

TECHNICAL REPORT

BROWARD COUNTY SEA TURTLE CONSERVATION PROGRAM 2014 REPORT

For the
BROWARD COUNTY BOARD OF COMMISSIONERS



Submitted by:

Dr. Derek Burkholder
Principal Investigator

Curtis Slagle
Project Manager

Nova Southeastern University
Oceanographic Center
8000 North Ocean Drive
Dania Beach, Florida 33004

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EXECUTIVE SUMMARY

The Nova Southeastern University, Broward County Sea Turtle Conservation Program conducted sea turtle nesting surveys daily from March 1, 2014 – October 31, 2014 for all Broward County beaches except John U Lloyd State Park (Index Beach, monitored by Park staff). All loggerhead, green and leatherback turtle crawls (nests and false crawls) were identified to species and recorded by Geographic Positioning System (GPS). All nests were marked using wooden stakes and Red-Glo flagging tape and monitored throughout the season until they hatched. Reproductive success was investigated for a total of 2134 nests after hatchout (2031 *in situ*, 44 Relocated, 59 Restraining Cage nests).

The 2014 sea turtle nesting season had the second highest nest numbers since the inception of the project/surveys in 1981. A total of 3049 nests were deposited in Broward County from March 9, 2014 – September 9, 2014. Loggerhead turtles led the nesting again this year with 2876 nests which is 417 more than last year, but still fell short of 2012, which had the highest loggerhead nesting on record (3284 nests). However loggerheads still fell well above the 5-year average of 2352 nests per season. Green turtles laid 134 nests on Broward County beaches this year, a number far below the record setting green turtle season last year with 495 nests. This is not surprising as marine turtles have a biennial reproductive cycle where an individual may only return to nest every 2 years in most cases. However even though last year was an extremely high green turtle season, 2014 still fell well below the 5-year average of 254 nests. This suggests that Broward County may experience another active green turtle nesting season in 2015. Leatherback turtles are the least common nesters in Broward County with 39 nests in 2014. This doubled the leatherback nesting from last year with only 18 nests and is well above the 5-year average of 25 nests.

Nesting Success (Nests/(Nests + False Crawls)) averaged 51.8% for all species combined, 51.7% for loggerheads, 47.9% for greens, and 79.6% for leatherbacks. The combined species nesting success was 4.5% higher than the 5-year average of 47.3%. The loggerhead nesting success was slightly higher than last year (49.9%) but well above the 5-year average of 46%. Green turtles and leatherbacks both showed a decrease in nesting success for the 2014 season compared to last year and were both slightly lower than the 5-year averages for each species.

A total of 2031 *in situ* nests were evaluated post hatching for hatchling success (1932 Loggerhead, 72 Green, 27 Leatherback) resulting in a total of 207,042 eggs and 179,039 “Hatchlings released” from inventoried nests in 2014 with a hatching success for all inventoried *in situ* nests of 83.6%. The number of nests that were relocated was the lowest on record for the project with only 50 nests (all species) and 1.64% of all nests being relocated this year. This is down almost 3% from the 4.17% and 124 nests that were relocated in 2013, and supports the “hands off” conservation approach. Forty-four relocated nests were excavated and investigated for post hatching success. This resulted in a total of 4938 eggs laid (in inventoried nests) and 3426 “hatchlings released” for a hatching success for inventoried relocated nests of 69.4%.

The Hillsboro and Deerfield Beach survey zone had the most active nesting in Broward County with an average of 146.86 nests/km (all species combined). The Hollywood Beach survey zone has the lowest nesting density with an average of 31.6 nests/km (all species combined). This nesting distribution could be influenced by a number of factors, but we believe that beachfront/coastal lighting likely plays a large role in nest/crawl distributions in Broward County where Hillsboro has the darkest coastal lighting environment and Hollywood being one of the brightest sections of beach in Broward County. Hillsboro has also historically housed an active sea turtle “hatchery” facility where nests were transported from other areas of Broward County and relocated into a fenced facility until hatchout. Likewise, historically nests have been relocated out of Hollywood Beach. Both the hatchery and historical relocation may also account for some of the nest distribution we see in Broward County today.

Our program monitored sea turtle nesting activity in relationship to three small renourishment projects in recent years and 1 active maintenance/bypass project: A1A Emergency Restoration in Ft Lauderdale (R65-R67) to rebuild highly eroded beach areas from Hurricane Sandy in 2012; Flood Control and Coastal Emergency Beach Erosion Control (FCCE) Truck Haul Project in Pompano Beach (R26-R53), sand placement concluded in November 2013; Hillsboro Inlet Maintenance and Sand Bypass Project in Hillsboro Beach (R25-R26); and Hillsboro/Deerfield Beach Nourishment Project (R5-R12) sand placement concluded on April 11, 2011. During the 2014 season sand was only placed in the discharge area associated with the Hillsboro Sand Bypass project. However, this ongoing project was able to work around most nests deposited within the identified discharge location so only one nest had to be relocated for these permitted activities.

INTRODUCTION

Since 1978, the Broward County Environmental Planning and Community Resilience Division (BCEPCRD) and Broward County Board of Commissioners has provided for the conservation of endangered and threatened sea turtles in Broward County, Florida. Florida coastlines experience some of the heaviest sea turtle nesting in the United States, and Broward County accounts for about 3% of all nesting within Florida. Broward County is in the normal nesting ranges of three species of sea turtles: the Loggerhead sea turtle (*Caretta caretta*), the Green sea turtle (*Chelonia mydas*), and the Leatherback sea turtle (*Dermochelys coriacea*). In the coastal waters around Broward County the Kemp's Ridley sea turtle (*Lepidochelys kempi*) and the Hawksbill sea turtle (*Eretmochelys imbricata*) can also be found, but do not nest regularly in the area. The loggerhead is listed as threatened in this region, while the green and leatherback sea turtles are categorized as endangered under the U.S. Endangered Species Act of 1973 and Florida's Marine Turtle Protection Act (379.2431, Florida Statutes).

These statutes protect all life history stages of sea turtles and therefore all conservation, monitoring, or research efforts require permitting by the Florida Fish and Wildlife Commission (FFWC) that is administered by the U.S. Fish and Wildlife Service (USFWS) for sea turtles on land. The National Oceanic and Atmospheric Association (NOAA) protects all in-water turtles. All monitoring and conservation efforts for this project were administered and supported by the Broward County Environmental Planning and Community Resilience Division and conducted by Nova Southeastern University, Broward County Sea Turtle Conservation Program (BCSTCP).

Beach Re-nourishment Projects

Broward County beaches are modified from historic profiles due to coastal development and shore protection projects. With the highly urbanized and armored coastline and beachfront in Broward County, beach profiles, beach width, dune structure are impacted. To help mitigate erosion along sections of Broward County beaches, intermittent beach renourishment projects have been established in some areas of the County. The BCEPCRD has maintained the sea turtle conservation and monitoring program in years with and without sand placement projects, to better understand the long term impacts of sand placement projects on nesting sea turtles. There have been three small renourishment projects in recent years: A1A Emergency Restoration project in Ft Lauderdale (R65-R67) to rebuild highly eroded beach areas from Hurricane Sandy in 2012; Flood Control and Coastal Emergency Beach Erosion Control (FCCE) Truck Haul Project in Pompano Beach (R26-R53), approximately 115,000 cubic yards of sand was scheduled to be placed in this area, sand placement concluded in November 2013; Hillsboro Inlet Maintenance and Sand Bypass Project in Hillsboro Beach (R25-R26); and Hillsboro/Deerfield Beach Nourishment Project (R5-R12).

Project Goals

The Nova Southeastern University, Broward County Sea Turtle Conservation Program in 2014 has strived to:

- 1) Conduct Daily Sea Turtle Nesting Surveys and Beach Monitoring for Mechanical Beach Cleaning and Various Permitted Projects and Beach Events
- 2) Relocate or Protect Imperiled Sea Turtle Nests to Maximize Hatchling Survival
- 3) Conduct Nest Evaluations and Monitoring to Examine Hatchling Success
- 4) Conduct Stranding and Salvage Activities and Maintain a 24-Hour Sea Turtle Emergency Hotline
- 5) Inform and Educate the Public Through Educational Seminars, Public Hatchling Releases, and Table Events About Sea Turtles and Sea Turtle Conservation/Management
- 6) Provide Accurate and Timely Reporting

MATERIALS AND METHODS

Personnel

As a protected species, all sea turtle monitoring and work was authorized and conducted by permitted individuals under Florida Fish and Wildlife Conservation Commission (FFWCC), Imperiled Species Management Section, Marine Turtle Permits #108, #148 issued to Laura Wright (January 1, 2014 – July 2, 2014) and Marine Turtle Permits #214, #215 issued to Curtis Slagle (July 2, 2014 – December 31, 2014). The FWCC Marine Turtle Guidelines and Broward County Interim Agreement were used to set procedures for all monitoring, stranding, and survey protocols for this project.

2014 Broward County Sea Turtle Conservation Staff:

- † Derek Burkholder – Primary Investigator
 - *† Curtis Slagle – Project Manager
 - *† Jessica Novy – Assistant Project Manager
 - *† Samantha McCorkle – Data Manager
 - *† Laura Wright – Interim Project Manager
 - *† Nina Thomson – Interim Assistant Project Manager

Abby Nease	Field Staff	*† Jenna Caderas	Field Staff
* Alex Marks	Field Staff	*† Jessica Woodward	Field Staff
Allison Santos	Field Staff	Joan Guerra	Field Staff
* Amanda Lankenau	Field Staff	Joe Penta	Field Staff
* Ashley Taylor	Field Staff	* Kaitlyn Brucker	Field Staff
Brian Black	Field Staff	* Laura Eldredge	Field Staff
* Caidra Rice	Field Staff	*† Lisa Morse	Field Staff
*† Carmen Rodriguez	Field Staff	* Matthew Ware	Field Staff

*† Catherine Brady	Field Staff	* Melissa Riley	Field Staff
Courtney Kiel	Field Volunteer, Contract Administrator	* Patrick Goebel	Field Staff
*† Eric Carlson	Field Staff	Rachel Zimmerman	Field Staff
* Gina Rappucci	Field Staff	*† Teal Kawana	Field Staff
*† Jamie Ahn	Field Staff	*† Whitney Nolton	Field Staff
* Represents Stranding Team		† Represents Presentation Team	

Sea Turtle Nesting Surveys

Daily sea turtle nesting surveys were conducted by BCSTCP staff from March 1, 2014 – October 31, 2014 (a month longer in some areas than previous years surveyed) for all Broward County beaches (38.6 km) except John U Lloyd State Park (3.9 km) (Figure 1), which was surveyed by park staff who provided the data for this area. Surveys began 30 minutes before sunrise each day and were conducted using all-terrain vehicles (ATVs – Honda Rancher 500). For survey purposes Broward County was divided into 5 survey zones; Hillsboro-Deerfield Beach (Hillsboro), Pompano Beach including Lauderdale-by-the-Sea (Pompano), Fort Lauderdale, John U. Lloyd State Park, and Hollywood-Hallandale including Dania Beach (Hollywood) (Table 1). For all survey zones, except John U Lloyd State Park, nest locations were referenced to Florida Department of Environmental Protection (FDEP) survey monuments numbered consecutively (North to South) from R1 – R128. The location of Broward County and survey zone boundary lines are shown in Figure 1A-F.

All nesting and non-nesting emergences, or false crawls, were recorded and locations marked by GPS when they were first encountered on the survey. Data was recorded on paper datasheets and electronically using a Nexus 7 tablet with the VJGames GPS Coordinates Application in the field. This tablet system uses GPS, Wi-Fi, and mobile networks to determine location. Use of the tablets in inclement weather proved to be difficult. Therefore, Garmin eTrex Venture HC handheld GPS units were used to document crawl and nest locations. All nests were additionally marked with a Trimble GeoExplorer 6000 Series or Trimble GeoExplorer 2008 Series (<1m accuracy) to allow for precise nest reestablishment throughout the season if necessary (stakes lost, nest washout, vandalism, etc). Nest GPS position is taken over the center of the clutch when known, or at the apex of the crawl. To ensure crawls are not double counted, after all data is collected from a crawl/nest and it is marked accordingly, the crawl marks (not the nest site) are driven over with the ATV to indicate they have already been documented.

For each crawl encountered, data was collected on paper data sheets and in an electronic datasheet on the Nexus tablet. At each site data was collected for:

- 1) Survey Zone Referenced to Nearest Property and R-Zone Monument Marker
- 2) Crawl Type (Nest or False Crawl)

- 3) Each Crawl/Nest Given a Unique Identifier Number (Beach Code/Nest or False Crawl Number)
- 4) Date of Crawl
- 5) Species
- 6) Measurement From Apex of Crawl/Nest to High Tide Line (HTL)
- 7) Crawl Characteristics (e.g. Crawl Width, # Body Pits, Orientation Circles, Etc)
- 8) Fate of Nest (In-situ, Relocation, additional protection)
- 9) Whether a turtle encountered an obstruction (ONA)
- 10) Whether a turtle disoriented (DIS)

Survey Zones were further broken down into “Treatment Zones” based on different management tools to be used to help control unwanted natural and anthropogenic influences in the area (Table 2, Figure 2A-V).

Treatment zones were broken down into “Donor”, “Donor/Restraining Cage”, “Restraining Cage”, “*in situ* and Recipient”, or “Recipient” categories. Zone designations with R-Monument boundaries are outlined in Table 2.

In a “Donor” zone, all loggerhead, green, and leatherback turtle nests are to be relocated to the nearest “Recipient” zone. R-24 – Hillsboro Inlet and R85 – Port Everglades Channel are “Donor” zones and use of Restraining Cages is not authorized in this zone for any species.

A “Donor/Restraining Cage” Zone is defined as every other loggerhead nest in this zone will be relocated to the nearest “Recipient” zone, the remaining nest will be left *in situ* and outfitted with a Restraining cage when the nest incubation reaches 45 days.

A “Restraining Cage” Zone is defined as every other loggerhead nest in this zone will be outfitted with a Restraining cage when the nest incubation reaches 45 days, the remaining nests will be left *in situ* with no additional protection.

An “*in situ*/Recipient” zone is defined as a zone where all nests will remain *in situ* and may accept any nests relocated from “Donor” zones. Restraining cages should not be used in these areas for lighting purposes.

An “*in situ*” only zone is defined as a zone where all nests should be left *in situ* and no nests should be relocated into this zone from “Donor” zones. Restraining cages may be used in these zones after FWC approval. (Table 2, Figure 2A-V)

All nests left “*in situ*” were marked with 4 stakes (1 Signed, 3 non-signed stakes) with a circle of bright “Red-Glo” flagging tape with a radius of at least 3 feet centered on the clutch. For sites where a clear dig sight cannot be identified, the whole area of disturbed sand should be encircled with bright tape. If during the course of the season, the nest markers are lost/washed away/vandalized/etc the nest can be re-established using the

Trimble sub-meter GPS units. Upon reestablishment nests were marked with a circle of bright (Red-Glo) flagging tape with at least a 5 ft radius centered on the nest site.

Nest Relocation

Nests deposited in areas that were deemed “At Risk/Donor Zones” by FFWCC or that were laid below the previous night’s high tide line were relocated either west of the original nest location if laid below the high tide line, or were relocated to the nearest recipient zone if laid in a donor zone to ensure highest hatchling success. All nests were relocated before 9am the morning they were deposited. Each nest was carefully dug by hand and the eggs were transported in buckets containing damp sand from the original nest chamber. Special care was taken to leave eggs in their natural orientation (how they were sitting in the original nest) to minimize possible injury to the embryos during transportation. A new “nest chamber” was dug by hand, eggs placed in the chamber and then reburied as per FWC Marine Turtle Guidelines.

Relocated nests were marked with 3 stakes (1 sign stake, 2 unsigned stakes) in a triangle with the egg chamber in the middle and surrounded with a bright “Red-Glo” flagging tape. All relocated nests were evaluated post-hatching for Hatchling success unless extenuating circumstances (washout, vandalism, etc) made post-hatching analysis impossible.

Restraining Cages

Restraining cages were used as a management tool for zones of high artificial lighting trespass on the beach (Figure 2A-V). In all “Cage” zones, egg chambers were located for each nest during the daily survey and nests marked as per standard procedures. Cages were constructed for every other nest in the “Cage” zones. Cages were deployed at the beginning of the hatch-out window and monitored until hatch-out (plus at least 72 hours before nests were excavated and assessed for hatchling emergence success) or until 70 days at which time the cage would be pulled and the nest excavated.

Cages were constructed of a thick plastic mesh (2cmx2cm mesh) lined with window screen on the inside of the cage to minimize hatchling entanglement in the cage and protect hatchlings from predators that may reach through the mesh. Cages were a cylinder (60cm diameter) centered over the egg chamber, with a flat mesh top secured in place and an access hatch in the top to facilitate hatchling release (Appendix 4A). Additionally a door was cut into the East facing side of the cage that would be opened during the day, so hatchlings that may emerge during the day would not be stuck desiccating in the cage during the heat of the day (Appendix 4A). An informative sign was affixed to each cage with the pertinent response phone numbers if a turtle was found in the cage (Appendix 4B).

For cage construction, the enclosure would be placed centered over the top of the egg chamber, a trench would be dug around the base of the cage, and the base of the cage would be buried in the ground 4-6 inches, and then secured to stakes to hold it in place.

Daily cage monitoring consisted of closing the ground level access door at sunset each day, checking the cage for hatchling activity at least once between 23:00 and 01:00 each night (any hatchlings encountered were removed from the cage and released), and opening the ground level access door at sunrise each morning.

Nest Evaluation/Hatchling Success

When possible, nests were excavated and assessed for reproductive success at least 72-hours post nest hatchout. If hatchout was not observed, nests were excavated and assessed after a 70-day incubation period for green and loggerhead nests and 80 days for leatherback turtles.

Nests were dug by hand and inventoried. For each nest the following data was collected:

- 1) Number of Eggs
- 2) Live In Nest (LIN)
- 3) Dead In Nest (DIN)
- 4) Live Pipped (LPIP)
- 5) Dead Pipped (DPIP)
- 6) Visual Development (VD)
- 7) No Visual Development (NVD)
- 8) White

Number of hatchlings released for each nest was determined as Total Number of Eggs minus DIN, DPIP, and unhatched eggs showing visible development (VD) or no visual development (NVD). Live hatchling production success was defined as the number of released hatchlings divided by the Total number of Eggs.

Lighting Surveys

Surveys for artificial lighting on Broward County beaches were conducted once each month between March and September 2014 for all survey zones. Surveyors walked each section of beach after dark (commencing between 22:00 and 00:00). Survey protocols followed standard techniques as described by the FWC Technical Report: Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches (Blair E. Witherington and R. Erik Martin 1996). All lights/fixtures that can be seen from the beach are considered non-compliant under, Section 62B-55, Florida Administrative Code (FAC) a Model Ordinance for Marine Turtle Protection, and were documented on a standardized "BCSTCP Lighting Survey Data Sheet" which is broken down by light/fixture type and property/address (Appendix 5). Each coastal municipality in Broward County adopted and enforces their own local Sea Turtle Friendly Lighting Ordinance. These ordinances vary slightly, but follow the general rule of thumb outlined in the Model Ordinance. A list of common lighting types found in Broward County can be found in Appendix 6. When possible, each surveyor worked the same section of beach each month to allow the highest level of familiarity with the properties surveyed,

minimizing human error and discretion thus providing a better long-term track of lighting non-compliance throughout the season.

Lighting survey reports were submitted to the Contract Administrator and FWC ISM staff monthly. These reports ultimately were sent to Code Enforcers in each Broward County coastal municipality for compliance verification and enforcement actions if necessary.

Strandings

A Sea Turtle Emergency Line is monitored 24 hours/day in Broward County and most members of our program are trained to respond to sea turtle strandings. When a call comes into the emergency line a member of our Sea Turtle Stranding Team is dispatched with a stranding kit which contains all of the necessary equipment (pit tag reader, measuring tape, data sheets, scalpel, forceps, camera, pens/pencils, spray paint, GPS unit, etc) to document the event. If a call is in response to a dead stranding, we will determine turtle species, sex, take morphometric measurements, document all notable injuries, photograph the animal and all injuries, scan for pit and flipper tags for identification, and when all data is collected will usually bury the turtle on or just off the beach. If the animal is in the water or too large to move, we mark the shell with spray paint, so we know that it is a documented animal. If we are responding to a live stranding, we will collect species, size and record whether or not it has fibropapilloma tumors. Once this information is collected we contact the FWC Florida Sea Turtle Stranding and Salvage Network Coordinator to determine what will be done with the individual (where it will be transported, etc). A summary of the BCSTCP Stranding Responses can be found in Appendix 1a, an example stranding response data form can be found in Appendix 1b.

Data Management and Analysis

Data was recorded on paper datasheets and electronically using a Nexus 7 tablet with the VJGames GPS Coordinates Application in the field. Data was entered daily into an Excel spreadsheet and all datasheets were photocopied and originals are being held on site at Nova Southeastern University, Oceanographic Center. All data was verified by at least one additional person once the data was entered and before analysis. Data analyzed and presented in this report was compiled/analyzed using Microsoft Excel 2008 for Mac and JMP Pro 9. All maps were constructed in ESRI ArcMap 10.1. Historical nesting, hatchling success trends, and reproductive success were analyzed using Analysis of Variance (ANOVA) for Linear Regression.

RESULTS

Sea Turtle Nesting Surveys

The 2014 Sea Turtle Nesting Survey in Broward County started on March 1, 2014, and the first crawl of the season was a Leatherback nest on March 9, 2014. A total of 5882 emergences were documented for all Broward County combined resulting in 3049 Nests and 2833 False Crawls (Figure 3) or a 51.8% Nesting Success (Figure 4). This is very

similar to last year's Nesting Success at 51.5%, but is still well above the 5-year average for all species combined of 47.31%.

