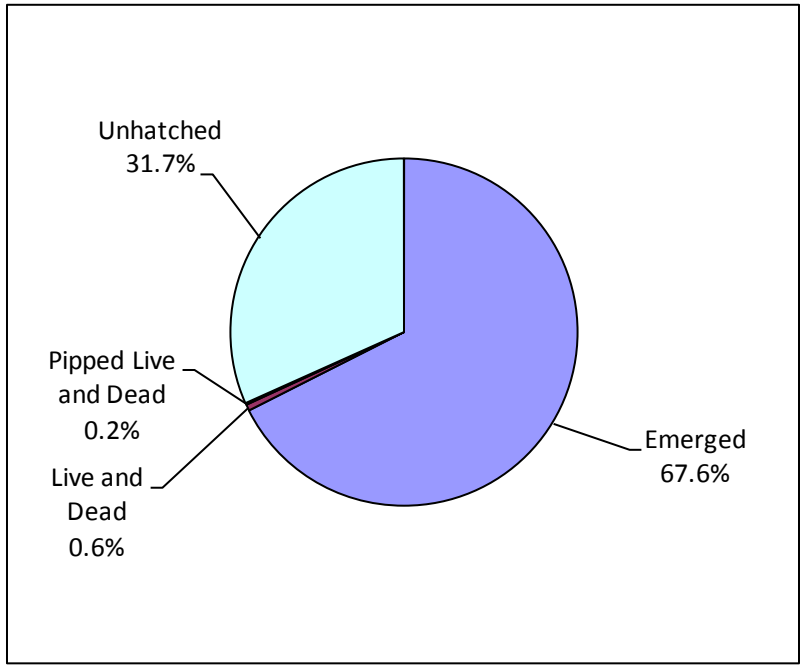
Attachments: (1) Statewide Nesting Beach Survey forms, (2) Nest productivity worksheets, (3) Disorientation incident reports, (4) Obstructed nesting attempt reports, (5) Nesting turtle tagging reports.



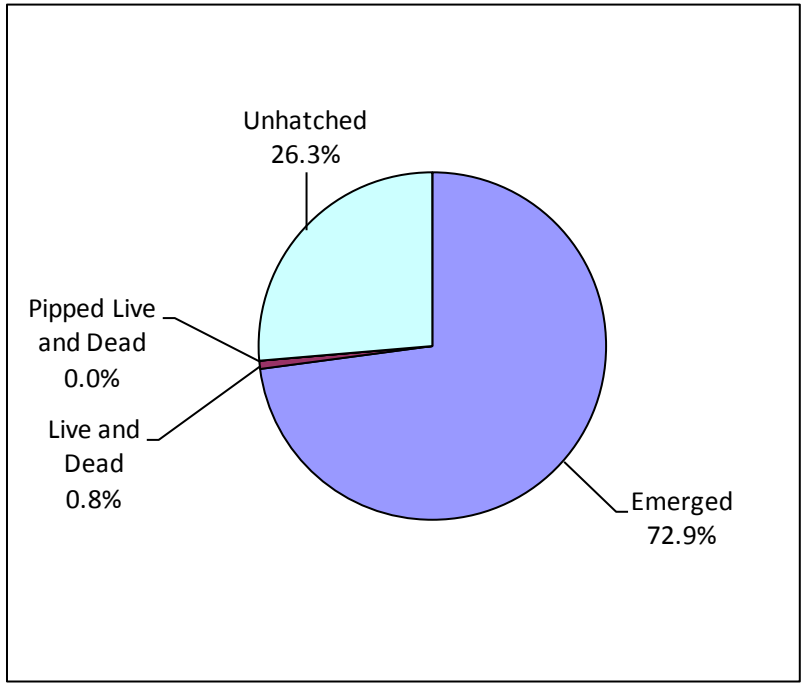
Figure 1. Survey area showing four beach sections nourished in 2017 (red nourished, yellow control).



