

# **Assessment of Sea Turtle Rehabilitation in North Carolina**

by

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## **EXECUTIVE SUMMARY**

As is the case with all sea turtle species, the five species that occur within North Carolina waters are listed as either threatened or endangered under the Endangered Species Act of 1973. Due to their endangered/threatened status, rehabilitation efforts are key for their long-term conservation since the release of healthy individuals helps promote more sustainable populations. In order to ensure rehabilitation efforts are concentrated properly and to assess their success rates, in-depth studies must be done on the stranding records available for each rehabilitation facility within the state. While other states such as Florida and Queensland, Australia have conducted studies to determine their rehabilitation characteristics and success rates, a comprehensive study of a similar nature has never been done with the sea turtle rehabilitation records for the state of North Carolina. This study analyzes the rehabilitation records for the state of North Carolina to determine the most common characteristics of sea turtles admitted for rehabilitation as well as the successful release rates over time.

Sea turtle rehabilitation efforts and record keeping began at the North Carolina Aquariums back in the mid-1980s which was soon followed by the opening of the Karen Beasley Sea Turtle Rescue and Rehabilitation Center in 1997. The North Carolina Aquarium on Roanoke Island partnered early with the Network for Endangered Sea Turtles (N.E.S.T.) which eventually became the Sea Turtle Animal Rescue (STAR) Center in 2014. Both the North Carolina Aquariums and the KBSTRRC largely outsourced any necessary veterinary care through a collaboration with North Carolina State University's College of Veterinary Medicine though the North Carolina Aquariums hired its first full-time veterinarian for sea turtle care in 2015.

This study reviews the rehabilitation records of North Carolina to date, presented as two datasets taken from the public North Carolina Aquariums and the private, non-profit Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC). A total of 2707 rehabilitation records were available which was narrowed down to 2594 records for data analysis after a variety of factors including the restriction of the time period used to only include those records from January 1997 to October 2018. Characteristics were determined for the majority of rehabilitation records such as: life stage, sex, stranding causation, stranding location, species, rehabilitation location, rehabilitation outcome, and release location. The successful rate of release was

determined and compared against studies done in Florida and Queensland, Australia for comparative purposes.

Based on the 2707 records available, both life stage and sex were removed as variables in future data analysis due to skewed proportions for turtles in their juvenile life stage as well as those that did not have their sex determined during rehabilitation. When looking at the restricted 2594 records, the most common sea turtle brought in for rehabilitation in North Carolina was a green sea turtle species, stranded in inshore waters (landward of the Coast Guard's COLREGS line) due to cold stunning, and successfully released. The most common rehabilitation facility used was the North Carolina Aquarium on Roanoke Island and its affiliates followed by the Karen Beasley Sea Turtle Rescue and Rehabilitation Center, and the North Carolina State University's College of Veterinary Medicine based in the Center for Marine Sciences and Technology (CMAST). When compared to the other studies looked at, the successful release rate for North Carolina was nearly double the successful release rates seen in both Florida and Queensland, Australia.

The results discussed in this study will help rehabilitation facilities in North Carolina better tailor resources and funds to accommodate the most commonly seen characteristics as well as provide a baseline to be compared against for future data analysis within North Carolina, other states, or when looking specifically at one rehabilitation facility.

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## INTRODUCTION

A total of five sea turtle species occur in the waters of North Carolina: the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*) and Kemp's ridley (*Lepidochelys kempii*). All five species are found in offshore waters year-round with loggerhead, green, and Kemp's ridley frequenting inshore waters between April and December and regularly nesting on shore between May and August. Leatherback and hawksbill species, however, only infrequently enter inshore waters with hawksbill first nesting on North Carolina shores in 2015 (Epperly et al. 1995; Siceloff, 2015).