Following the general trend, leatherback turtles are the first species to nest in Broward County, followed by Loggerhead turtles, and the Green turtles nesting later in the season (Figure 5).

Loggerhead Sea Turtles (*Caretta caretta*)

Overall Nesting Activity

Loggerhead nesting again made up the majority of the nesting activity in Broward County in 2014. A total of 5553 crawls were recorded for loggerhead turtles in all of Broward County. Resulting in 2876 Nests and 2677 False Crawls for a Broward County wide nesting success of 51.79%. This is nearly a 2% rise in nesting success from last year (49.97%) and is over 5% higher than the 5-year average of 46.07% and in fact represents the highest Nesting Success for Loggerhead turtles County wide since before 2000 (Figure 6). Since 2000 nesting success has remained fairly stable with some up and down over the years, however regression analysis does not show a significant positive or negative trend over this time period $y = 0.0008x + 0.4566$, $R^2 = 0.0077$, $P = 0.82$ (Figure 6). This nesting represents a nest density (County wide) of 74.51 nests/km which is the second highest nest density behind the record setting 2012 nesting season. Loggerhead nesting has experienced a significant increase over the life of the program with an average increase of 30.5 nests per year from 1981 – 2014. Regression shows a highly significant positive trend $y = 30.496x + 1463.1$, $R^2 = 0.3407$, $P < 0.001$ (Figure 7).

Temporal Patterns

The first loggerhead nest was deposited on April 22, 2014 and the first loggerhead false crawl was documented on April 25, 2014. Highest daily nesting was June 11, 2014 with 55 nests laid in Broward County. The last loggerhead nest was deposited on September 5, 2014, and the last False Crawl recorded on September 11, 2014 (Figure 5).

Spatial Patterns

Loggerhead nests and false crawls were recorded in all survey zones with an average of 74.51 nests per km. Hollywood showed the lowest Loggerhead nesting with 14.79 nests/km and Hillsboro experienced the highest nesting with 149 nests/km. (Table 3).

Incubation Periods

Incubation periods were determined for 1822 loggerhead nests left *in situ* on Broward County Beaches (minus John U Lloyd) in 2014. Incubation ranged from 40 – 69 days with a mean incubation period of 51.9 days. This falls well within the expected incubation range for loggerhead turtles as there were no unusual rainfall or storm events this year.

Reproductive Success

Reproductive success was investigated in 1932 *in situ* loggerhead nests across Broward County (not including John U Lloyd). In these evaluated nests 196,270 eggs were laid resulting in 169,651 “hatchlings released” for a release success rate of 83.5% (Table 6). This is about 200 more nests evaluated than the 2013 season, but represents about a 5% lower hatchling released success rate than last year. However this is still about 5% higher than the 5-year average of 78.4% hatchling success.

Table 7 shows the fate of each egg deposited in the evaluated loggerhead nests left *in situ*, relocated, and cages outfitted with hatchling restraining cages. The highest hatchling released percentages came from nests evaluated in Pompano Beach with a success rate of 89.8%, the lowest was in Hillsboro Beach at 80.2%. This may be attributed to the higher predation rates in Hillsboro Beach, and the late season inundation associated with Hurricane Cristobal.

Green Sea Turtles (*Chelonia mydas*)

Overall Nesting Activity

Green turtles are historically the second highest nesters in Broward County. This trend continued again for the 2014 nesting season. A total of 280 crawls were recorded for green turtles in all of Broward County. Resulting in 134 nests and 146 False Crawls for a Broward County wide green turtle nesting success of 47.86%. Since 2000 nesting success has seen a moderate increase over the years, regression analysis shows a moderately significant positive trend ($P = 0.066$) over this time period $y = 0.0092x + 0.4081$, $R^2 = 0.2459$ (Figure 6). Like the loggerhead turtles, green nesting has experienced a significant increase over the life of the program with an average increase of 7.6 nests per year from 1981 – 2014. Regression shows a highly significant positive trend $y = 7.5566x - 17.652$, $R^2 = 0.5101$, $P < 0.001$ (Figure 7).

The 2013 nesting season saw a project history record high season for green turtles with 500 green turtle nests County-wide and a nesting success rate of 59.59%. The low green turtle nesting activity this year is not unexpected due to the biennial nesting pattern of marine turtles. Suggesting we may experience another large green turtle nesting season in 2015.

Temporal Patterns

The first green turtle nest was deposited on May 28, 2014 and the first green turtle false crawl was documented on May 30, 2014. Highest daily nesting was July 5, 2014 with 5 nests laid in Broward County. The last green turtle nest was deposited on September 9, 2014, and the last False Crawl was recorded on August 30, 2014 (Figure 5).

Spatial Patterns

Green turtle crawls were recorded in all survey zones, however Hollywood only received 1 False Crawl and zero nests. Countywide green turtles showed an average of 3.47 nests per km. The highest green nesting was in the Hillsboro zone with 9.57 nests/km, and lowest in the Hollywood zone with 0 nests/km (Table 3).

Incubation Periods

Incubation periods were determined for 69 green turtle nests left *in situ* on Broward County Beaches (minus John U Lloyd) in 2014. Incubation ranged from 45 - 61 days with a mean incubation period of 51.4 days. This falls well within the expected range of green turtle incubation periods.

Reproductive Success

Reproductive success was evaluated for 72 green turtle nests that were left *in situ* in 2014. There were 8363 eggs deposited in the evaluated nests resulting in 7513 “hatchlings released” for a release success rate of 86.6% (Table 6). The 2014 season had a much lower number of green turtle nests deposited and therefore had less evaluated (72 vs. 336 in 2013), however the hatchling release success rate was only about 3% less than that recorded in 2012 at 89.7%.

Table 8 shows the fate of each egg in evaluated green turtle nests broken down by beach location, *in situ*, and relocated nests. The highest emergence percentage for *in situ* nests was found on Fort Lauderdale Beach at 93.5% and the lowest again on Hillsboro Beach at 83.8%.

Leatherback Sea Turtles (*Dermochelys coriacea*)

Overall Nesting Activity

Leatherback turtles are historically the lowest nesting species in Broward County. This trend continued again for the 2014 season. A total of 49 crawls were recorded in all of Broward County resulting in 39 nests and 10 false crawls for a County-wide nesting success for leatherback turtles of 79.59%. Since 2000 nesting success has remained fairly stable over the years, regression analysis does not show a significant positive or negative trend ($P = 0.59$) over this time period $y = -0.0028x + 0.8517$, $R^2 = 0.01874$ (Figure 6). Like the loggerhead and green turtles, leatherback nesting has experienced a significant increase over the life of the program with an average increase of 0.74 nests per year from 1981 – 2014. Regression shows a highly significant positive trend $y = 0.7352x + 2.7807$, $R^2 = 0.2816$, $P = 0.001$ (Figure 7).

Temporal Patterns

The first leatherback nest was deposited on March 9, 2014 and the first leatherback false crawl was documented on April 5, 2014. Highest daily nesting was April 22, 2014 with 4 nests laid in Broward County. The last leatherback nest was deposited on June 29, 2014, and the last False Crawl was recorded on June 28, 2014 (Figure 5).

Spatial Patterns

Leatherback crawls were recorded in all survey zones, however Pompano Beach zone had no False Crawls, and John U Lloyd had no nests deposited in 2014. Countywide leatherback turtles showed an average of 1.01 nests/km. The highest leatherback nesting zone was Hillsboro with 2.08 nests/km and lowest in John U Lloyd with zero nests/km (Table 3).

Incubation Periods

Incubation periods were determined for 27 leatherback nests left *in situ* on Broward County Beaches (minus John U Lloyd) in 2014. The overall 2014 season incubation periods ranged from 50 – 83 days with a mean incubation period of 65.9 days. Nests deposited later in the season, after the beginning of August, experienced shorter incubation periods with a mean of 57 days.

Reproductive Success

Reproductive success was assessed for 27 leatherback nests left *in situ* in Broward County. The 27 nests resulted in 2409 eggs and 1875 hatchlings released for a Hatchling Release Success rate of 77.8% (Table 6). This is almost 8% higher than last year with a hatchling release success rate of 69.5% for *in situ* leatherback nests. Hatchling success is generally lower for the leatherback species. Most of the evaluated nests were from Hillsboro Beach which also had the lowest Hatchling Emerged percentages at 73.1%. Hollywood Beach had the highest percentage at 93.4% (Table 9). However these are based on quite low sample sizes.

Beach Re-Nourishment Projects

No nests were relocated for sand placement in the 2014 season. However four beach renourishment projects have been completed in recent years that were monitored for post project impacts on nesting behavior/success.

Nesting Success

The Hillsboro/Deerfield Beach Nourishment Project (R5-R12) which encompasses most of Hillsboro/Deerfield survey zone and accounted for 346 loggerhead nests and 317 false crawls for a loggerhead nesting success of 52.19% (Table 10). Green turtles laid 7 nests in the fill area and made 17 false crawls for a green nesting success of 29.17%. There

was only 1 leatherback nest in the fill zone and 3 false crawls leaving a nesting success of 25% (Table 10).

The Hillsboro Inlet Maintenance and Sand Bypass Project in Hillsboro Beach (R25-R26) is a small area that only impacted 3 (2 *in situ*, 1 relocation) loggerhead nests and 2 false crawls leaving a loggerhead nesting success in this project area of 60% (Table 10). This is up significantly from the 25% loggerhead nesting success in 2013. There were no green or leatherback nests or false crawls in this area this season.

This is the first year of post project monitoring for the Flood Control and Coastal Emergency Beach Erosion Control (FCCE) Truck Haul Project at Pompano Beach (R26-R53). This project impacted the longest extent of beach of any of the recent projects. The fill area had 581 loggerhead nests and 534 false crawls for a loggerhead nesting success in the fill zone of 52.11% (Table 10). This is very similar to the 51.8% nesting success for loggerhead turtles across all beaches in Broward County this nesting season (Table 4). Green turtles laid 7 nests and 20 false crawls for a nesting success of 25.93%. Leatherbacks laid 9 nests and 0 false crawls for a nesting success of 100% in the project area (Table 10).

The A1A Emergency Restoration Project (R65-R67) accounted for 32 loggerhead nests and 37 false crawls for a nesting success rate of 46.38% (Table 10). This is up about 5% from 41.7% loggerhead nesting success in 2013. Green turtles laid 1 nest in the fill area and only saw 5 false crawls for a nesting success of 16.67%, and there were no leatherback nests or false crawls in the area.

Reproductive Success

The Hillsboro/Deerfield Beach Nourishment Project (R5-R12) had a total of 346 loggerhead nests within the project area. Of the 327 nests, 247 nests were evaluated for nesting reproductive success. The 247 nests resulted in 21,154 eggs with 17,600 hatchlings released for a release success of 77.9%. There were 5 evaluated green turtle nests that resulted in 572 eggs with 523 hatchlings release for a release success of 88.3%. There was 1 leatherback nest that resulted in 90 eggs and 44 hatchlings released for a release success of 48.9% (Table 11).

The Hillsboro Inlet Maintenance and Sand Bypass Project in Hillsboro Beach (R25-R26) had a total of 3 loggerhead nests, 2 of which were evaluated for reproductive success. These 2 nests resulted in 225 eggs and 116 hatchlings released for a release success of 51.6% (Table 11).

The Flood Control and Coastal Emergency Beach Erosion Control (FCCE) Truck Haul Project had 490 loggerhead nests that were evaluated for reproductive success. These nests resulted in 49,781 eggs and 44,242 hatchlings released for a release success of 88.8%. There were 6 green turtle nests evaluated for reproductive success resulting in 782 eggs and 723 hatchlings released for a release success of 91.1%. There were 5

leatherback nests that were evaluated for reproductive success resulting in 504 eggs and 418 hatchlings released for a release success of 83% (Table 11).

The A1A Emergency Restoration Project (R65-R67) had 27 loggerhead nests that were evaluated for reproductive success. These nests resulted in 2916 eggs and 2339 hatchlings released for a release success of 80.2% (Table 11). There were no green or leatherback nests that were evaluated for reproductive success in the project area.

Relocation

A total of 50 nests were relocated throughout the 2014 nesting-season. Of these 50 nests; 15 were relocated mid-incubation due to nest chamber washout or egg exposure, 12 were relocated because they were laid below the high tide line, the remaining 23 nests were relocated because they were laid in a partial or full “Donor” zone as specified by FWC.

Nest relocation activities have dropped significantly in Broward County in the last several years as management practices are moving toward a more “Hands Off” approach. Rather than utilizing extensive relocation efforts of moving the majority of nests into protected “Hatchery” areas as has been done in Broward County historically as relocation often decreases the nest’s hatching success.

For all Broward County and all turtle species combined only 1.64% of nests were relocated in the 2014 season compared to over 56% relocation rate in 2005 (Figure 8). Relocation rate has been on a steady decline as management strategies are changing, but 2014 represents the lowest relocation rate to date for the project and is well below the 5-year average of 12.65%.

Incubation Period

Incubation periods were determined for 40 relocated loggerhead nests (13 relocated mid-incubation due to washover/washout). Relocated loggerhead nests had an incubation range from 46 – 62 days with a mean incubation period of 51.5 days. This is very similar to *in situ* loggerhead nests that had a mean incubation period of 51.9 days. Incubation periods were calculated for 2 relocated green nests. Incubation periods ranged from 49 – 52 days with an average of 50.5 days. This is slightly lower than the mean incubation period for *in situ* green turtles of 51.4 days, but this mean is only based on 2 data-points. Likewise, incubation periods were determined for 2 relocated leatherback nests (1 nests was a mid-incubation relocation due to nest washover/washout). Relocated leatherback nests had an incubation period ranging from 65-66 days with a mean incubation period of 65.5 days. This is higher than the mean incubation period of 57 days calculated for *in situ* nests, but is based on a very limited sample size.

Reproductive Success

Reproductive success was calculated for 44 relocated nests (40 loggerhead, 2 green, 2 leatherback). The 40 loggerhead nests resulted in 4504 eggs with 3280 hatchlings

released for a release success of 71.9%. This is 10% lower than what was reported in 2013 for 115 relocated loggerhead nests (Burney and Wright, 2013). The 2 green turtle nests resulted in 276 eggs with 72 hatchlings released for a release success of 26.1%. However with the very small sample size, this low percentage is largely driven by 1 very low success nest. The 2 leatherback nests resulted in 158 eggs with 74 hatchlings released for a release success of 46.8%.

Hatchling Disorientation Events

The Broward County Sea Turtle Conservation Program surveyors reported 155 nests that experienced disorientation across Broward County that were recorded on morning surveys. A disorientation event is defined as either an adult or hatchling sea turtle that does not orient or travel toward the sea, but instead will travel in another direction. Most of these events can be tied to an anthropogenic light source that is overpowering what would naturally be the brightest point on the horizon which is over the ocean (See Appendix 5 for example Disorientation Report). Eighty-nine of these disoriented nests were in the Pompano Beach Survey zone and an additional 37 disoriented nests were in Fort Lauderdale Survey zone. Together these two survey zones accounted for 81% of the disorientation events reported by BCSTCP staff this season. One hundred and fifty five disorientation events is only 2 higher than what was documented in the 2013 season but is still significantly higher than the 5-year Broward County average of 108.4 events (Figure 9). It is interesting to note that disorientations were very low in 2009 and lower the 5-year average. If you remove 2009 and calculate a 4-year average, it raises to an average of 132.25 events per year. For each disorientation event, a Marine Turtle Hatchling Disorientation Incident Report Form was filed with FFWCC.

Two volunteer organizations: Sea Turtle Oversight Protection (S.T.O.P) and South Florida Audubon Sea Turtle Volunteer Organization had a strong presence on the Broward County beaches this year and reported disorientation events separately from the BCSTCP. When an organization (BCSTCP, S.T.O.P., Audubon) recorded a disorientation event and files a Marine Turtle Hatchling Disorientation Incident Report Form, the nest was marked with colored flagging tape marked with the date of hatchout. This was designed to minimize double reporting disorientation events to FWCC. The disorientation event records from S.T.O.P. and the South Florida Audubon volunteer groups are not presented in this report.

Predation and Poaching

In 2014, 326 nests in Broward County (not including John U Lloyd) experienced predation that is 10.69% of all nests (all species, all zones). This is slightly higher than last year that had an overall predation rate of 9.08% and is 3.58% higher than the 5-year predation average percentage of 7.11%. Broward County as a whole has shown little change in predation percentages from 2005 – 2014, however we may be seeing a slight increase in predation events if the 2013 and 2014 trends hold true in the future (Figure 10). Fox are the primary culprit in this region, but iguanas, raccoons, ants, night heron, crow, and other unknown bird species were also documenting predating nests. The

Hollywood survey zone experienced the lowest predation impact with no predation events. Hillsboro survey zone experienced the highest predation rates at over 25% of nests experiencing predation (Figure 11). As Hillsboro is also the highest nesting density in Broward County this elevated predation impact may warrant some degree of nest protection in future years.

In addition to predation impacts, 15 nests in Broward County were impacted by human disturbance/poaching. This is about half of what we saw last season where 28 nests were impacted. Most impacts were light digging in the nest or nest vandalism, but some experienced heavy digging/trenching within the nest perimeter.

Restraining Cages

In the designated “Caging” or “Caging/Donor” zones a total of 67 restraining cages were constructed on loggerhead turtle nests (Eight were not excavated due to washout/reestablish): 39 Ft Lauderdale (5 Washover/Reestablished), 24 Hollywood (2 Washover/Reestablished), 2 Commercial Pier, 2 Anglin’s Fishing Pier (1 Washover/Reestablished).

Incubation Period

We were able to excavate 59 of the 67 nests that received hatchling restraining cages. All of these nests were loggerhead nests with the first cage being constructed June 18, 2014 on Hollywood Beach, the last was constructed September 21, 2014 on Hollywood Beach and removed September 30, 2014. Incubation period for caged nests ranged from 48 days to 56 days with a mean incubation period of 52 days. This is very similar to the wider dataset of *in situ* loggerhead nests, which had incubation periods ranging from 40 - 69 days with a mean incubation period of 51.9 days in 2014.

Reproductive Success

Caged nests were excavated and analyzed for reproductive success. Eight of the 67 cages constructed this season could not be analyzed due to washout and/or loss of cage/stakes that required reestablishment (Egg chambers could not be located). A total of 6284 eggs were deposited in the 59 inventoried cages that were outfitted with hatchling restraining cages with 3426 “hatchlings released” for a hatching success rate of 78.6% across all inventoried caged nests (Table 6). This hatching success rate is comparable to the 83.5% mean hatchling release of 1932 loggerhead nests left *In situ* this season. This is a 7% higher hatchling release rate compared to relocated loggerhead nests this season at 71.9%.

We found hatchling-restraining cages to be an effective short-term mitigation action in areas of bright anthropogenic beachfront lighting to minimize loss and death of sea turtle hatchlings that would likely disorient in these areas. The cages also provided an effective educational tool in the field with signage and allowing our team to speak to beachgoers about sea turtle friendly lighting and why these measures were being used in certain

areas. However as a long-term management tool we highly recommend continuing to work to rectify the underlying lighting issues at the light source in these areas rather than using restraining cages as a long-term management solution in these areas. Please see the *Technical Report Supplement: Broward County Sea Turtle Conservation Program Lighting Survey 2014 Report* for more information on light tracking and rectification recommendations in Broward County.

Overwash and Washout Events

A total of 1012 Nests throughout Broward County (except John U Lloyd) experienced Overwash/Inundation throughout the season. This is higher than the 2013 season, which had 655 nests impacted; this year also was higher than the 5 year average (2009-2013) of 759 nests. However the overwash frequency is less than the 2012 season, which reached over 1700 impacted nests (Figure 12). Hurricane Cristobal (in conjunction with a high tide event) (August 25-26, 2014), which travelled up the East Coast of the United States, is responsible for the majority of the washover/inundation events in 2014. While Cristobal was quite far offshore when it passed Broward County, the wave action coupled with a period of particularly high tides resulted in heavy beach inundation, especially on Hillsboro/Deerfield Beaches, which have a high density of nests and a very narrow profile for most of its length.

Strandings

The Broward County Sea Turtle Conservation Program Stranding Team responded to 40 marine turtle stranding events from January 1, 2014 to November 23, 2014. Of these 26 were dead stranded turtles and 14 were live strandings (see Appendix 1a for a full breakdown of stranding response). At each stranding a Sea Turtle Stranding Form was completed and sent to FWC and the Broward County Project Administrator (see Appendix 1b for an example). Stranding numbers were much lower in 2014 than were reported in 2012 and 2013, which experienced more than 3 times the number of strandings than 2014 (see Appendix 1c for a Broward County Stranding history).

Obstructed Nesting Attempts

Morning surveys documented 300 obstructed nesting attempts (ONA), 250 of these were loggerhead crawls and 3 green turtles. Of the 300 ONAs, 152 resulted in false crawls and 148 resulted in a nest. Turtles encountered a number of obstructions that were documented of these 110 were impacted by beach furniture, 86 by a seawall, 44 by an escarpment, 28 by a rock outcropping, 15 by cabanas, 4 by rock revetment, 4 by an umbrella, 3 by dune crossover, 1 by nourishment escarpment, 1 by boat, and 66 by miscellaneous (fence, garbage can, etc).