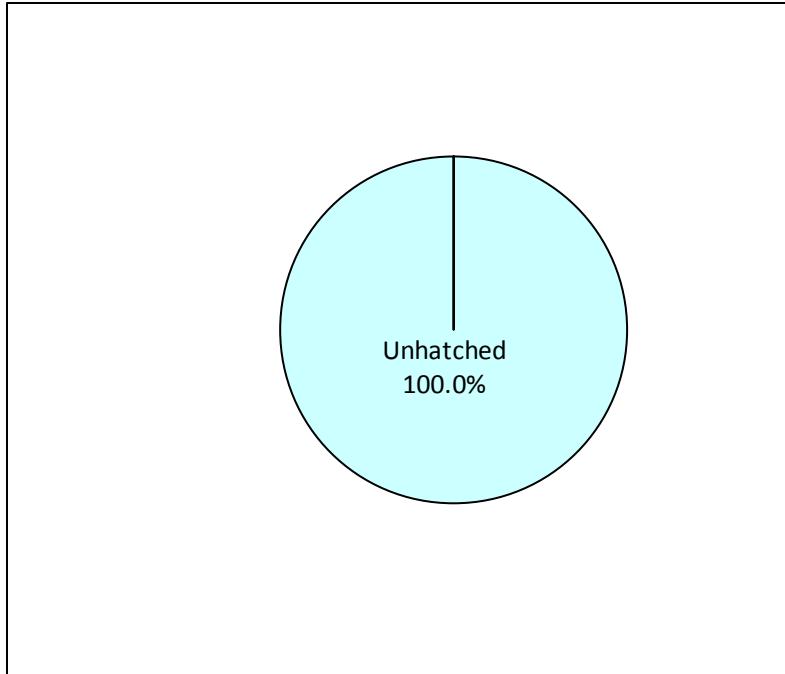
Figure 2. Sea turtle nest and false crawl locations on Panama City Beach in 2017. Each column of symbols represents crawls on 1/2-mile beach segment (blue nests, yellow false crawls, circles loggerhead, triangles leatherback, squares green).



(a) In situ loggerhead nests (35)



(b) In situ green nests (4)



(c) In situ leatherback nest (1)

Figure 3. Emergence success for loggerhead, green, and leatherback nests on Panama City Beach in 2017 (40 nests). Contents are unhatched eggs, live and dead hatchlings found in nest, pipped eggs where hatchling partially broke free of shell, and emerged hatchlings that escaped the nest.

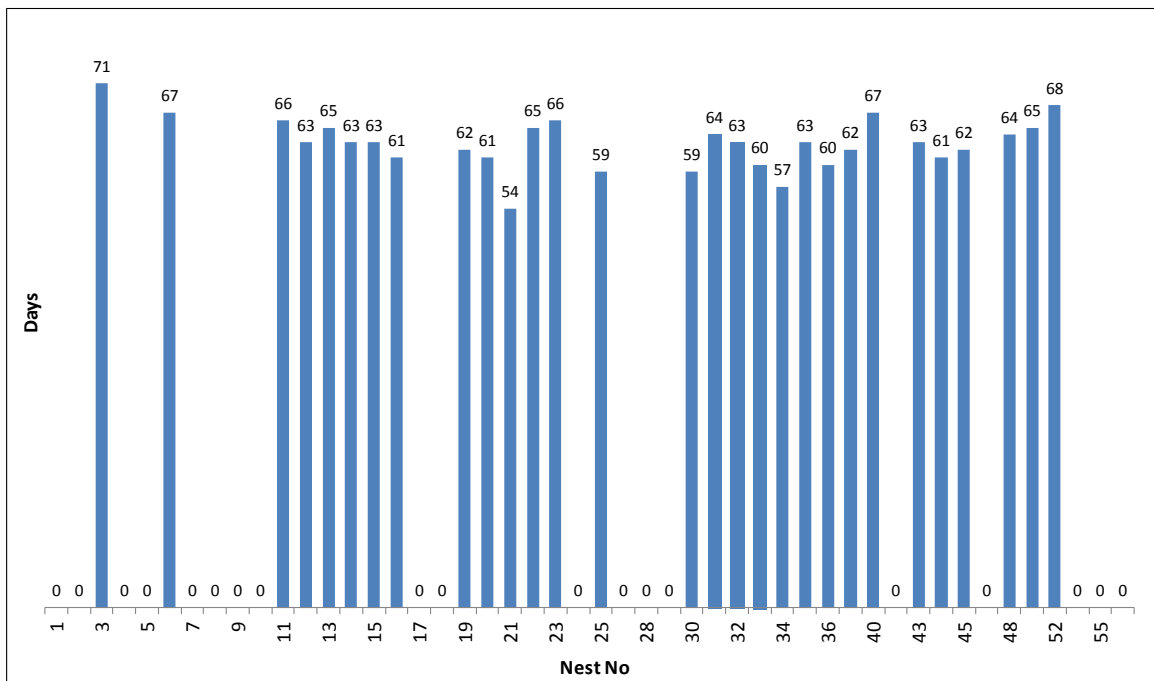


Figure 4. Loggerhead incubation periods on Panama City Beach in 2017 (29 nests). Zeroes indicate nests that failed to hatch or had unknown incubation periods.