The US Endangered Species Act of 1973 protects all five species, listing the loggerhead and green as threatened and the remaining three as endangered, and thus are afforded protection under both Federal and State laws. The state of North Carolina, in cooperation with the federal government, coordinates networks of volunteers and cooperators to monitor and protect nesting sea turtles, their eggs, and the resultant hatchlings during summer months, and also to respond to dead, sick or injured sea turtles that are found along the coastline during most months of year. In the case of live, stranded turtles that are in need of medical attention, there are four facilities that have traditionally provided space for the care and rehabilitation of sick or injured turtles in North Carolina: the three public aquariums managed by the Aquariums Division of the North Carolina Department of Natural and Cultural Resources located at Fort Fisher, Pine Knoll Shores, and Roanoke Island, and the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC) in Surf City.

Since at least the early 1980s, the three aquarium locations have participated in sea turtle rehabilitation to varying degrees, depending on space, equipment and personnel availability, but without any dedicated space or personnel. In 1997, the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC) was founded in Topsail Beach as a nonprofit rescue center to deal with sick or injured sea turtles, and continues to work in this capacity, although the facility moved in 2014 to a larger building in nearby Surf City. In the early 2000s, the NC Aquarium location on Roanoke Island partnered with the Network for Endangered Sea Turtles (N.E.S.T.), a local nonprofit sea turtle volunteer organization, to create a dedicated space for treating sick or injured sea turtles. This effort was expanded in 2014 when the NC Aquarium on Roanoke Island created the Sea Turtle Animal Rescue (STAR) Center, which includes a larger space and

dedicated aquarium staff for the rehabilitation of sea turtles. Most sea turtle rehabilitation efforts in North Carolina are concentrated at either the KBSTRRC or STAR Center, although the other two NC Aquarium locations and other associated facilities will provide care for simpler cases when needed.

In the early years of sea turtle rehabilitation, veterinary oversight was provided by private veterinarians. Starting about two decades ago, both KBSTRRC and NC Aquariums (including STAR) established collaborative partnerships with NCSU College of Veterinary Medicine, whereby veterinary students gain valuable experience in sea turtle medicine while the rehabilitation centers benefit from the knowledge and oversight of established veterinarians. In 2015, the NC Aquariums hired a full-time veterinarian with extensive sea turtle experience. Another benefit of these collaborative partnerships is that the documentation of rehabilitation cases and procedures was standardized throughout the state.

All sea turtles that are taken to rehabilitation centers in North Carolina must be documented for the state sea turtle stranding network, and subsequent notations are made during their treatment, including final status (successfully released back to the wild, died, or kept in permanent captivity). However, to date there has never been a directed effort to conduct a meta-analysis of data on rehabilitation cases in North Carolina. This project aims to globally analyze the data on sea turtle rehabilitation in North Carolina, and generate basic descriptive statistics such as: the number of turtles that have been admitted to rehabilitation facilities, the rate of successful treatment/release, the types of injuries or diseases seen, the species and life stage classes that are admitted, the seasonal variation in types of admittances (if any), etc.

While this type of assessment has never been conducted in North Carolina, there have been studies looking into other places such as Queensland, Australia and Florida. The outcome of sea turtles from rehabilitation in Florida was looked at by Baker, Edwards & Pike (2015) as well as the effect of phenotypes on the rehabilitation outcome. They found that over an 18-year period 36.8% of turtles admitted to rehabilitation with known outcomes were released back into the wild, 55.3% died while in rehabilitation, and the remaining 1.6% survived but were placed in permanent captivity. Similar results were seen in Flint et al. (2017) who looked at the outcome of sea turtle rehabilitation in Queensland, Australia along with the strand causes and the cost of rehabilitation per turtle. They found that over a different 18-year period 59% of live-strandings

went on to be rehabilitated and of those 39.5% were released, 43.7% died in care, and 16.8% were euthanized. Across species the primary cause of stranding was unknown (54%), then disease (18%), buoyancy disorder (13%), and fractures (6%). Both studies noted the low rate of release success compared to the cost and highlighted that funding and efforts could be better concentrated. In Queensland, Flint et al. (2017) suggest concentrating funding in public and scientist education to reduce strandings and advance understanding of diseases and biology of sea turtles along with developing focused triage and treatment during major events and in hotspots to reduce costs at rehabilitation centers while also freeing up resources and space. In Florida, Baker, Edwards & Pike (2015) recommend prioritizing rehabilitation efforts, especially when the number of strandings exceeds resource availability, to adult turtles, species that are easier to rehabilitate, and species that are rare to the state.