DISCUSSION

Yearly Nesting Trends and Nesting Success

The 2014 nesting season had the second highest nest count in project history only falling behind the record 2012 nesting season. All three species of nesting turtles in Broward County have shown a significant increase in nest deposition over the history of the Broward County Sea Turtle Conservation Program starting in 1981. Loggerheads are on an increasing trend of +30.5 nests per year since 1981 (Figure 7). However when we break the history down, there was a 10 year period of decline from 1997 – 2007. Since 2007 we have seen an increase in loggerhead nesting again rising at a much higher rate than the project trend. Since 2007 we have seen a significant rise in loggerhead nesting throughout Broward County. Green turtles have also seen a positive historic trend in nesting in Broward County. While 2014 was a low nesting year for green turtles, the record high green season in 2013 may indicate either new recruits or a large percentage of the nesting females returning for that season. Burney and Wright (2013) suggested that this season might be a low nesting year due to the biennial nesting pattern seen with green turtle nesting behavior. Leatherback nesting is also on an increasing historical trend and this year has followed the general up/down nesting pattern that has been in place for the last 10 years. Suggesting that leatherback nesting may be lower again next year, but will continue on the overall upward nesting trend.

Seasonal Nesting Patterns

The seasonal nesting pattern is consistent to what is normally found in Broward County with the first nesters to arrive being the leatherbacks, followed by loggerheads and followed up by green turtles. The first leatherback nest was deposited 9 days earlier than the 2013 season. The first loggerhead nest was deposited almost the same time as the first 2013 loggerhead nest on April 22 (April 20 for 2013). Green nesting started only 1 day later than the 2013 season on May 28, 2014. However the green nesting ended 2 weeks earlier with the last green nest deposited on September 9, 2014 rather than September 25 in 2013. Nest deposition follows a nice bell curve with the height of the season falling in June/July for loggerheads which is similar to historic nesting patterns.

Countywide Nest Distribution

Nest distributions this season closely resemble patterns that have been seen in Broward County for many years with the highest nesting in Hillsboro/Deerfield Beaches, and the lowest nesting activity on Hollywood Beach. In addition we see very little crawl/nest activity directly adjacent to jetties and inlets. These types of “beach armoring” constructions disrupt the natural water flow and many times result in increased beach erosion near the structures and impact sea turtle nesting (Mosier and Witherington, 2000, Rizkalla and Savage, 2011).

Hillsboro beach has some of the lowest human population density and lighting of any of the Broward County beaches. This makes for a very suitable nesting environment for sea

turtles in this area and may be one reason we see increased nesting activity in this area. However the historic operation of a sea turtle “hatchery” facility at the Hillsboro Beach Club that was maintained through the 2005 nesting season may also play some role in the heavy utilization of Hillsboro and the underutilization of Hollywood beaches for sea turtle nesting. Hollywood is one of the brightest beach stretches in Broward County and because of this was a long time “Donor” zone where nests would be removed and placed in hatchery facilities. Female sea turtles return to their natal beaches when they are ready to deposit nests of their own (Lohmann, et al. 1997). We may be seeing some impact of this long-term movement of nests into the Hillsboro Beach area and may be a question that warrants further investigation in the future.

Nest Relocation

Historically sea turtle hatcheries were used quite extensively in Broward County as a management tool to protect marine turtles. An active hatchery facility was maintained near the Hillsboro Beach Club until 2005 (Burney and Ouellette, 2005). Hatchery facilities provide a sound management tool in heavily impacted coastal communities where nests left to their own devices will likely experience very high rates of disorientation, predation, washout, etc. However the hatchery model is not without its complications as well. The sex of marine turtle hatchlings is dependent on sand temperature during incubation (Standora and Spotila, 1985). A beach with all nests left *in situ* will experience a range of temperatures, where some nests are laid closer or farther away from the water, or from shading from dune vegetation, etc; likewise, different nest chamber depths will likely experience different temperatures during development. When all or most of a beach’s nests are relocated into a hatchery facility, this may eliminate some of the natural temperature variation found when nests are left *in situ*. Also when nests are packed densely together as in a hatchery facility they become more vulnerable as a whole to disease and disease transmission, predation (though predation can be dealt with at some level with fencing/protection), storm events (less buffering by having nests widely distributed as would be found when left *in situ*). In 2004, Hurricane Frances and Hurricane Jeanne had significant negative impacts on the hatchery nest facilities (Burney and Ouellette, 2004).

Relocations generally experience lower hatching success than *in situ* nests because even though eggs are handled with the utmost care, they are still being moved and placed into an artificial chamber that is likely not as good as what the mother can build. In a hatchery system, some nests may travel a long distance in buckets before they are placed in their new handmade nests. The final year of the hatchery facilities loggerhead nests had a Release Success (live hatchlings released/total eggs) was 53.3% for relocated nests (N = 1151 nests or 56.04% of all nests in 2005) (Burney and Ouellette, 2005). Our relocated Release Success in the 2014 season was much higher at 71.9% (N = 50 nests or 1.64% of all nests in 2014). While this is still not as ideal as nests left *in situ*, it is almost 20% higher than the release success experienced in the final year of hatchery use in 2005. This may be to the much shorter travel distances nests are being moved (most of which are walked to their new location, rather than riding on the back of an ATV). As lighting compliance improves in Broward County, we recommend continuing the more “Hands

Off” management strategy. Data in the coming years will help determine the most effecting suite of management tools for the dynamic and highly utilized beaches of Broward County.

Disorientation Reports

Disorientation reports provide a mechanism to document nests that experience significant hatchling disorientation. In Broward County we have 3 organizations documenting these events. With multiple groups recording disorientation events, it makes it difficult to have a standardized methodology county wide that would be beneficial to make disorientation reporting most effective as a management tool. The volunteer groups in many cases are targeting locations and nests that are at highest risk of disorientation to be able to best protect the hatchlings emerging from these nests in areas most impacted by artificial lighting. This targeted monitoring may bias the data in certain areas that are heavily monitored. We recommend that this possible bias be considered when using disorientation reports as a management tool in Broward County.

Challenges Encountered

The Atlantic hurricane season was quite benign this year, however Hurricane Cristobal impacted Broward County on August 25-26, 2014. The storm travelled far offshore, however storm surge and wave action coupled with a particularly high tide event caused extensive washover and washout events across Broward County, especially in Hillsboro Beach, which has a very narrow beach profile resulting in many nests being washed out or needing to be reestablished. Likewise, several nests outfitted with hatchling restraining cages were impacted and cages had to be reestablished after waters receded.

In addition a period of especially high tides were cause for worry for nest overwash, inundation, and washout. However preparatory activities (re-securing stakes, removing restraining cages in areas of high washover probability, etc) helped mitigate the impact. While it did not help nests to escape overwash, the preparations did remove the need for any reestablishment due to lost stakes.

We also experienced some degree of vandalism throughout the season that impacted our abilities to conduct post hatching assessments in some cases. We had a few restraining cages that were pulled out/destroyed and had some cases where nest markers were moved making egg chamber location very difficult.

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TABLES & FIGURES

Table 1:

Broward County Survey Areas			
BEACH	BEACH LENGTH (km)	BOUNDARIES	FDEP SURVEY MARKER #
Hillsboro-Deerfield Beach	7.0	Palm Beach Co. line to Hillsboro Inlet	R1-24
Pompano Beach Including Lauderdale-by-the-Sea	7.7	Hillsboro Inlet to Commercial Blvd.	R25-50
Fort Lauderdale	10.6	Commercial Blvd. to Port Everglades Inlet	R51-85
John U. Lloyd Park	3.9	Port Everglades Inlet to Dania Beach fence	R86-96
Hollywood-Hallandale Including Dania	9.4	Dania Beach fence to Miami Dade Co. line	R97-128

Table 1: Summary of the sea turtle nesting beach 2014 survey zones in Broward County, Florida, USA.

Table 2:

Zone	In Situ Only	In Situ & Recipient	Restraining Cage	Donor/Restraining Cage	Donor
Description	All nests left in situ; nests from "Donor" zones may not be relocated in these zones; restraining cages may be used with approval by FWC	All nests left in situ; nests from "Donor" zones may be relocated to this area. Cages should not be used.	All nests left in situ; fit a restraining cage to every other nest	Every other nest relocated to "Recipient" zone, remaining nests fitted with restraining cages.	All nests relocated from this area to nearest "Recipient" zones.
R-Monument	R1-R6 R25-R26 R34-R39 R50-R51 R53-R58 R64-R80 R84-R84.7 R97.5-R102 R113-R124	R6-R24 R26-R34 R39-R50 R51-R53 R58-R64 R80-R84 R102-R107 R124-R128	R34-R35 R50-R51 R74-R78 R113-R124	R107-R113	R24 - Hillsboro Inlet R85 - Port Everglades

Table 2: Summary of treatment zones by R-Monument for 2014 sea turtle nesting season, Broward County, Florida.

Table 3:

Beach	Loggerhead			Green			Leatherback		
	<i>Total Nests</i>	<i>Beach Length</i>	<i>Nests per km</i>	<i>Total Nests</i>	<i>Beach Length</i>	<i>Nests per km</i>	<i>Total Nests</i>	<i>Beach Length</i>	<i>Nests per km</i>
Ft Lauderdale	914	10.6	86.23	44	10.6	4.15	5	10.6	0.47
Pompano	530	7.7	68.83	7	7.7	0.91	9	7.7	1.17
Hillsboro	1043	7	149.00	67	7	9.57	22	7	3.14
Hollywood	139	9.4	14.79	0	9.4	0.00	3	9.4	0.32
John U Lloyd	250	3.9	64.10	16	3.9	4.10	0	3.9	0.00
OVERALL	2876	38.6	74.51	134	38.6	3.47	39	38.6	1.01

Table 3: Total nests and nesting densities (Nests per km) by Species and Survey Zone in 2014

Table 4:

Beach	Loggerhead			Green			Leatherback		
	<i>Nests</i>	<i>FC</i>	<i>NS</i>	<i>Nests</i>	<i>FC</i>	<i>NS</i>	<i>Nests</i>	<i>FC</i>	<i>NS</i>
Ft Lauderdale	914	811	52.99%	44	49	47.31%	5	1	83.33%
Pompano	530	487	52.11%	7	18	28.00%	9	0	100.00%
Hillsboro	1043	962	52.02%	67	59	53.17%	22	7	75.86%
Hollywood	139	152	47.77%	0	1	0.00%	3	0	100.00%
John U Lloyd	250	264	48.64%	16	19	45.71%	0	2	0.00%
OVERALL	2876	2676	51.80%	134	146	47.86%	39	10	79.59%

Table 4: Total nests, False Crawls (FC) and Nesting Success (NS) by Species and Survey Zone in 2014

Table 5:

	Loggerhead	Green	Leatherback	Total
<i>In situ</i>				
Ft Lauderdale	857	42	3	902
Pompano	520	7	9	536
Hillsboro	1033	67	22	1122
Hollywood	103	0	0	103
OVERALL	2513	116	34	2663

Relocated				
Ft Lauderdale	16	2	2	20
Pompano	8	0	0	8
Hillsboro	10	0	0	10
Hollywood	12	0	0	12
OVERALL	46	2	2	50

Caged				
Ft Lauderdale	41	0	0	41
Pompano	2	0	0	2
Hillsboro	0	0	0	0
Hollywood	24	0	0	24
OVERALL	67	0	0	67

Table 5: Breakdown of nest treatment (*In situ*, Relocate, Restraining Cage) by beach and species with overall totals.

Table 6: Total egg counts, released hatchlings, and overall release successes for *in situ*, relocated, and caged nests of loggerheads, greens, and leatherbacks in 2014, with numbers of unevaluated nests.

Species	# Eggs	# Eval Nests	Hatchlings Released	Release Success %	Uneval Nests
<i>In situ</i>					
Loggerhead	196270	1932	169651	83.5	577
Green	8363	72	7513	86.6	46
Leatherback	2409	27	1875	77.8	10
Total	207042	2031	179039	83.6	633
Relocated					
Loggerhead	4504	40	3280	71.9	5
Green	276	2	72	26.1	0
Leatherback	158	2	74	46.8	0
Total	4938	44	3426	69.4	5
Restraining Cage					
Loggerhead	6284	59	5030	78.6	8
Total	6284	59	5030	78.6	8
Overall					
Loggerhead	207058	2031	177961	80	590
Green	8639	74	7585	83.9	46
Leatherback	2567	29	1949	72.5	10
Total	218264	2134	187495	78.8	646

Table 7: Accounting of the status of all hatched and unhatched eggs in evaluated *In situ*, Relocated, and Caged Loggerhead nests for 2014.

Location	Total Eggs	# Eval Nests	Emerged (%)	LIN (%)	DIN (%)	Live PIP (%)	Dead PIP (%)	VD (%)	NVD (%)
<i>In situ</i> Nests									
Hillsboro Beach	60979	693	80.2	1.3	1.3	0.1	2.8	3.8	6.0
Pompano Beach	47540	438	89.8	1.0	0.5	0.1	1.5	2.6	5.4
Ft Lauderdale Beach	78705	716	85.1	1.4	1.5	0.1	3.0	6.0	6.7
Hollywood Beach	9046	84	82.5	0.9	0.8	0.2	2.6	5.5	8.6
Overall <i>In situ</i>	196270	1931	84.5	1.2	1.2	0.1	2.6	4.5	6.3
Relocated Nests									
Hillsboro Beach	682	7	72.1	6.3	1.5	2.1	4.8	5.3	12.2
Pompano Beach	750	8	74.5	4.7	3.3	2.1	7.6	2.5	11.6
Ft Lauderdale Beach	2057	18	68.2	4.8	2.9	1.3	11.4	3.1	13.9
Hollywood Beach	1072	10	81.8	4.8	2.5	1.5	0.9	3.7	11.0
Overall Relocated	4561	43	73	5.0	2.7	1.6	7.3	3.5	12.6
Caged Nests									
Pompano Beach	140	1	34.3	0.0	0.0	0.0	0.0	3.6	62.1
Ft Lauderdale Beach	3728	36	81.1	1.3	3.0	0.1	4.2	3.6	7.9
Hollywood Beach	2390	22	81.9	1.0	2.4	0.0	4.1	8.0	3.6
Overall Caged	6258	59	80.4	1.1	2.7	0.1	4.1	5.3	7.5

Table 8: Accounting of the status of all hatched and unhatched eggs in evaluated *In situ* and Relocated Green nests for 2014.

Location	Total Eggs #	Eval Nests	Emerged (%)	LIN (%)	DIN (%)	Live PIP (%)	Dead PIP (%)	VD (%)	NVD (%)
<i>In situ Nests</i>									
Hillsboro Beach	3854	36	83.8	1.7	1.4	0.1	1.8	3.7	7.4
Pompano Beach	782	6	91.1	8.3	0.6	0.0	3.8	1.7	1.4
Ft Lauderdale Beach	3727	30	93.5	3.6	0.4	0.2	1.3	3.1	1.7
Overall <i>In situ</i>	8363	72	88.7	3.2	0.9	0.1	1.8	3.2	4.3
Relocated Nests									
Ft Lauderdale Beach	276	2	23.9	6.9	6.2	0.7	17.4	6.5	43.8
Overall Relocated	276	2	23.9	6.9	6.2	0.7	17.4	6.5	43.8

Table 9: Accounting of the status of all hatched and unhatched eggs in evaluated *In situ* and Relocated Leatherback nests for 2014.

Location	Total Eggs #	Eval Nests	Emerged (%)	LIN (%)	DIN (%)	Live PIP (%)	Dead PIP (%)	VD (%)	NVD (%)
<i>In situ Nests</i>									
Hillsboro Beach	1538	17	73.1	1.0	0.9	0.1	0.8	5.7	19.6
Pompano Beach	504	5	82.9	1.0	1.2	0.0	0.2	1.2	14.5
Ft Lauderdale Beach	185	2	88.1	0.0	1.6	0.5	0.0	2.7	7.6
Hollywood Beach	182	3	93.4	0.5	0.5	0.0	0.5	1.1	4.9
Overall <i>In situ</i>	2409	27	77.83	0.9	1.0	0.1	0.5	4.2	16.5
Relocated Nests									
Ft Lauderdale Beach	158	2	47.6	5.7	0.0	0.0	5.1	1.9	46.2
Overall Relocated	158	2	47.6	5.7	0.0	0.0	5.1	1.9	46.2

Table 10: Nesting success of loggerhead, green and leatherback turtles in relation to beach renourishment projects.

Project	Loggerhead			Green			Leatherback		
	Nests	FC	NS	Nests	FC	NS	Nests	FC	NS
Hillsboro/Deerfield	346	317	52.19%	7	17	29.17%	1	3	25.00%
Hillsboro Inlet	3	2	60.00%	0	0	NA	0	0	NA
FCCE	581	534	52.11%	7	20	25.93%	9	0	100.00%
A1A	32	37	46.38%	1	5	16.67%	0	0	NA
OVERALL	962	890	51.94%	15	42	26.32%	10	3	76.92%

Table 11: Reproductive success of loggerhead, green and leatherback turtles in relation to beach renourishment projects.

Project	# Eggs	# Eval Nests	Hatchlings Released	Release Success %	Uneval Nests
Hillsboro/Deerfield					
Loggerhead	21154	247	17600	77.9	99
Green	572	5	523	88.3	2
Leatherback	90	1	44	48.9	0
Hillsboro Inlet					
Loggerhead	225	2	116	51.6	1
FCCE					
Loggerhead	49781	490	44242	88.8	91
Green	782	6	723	91.1	1
Leatherback	504	5	418	83	4
A1A					
Loggerhead	2916	27	2339	80.2	5

Figure 1A-F: Location of Broward County and 2014 Survey Zones
Figure 1A: 2014 Survey Zones



Figure 1B: 2014 Survey Zones



Figure 1C: 2014 Survey Zones

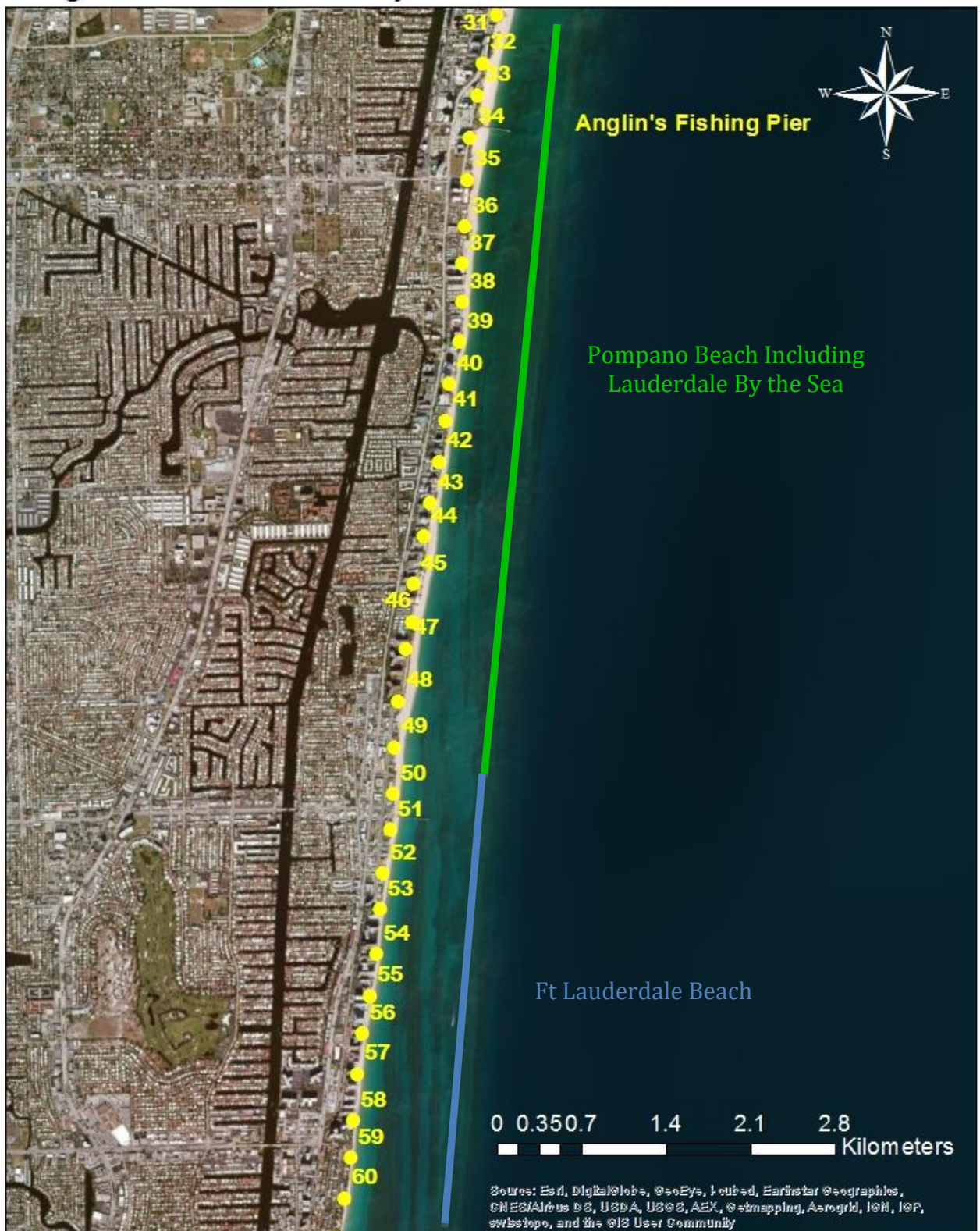


Figure 1D: 2014 Survey Zones



Figure 1E: 2014 Survey Zones



Figure 1F: 2014 Survey Zones

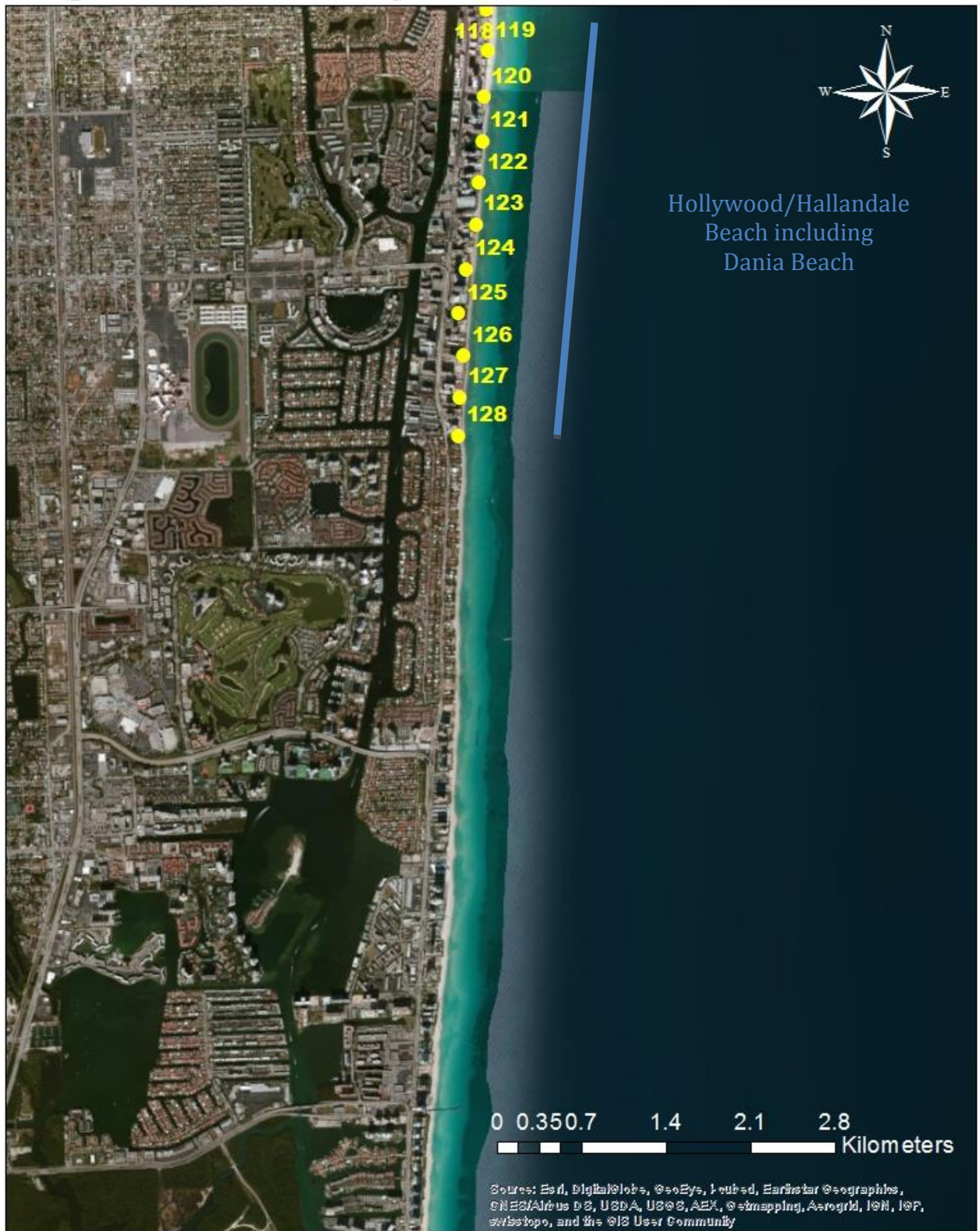


Figure 2A-R: Location of 2014 Treatment Zones: Red dots = Loggerhead nests, Green dots = Green nests, Blue dots = Leatherback nests.