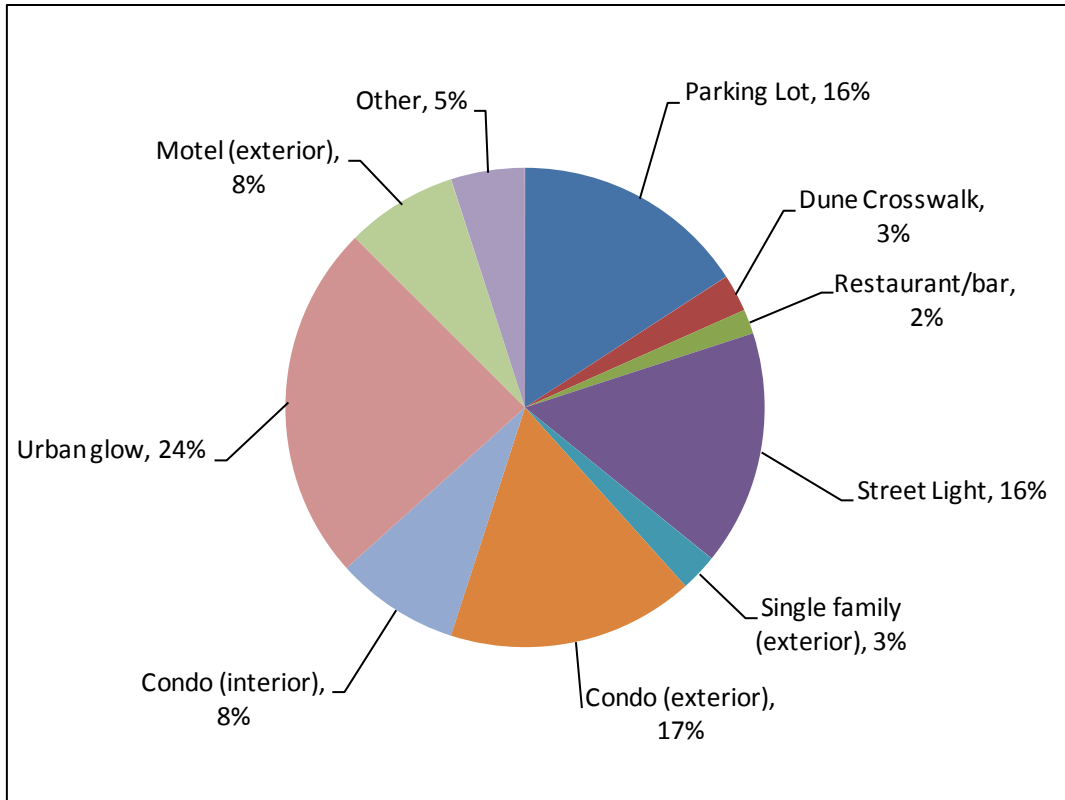


Figure 5. Lights contributing to hatchling disorientation incidents on Panama City Beach in 2017 (19 loggerhead nests, 1 green nest).



Figure 6. Pictures of obstructions encountered by nesting sea turtles on Panama City Beach in 2017.

Table 1. Loggerhead, green, and leatherback nest locations and hatching information on Panama City Beach in 2017. Latitude/longitude data obtained from GPS unit. Species Cc loggerhead, Cm green, Dc leatherback. UNK=unknown