Figure 2A: 2014 Treatment Zones



Figure 2B: 2014 Treatment Zones

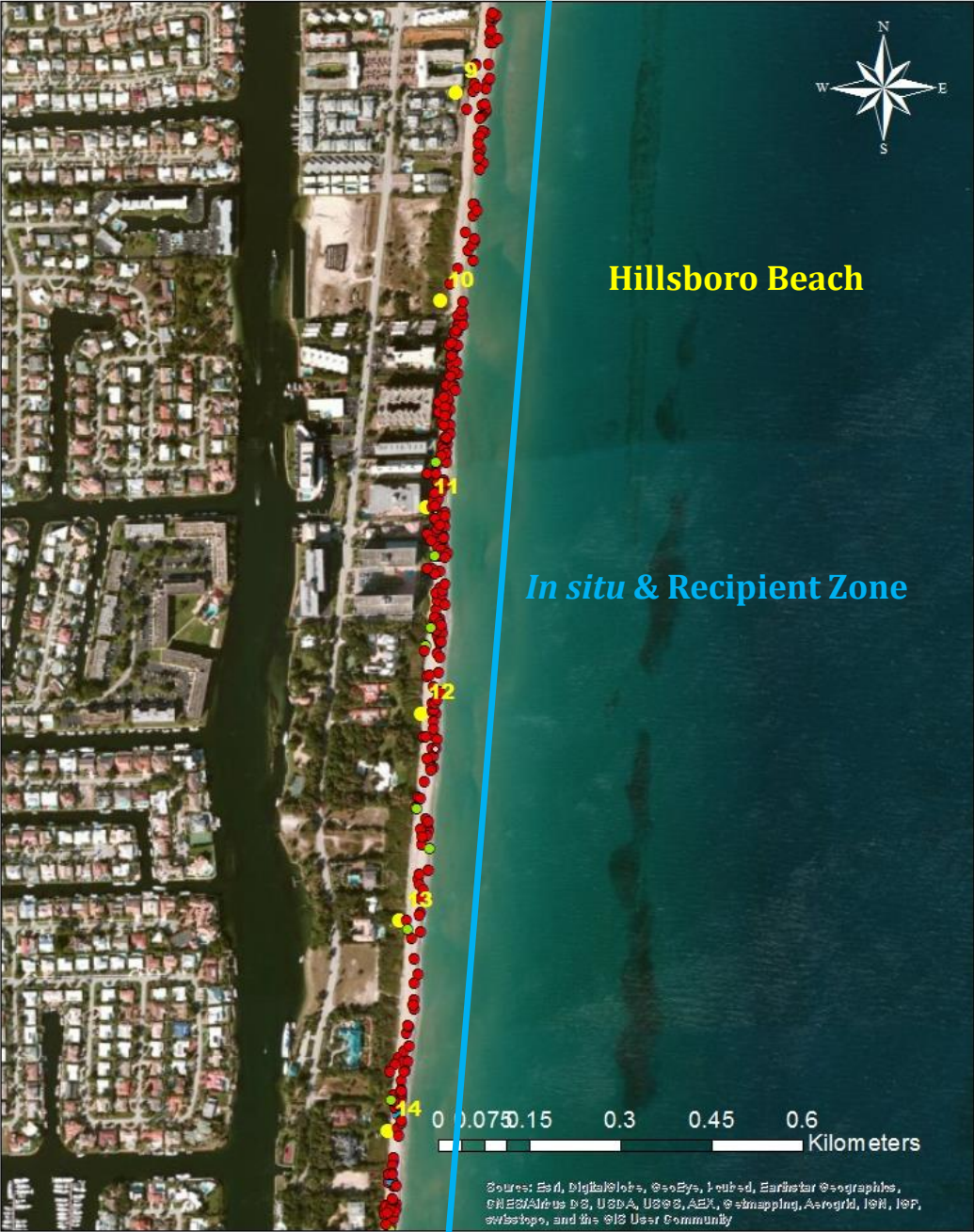


Figure 2C: 2014 Treatment Zones



Figure 2D: 2014 Treatment Zones



Figure 2E: 2014 Treatment Zones



Figure 2F: 2014 Treatment Zones

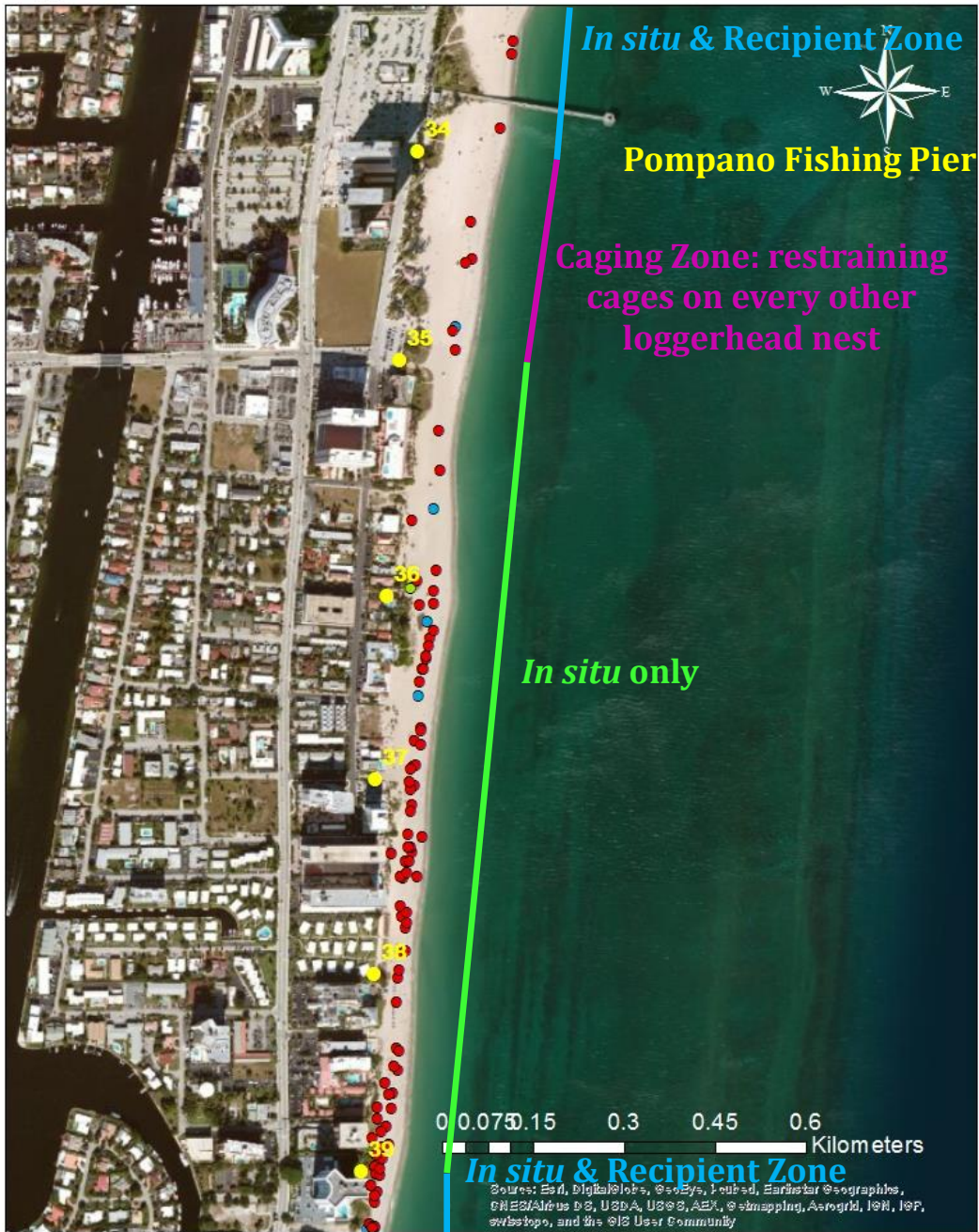


Figure 2G: 2014 Treatment Zones



Figure 2H: 2014 Treatment Zones



Figure 2I: 2014 Treatment Zones



Figure 2J: 2014 Treatment Zones



Figure 2K: 2014 Treatment Zones



Figure 2L: 2014 Treatment Zones



Figure 2M: 2014 Treatment Zones



Figure 2N: 2014 Treatment Zones



Figure 20: 2014 Treatment Zones



Figure P: 2014 Treatment Zones



Figure 2Q: 2014 Treatment Zones



Figure 2R: 2014 Treatment Zones



Figure 2S: 2014 Treatment Zones



Figure 2T: 2014 Treatment Zones

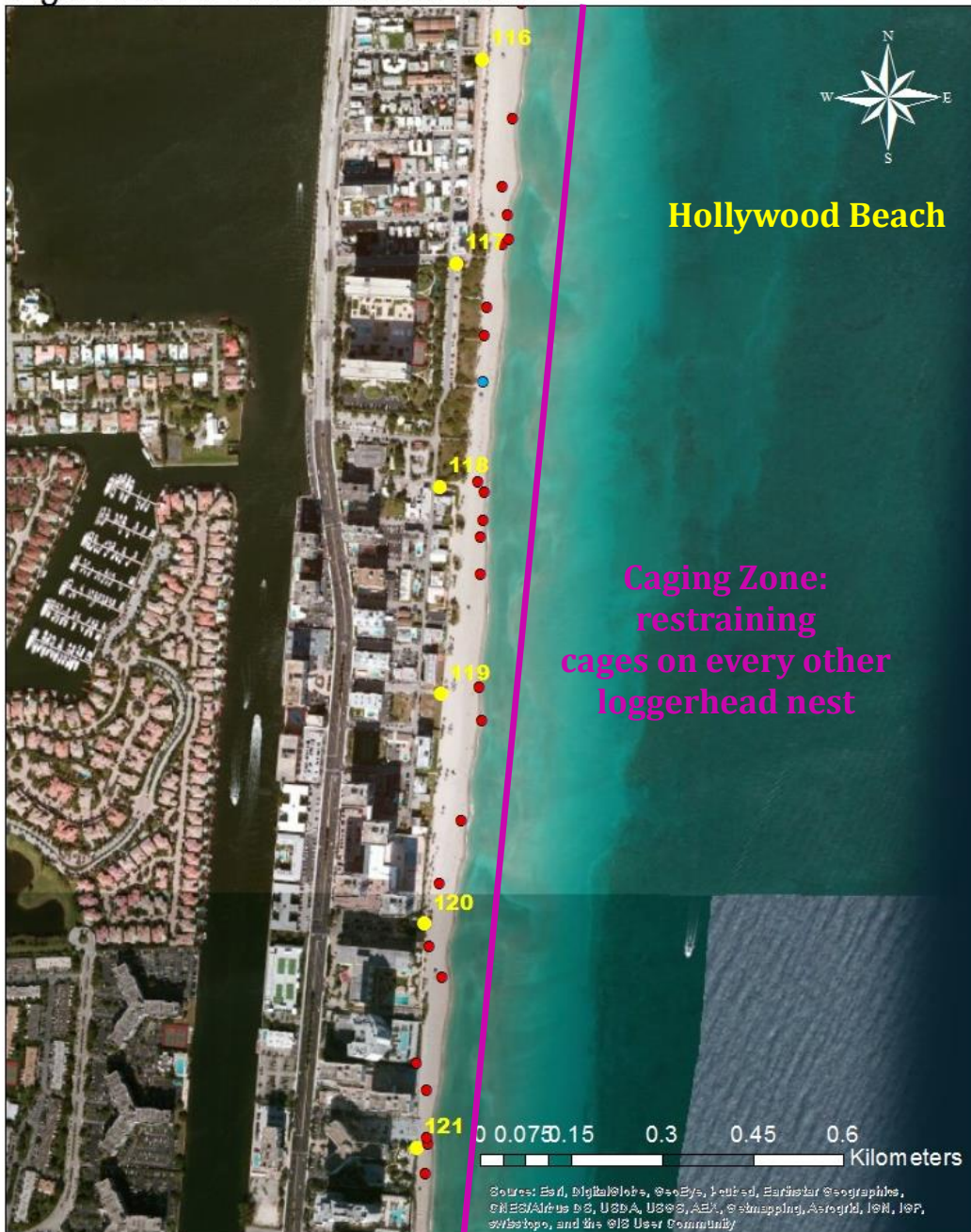


Figure 2U: 2014 Treatment Zones



Figure 2V: 2014 Treatment Zones

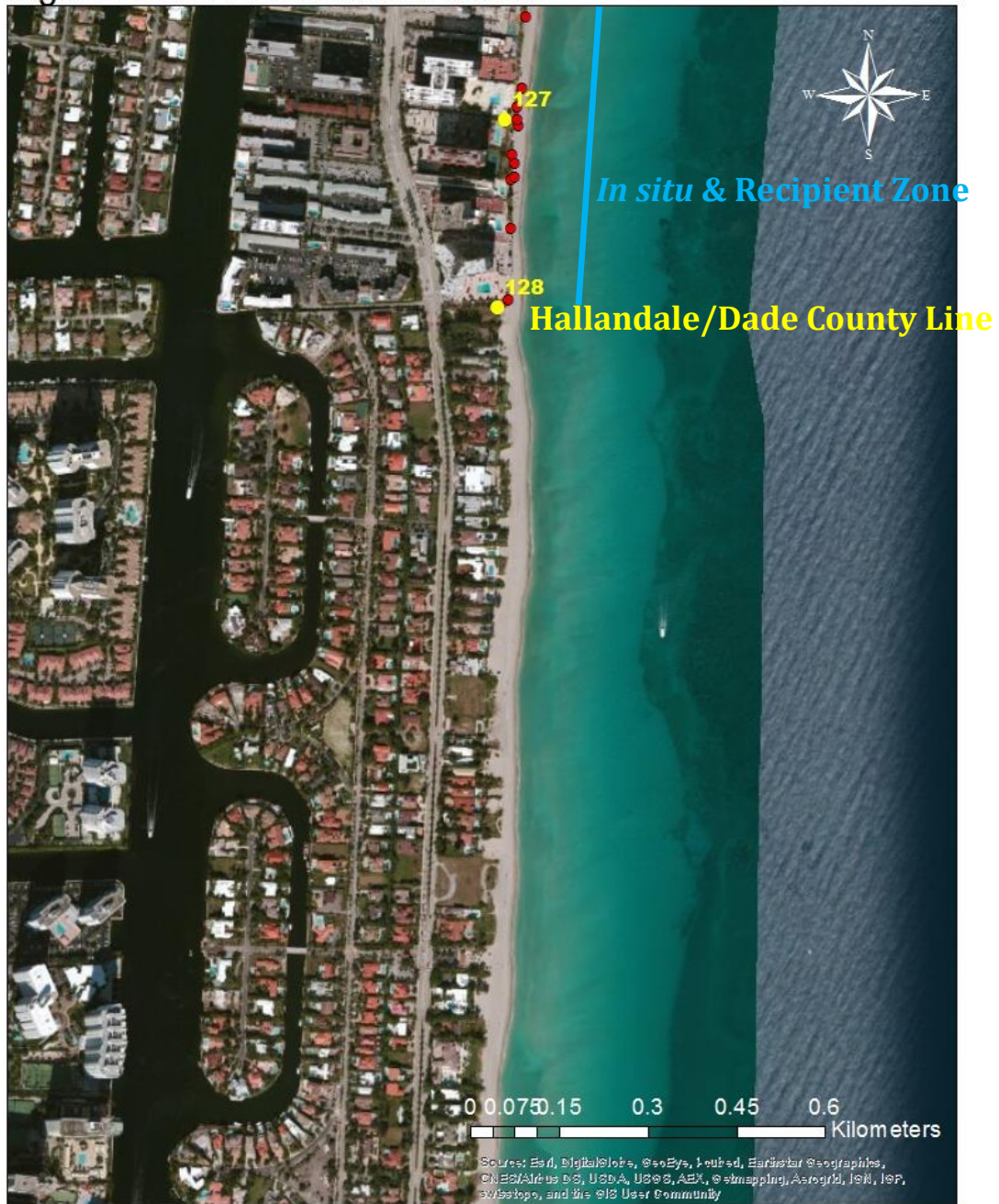


Figure 3: Total number of nests and false crawls, all species combined for Broward County (2000-2014)

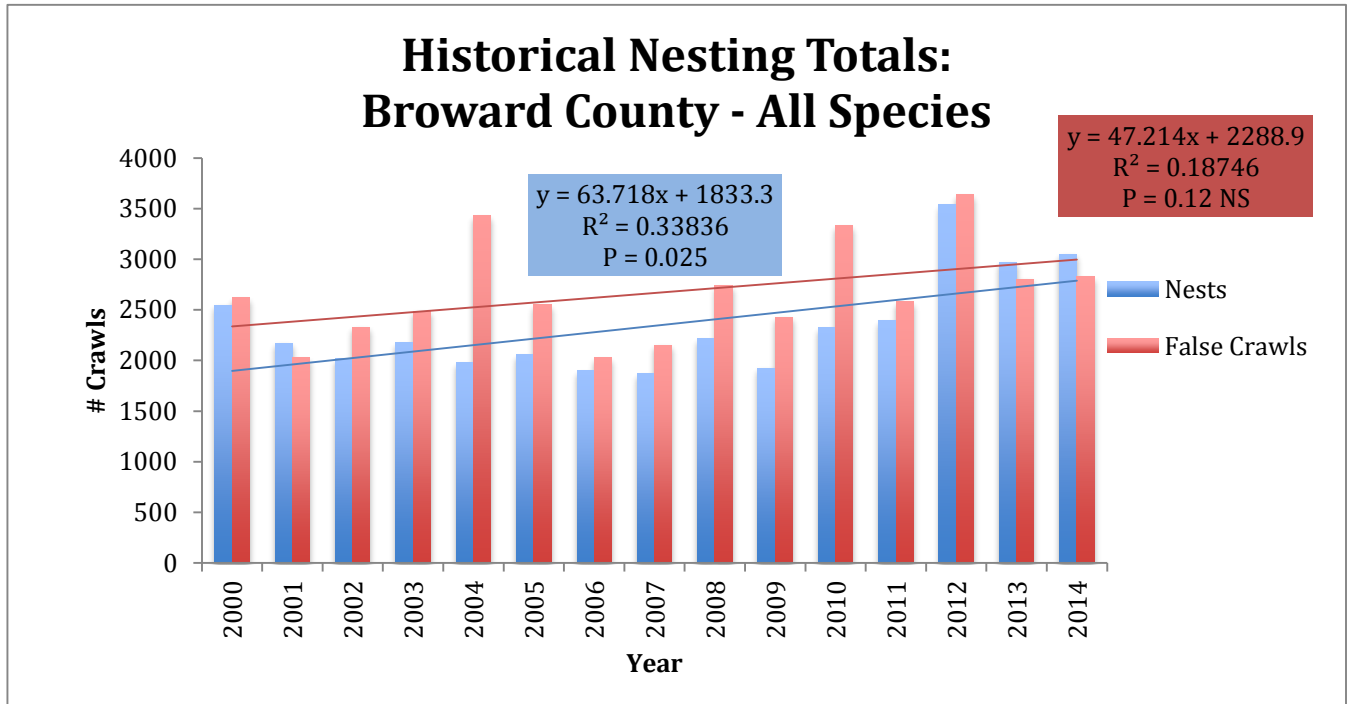


Figure 4: Nesting success in percentages, all species combined for Broward County (2000-2014)

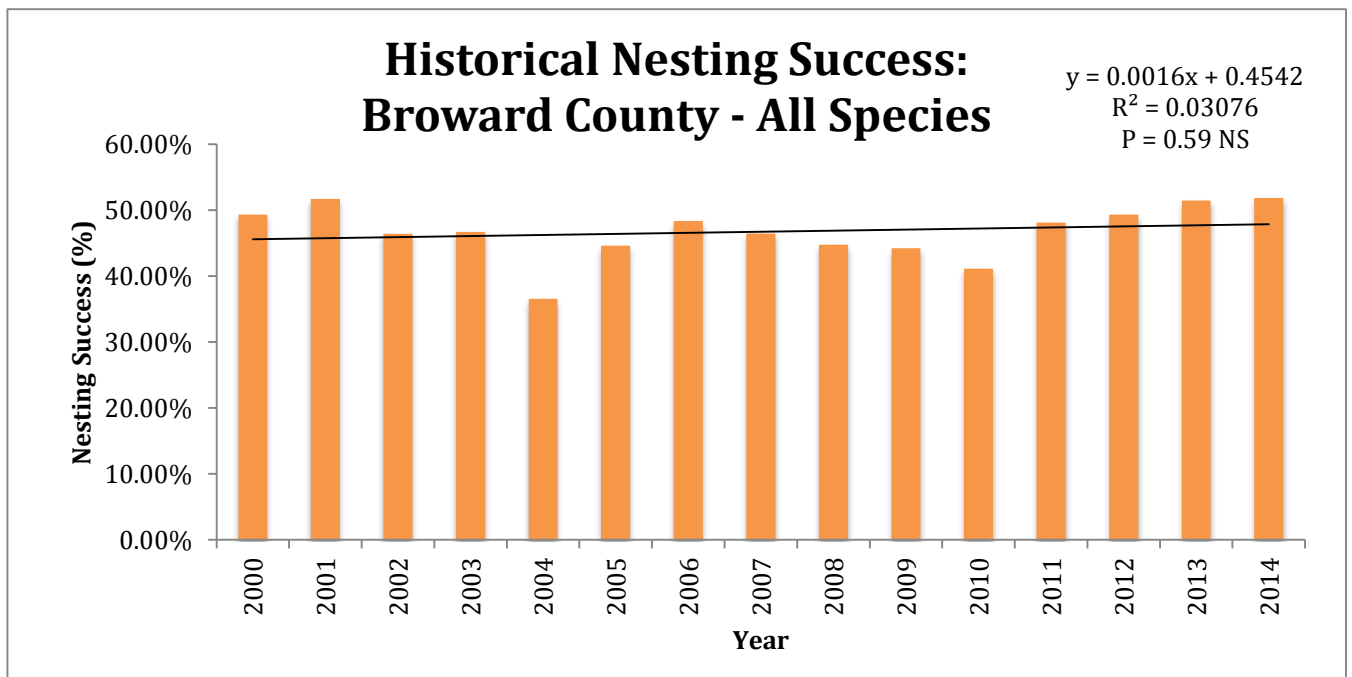


Figure 5: Number of nests laid per day in Broward County, Florida by species.

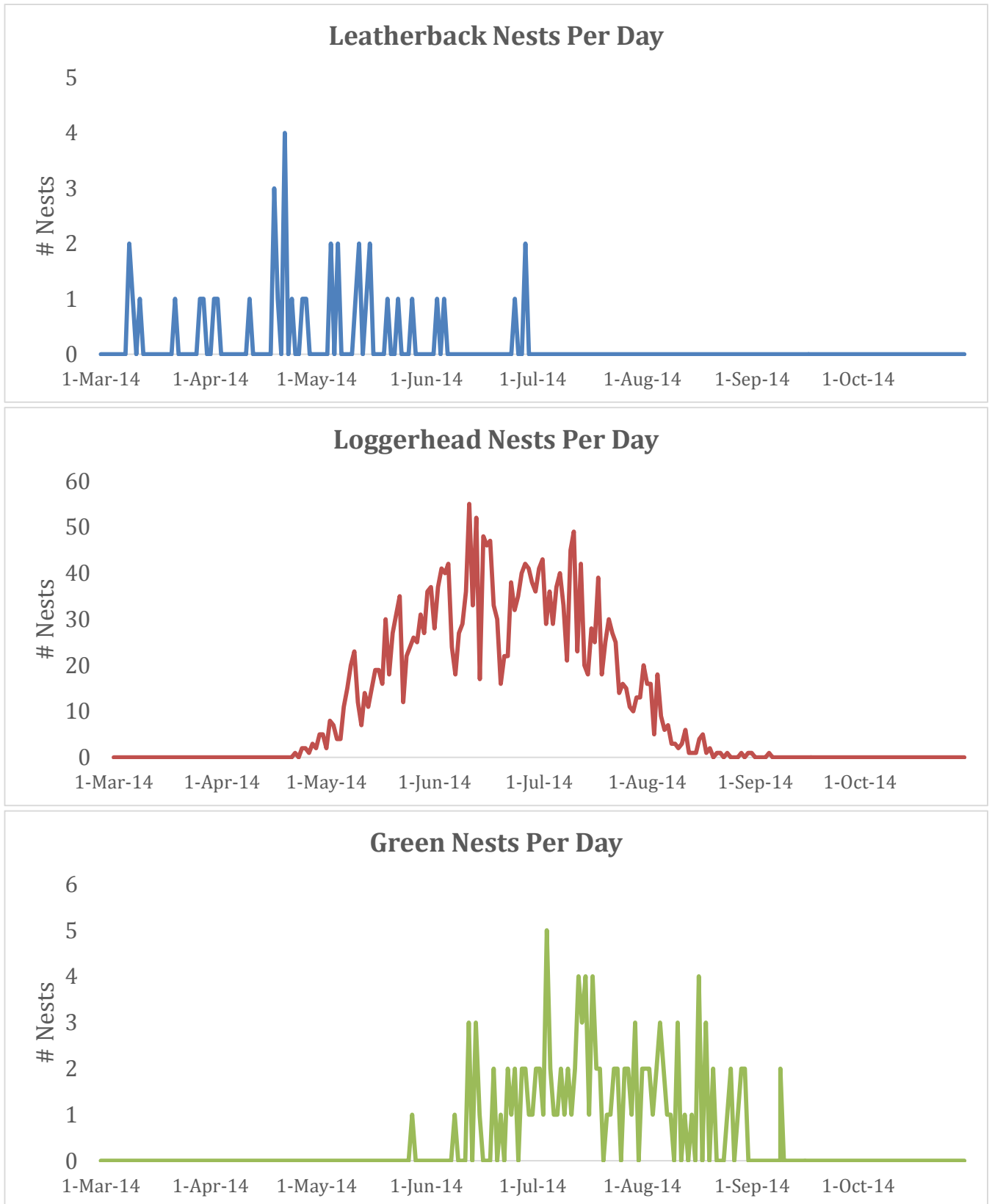


Figure 6: Historical nesting success in Broward County by species from 2000 – 2014.

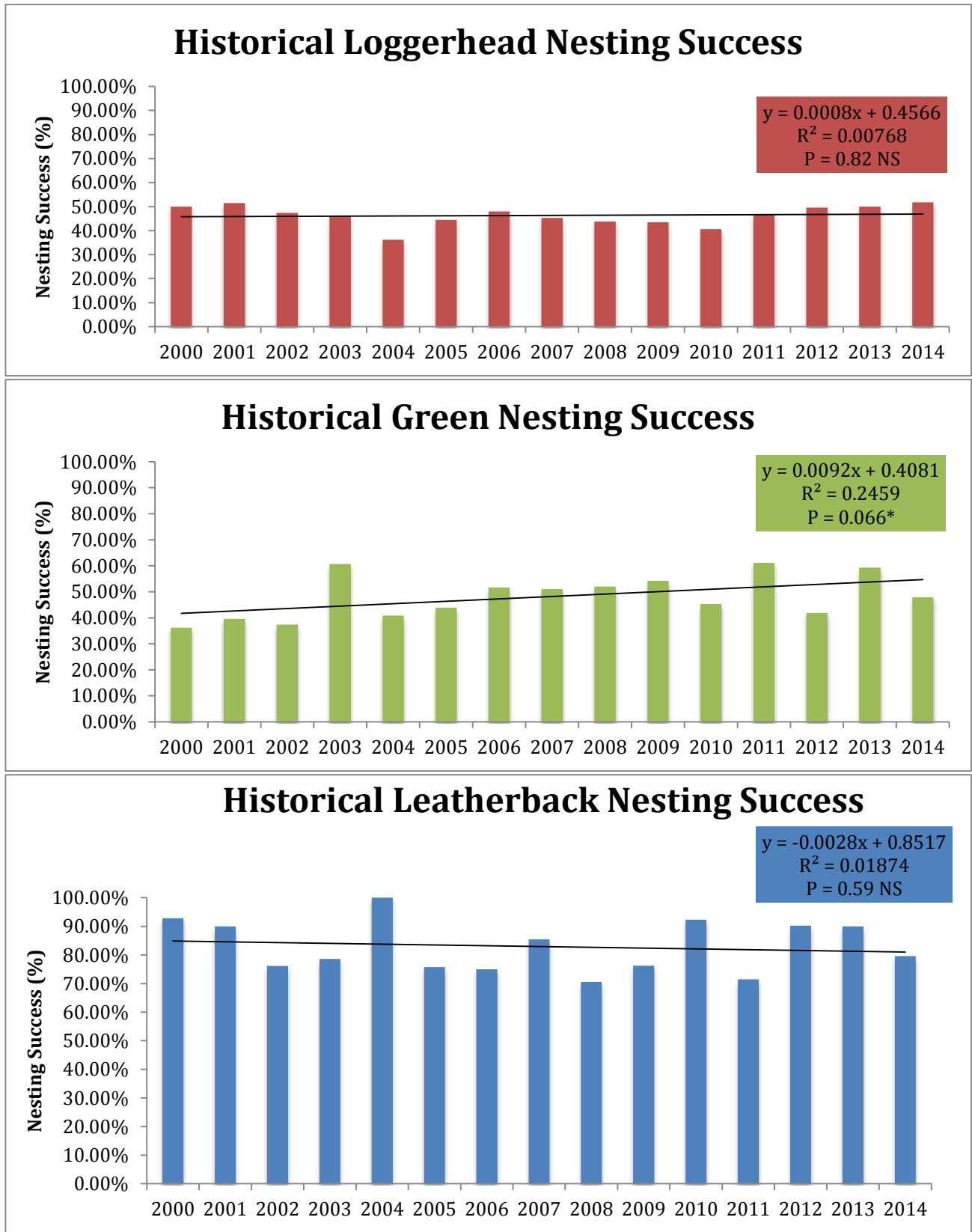


Figure 7: Historical nest activity in Broward County by species from 1981 – 2014.

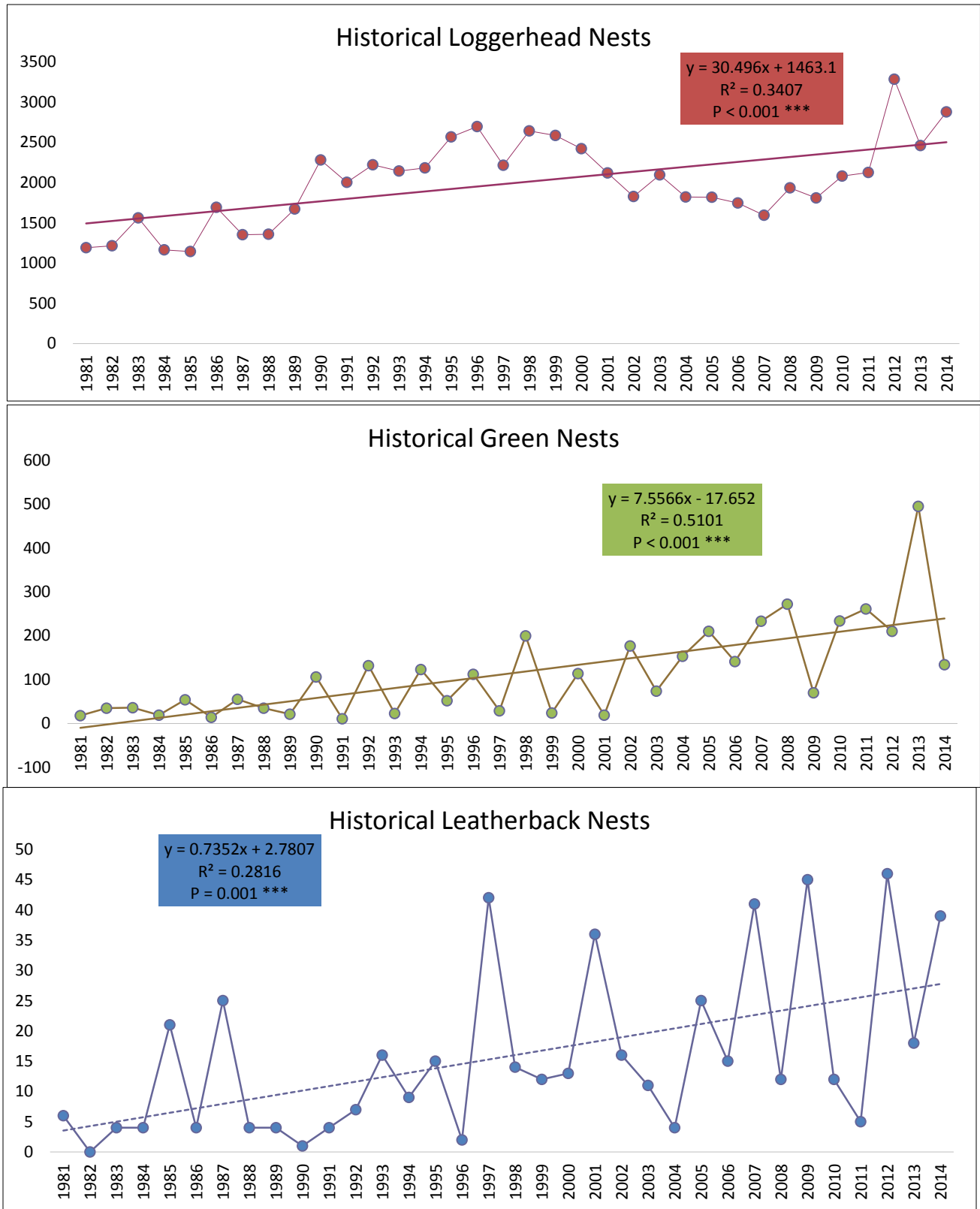


Figure 8: Historical Nest Relocation Activity – All Broward County (Except John U Lloyd)

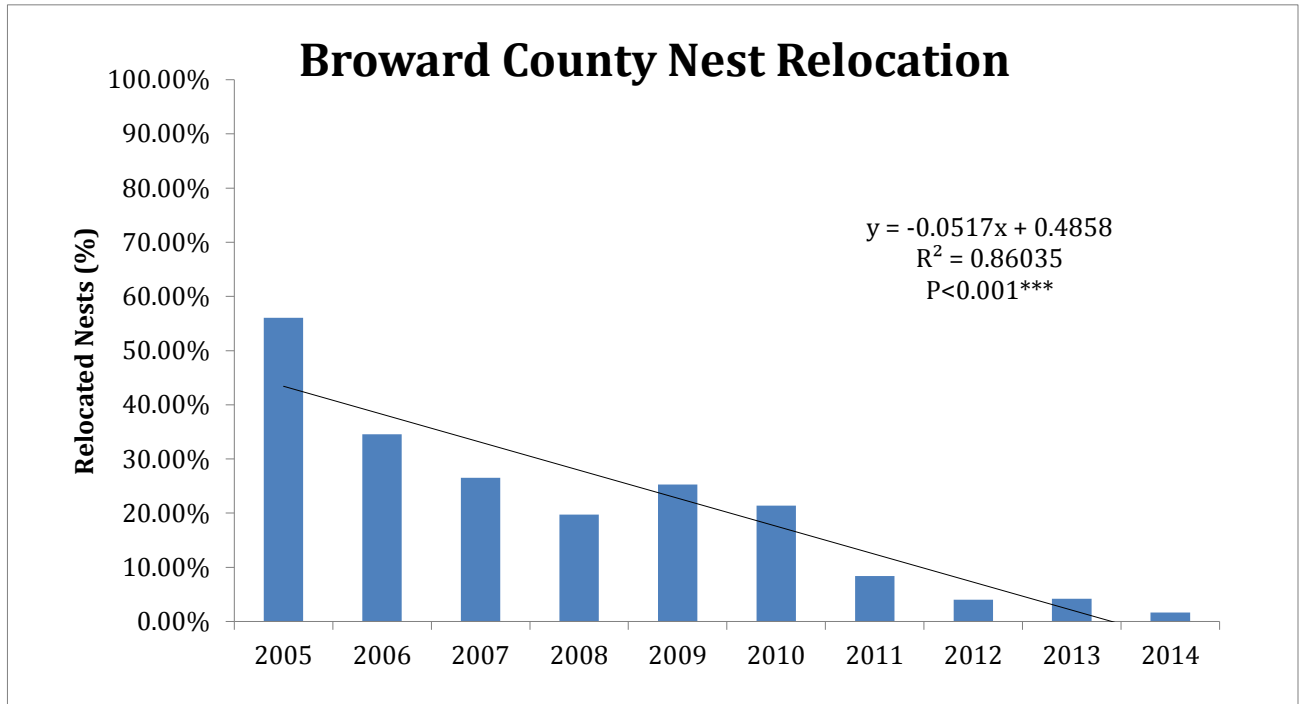


Figure 9: Historical Disorientation Reporting by the BCSTCP – All Broward County (Except John U Lloyd)

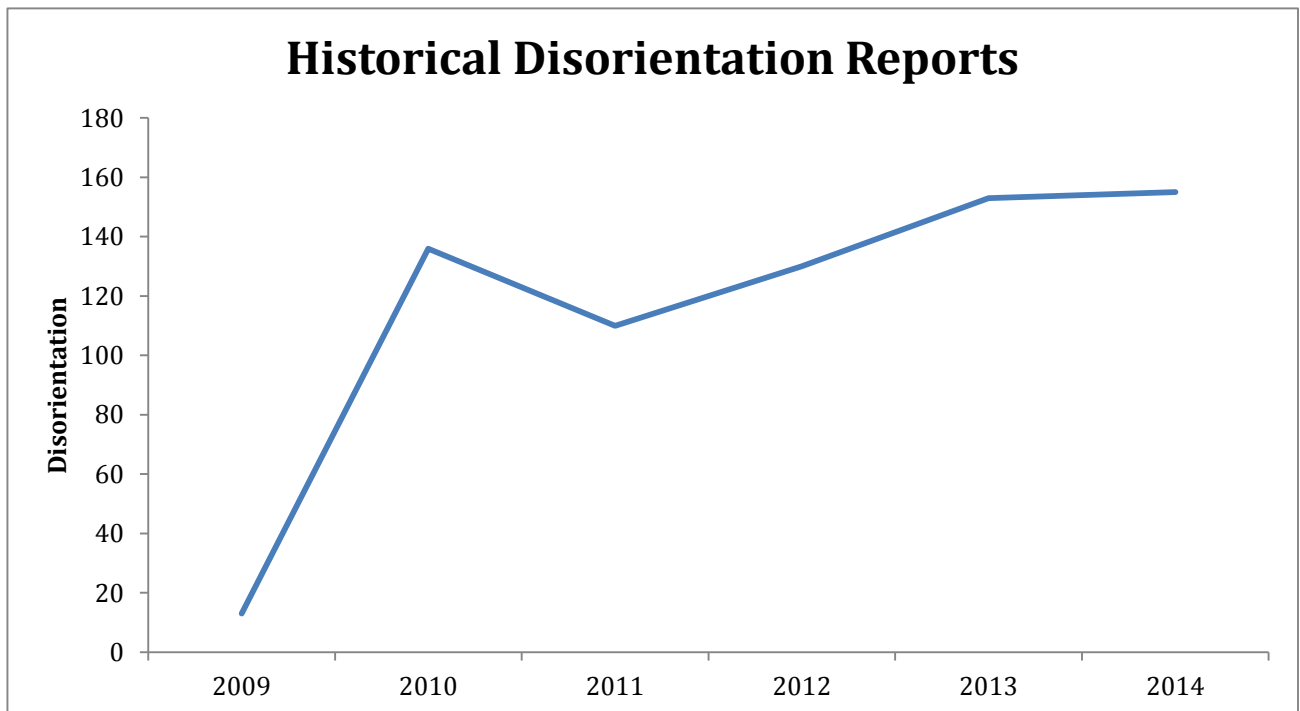


Figure 10: Percentage of nests that experienced predation in the Hillsboro Survey Zone, all species combined.