Nest No	Species	Address	In Situ or Relocated	Date Laid	Date Hatched	Incubation Period (days)	Total Eggs	Emerged	Latitude	Longitude
1	Cc	House, 20816 Front Beach Rd, Sunnyside Beach	In situ	18-May	UNK	UNK	UNK	0	30.24751	-85.94418
2	Cc	Mariner West Condo, 6213 Thomas Dr	In situ	19-May	UNK	UNK	72	0	30.14973	-85.76669
3	Cc	House, 21605 Front Beach Rd	In situ	29-May	7-Aug	71	89	80	30.25220	-85.95434
4	Cc	Mariner West Condo, 6213 Thomas Dr	In situ	3-Jun	UNK	UNK	20	0	30.14994	-85.76682
5	Cc	Largo Mar Condo, 5717 Thomas Dr	In situ	3-Jun	UNK	UNK	UNK	0	30.14542	-85.76087
6	Cc	358 Beachside Dr, Carillon Beach	In situ	10-Jun	16-Aug	67	105	90	30.262174	-85.978629
7	Cc	Commodore Condo, 4715 Thomas Dr	In situ	18-Jun	UNK	UNK	UNK	0	30.13591	-85.749394
8	Cc	House, 8401 Surf Dr	In situ	18-Jun	UNK	UNK	UNK	0	30.16378	-85.78682
9	Cc	House, 22107 Front Beach Rd	In situ	18-Jun	UNK	UNK	97	0	30.25566	-85.96308
10	Cc	Townhouse, 5920 Gulf Dr	In situ	22-Jun	UNK	UNK	63	0	30.147178	-85.762874
11	Cc	Top of the Gulf Condo, 8817 Thomas Dr	In situ	23-Jun	27-Aug	66	81	67	30.16923	-85.79581
12	Cc	House, 8408 Surf Dr	In situ	24-Jun	25-Aug	63	82	80	30.16369	-85.78648
13	Cc	Oceanna Condo, 8000 Surf Dr	In situ	24-Jun	27-Aug	65	73	60	30.16073	-85.78197
14	Cc	House, 8404 Surf Dr	In situ	25-Jun	26-Aug	63	103	76	30.16357	-85.78629
15	Cc	Moonspinner Condo, 4425 Thomas Dr	In situ	26-Jun	27-Aug	63	110	24	30.13446	-85.74728
16	Cc	House, 20816 Front Beach Rd, Sunnyside Beach	In situ	26-Jun	25-Aug	61	126	124	30.24761	-85.94379
17	Cc	Sterling Reef Condo, 12011 Front Beach Rd	In situ	27-Jun	UNK	UNK	UNK	0	30.18780	-85.82842
18	Cc	Boardwalk Beach Resort, 9600 S. Thomas Dr	In situ	27-Jun	UNK	UNK	UNK	0	30.17142	-85.79971
19	Cc	Hidden Dunes Condo, 7115 Thomas Dr	In situ	27-Jun	27-Aug	62	86	71	30.15607	-85.77505
20	Cc	House, 5421 Gulf Dr	In situ	27-Jun	26-Aug	61	81	75	30.14333	-85.75784
21	Cc	Pinnacle Port Condo, 23223 Front Beach Rd	In situ	29-Jun	21-Aug	54	143	134	30.26600	-85.98881
22	Cc	Sterling Beach Condo, 6627 Thomas Dr	In situ	29-Jun	1-Sep	65	52	49	30.15290	-85.77071

23	Cc	Thomas Donut & Snack Shop, 19208 Front Beach Rd	In situ	2-Jul	5-Sep	66	76	71	30.237086	-85.92114
24	Cc	Largo Mar Condo, 5717 Thomas Dr	In situ	2-Jul	UNK	UNK	UNK	0	30.14553	-85.76105
25	Cc	House, 16513 Front Beach Rd	In situ	4-Jul	31-Aug	59	141	132	30.21755	-85.88245
26	Cc	Holiday Terrace Motel, 11831 Front Beach Rd	In situ	4-Jul	UNK	UNK	UNK	0	30.18686	-85.82697
27	Dc	House, 17485 Front Beach Rd	In situ	4-Jul	UNK	UNK	105	0	30.22780	-85.90215
28	Cc	Bel Air Condo, 8515 Surf Dr	In situ	4-Jul	UNK	UNK	74	0	30.16458	-85.78841
29	Cc	Hooters, 12709 Front Beach Rd	In situ	5-Jul	UNK	UNK	UNK	0	30.19251	-85.83688
30	Cc	House, 22013 Front Beach Rd	In situ	5-Jul	2-Sep	59	142	125	30.25456	-85.96039
31	Cc	Townhouse, 13407 Oleander Dr	In situ	6-Jul	7-Sep	64	118	1	30.19785	-85.84557
32	Cc	House, 14210 Front Beach Rd	In situ	7-Jul	7-Sep	63	75	71	30.20246	-85.85931
33	Cc	Pirates Cove Villas, 23001 Front Beach Rd	In situ	8-Jul	5-Sep	60	113	103	30.25936	-85.97204
34	Cc	Beachcomber Resort, 17101 Front Beach Rd	In situ	10-Jul	4-Sep	57	98	88	30.22153	-85.88965
35	Cc	House, 21014 Front Beach Rd	In situ	11-Jul	11-Sep	63	70	12	30.24834	-85.94605
36	Cc	House, 318 Beachside Dr, Carillon Beach	In situ	11-Jul	8-Sep	60	129	121	30.26323	-85.98167
37	Dc	Palmetto Inn, 17255 Front Beach Rd	In situ	14-Jul	UNK	UNK	UNK	0	30.22388	-85.89467
38	Dc	Portside Resort, 17620 Front Beach Rd	In situ	14-Jul	UNK	UNK	UNK	0	30.23027	-85.90746
39	Cc	House, 358 Beachside Dr, Carillon Beach	In situ	14-Jul	13-Sep	62	103	7	30.26242	-85.97852
40	Cc	House, 19104 Front Beach Rd	In situ	16-Jul	20-Sep	67	126	24	30.23677	-85.92057
41	Cm	House, 21507 Front Beach Rd	In situ	16-Jul	UNK	UNK	UNK	0	30.25211	-85.95364
42	Cc	Treasure Island Condo, 5004 Thomas Dr	In situ	17-Jul	UNK	UNK	117	96	30.13976	-85.75399
43	Cc	Townhouse, 17867 Front Beach Rd	In situ	18-Jul	18-Sep	63	80	77	30.23438	-85.91571
44	Cc	Moonspinner Condo, 4425 Thomas Dr	In situ	18-Jul	16-Sep	61	99	95	30.13427	-85.7469
45	Cc	Beachside Resort, 21905 Front Beach Rd	In situ	18-Jul	17-Sep	62	73	70	30.25395	-85.9589
46	Cc	Pinnacle Port Condo, 23223 Front Beach Rd	In situ	18-Jul	UNK	UNK	UNK	0	30.26527	-85.98718
47	Dc	House, 322 Beachside Dr, Carillon Beach	In situ	22-Jul	UNK	UNK	UNK	0	30.26314	-85.98135
48	Cc	Townhouse, 22331 Front Beach Rd	In situ	23-Jul	24-Sep	64	85	81	30.25671	-85.96553
49	Cc	Edgewater Beach Resort, 11212	In situ	27-Jul	30-Sep	65	117	70	30.18346	-85.82039

Front Beach Rd										
50	Cm	Surfside Christian Retreat, 21429 Front Beach Rd	In situ	29-Jul	25-Sep	58	144	103	30.25190	-85.95287
51	Cm	Ramsgate Condo, 23011 Front Beach Rd	In situ	29-Jul	UNK	UNK	88	45	30.26023	-85.97421
52	Cc	Dunes of Panama Condo, 7205 Thomas Dr	In situ	30-Jul	6-Oct	68	UNK	Note	30.15700	-85.77660
53	Cc	Laguna Beach Christian Retreat, 20225 Front Beach Rd	In situ	3-Aug	UNK	UNK	UNK	0	30.24377	-85.93600
54	Cm	House, 19404 Front Beach Rd	In situ	7-Aug	7-Oct	62	141	136	30.23857	-85.92368
55	Cc	Townhouse, 22325 Front Beach Rd	In situ	7-Aug	UNK	UNK	97	66	30.25663	-85.96529
56	Cc	House, 16401 Front Beach Rd	In situ	13-Aug	UNK	UNK	UNK	0	30.21635	-85.88016
57	Cm	Pinnacle Port Condo, 23223 Front Beach Rd	In situ	25-Aug	UNK	UNK	18	1	30.26597	-85.98853

Note: Nest completely washed out after hatch.

Table 2. Loggerhead, green, and leatherback false crawl locations and crawl dates on Panama City Beach in 2017. Latitude/longitude data obtained from GPS unit.