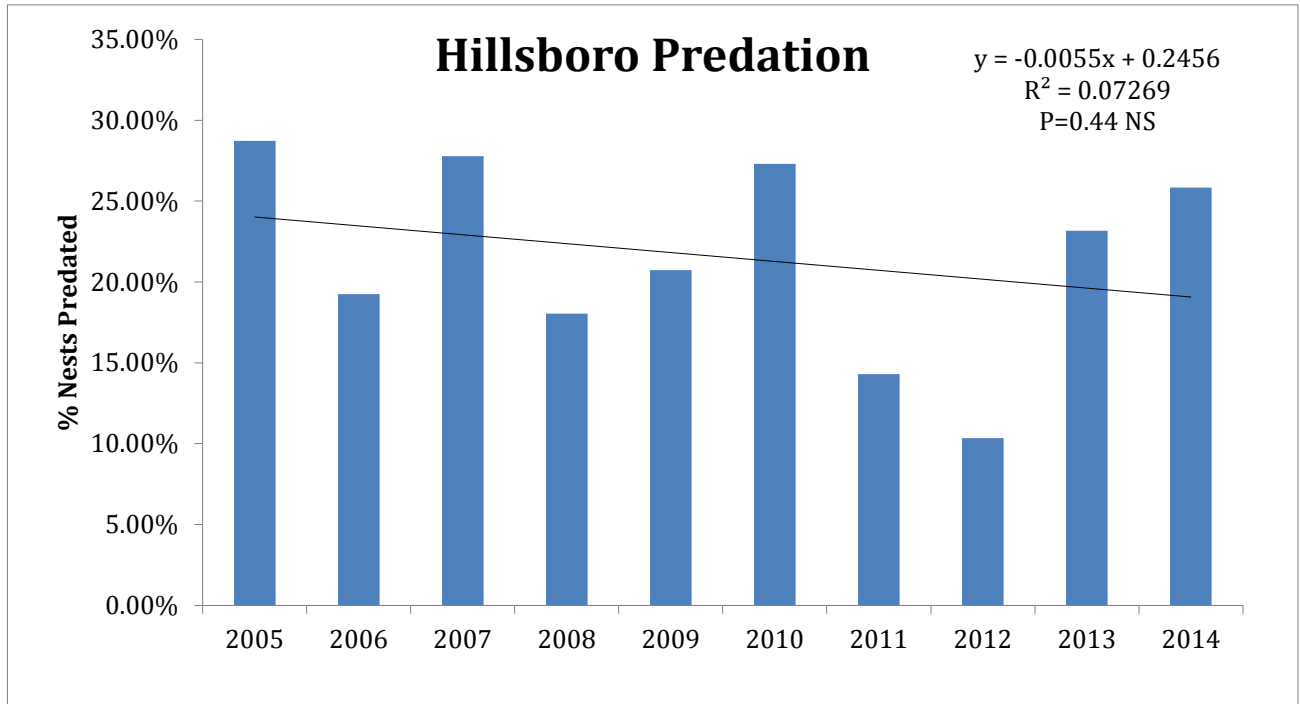


Figure 11: Percentage of nests that experienced predation in Broward County, all species and survey zones combined.

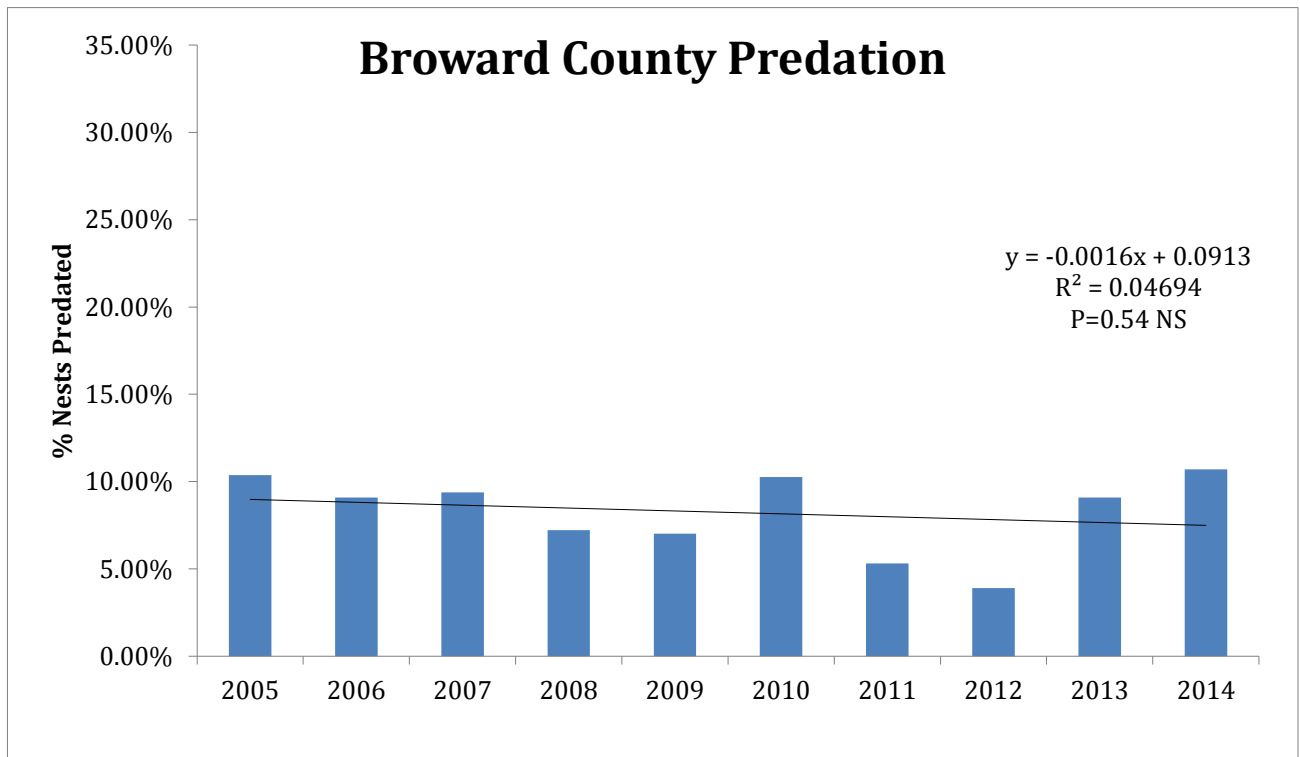
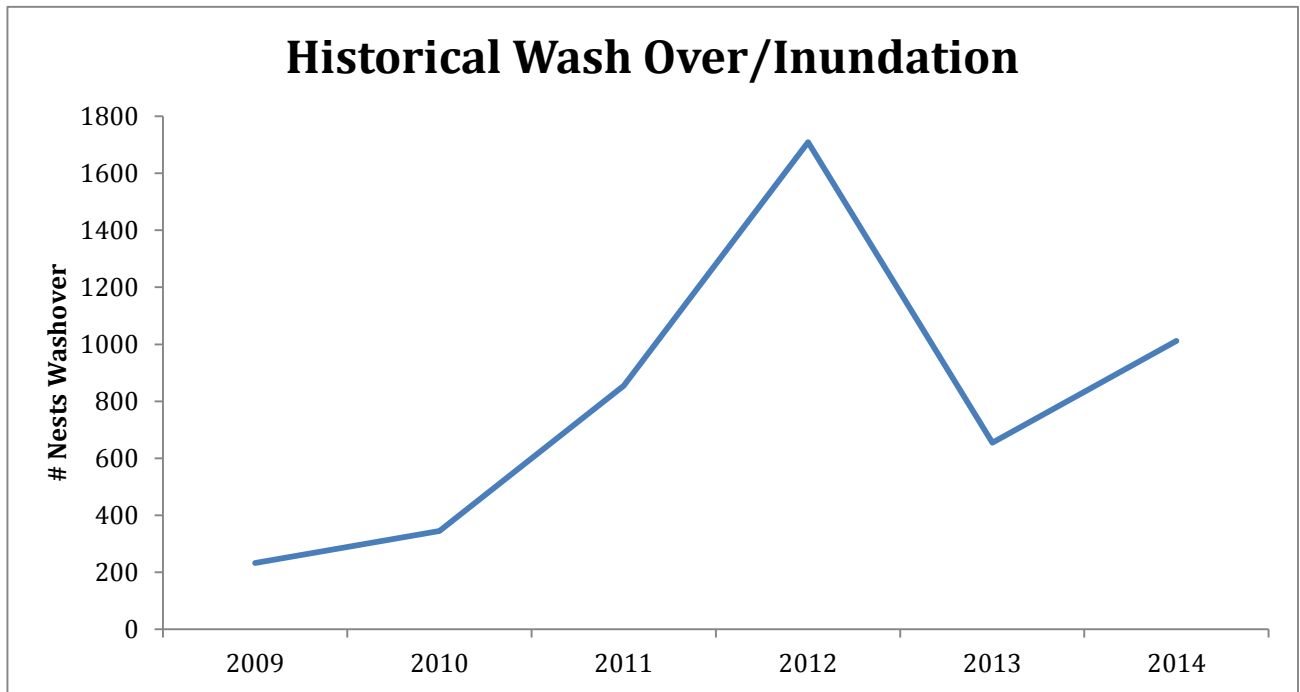


Figure 12: Historical Nest Washover/Inundation – All Broward County (Except John U Lloyd)



Appendix 1a: Summary of Sea Turtle Strandings and Emergency Line Calls

The Broward County Sea Turtle Conservation Program's Stranding Team responded to 40 stranding events from January 1, 2014 to November 23, 2014. Of these 26 turtles (17 *Chelonia mydas*, 3 *Caretta caretta*, 2 *Eretmochelys imbricata*) were dead upon arrival (1 possible poaching, 10 boat strike, 15 unknown cause of death), 2 of these were collected and frozen for use in a future FWC necropsies. The remaining dead stranded turtles were either buried on or just off the beach, or if in the water, or too large to move, they were marked (painted) so that we knew they were accounted for.

Fourteen stranding responses were for live turtles. We had 2 – Hawksbill sea turtles (*Eretmochelys imbricata*), 4 – Loggerhead sea turtles (*Caretta caretta*), and 8 – Green sea turtles (*Chelonia mydas*). Of these; 2 were transported to Miami Seaquarium in Miami, Florida; two were transported to the Sea Turtle Hospital in Marathon, Florida; and 8 were taken to Gumbo Limbo Nature Center in Boca Raton, Florida for treatment and rehabilitation.

An Emergency Response line is monitored 24 hours a day throughout the year to provide a contact point for anyone who finds a sea turtle in distress.

Summary of Sea Turtle Emergency Line Use:

Call Subject	Number Calls
Live Strandings	14
Total Strandings	40
Disorientations	36
Caging Inquiries	20
Nest Locations	40
Non-Emergency Inquiries	80
OVERALL	230

Appendix 1b: Example Sea Turtle Stranding Report

SEA TURTLE STRANDING AND SALVAGE NETWORK – STRANDING REPORT

OBSERVER'S NAME
 First Curtis M.I. J Last Slagle
 E-mail _____
 Affiliation Broward County Sea Turtle Conservation Program

 (Area code) Phone number _____

STRANDING DATE:
 Year 2014 Month 05 Day 30
 Turtle number by day 011

State coordinator must be notified within 24 hrs;
 this was done by phone (561)575-5407
 email fax (561)743-6228
 FWC • • • • • Alert Hotline 1-888-404-3922

SPECIES: (check one)
 CC = Loggerhead
 CM = Green turtle
 DC = Leatherback
 EI = Hawksbill
 LK = Kemp's ridley
 LO = Olive ridley
 UN = Unidentified
Check unidentified if not positive. Do not guess.

Photos taken? Yes No
 Species verified by state coordinator? Yes No

SEX: (check one)
 Immature, undetermined
 Female Male
 How was sex determined?
 Necropsy
 Tail length (adult only)
 Length of tail beyond carapace _____ cm/in

STRANDING LOCATION: Offshore (Atlantic or Gulf beach) Inshore (bay, river, sound, inlet, etc)
 State Florida County Broward
 Descriptive location (be specific) 11 & 45 NE 21st Ave, Deerfield, FL
Deerfield Lifeguard Stand #3

 Latitude 26. Longitude -80.

CONDITION: (check one)
 0 = Alive
 1 = Fresh dead
 2 = Moderately decomposed
 3 = Severely decomposed
 4 = Dried carcass
 5 = Skeleton, bones only

FINAL DISPOSITION: (check one)
 1 = Left on beach where found; painted? Yes* No(5)
 2 = Buried: on beach / off beach;
 carcass painted before buried? Yes* No
 3 = Salvaged: all / part(s), what/why? _____

 4 = Pulled up on beach/dune; painted? Yes* No
 6 = Alive, released
 7 = Alive, taken to rehab. facility, where? _____
 8 = Left floating, not recovered; painted? Yes* No
 9 = Other, explain _____

 *If painted, what color? _____

TAGS: Contact state coordinator before disposing of any tagged animal!!
 Flipper tags present at stranding? Yes No
 If so, has CMTTP been notified? Yes No
Check all 4 flippers. If found at stranding, record tag number(s)/tag location/return address

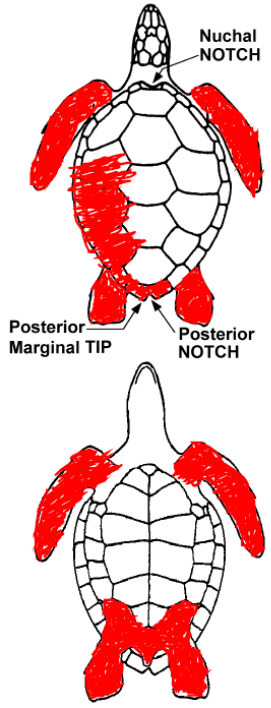
PIT tag scan? Yes No
Check all 4 flippers. If PIT tag found at stranding record id/tag location

 Checked for living tag? Yes No
 If found, record location (scute number & side)

.....
 Fibropapilloma-like tumors present? Yes No
 FP documentation form attached? Yes No

CARAPACE MEASUREMENTS: (see drawing)
Using calipers Choose unit
 Straight length (NOTCH-TIP) _____ cm/in
 Minimum length (NOTCH-NOTCH) _____ cm/in
 Straight width (Widest Point) _____ cm/in
Using non-metal measuring tape Choose unit
 Curved length (NOTCH-TIP) 101.5 cm
 Minimum length (NOTCH-NOTCH) 101.0 cm
 Curved width (Widest Point) 94.0 cm

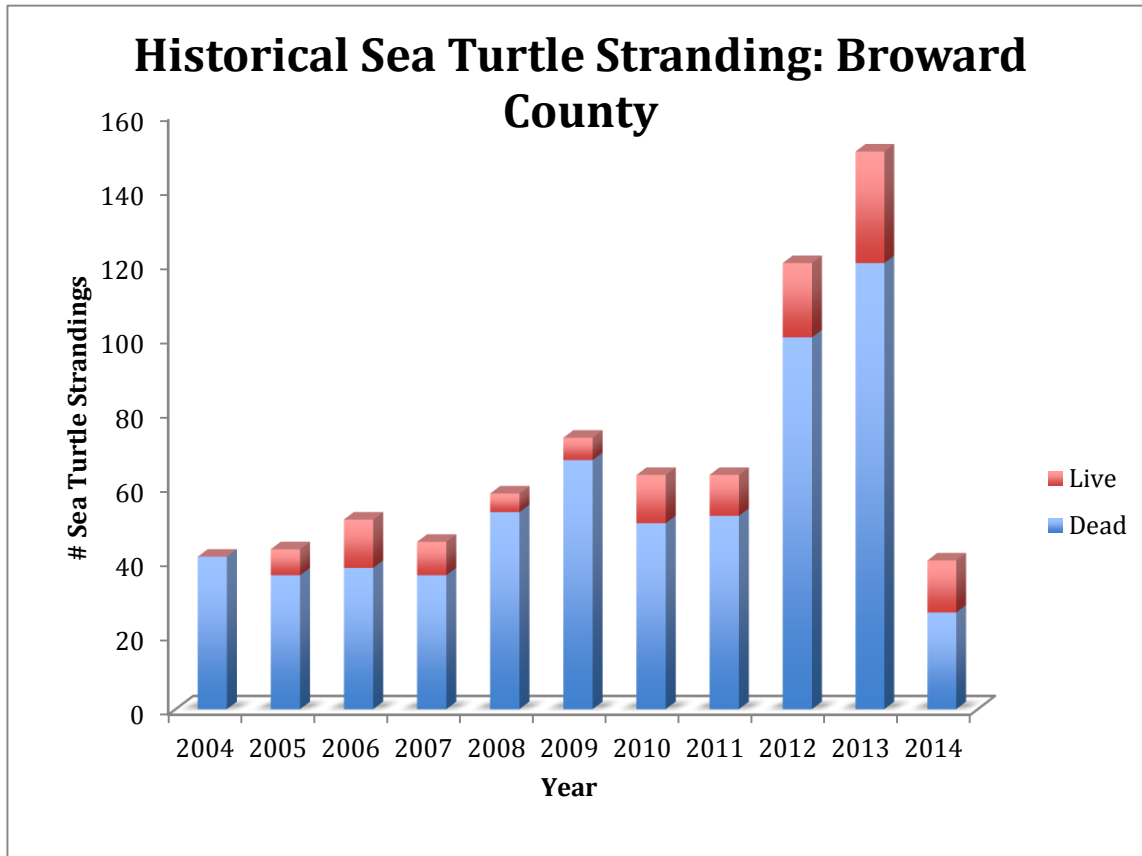
 Weight actual / est. 120 lb



Mark wounds or abnormalities on diagrams at left and describe below (note tar or oil, gear or debris entanglement, propeller damage, epibiota, papillomas, emaciation, etc.). **Please note if no wounds or abnormalities were found.** If released, note if new tags were applied.

All flippers missing
Possible boat strike on left side of carapace with damage to left lateral scutes

Appendix 1c: Historical Sea Turtle Stranding: Broward County



Sea turtle stranding numbers have been relatively stable over the last 10 years generally staying around 40-65 strandings each year. However 2012 and 2013 both proved to be exceptionally high years with 120 and 150 strandings per year respectively. These large years greatly skew the “5-year average” which is why a longer history is shown here.

Appendix 2: Summary of Education/Outreach Activities

Marine turtles have a strong presence on the beaches of Broward County, Florida and thus within the community. One of the goals of the NSU, Broward County Sea Turtle Conservation Program is to provide engaging educational/outreach opportunities to the general public and especially students to bring awareness to individuals, businesses, beach users, and coastal residents to try to nurture stewardship towards a more suitable environment for these important animals.

Educational flyers were distributed throughout the season to interested parties on the beach, at turtle talks, school visitations, and hatchling releases. To date in 2014, the NSU BCSTCP Presentation Team has conducted a total of 65 education/outreach events connecting with over 10,000 individuals! From June 14, 2014 – September 6, 2014 we conducted 39 turtle talks (PowerPoint Presentation) that were followed by a public Hatchling Release with groups including: Anne Kolb Nature Center, Boy Scouts of America, Girl Scouts of America, Saltwater Studies, Buzzy Kids Inc., Shepherd of the Coast Lutheran, Broward Shell Club, Hillsboro Club, Northeast High School STEAM Research Club, NSU Nature Club, Women's International Shipping & Trading Association (WISTA), Museum of Discovery & Science, The Wave, American Heritage Science Adventure Camp, Florida Marine Aquarium Society Club, Hillsboro Police Department, and Family Groups.

An additional 18 turtle education seminars (PowerPoint Presentation) were also conducted between March 14, 2014 and October 29, 2014 at/with the following locations/groups:

- 1) Driftwood Middle School (Career Day) – March 14, 2014
- 2) Girl Scout Troop 10766 – April 9, 2014
- 3) Royal Palm Elementary School (Career Day) – May 9, 2014
- 4) American Heritage Science Adventure Camp – June 20 & July 18, 2014
- 5) Shalom Preschool Chabad – June 23, 2014
- 6) Bayview Elementary School – June 26, 2014
- 7) Northwest Regional Library Summer Program – June 26, 2014
- 8) Lafayette Hait Park Buddies – July 1 & 3, 2014
- 9) IGFA Summer Camp – July 8 & August 12, 2014
- 10) Camp Wild – July 24, 2014
- 11) Sherman Library – July 29 & 30, 2014
- 12) Orange Brook Elementary School – September 4, 2014
- 13) Glades Middle School (Career Day) – October 29, 2014

Lastly, our team participated in 8 Table Events between March 1, 2014 and November 16, 2014 where specimens could be examined, information handouts, brochures, door hangers, table tents and activity books were disseminated to event/festival goers:

- 1) Gumbo Limbo Nature Center Sea Turtle Day – March 1, 2014
- 2) Tortuga Music Festival Conservation Village – April 12-13, 2014
- 3) Friends of Anne Kolb Starbucks Community Night – May 16, 2014
- 4) Higher Education Block Party, NSU Museum of Art – October 16, 2014
- 5) Royal Palm Elementary School – October 30, 2014
- 6) Flamingo Gardens SwampFest – November 15-16, 2014

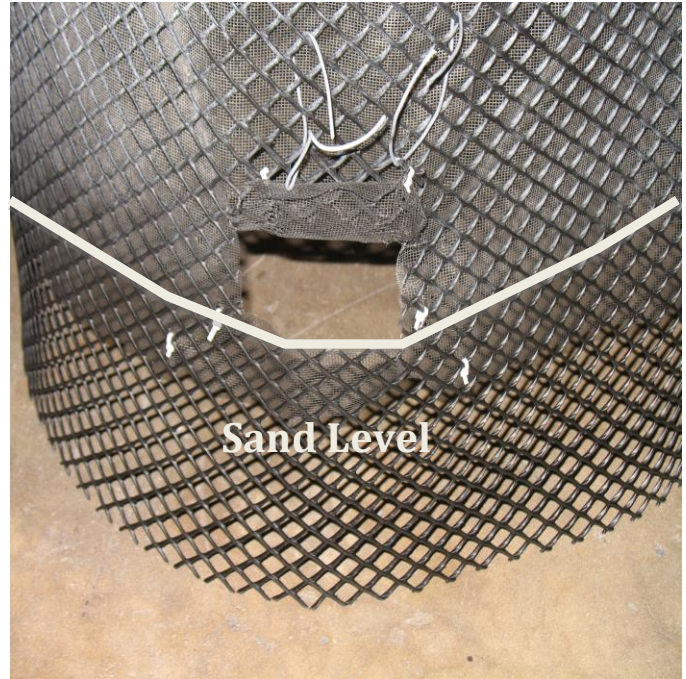
Appendix 3: Sea turtle nest warning sign

Sign affixed to all sea turtles nests in Broward County, Florida. Black lettering on yellow background. Size: 5.5" X 8.5".