Crawl No	Species	Address	Crawl Date	Latitude	Longitude
1	Cc	Edgewater Beach Resort, 11212 Front Beach Rd	22-May	30.18552	-85.82430
2	Cc	House, 20816 Front Beach Rd	30-May	30.24748	-85.94417
3	Cc	House, 22219 Front Beach Rd	30-May	30.25571	-85.96354
4	Cc	House, 20816 Front Beach Rd	31-May	30.24735	-85.94386
5	Cc	Pinnacle Port Condo, 23223 Front Beach Rd	1-Jun	30.2645	-85.98575
6	Cc	House, 400 Beachside Dr, Carillon Beach	6-Jun	30.26135	-85.97703
7	Cc	House, 13800 Front Beach Rd	7-Jun	30.19991	-85.84946
8	Cc	Polynesian Village Condo, 16621 Front Beach Rd	7-Jun	30.21867	-85.88448
9	Cc	House, 290 Beachside Dr, Carillon Beach	10-Jun	30.26396	-85.98354
10	Cc	Seachase Condo, 17351 FBR	15-Jun	30.22546	-85.89796
11	Cc	Emerald Isle Resort, 17545 Front Beach Rd	15-Jun	30.22920	-85.90502
12	Cc	House, 20001 Front Beach Rd	17-Jun	30.24248	-85.93329
13	Cc	House, 320 Beachside Dr, Carillon Beach	17-Jun	30.26301	-85.98133
14	Cc	Holiday Inn, 17701 Front Beach Rd	18-Jun	30.22071	-85.88863
15	Cc	House, 20816 Front Beach Rd	18-Jun	30.24737	-85.94386
16	Cc	Pineapple Willies, 9875 S Thomas Dr	19-Jun	30.17478	-85.80579
17	Cc	House, 8225 Surf Dr	19-Jun	30.16253	-85.78524
18	Cc	House, 8408 Surf Dr	22-Jun	30.16381	-85.78648
19	Cc	House, 13221 Oleander Dr	23-Jun	30.19598	-85.84281
20	Cc	Townhouse, 13407 Oleander Dr	26-Jun	30.19766	-85.84568
21	Cc	House, 13403 Oleander Dr	26-Jun	30.19754	-85.84542
22	Cc	House, 13305 Oleander Dr	26-Jun	30.19689	-85.84439
23	Cc	House, 13700 Front Beach Rd	27-Jun	30.19934	-85.84835
24	Cc	House, 14210 Front Beach Rd	27-Jun	30.20252	-85.85406
25	Cc	House, 13315 Oleander Dr	27-Jun	30.19724	-85.84501
26	Cc	Holiday Inn Express, 12907 Front Beach Rd	27-Jun	30.19394	-85.83933
27	Cc	Continental Condo, 15413 Front Beach Rd	27-Jun	30.21023	-85.86842
28	Cc	Days Inn, 12818 Front Beach Rd	27-Jun	30.19312	-85.83778
29	Cc	Harpoon Harry's Restaurant, 12627 Front Beach Rd	27-Jun	30.19242	-85.83652
30	Cc	Chateau Motel, 12525 Front Beach Rd	27-Jun	30.19117	-85.83449
31	Cc	Edgewater Beach Resort, 11212 Front Beach Rd	27-Jun	30.18526	-85.82376
32	Cc	Bikini Beach Motel, 11001 Front Beach Rd	27-Jun	30.18114	-85.81665
33	Cc	Sunbird Condo, 9850 S. Thomas Dr	27-Jun	30.17405	-85.80432
34	Cc	House, 6621 Gulf Dr	27-Jun	30.15301	-85.77102
35	Cc	Boardwalk Beach Resort, 9400 S Thomas Dr	30-Jun	30.17074	-85.79843
36	Cc	Townhouse, 8017 Surf Dr	2-Jul	30.16079	-85.78268
37	Cc	Gulf Crest Condo, 8715 Surf Dr	4-Jul	30.16618	-85.79108
38	Cc	City Pier, 16201 Front Beach Rd	4-Jul	30.21433	-85.87663
39	Cc	Aquavista Condo, 17155 Front Beach Rd	4-Jul	30.22263	-85.89236
40	Dc	Grandview Condo, 10713 Front Beach Rd	13-Jul	30.17883	-85.81265
41	Cc	Pinnacle Port Condo, 23223 Front Beach Rd	17-Jul	30.26630	-85.98981
42	Cc	House, 13814 Front Beach Rd	19-Jul	30.20019	-85.84995
43	Cc	House, 20413 Front Beach Rd	19-Jul	30.24450	-85.93775
44	Cm	House, 22015 FBR	26-Jul	30.25486	-85.96033
45	Cc	Long Beach Resort, 10511 Front Beach Rd	30-Jul	30.17634	-85.80842
46	Cc	Townhouse, 22331 Front Beach Rd	10-Aug	30.25676	-85.96545
47	Cm	House, 382 Beachside Dr, Carillon Beach	25-Aug	30.26203	-85.97761

Table 3. Loggerhead nest excavation data on Panama City Beach in 2017. Contents are unhatched eggs, live and dead hatchlings found in nest, pipped eggs where hatchling partially broke free of shell, and emerged hatchlings that escaped the nest. Rows in red indicate nests partially washed out.

Nest No	Eggs	Emerged	Live in Nest	Dead in Nest	Pipped Live	Pipped Dead	Unhatch	Emergence Success	In Situ or Relocated
2	72	0	0	0	0	0	72	0.00	In situ
3	89	80	3	0	0	0	6	0.90	In situ
4	20	0	0	0	0	0	20	0.00	In situ
6	105	90	0	1	0	0	14	0.86	In situ
9	97	0	0	0	0	0	97	0.00	In situ
10	63	0	0	0	0	0	63	0.00	In situ
11	81	67	0	0	0	1	13	0.83	In situ
12	82	80	0	0	0	0	2	0.98	In situ
13	73	60	0	0	0	0	13	0.82	In situ
14	103	76	1	0	0	0	26	0.74	In situ
15	110	24	1	0	0	0	85	0.22	In situ
16	126	124	1	0	0	0	1	0.98	In situ
19	86	71	0	0	0	0	15	0.83	In situ
20	81	75	0	0	0	0	6	0.93	In situ
21	143	134	1	0	0	0	8	0.94	In situ
22	52	49	0	0	0	0	3	0.94	In situ
23	76	71	0	0	0	0	5	0.93	In situ
25	141	132	0	0	0	0	9	0.94	In situ
28	74	0	0	0	0	0	74	0.00	In situ
30	142	125	0	0	1	0	16	0.88	In situ
31	118	1	0	0	0	0	117	0.01	In situ
32	75	71	0	0	0	0	4	0.95	In situ
33	113	103	0	0	0	0	10	0.91	In situ
34	98	88	1	0	1	0	8	0.90	In situ
35	70	12	0	0	0	0	58	0.17	In situ
36	129	121	0	0	0	0	8	0.94	In situ
39	103	7	2	0	0	0	94	0.07	In situ
40	126	24	4	0	0	1	97	0.19	In situ
42	117	96	1	0	0	1	19	0.82	In situ
43	80	77	0	1	0	0	2	0.96	In situ
44	99	95	0	0	0	0	4	0.96	In situ
45	73	70	0	0	1	0	2	0.96	In situ
48	85	81	0	0	0	0	4	0.95	In situ
49	117	70	0	0	0	0	47	0.60	In situ
55	97	66	0	2	0	0	29	0.68	In situ
TOTAL	3316	2240	15	4	3	3	1051	0.68	
Excluding Wash-outs	3127	2174	15	2	3	3	930	0.70	

Table 4. Green and leatherback nest excavation data on Panama City Beach in 2017. Contents are unhatched eggs, live and dead hatchlings found in nest, pipped eggs where hatchling partially broke free of shell, and emerged hatchlings that escaped the nest. Rows in red indicate nests partially washed out.

Nest No	Eggs	Emerged	Live in Nest	Dead in Nest	Pipped Live	Pipped Dead	Unhatch	Emergence Success	In Situ or Relocated
Green Nests									
50	144	103	1	0	0	0	40	0.72	In situ
51	88	45	0	1	0	0	42	0.51	In situ
54	141	136	1	0	0	0	4	0.96	In situ
57	18	1	0	0	0	0	16	0.06	In situ
TOTAL	391	285	2	1	0	0	103	0.73	
Leatherback Nest									
27	105	0	0	0	0	0	105	0.00	In situ

Table 5. Sea turtle strandings on Panama City Beach during 1 May to 31 October 2017.
 Latitude/longitude data obtained from GPS unit or estimated from Google Earth.
 Species Cc loggerhead, Cm green, Lk Kemp's ridley. UNK=unknown

No.	Date	Location	Latitude	Longitude	Species	Shell Length (inches)	Final Disposition
1	6-May	M.B. Miller County Pier, 12213 Front Beach Rd	30.18665	-85.83400	Cc	UNK	Live in water, released on site
2	13-May	House, 6619 Gulf Dr	30.15291	-85.77090	Lk	22	Dead on beach, disposed in landfill
3	13-May	M.B. Miller County Pier, 12213 Front Beach Rd	30.18937	-85.83249	Cc	26.4	Live in water, Gulf World
4	16-May	Surfside Christian Retreat, 21429 Front Beach Rd	30.25144	-85.95290	Lk	24.3	Dead on beach, NMFS
5	24-May	House, 5527 Gulf Dr	30.154373	-85.773108	Cc	32.1	Live on beach, Gulf World
6	25-May	Holiday Inn Sunspree, 11127 Front Beach Rd	30.18240	-85.81858	Cc	31.6	Live on beach, Gulf World
7	26-May	Summit Condo, 8743 Thomas Dr	30.16710	-85.79271	Cc	30.3	Dead on beach, NMFS
8	30-May	M.B. Miller County Pier, 12213 Front Beach Rd	30.18684	-85.833927	Cc	27.2	Live in water, Gulf World
9	9-Jun	Tidewater Condo, 16819 Front Beach Rd	30.22	-85.8866	Cc	27	Live on beach, Gulf World
10	14-Jun	Russell-Fields City Pier, 16201 Front Beach Rd	30.212226	-85.879666	Cc	29.1	Live in water, Gulf World
11	14-Jun	Russell-Fields City Pier, 16201 Front Beach Rd	UNK	UNK	Cm	18.6	Live in water, Gulf World
12	28-Jun	Boardwalk Beach Resort, 9450 S Thomas Dr	30.16993	-85.79763	Lk	23	Dead on beach, NMFS
13	30-Jun	Wyndham Condo, 14700 Front Beach Rd	30.20480	-85.85825	Cm	38.1	Dead on beach, disposed in landfill
14	19-Jul	Majestic Beach Resort, 10901 Front Beach Rd	30.17985	-85.81441	Cc	29.8	Dead on beach, NMFS
15	21-Jul	M.B. Miller County Pier, 12213 Front Beach Rd	30.18661	-85.833941	Cc	28.1	Live in water, Gulf World
16	28-Jul	M.B. Miller County Pier, 12213 Front Beach Rd	30.186701	-85.833875	Cc	31.5	Live in water, Gulf World
17	29-Jul	M.B. Miller County Pier, 12213 Front Beach Rd	30.186701	-85.833875	Lk	23	Live in water, Gulf World
18	8-Aug	Russell-Fields City Pier, 16201 Front Beach Rd	30.212608	-85.879658	Cm	14.3	Live in water, released on site
19	23-Aug	Ambassador Condo, 15617 Front Beach Rd	30.21120	-85.87049	Cc	24	Dead on beach, disposed in landfill
20	25-Aug	Ocean Towers Condo, 11211 Front Beach Rd	30.18272	-85.81928	Cc	27.7	Dead on beach, NMFS
21	29-Aug	Russell-Fields City Pier, 16201 Front Beach Rd	30.212556	-85.879391	Cc	27.9	Live in water, Gulf World