Appendix 4: Sea Turtle Enclosure Cage and Sign

4A: Sea Turtle Hatchling Enclosure Cage Design with Escape Door



4B: Enclosure Cage Informational Sign 8.5x11 - (Affixed to each cage)



Appendix 5: Blank FWC Marine Turtle Disorientation Report

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

FWC MARINE TURTLE DISORIENTATION REPORT

If you have any questions, please contact FWC at the Tequesta Field Laboratory (561) 882-5975

Fax reports to: (561) 743-6228 or Email reports to: SeaTurtleLighting@MyFWC.com

Send reports to: Disorientation Reports, FWC, 19100 SE Federal Highway, Tequesta, FL 33469

Marine Turtle Permit #: _____ Date of Incident: _____

Observer's Name: _____

Telephone (include area code): _____ E-mail address: _____

Location of Disorientation Event: (address, beach name and/or nearest landmark): _____

City: _____ County: _____

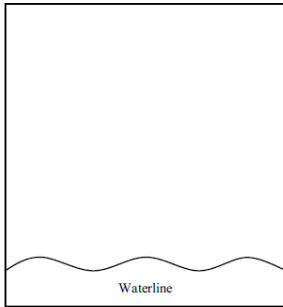
Local nest ID#: _____ Zone nest was located in: _____

Nest GPS Coordinates (use decimal degrees: i.e., Lat 26.845412 Long -80.458796):

Latitude: _____ Longitude: _____

SPECIES: (check one) <input type="checkbox"/> Cc = Loggerhead <input type="checkbox"/> Cm = Green Turtle <input type="checkbox"/> Dc = Leatherback <input type="checkbox"/> Un = Unidentified <input type="checkbox"/> O = Other _____	TYPE OF EVENT: (check one) <input type="checkbox"/> Adult – Nesting Emergence <input type="checkbox"/> Adult – False Crawl <input type="checkbox"/> Hatchling	NEST TREATMENT: (check all used) <input type="checkbox"/> Restraining Cage <input type="checkbox"/> Self-releasing Screen/Cage <input type="checkbox"/> Light Barrier (i.e., silt screen) <input type="checkbox"/> Relocated
--	---	---

Incident was documented during: (check one) Morning Survey Night Survey Daytime



Was the incident photographed? YES NO

Was the source nest found? YES NO

Was the nest excavated? YES NO

If "YES" report date of excavation: _____

Number of turtles disoriented:
 1
 2-10
 11-50
 >50

Disoriented turtles reaching the water:
 All
 Some
 None
 Not investigated

Were any disoriented turtles found dead? YES NO

If "YES" indicate the number: _____

Addresses/landmarks turtle(s) disoriented towards: _____

Were probable/possible light source(s) identified? YES NO

If "NO" indicate why: (check one) No lights present Too many lights Other: _____

Indicate categories of light(s) identified as probable/possible lighting sources: (check all that apply)

- | | | |
|---|--|---|
| <input type="checkbox"/> parking lot | <input type="checkbox"/> street light | <input type="checkbox"/> condominium (interior) |
| <input type="checkbox"/> dune crossover | <input type="checkbox"/> single family home (interior) | <input type="checkbox"/> condominium (exterior) |
| <input type="checkbox"/> restaurant/bar | <input type="checkbox"/> single family home (exterior) | <input type="checkbox"/> sky glow/urban glow |
| <input type="checkbox"/> pier | <input type="checkbox"/> sign | <input type="checkbox"/> other: _____ |

Additional comments (use back if necessary): _____

Local authority provided a copy of this report: City County FWC Other: _____

Signature of Observer

Date

Appendix 7: Lighting Survey Lighting Examples

Cobra: Streetlights pretty bright look like a cobra head



Acorn: Normally streetlights look like acorns sometimes turtle friendly with amber bulb



Floodlight: Very bright usually attached to corners of buildings



Carriage: Normally a streetlight, light looks like would be on horse drawn carriage



Globe: Circular normally streetlights sometimes half globes are seen



NEMA: Extremely bright streetlight if see one let me know where as we have covers for these during turtle season



Bell: Typically streetlights that look like a bell



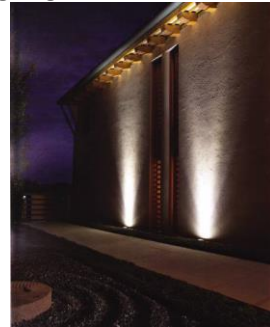
Wall mount: Anything that is mounted to a wall of a building that isn't already described here



Ceiling mounted: Anything that is mounted to a ceiling that isn't already described here



Up-lighting: Lights that are directed upwards



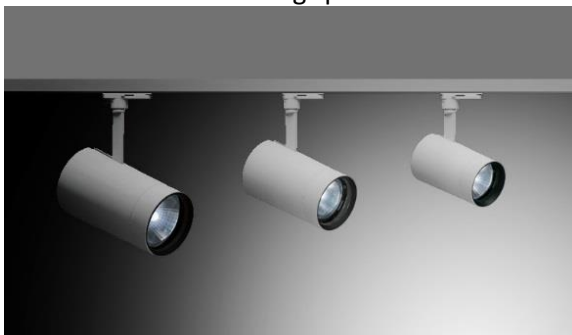
Bollards: A lot are turtle friendly if fitted properly mostly pathway lights attached to ground



Landscape: Directed towards trees or vegetation



Spotlights: Very bright direct light towards something specific



Interior: Any lights that are inside and on



Rope lighting: Multiple small lights all attached to a rope



Posted: Any other lights on a pole not specifically known



UFO: Typically streetlights that look like UFOs



Canister: Light housed in a canister turtle friendly if is pointing directly down



Pool lights: Lights that are underwater



Neon: Lights that show are neon colors



Signage: Signs that are lit up



Fluorescent: Extremely bright lights usually seen in car garages



Step lights: Small lights that illuminate steps of a stairway




Walkway lights: Lights that illuminate a walkway



Appendix 8: 2014 Florida Fish and Wildlife Conservation Commission Sea Turtle Nesting Reports

Ft Lauderdale:

 FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION FISH AND WILDLIFE RESEARCH INSTITUTE SEA TURTLE NESTING REPORT FOR 2014			
1. PRINCIPAL PERMIT HOLDER INFORMATION			
Principal Permit Holder:	Curtis Slagle	Permit Number:	214
Organization:	Broward County Sea Turtle Conservation Program		
Address:	590 SE 12th St. Apt. 207 Dania Beach, FL 33004		
County:	Broward	Email Address:	cs1858@nova.edu
Day Telephone (include area code):	(954) 383-2072	Night Telephone:	(954) 383-2072
Beach Name:	Ft. Lauderdale Beach		
Point of Contact & Phone #	Curtis Slagle - 954-383-2072	Email Address for Point of Contact: (if different from above)	N/A
2. GENERAL SURVEY INFORMATION			
Survey Boundary Information: Please describe survey boundaries geographically. If boundaries have changed, please enter the new boundaries in the space below. <u>Be specific</u> and use known landmarks that can be found on a map (or include a marked map).			
Beginning Survey Boundary:	Commerical Blvd. Pier (26.18948, -80.09466)		
Ending Survey Boundary:	Port Everglades Inlet (26.09508, -80.10500)		
Beach Length: KM (miles):	10.6 km (6.6 miles)	Was this the same survey area as last year? (Y or N)	Y
IF NO, please explain the specific differences, new survey length, AND why the survey area changed:			
N/A			
Start Date of Survey (mm/dd/yy):		03/01/14	End Date of Survey (mm/dd/yy): 10/31/14
Time of Day Surveyed: Start (include AM or PM)	30 Minutes Before Sunrise (6-7 AM)	Finish (include AM or PM)	(10-11 AM)
Number of Days Per Week Surveyed:	7		
Total # of Days Surveyed in 2014 (this is the total # of days between start and end dates MINUS any missed days):	245		
If you did not survey 7 days per week throughout the nesting season, please describe your survey schedule (how many days per week, what days of the week). It is recommended to adhere to a fixed schedule if 7 days/week is not possible (e.g., 5 days/week every week), and these days would preferably be consecutive.			
N/A			
If you did not survey 7 days per week, how were tracks counted on the day that surveys resumed after a missed day?			
N/A			
Were all non-nesting crawls (false crawls) counted during your survey? Yes or No			Yes
How many people were involved in surveying your nesting beach this season?			25

3. NESTING BEACH MANAGEMENT INFORMATION			
Do you collect GPS data for your nests? (Y / N)	Y	Do you save (electronic or paper files) these data? (Y/N)	Y
If nests were RELOCATED, were they relocated Individually (Ex: simply moving the nest directly landward of the original location or otherwise maintaining natural nest spacing) or in a Group with other relocated nests (i.e., self-releasing and/or restraining hatchery)?			Individual
Please give reasons for relocating nests. (Example: nest located below high tide line, in high foot traffic area, etc.)			
Nest below high tide line, donor zones designated by FWC, and exposed eggs			
If a HATCHERY was used, please give reasons AND specific location:			
N/A			
4. FATE OF NEST INFORMATION			
How many nests were marked?			964
How many marked nests were negatively affected by predators other than humans during the course of the season? Note: this includes both partially and completely predated nests			31
List all non-human predators that were documented predated nests this season:			
Fox and night heron			
If predator control methods other than screening/caging were employed, please describe below:			
N/A			
How many marked nests were negatively affected by the nesting female or another nesting sea turtle?			1
How many marked nests were negatively affected by roots (i.e., damaged eggs, impeded hatchling emergence)?			1
How many marked nests were negatively affected by erosion, accretion, inundation, and storm-related events PRIOR to hatching? Note: this <u>does not</u> include stake loss.			391
Please give details:		4 nests were relocated due to exposed eggs mid incubation	
9 nests were washed out. The remaining 378 nests were washed over at some point during season, some had to be reestablished.			
How many marked nests were taken or disturbed by humans (Example: nest dug into, eggs removed, etc.)? Note: this <u>does not</u> include stake removal.			2
Please give details:		Fort Lauderdale nest 18, 23, 66, 321, and 809 were all disturbed by humans	
All nests had varying levels of digging. Nest 321's cage was vandalized.			
If human disturbances occurred, were they reported to law enforcement? Yes or No			Yes
Unmarked Nests: If known, please enter any comments regarding fate of unmarked nests on your beach. (Example: 14 unmarked nests were predated by raccoons, etc.)			
Eight unmarked nests were found on date of hatchling emergence, marked, and excavated three days later as normal.			
One unmarked nest was observed via disorientation event but nest source was not found.			
How many disorientation events occurred on this survey area in 2014?			37
If disorientation events occurred, have all disorientation reports been submitted to FWC? Yes or No			Yes
I certify the above information to be true and accurate to the best of my knowledge. (type in name & date)			
Curtis Slagle		Date:	11/20/2014



**FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
FISH AND WILDLIFE RESEARCH INSTITUTE
SEA TURTLE NESTING REPORT FOR 2014**

1. PRINCIPAL PERMIT HOLDER INFORMATION

Principal Permit Holder: **Curtis Slagle** Permit Number: **214**

Beach Name: **Ft. Lauderdale Beach**

2. GENERAL NESTING DATA for All nests on this survey area (Marked, Unmarked, & Misidentified Nests)

	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
Total # of Nests	914	44	5	0	0
Total # of Non-Nesting Emergences (False Crawls)	811	49	1	0	0
Date (mm/dd/yy) of First Documented Nest	04/24/14	06/13/14	04/03/14		
Date (mm/dd/yy) of Last Documented Nest	09/05/14	08/30/14	06/29/14		

Total # of Nests Prior to 15 May:	53	0	4	0	0
Total # of Nests After 31 Aug:	1	0	0	0	0

Comments: One nest (missed and not excavated) did not have species identification - not included above

In the spaces below, please provide information on the initial nest treatment (e.g., in situ, screened, relocated, etc.). For example, if the initial treatment was in situ with no protection, it should be included in "(a) # of Nests left in place without additional protection" even if you later relocate the nest due to erosion.

Nest Data for nests *left in place* (where the turtle deposited the clutch): These nests may be left without additional protection, screened with a self-releasing flat screen, or covered with self-releasing or restraining above-ground cages.

Record the number of nests by category and species. For each species, rows a+b+c+d should equal the total number of nests left in place. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS LEFT IN PLACE (a + b + c + d)	902	42	4	0	0
(a) # of Nests left in Place without Additional Protection	902	42	4	0	0
(b) # of Nests left in Place with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Nests left in Place with Self-Releasing Cage	0	0	0	0	0
(d) # of Nests left in Place with Restraining Cage	0	0	0	0	0

Relocated Nest Data: Relocated nests are those where the clutch is removed from its original site of deposition and reburied at another site. These nests may be relocated to individual sites or as a group to a hatchery (a permanent or semi-permanent fenced or caged area where many nests are re-buried as a group). As with nests left in place, relocated nests may be left without additional protection, covered with self-releasing flat screen, or covered with a self-releasing for restraining above-ground cages. Hatcheries may be self-releasing (hatchlings escape unaided) or restraining (hatchlings cannot escape unaided).

Record the number of nests by category and species. For each species, rows a+b+c+d+e+f should equal the total number of relocated nests. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS RELOCATED (a + b + c + d + e + f)	13	2	1	0	0
(a) # of Relocated Nests without Additional Protection	0	0	0	0	0
(b) # of Relocated Nests with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Relocated Nests with Self-Releasing Cage	0	0	0	0	0
(d) # of Relocated Nests with Restraining Cage	0	0	0	0	0
(e) # of Relocated Nests to Self-Releasing Hatchery	0	0	0	0	0
(f) # of Relocated Nests to Restraining Hatchery	0	0	0	0	0


Additional Comments for the 2014 Season

Beach Name:

Ft. Lauderdale Beach

Nesting Beach Management Information (e.g., predation, storms, poaching, etc.)	<p>Predation made a larger impact this season in south Fort Lauderdale (R80-85). 30 of 31 total nests predated were predated in this area and by foxes.</p> <p>Hurricane Cristobal accounted for most of the washed out nests, washovers, reestablished nests, and cage removals.</p> <p>Poaching - 4 nests experienced a poaching attempt during the 2014 season. No eggs were disturbed. 2 nests experienced vandalism during the 2014 season.</p> <p>Restraining Caging - Storm and high tide events resulted in multiple cages having to be removed sporadically throughout the season. Most cages were able to be replaced within three days of removal.</p>
General Nesting Data (e.g., nests, false crawls)	<p style="text-align: center;">964 total nest and 861 total false crawls.</p> <p style="text-align: center;">111 ONA and 37 DIS reports.</p> <p style="text-align: center;">6 of the 9 missed nests were associated with a false crawl.</p>
Nest Success Data	<p style="text-align: center;">162 nests were not excavated due to various reasons.</p>
Miscellaneous Comments Regarding Data	<p style="text-align: center;">Restraining cages were utilized as a conservation effort for local lighting issues.</p> <p>Caged nests 22 (relocated mid incubation), 321, 412, 621, and 938 were not excavated since high tide and storm events washed away stakes resulting in loss of egg chamber location.</p> <p style="text-align: center;">Nest relocation was only utilized if eggs were exposed, at or below HTL, or if nests were deposited in a designated donor zone.</p> <p>All relocated nests were excavated. Nests 22 and 782 were relocated mid incubation due to exposed eggs but were not excavated due to loss of egg chamber location from stake removal.</p> <p>Some difficulty was encountered maintaining the "every other nest caged" pattern due small data errors in zone designation.</p>

Pompano/Lauderdale By The Sea:

 FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION FISH AND WILDLIFE RESEARCH INSTITUTE SEA TURTLE NESTING REPORT FOR 2014			
1. PRINCIPAL PERMIT HOLDER INFORMATION			
Principal Permit Holder:		Curtis Slagle	Permit Number: 214
Organization:	Broward County Sea Turtle Conservation Program		
Address:	590 SE 12th St. Apt. 207		
	Dania Beach, FL 33004		
County:	Broward	Email Address:	cs1858@nova.edu
Day Telephone (include area code):	(954) 383-2072	Night Telephone:	(954) 383-2072
Beach Name:	Pompano/Lauderdale-by-the-Sea		
Point of Contact & Phone #	Curtis Slagle - 954-383-2072	Email Address for Point of Contact: (if different from above)	N/A
2. GENERAL SURVEY INFORMATION			
Survey Boundary Information: Please describe survey boundaries geographically. If boundaries have changed, please enter the new boundaries in the space below. <u>Be specific</u> and use known landmarks that can be found on a map (or include a marked map).			
Beginning Survey Boundary:	Hillsboro Inlet (26.25801, -80.08185)		
Ending Survey Boundary:	Commerical Blvd. Pier (26.18948, -80.09466)		
Beach Length: KM (miles):	7.7 km (4.8 miles)	Was this the same survey area as last year? (Y or N)	Y
IF NO, please explain the specific differences, new survey length, AND why the survey area changed:			
N/A			
Start Date of Survey (mm/dd/yy):		03/01/14	End Date of Survey (mm/dd/yy): 10/31/14
Time of Day Surveyed: Start (include AM or PM)		30 Minutes Before Sunrise (6-7 AM)	Finish (include AM or PM) (10-11 AM)
Number of Days Per Week Surveyed:		7	
Total # of Days Surveyed in 2014 (this is the total # of days between start and end dates MINUS any missed days):			245
If you did not survey 7 days per week throughout the nesting season, please describe your survey schedule (how many days per week, what days of the week). <u>It is recommended to adhere to a fixed schedule</u> if 7 days/week is not possible (e.g., 5 days/week every week), and these days would preferably be consecutive.			
N/A			
If you did not survey 7 days per week, how were tracks counted on the day that surveys resumed after a missed day?			
N/A			
Were all non-nesting crawls (false crawls) counted during your survey? Yes or No			Yes
How many people were involved in surveying your nesting beach this season?			25

3. NESTING BEACH MANAGEMENT INFORMATION			
Do you collect GPS data for your nests? (Y / N)	Y	Do you save (electronic or paper files) these data? (Y/N)	Y
If nests were RELOCATED, were they relocated Individually (Ex: simply moving the nest directly landward of the original location or otherwise maintaining natural nest spacing) or in a Group with other relocated nests (i.e., self-releasing and/or restraining hatchery)?			Individual
Please give reasons for relocating nests. (Example: nest located below high tide line, in high foot traffic area, etc.)			
Nest below high tide line, donor zones designated by FWC, and/or exposed eggs			
If a HATCHERY was used, please give reasons AND specific location:			
N/A			
4. FATE OF NEST INFORMATION			
How many nests were marked?	546		
How many marked nests were negatively affected by predators other than humans during the course of the season? Note: this includes both partially and completely predated nests	3		
List all non-human predators that were documented predated nests this season:			
Birds (unknown species), fox, and iguana (after egg chamber exposure)			
If predator control methods other than screening/caging were employed, please describe below:			
N/A			
How many marked nests were negatively affected by the nesting female or another nesting sea turtle?	0		
How many marked nests were negatively affected by roots (i.e., damaged eggs, impeded hatchling emergence)?	0		
How many marked nests were negatively affected by erosion, accretion, inundation, and storm-related events PRIOR to hatching? Note: this <u>does not</u> include stake loss.	206		
Please give details:	4 nests were relocated due to exposed eggs mid incubation		
The remaining 202 nests were washed over at some point during season, some had to reestablished.			
How many marked nests were taken or disturbed by humans (Example: nest dug into, eggs removed, etc.)? Note: this <u>does not</u> include stake removal.	8		
Please give details:	Pompano nest 50, 59, 127, 132, 191, 273, 281, 448 were all disturbed by humans		
Primarily light digging into nest. P59 was relocated by random citizen.			
If human disturbances occurred, were they reported to law enforcement?	Yes or No	Yes	
Unmarked Nests: If known, please enter any comments regarding fate of unmarked nests on your beach. (Example: 14 unmarked nests were predated by raccoons, etc.)			
Ten unmarked nests were found on date of hatchling emergence, marked, and excavated three days later as normal.			
How many disorientation events occurred on this survey area in 2014?	89		
If disorientation events occurred, have all disorientation reports been submitted to FWC? Yes or No	Yes		
I certify the above information to be true and accurate to the best of my knowledge. (type in name & date)			
Curtis Slagle		Date:	11/21/2014



**FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
FISH AND WILDLIFE RESEARCH INSTITUTE
SEA TURTLE NESTING REPORT FOR 2014**

1. PRINCIPAL PERMIT HOLDER INFORMATION

Principal Permit Holder: **Curtis Slagle** Permit Number: **214**
 Beach Name: **Pompano/Lauderdale-by-the-Sea**

2. GENERAL NESTING DATA for All nests on this survey area (Marked, Unmarked, & Misidentified Nests)

	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
Total # of Nests	530	7	9	0	0
Total # of Non-Nesting Emergences (False Crawls)	487	18	0	0	0
Date (mm/dd/yy) of First Documented Nest	04/25/14	06/13/14	03/09/14		
Date (mm/dd/yy) of Last Documented Nest	08/31/14	08/11/14	05/16/14		

Total # of Nests Prior to 15 May:	47	0	8	0	0
Total # of Nests After 31 Aug:	0	0	0	0	0

Comments: N/A

In the spaces below, please provide information on the initial nest treatment (e.g., in situ, screened, relocated, etc.). For example, if the initial treatment was in situ with no protection, it should be included in "(a) # of Nests left in place without additional protection" even if you later relocate the nest due to erosion.