22	19-Sep	Russell-Fields City Pier, 16201 Front Beach Rd	30.212409	-85.879531	Cm	12.8	Live in water, Gulf World
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Table 6. Obstacles encountered by sea turtles during nesting attempts on Panama City Beach in 2017. Latitude/longitude data obtained from GPS unit.

Crawl No	Species	Crawl Type	Address	Latitude	Longitude	Incident Date	Obstacles Encountered
9	Cc	False Crawl	House, 290 Beachside Dr, Carillon Beach	30.26396	-85.98354	10-Jun	umbrella, lounge chairs
11	Cc	False Crawl	Emerald Isle Resort, 17545 Front Beach Rd	30.2292	-85.90502	15-Jun	lounge chairs
15	Cc	False Crawl	House, 20816 Front Beach Rd	30.24737	-85.94386	18-Jun	pit
27	Cc	False Crawl	Continental Condo, 15413 Front Beach Rd	30.21023	-85.86842	27-Jun	lounge chairs
33	Cc	False Crawl	Sunbird Condo, 9850 S. Thomas Dr	30.17405	-85.80432	27-Jun	lounge chairs
35	Cc	False Crawl	Boardwalk Beach Resort, 9400 S Thomas Dr	30.17074	-85.79843	30-Jun	lounge chairs
37	Cc	False Crawl	Gulf Crest Condo, 8715 Surf Dr	30.16618	-85.79108	4-Jul	lounge chairs, pit
47	Cm	False Crawl	House, 382 Beachside Dr, Carillon Beach	30.26203	-85.97761	25-Aug	dune fence
4	Cc	Nest	Mariner West Condo, 6213 Thomas Dr	30.14994	-85.76682	3-Jun	lounge chairs
5	Cc	Nest	Largo Mar Condo, 5717 Thomas Dr	30.14542	-85.76087	3-Jun	lounge chairs
11	Cc	Nest	Top of the Gulf Condo, 8817 Thomas Dr	30.16923	-85.79581	23-Jun	lounge chairs
17	Cc	Nest	Sterling Reef Condo, 12011 Front Beach Rd	30.1878	-85.82842	27-Jun	lounge chairs
19	Cc	Nest	Hidden Dunes Condo, 7115 Thomas Dr	30.15607	-85.77505	27-Jun	lounge chairs
31	Cc	Nest	Townhouse, 13407 Oleander Dr	30.19785	-85.84557	6-Jul	trash can
34	Cc	Nest	Beachcomber Resort, 17101 Front Beach Rd	30.22153	-85.88965	10-Jul	lounge chairs, trash can, storage box
39	Cc	Nest	House, 358 Beachside Dr, Carillon Beach	30.26242	-85.97852	14-Jul	lounge chairs, trash can
41	Cm	Nest	House, 21507 Front Beach Rd	30.25211	-85.95364	16-Jul	lounge chairs
42	Cc	Nest	Treasure Island Condo, 5004 Thomas Dr	30.13976	-85.75399	17-Jul	lounge chairs
44	Cc	Nest	Moonspinner Condo, 4425 Thomas Dr	30.13427	-85.7469	18-Jul	lounge chairs
45	Cc	Nest	Beachside Resort, 21905 Front Beach Rd	30.25395	-85.9589	18-Jul	lounge chairs, pit
50	Cm	Nest	Surfside Christian Retreat, 21429 Front Beach Rd	30.2519	-85.95287	29-Jul	lounge chairs, volley ball poles