Nest Data for nests left in place (where the turtle deposited the clutch): These nests may be left without additional protection, screened with a self-releasing flat screen, or covered with self-releasing or restraining above-ground cages.

Record the number of nests by category and species. For each species, rows a+b+c+d should equal the total number of nests left in place. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS LEFT IN PLACE (a + b + c + d)	526	7	9	0	0
(a) # of Nests left in Place without Additional Protection	526	7	9	0	0
(b) # of Nests left in Place with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Nests left in Place with Self-Releasing Cage	0	0	0	0	0
(d) # of Nests left in Place with Restraining Cage	0	0	0	0	0

Relocated Nest Data: Relocated nests are those where the clutch is removed from its original site of deposition and reburied at another site. These nests may be relocated to individual sites or as a group to a hatchery (a permanent or semi-permanent fenced or caged area where many nests are re-buried as a group). As with nests left in place, relocated nests may be left without additional protection, covered with self-releasing flat screen, or covered with a self-releasing for restraining above-ground cages. Hatcheries may be self-releasing (hatchlings escape unaided) or restraining (hatchlings cannot escape unaided).

Record the number of nests by category and species. For each species, rows a+b+c+d+e+f should equal the total number of relocated nests. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS RELOCATED (a + b + c + d + e + f)	4	0	0	0	0
(a) # of Relocated Nests without Additional Protection	4	0	0	0	0
(b) # of Relocated Nests with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Relocated Nests with Self-Releasing Cage	0	0	0	0	0
(d) # of Relocated Nests with Restraining Cage	0	0	0	0	0
(e) # of Relocated Nests to Self-Releasing Hatchery	0	0	0	0	0
(f) # of Relocated Nests to Restraining Hatchery	0	0	0	0	0


Additional Comments for the 2014 Season

Beach Name:

Pompano/Lauderdale-by-the-Sea

<p>Nesting Beach Management Information (e.g., predation, storms, poaching, etc.)</p>	<p>Predation - minimal impact by predation, mostly scavenging exposed egg chamber</p> <p>Storms - 4 nests were relocated mid incubation due to egg exposure from high tide/storm events. 1 of these nests were affected from hurricane Cristobal.</p> <p>Poaching - There was no successful poaching events, primarily light digging. Nest P59 was relocated by a concerned citizen.</p> <p>Restraining Caging - Storm and high tide events resulted in multiple cages having to be removed sporadically throughout the season. Most cages were able to be replaced within three days of removal.</p>
<p>General Nesting Data (e.g., nests, false crawls)</p>	<p>546 total nest and 505 false crawls.</p> <p>25 ONA and 89 DIS reports.</p> <p>5 of the 10 missed nests were associated with a false crawl.</p>
<p>Nest Success Data</p>	<p>88 nests were not excavated due to various reasons.</p>
<p>Miscellaneous Comments Regarding Data</p>	<p>Restraining cages were utilized as a conservation effort for local lighting issues.</p> <p>Caged nests 323 was not excavated since high tide and storm events washed away stakes resulting in loss of egg chamber location.</p> <p>Nest relocation was only utilized if eggs were exposed, at or below HTL, or if nests were deposited in a designated donor zone.</p> <p>All relocated nests were excavated</p>

Hollywood/Hallandale:

 FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION FISH AND WILDLIFE RESEARCH INSTITUTE SEA TURTLE NESTING REPORT FOR 2014			
1. PRINCIPAL PERMIT HOLDER INFORMATION			
Principal Permit Holder:		Curtis Slagle	Permit Number: 214
Organization:	Broward County Sea Turtle Conservation Program		
Address:	590 SE 12th St. Apt. 207		
	Dania Beach, FL 33004		
County:	Broward	Email Address:	cs1858@nova.edu
Day Telephone (include area code):	(954) 383-2072	Night Telephone:	(954) 383-2072
Beach Name:	Hollywood/Hallandale Beaches		
Point of Contact & Phone #	Curtis Slagle - 954-383-2072	Email Address for Point of Contact: (if different from above)	N/A
2. GENERAL SURVEY INFORMATION			
Survey Boundary Information: Please describe survey boundaries geographically. If boundaries have changed, please enter the new boundaries in the space below. <u>Be specific</u> and use known landmarks that can be found on a map (or include a marked map).			
Beginning Survey Boundary:	3.9 km S of Port Everglades Inlet (26.06043, -80.11138)		
Ending Survey Boundary:	Broward/Miami-Dade Co Line (25.97518, -80.11828)		
Beach Length: KM (miles):	9.4 km (5.8 miles)	Was this the same survey area as last year? (Y or N)	Y
IF NO, please explain the specific differences, new survey length, AND why the survey area changed:			
N/A			
Start Date of Survey (mm/dd/yy):		03/01/14	End Date of Survey (mm/dd/yy): 10/31/14
Time of Day Surveyed: Start (include AM or PM)	30 Minutes Before Sunrise (6-7 AM)	Finish (include AM or PM)	(8-9 AM)
Number of Days Per Week Surveyed:		7	
Total # of Days Surveyed in 2014 (this is the total # of days between start and end dates MINUS any missed days):			245
If you did not survey 7 days per week throughout the nesting season, please describe your survey schedule (how many days per week, what days of the week). <u>It is recommended to adhere to a fixed schedule</u> if 7 days/week is not possible (e.g., 5 days/week every week), and these days would preferably be consecutive.			
N/A			
If you did not survey 7 days per week, how were tracks counted on the day that surveys resumed after a missed day?			
N/A			
Were all non-nesting crawls (false crawls) counted during your survey? Yes or No			Yes
How many people were involved in surveying your nesting beach this season?			25

3. NESTING BEACH MANAGEMENT INFORMATION			
Do you collect GPS data for your nests? (Y/N)	Y	Do you save (electronic or paper files) these data? (Y/N)	Y
If nests were RELOCATED, were they relocated Individually (Ex: simply moving the nest directly landward of the original location or otherwise maintaining natural nest spacing) or in a Group with other relocated nests (i.e., self-releasing and/or restraining hatchery)?			Individual
Please give reasons for relocating nests. (Example: nest located below high tide line, in high foot traffic area, etc.)			
Nest below high tide line, donor zones designated by FWC, and/or exposed eggs.			
If a HATCHERY was used, please give reasons AND specific location:			
N/A			
4. FATE OF NEST INFORMATION			
How many nests were marked?			142
How many marked nests were negatively affected by predators other than humans during the course of the season? Note: this includes both partially and completely predated nests			0
List all non-human predators that were documented predated nests this season:			
N/A			
If predator control methods other than screening/caging were employed, please describe below:			
N/A			
How many marked nests were negatively affected by the nesting female or another nesting sea turtle?			0
How many marked nests were negatively affected by roots (i.e., damaged eggs, impeded hatchling emergence)?			0
How many marked nests were negatively affected by erosion, accretion, inundation, and storm-related events PRIOR to hatching? Note: this <u>does not</u> include stake loss.			42
Please give details:	3 nests were relocated due to exposed eggs mid incubation		
Hollywood nests 79 and 125 were washed out completely. The remaining 37 nests were washed over at some point during the season.			
How many marked nests were taken or disturbed by humans (Example: nest dug into, eggs removed, etc.)? Note: this <u>does not</u> include stake removal.			2
Please give details:	Hollywood nest #8 was dug into - no eggs disturbed; Hollywood nest #4 had restraining cage removed		
If human disturbances occurred, were they reported to law enforcement? Yes or No			Yes
Unmarked Nests: If known, please enter any comments regarding fate of unmarked nests on your beach. (Example: 14 unmarked nests were predated by raccoons, etc.)			
Two unmarked nests were found on date of hatchling emergence, marked, and excavated three days later as normal.			
How many disorientation events occurred on this survey area in 2014?			15
If disorientation events occurred, have all disorientation reports been submitted to FWC? Yes or No			Yes
I certify the above information to be true and accurate to the best of my knowledge. (type in name & date)			
Curtis Slagle		Date:	11-11-2014



**FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
FISH AND WILDLIFE RESEARCH INSTITUTE
SEA TURTLE NESTING REPORT FOR 2014**

1. PRINCIPAL PERMIT HOLDER INFORMATION

Principal Permit Holder:	Curtis Slagle	Permit Number:	214
Beach Name: Hollywood/Hallandale Beaches			

2. GENERAL NESTING DATA for All nests on this survey area (Marked, Unmarked, & Misidentified Nests)

	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
Total # of Nests	139	0	3	0	0
Total # of Non-Nesting Emergences (False Crawls)	153	1	0	0	0
Date (mm/dd/yy) of First Documented Nest	04/29/14		03/29/14		
Date (mm/dd/yy) of Last Documented Nest	08/22/14		05/07/14		

Total # of Nests Prior to 15 May:	9	0	3	0	0
Total # of Nests After 31 Aug:	0	0	0	0	0

Comments: N/A

In the spaces below, please provide information on the initial nest treatment (e.g., in situ, screened, relocated, etc.). For example, if the initial treatment was in situ with no protection, it should be included in "(a) # of Nests left in place without additional protection" even if you later relocate the nest due to erosion.

Nest Data for nests left in place (where the turtle deposited the clutch): These nests may be left without additional protection, screened with a self-releasing flat screen, or covered with self-releasing or restraining above-ground cages.

Record the number of nests by category and species. For each species, rows a+b+c+d should equal the total number of nests left in place. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS LEFT IN PLACE (a + b + c + d)	130	0	3	0	0
(a) # of Nests left in Place without Additional Protection	130	0	3	0	0
(b) # of Nests left in Place with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Nests left in Place with Self-Releasing Cage	0	0	0	0	0
(d) # of Nests left in Place with Restraining Cage	0	0	0	0	0

Relocated Nest Data: Relocated nests are those where the clutch is removed from its original site of deposition and reburied at another site. These nests may be relocated to individual sites or as a group to a hatchery (a permanent or semi-permanent fenced or caged area where many nests are re-buried as a group). As with nests left in place, relocated nests may be left without additional protection, covered with self-releasing flat screen, or covered with a self-releasing for restraining above-ground cages. Hatcheries may be self-releasing (hatchlings escape unaided) or restraining (hatchlings cannot escape unaided).

Record the number of nests by category and species. For each species, rows a+b+c+d+e+f should equal the total number of relocated nests. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS RELOCATED (a + b + c + d + e + f)	9	0	0	0	0
(a) # of Relocated Nests without Additional Protection	9	0	0	0	0
(b) # of Relocated Nests with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Relocated Nests with Self-Releasing Cage	0	0	0	0	0
(d) # of Relocated Nests with Restraining Cage	0	0	0	0	0
(e) # of Relocated Nests to Self-Releasing Hatchery	0	0	0	0	0
(f) # of Relocated Nests to Restraining Hatchery	0	0	0	0	0


Additional Comments for the 2014 Season

Beach Name:

Hollywood/Hallandale Beaches

<p>Nesting Beach Management Information (e.g., predation, storms, poaching, etc.)</p>	<p align="center">Predation -</p> <p>Storms - Hurricane Cristobal resulted in two completely washed out nests, ten nests being reestablished, two nest having eggs exposed, and multiple wash overs.</p> <p align="center">Poaching - No successful poaching, only vandalism and one unsuccessful digging attempt.</p> <p>Restraining Caging - Storm and hide tide events resulted in multiple cages having to be removed sporadically throughout the season. Most cages were able to be replaced within three days of removal</p>
<p>General Nesting Data (e.g., nests, false crawls)</p>	<p align="center">142 total nests and 154 total false crawls</p> <p align="center">14 ONA and 15 DIS reports</p> <p align="center">2 missed nests, 1 associated with a false crawl.</p>
<p>Nest Success Data</p>	<p align="center">22 Nests were not excavated due to various reasons.</p>
<p>Miscellaneous Comments Regarding Data</p>	<p align="center">Restraining cages were utilized as a conservation effort for local lighting issues.</p> <p>Caged nests 12, 125, and 131 were not excavated since high tide and storm events washed away stakes or stakes were removed by human disturbance, resulting in loss of egg chamber location.</p> <p>Nest relocation was only utilized if eggs were exposed or if nests were deposited in a "take one leave one" zone, except for Hollywood nest 10 which was relocated due to misinterpretation of take one leave one zone by a worker.</p> <p align="center">All relocated nests were excavated</p> <p align="center">Some difficulty was encountered maintaining the "take one leave one" pattern.</p>

Hillsboro/Deerfield:

 FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION FISH AND WILDLIFE RESEARCH INSTITUTE SEA TURTLE NESTING REPORT FOR 2014			
1. PRINCIPAL PERMIT HOLDER INFORMATION			
Principal Permit Holder:	Curtis Slagle		Permit Number: 214
Organization:	Broward County Sea Turtle Conservation Program		
Address:	590 SE 12th St. Apt. 207		
	Dania Beach, FL 33004		
County:	Broward	Email Address:	cs1858@nova.edu
Day Telephone (include area code):	(954) 383-2072	Night Telephone:	(954) 383-2072
Beach Name:	Deerfield/Hillsboro Beaches		
Point of Contact & Phone #	Curtis Slagle - 954-383-2072	Email Address for Point of Contact: (if different from above)	N/A
2. GENERAL SURVEY INFORMATION			
<p>Survey Boundary Information: Please describe survey boundaries geographically. If boundaries have changed, please enter the new boundaries in the space below. <u>Be specific</u> and use known landmarks that can be found on a map (or include a marked map).</p>			
Beginning Survey Boundary:	Palm Bch/Broward Co Line (26.32100, -80.07447)		
Ending Survey Boundary:	Hillsboro Inlet (26.25817, -80.08043)		
Beach Length: KM (miles):	7 km (4.4 miles)	Was this the same survey area as last year? (Y or N)	Y
IF NO, please explain the specific differences, new survey length, AND why the survey area changed:			
N/A			
Start Date of Survey (mm/dd/yy):		03/01/14	End Date of Survey (mm/dd/yy): 10/31/14
Time of Day Surveyed: Start (include AM or PM)	30 Minutes Before Sunrise (6-7 AM)	Finish (include AM or PM)	(1-2 PM)
Number of Days Per Week Surveyed:		7	
Total # of Days Surveyed in 2014 (this is the total # of days between start and end dates MINUS any missed days):			245
<p>If you did not survey 7 days per week throughout the nesting season, please describe your survey schedule (how many days per week, what days of the week). <u>It is recommended to adhere to a fixed schedule</u> if 7 days/week is not possible (e.g., 5 days/week every week), and these days would preferably be consecutive.</p>			
N/A			
If you did not survey 7 days per week, how were tracks counted on the day that surveys resumed after a missed day?			
N/A			
Were all non-nesting crawls (false crawls) counted during your survey? Yes or No			Yes
How many people were involved in surveying your nesting beach this season?			25

3. NESTING BEACH MANAGEMENT INFORMATION			
Do you collect GPS data for your nests? (Y/N)	Y	Do you save (electronic or paper files) these data? (Y/N)	Y
If nests were RELOCATED, were they relocated Individually (Ex: simply moving the nest directly landward of the original location or otherwise maintaining natural nest spacing) or in a Group with other relocated nests (i.e., self-releasing and/or restraining hatchery)?			Individual
Please give reasons for relocating nests. (Example: nest located below high tide line, in high foot traffic area, etc.)			
Nest below high tide line, donor zones designated by FWC, and exposed eggs			
If a HATCHERY was used, please give reasons AND specific location:			
N/A			
4. FATE OF NEST INFORMATION			
How many nests were marked?			1132
How many marked nests were negatively affected by predators other than humans during the course of the season? Note: this includes both partially and completely predated nests			292
List all non-human predators that were documented predated nests this season:			
Fox, crows, and ants			
If predator control methods other than screening/caging were employed, please describe below:			
N/A			
How many marked nests were negatively affected by the nesting female or another nesting sea turtle?			0
How many marked nests were negatively affected by roots (i.e., damaged eggs, impeded hatchling emergence)?			1
How many marked nests were negatively affected by erosion, accretion, inundation, and storm-related events PRIOR to hatching? Note: this <u>does not</u> include stake loss.			377
Please give details:		46 nests were washed out completely. 5 nests required relocation due to exposed eggs.	
54 nests (which may or may not include nests above) were reestablished. All 377 nests were at a minimum, washed over.			
How many marked nests were taken or disturbed by humans (Example: nest dug into, eggs removed, etc.)? Note: this <u>does not</u> include stake removal.			0
Please give details:		No nests were disturbed by humans.	
If human disturbances occurred, were they reported to law enforcement? Yes or No			N/A
Unmarked Nests: If known, please enter any comments regarding fate of unmarked nests on your beach. (Example: 14 unmarked nests were predated by raccoons, etc.)			
26 unmarked nests were found on date of hatchling emergence or predation.			
All were marked and excavated accordingly, except for 5, which were due to loss of stakes and therefore egg chamber location.			
How many disorientation events occurred on this survey area in 2014?			14
If disorientation events occurred, have all disorientation reports been submitted to FWC? Yes or No			Yes
I certify the above information to be true and accurate to the best of my knowledge. (type in name & date)			
Curtis Slagle		Date:	11/28/2014



**FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
FISH AND WILDLIFE RESEARCH INSTITUTE
SEA TURTLE NESTING REPORT FOR 2014**

1. PRINCIPAL PERMIT HOLDER INFORMATION

Principal Permit Holder: **Curtis Slagle** Permit Number: **214**
 Beach Name: **Deerfield/Hillsboro Beaches**

2. GENERAL NESTING DATA for All nests on this survey area (Marked, Unmarked, & Misidentified Nests)

	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
Total # of Nests	1043	67	22	0	0
Total # of Non-Nesting Emergences (False Crawls)	962	59	7	0	0
Date (mm/dd/yy) of First Documented Nest	04/22/14	05/28/14	03/09/14		
Date (mm/dd/yy) of Last Documented Nest	08/28/14	09/09/14	06/29/14		
Total # of Nests Prior to 15 May:	62	0	13	0	0
Total # of Nests After 31 Aug:	0	2	0	0	0

Comments: N/A

In the spaces below, please provide information on the initial nest treatment (e.g., in situ, screened, relocated, etc.). For example, if the initial treatment was in situ with no protection, it should be included in "(a) # of Nests left in place without additional protection" even if you later relocate the nest due to erosion.

Nest Data for nests *left in place* (where the turtle deposited the clutch): These nests may be left without additional protection, screened with a self-releasing flat screen, or covered with self-releasing or restraining above-ground cages.

Record the number of nests by category and species. For each species, rows a+b+c+d should equal the total number of nests left in place. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS LEFT IN PLACE (a + b + c + d)	1037	67	22	0	0
(a) # of Nests left in Place without Additional Protection	1037	67	22	0	0
(b) # of Nests left in Place with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Nests left in Place with Self-Releasing Cage	0	0	0	0	0
(d) # of Nests left in Place with Restraining Cage	0	0	0	0	0

Relocated Nest Data: Relocated nests are those where the clutch is removed from its original site of deposition and reburied at another site. These nests may be relocated to individual sites or as a group to a hatchery (a permanent or semi-permanent fenced or caged area where many nests are re-buried as a group). As with nests left in place, relocated nests may be left without additional protection, covered with self-releasing flat screen, or covered with a self-releasing for restraining above-ground cages. Hatcheries may be self-releasing (hatchlings escape unaided) or restraining (hatchlings cannot escape unaided).

Record the number of nests by category and species. For each species, rows a+b+c+d+e+f should equal the total number of relocated nests. Please check to make sure this is the case.	<i>C. caretta</i> (Loggerhead)	<i>C. mydas</i> (Green Turtle)	<i>D. coriacea</i> (Leatherback)	<i>E. imbricata</i> (Hawksbill)	<i>L. kempii</i> (Kemp's Ridley)
TOTAL # OF NESTS RELOCATED (a + b + c + d + e + f)	6	0	0	0	0
(a) # of Relocated Nests without Additional Protection	6	0	0	0	0
(b) # of Relocated Nests with Self-Releasing Flat Screen	0	0	0	0	0
(c) # of Relocated Nests with Self-Releasing Cage	0	0	0	0	0
(d) # of Relocated Nests with Restraining Cage	0	0	0	0	0
(e) # of Relocated Nests to Self-Releasing Hatchery	0	0	0	0	0
(f) # of Relocated Nests to Restraining Hatchery	0	0	0	0	0

Additional Comments for the 2014 Season

Beach Name:

Deerfield/Hillsboro Beaches

Nesting Beach Management Information (e.g., predation, storms, poaching, etc.)	<p>Predation made a big impact this season in the southern half of Hillsboro Beach, primarily by foxes.</p> <p>Hurricane Cristobal accounted for most of the washed out nests, washovers, and reestablished nests.</p> <p>Poaching attempts weren't present for this beach during the 2014 season.</p>
General Nesting Data (e.g., nests, false crawls)	<p style="text-align: center;">1132 total nests and 1028 false crawls.</p> <p style="text-align: center;">150 ONA and 14 DIS reports.</p> <p style="text-align: center;">17 of 26 missed nests were associated with a false crawl.</p>
Nest Success Data	<p style="text-align: center;">372 nests were not excavated due to various reasons.</p>
Miscellaneous Comments Regarding Data	<p>Nest relocation was only utilized if eggs were exposed, at or below HTL, or if nests were deposited in a designated donor zone.</p> <p>Relocated nest 244 was not excavated due to loss of stakes and therefore egg chamber location.</p> <p>Relocated nests (mid incubation) 38, 1107, and 1132 were not excavated due to loss of stakes and therefore egg chamber location.</p>