These published papers provide a baseline against which to compare results in North Carolina, and provide standardized methods of analysis, to facilitate comparison across locations. We will also look for other trends or relationships in the data, which may provide insight into tailoring types of treatments or how to prioritize efforts in cases of mass stranding events. Finally, this type of assessment will help highlight the work being done by the different facilities and place the sea turtle rehabilitation efforts in North Carolina into context for other locations and regions.

## **METHODS**

### *Data*

Two datasets were obtained by permission, one from the Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC) containing 582 records and one from the North Carolina Aquariums network containing 2125 records. In 1988, the North Carolina Aquariums began recording turtles brought in for rehabilitation and their database includes all turtles that passed through their facilities as well as any turtles that were cared for in affiliated location or with affiliated individuals. The KBSTRRC started recording stranded turtles in 1997 and their database includes any turtles that were taken to the KBSTRRC first; in some instances, there are turtles that pass through both the KBSTRRC and the aquarium network but only one record is made in the database that it first appears. A majority of the turtles listed in the databases were

taken in for rehabilitation purposes but occasionally healthy, dead, or post-hatchling turtles are also recorded. Both databases record data for every turtle in categories such as species, life stage, sex, strand location, cause of stranding, release location, release date, etc.

### *Categories Used in Data Analysis*

The categories used during data analysis were adapted from those used in the databases, sometimes these were verbatim in the case of 'Date', 'Species', 'Sex', 'LifeStage', 'TypeRep', 'StrandSite', 'Condition', 'Latitude', 'Longitude', and 'FinalDisposition', while the rest had to be adapted slightly or expanded upon from the notes. The category 'RehabDescription' was expanded upon into four categories, 'First through Fourth Location', to separate each facility that each turtle went to. 'RehabDisposition', 'RehabDispositionDate', 'ReleaseLatitude', and 'ReleaseLongitude' categories had some occasional blank spots which were filled when possible by using the 'Notes' and 'DeathDescription' categories from the original databases; these two categories were also used to fill in blanks for the 'ProbableCauseStrand' category which was consolidated by combining 'unknown', 'no apparent injuries', and 'unable to determine' all under 'unknown'. Using the 'Date' and 'ReleaseDate' categories, the 'DaysinCare' category was added to calculate how many days each turtle spent in rehab before an outcome was achieved.

### *Data Analysis*

A combined total of 2707 records were in the two raw datasets. I restricted my analyses to only include records between January 1997 and October 2018 which removed 2 records that were pre-1997. Following this, records were only included for data analysis if the sea turtle was taken to a rehabilitation location in North Carolina while still living but not if they were post-hatchlings (less than one month old). This excluded 73 records of sea turtles that were dead on arrival to the rehab location or died en route to a rehab location, 17 post-hatchlings, 9 sea turtles that were found in NC but were subsequently rehabled out-of-state, 6 incomplete records, 3 sea turtles that were for research purposes and were not initial strandings, 2 sea turtles that were found dead and were only taken to a rehab location to be necropsied, and 1 duplicate record. This added together a total of 113 records removed and 2594 records left for data analysis using R and reported with a 95% confidence interval chosen to represent the variance within a dynamic population. Additionally, a data analysis was conducted with the removal of the 838 records

from 2016; this year was potentially anomalous and removed to see how results and trends changed. The analysis of these combined databases represents the first comprehensive look into sea turtle strandings in the state of North Carolina.

## **RESULTS**

### *Data Analysis of Raw Records*

#### Life Stage

Raw records were recategorized based on the straight carapace length (SCL) for each sea turtle and using the size at sexual maturity for different sea turtle species in Northwest Atlantic populations as seen in Avens & Snover, 2013. When SCL was not recorded, any curved carapace length (CCL) recorded was converted to SCL using formulas found in Avens, 2007 and Goshe, 2010; if both SCL and CCL were not recorded, the record was marked as 'Unknown'. The most common life stage seen was juvenile (94.2%, n= 2549), followed by unknown (3.8%, n= 103) and then adult (2%, n= 55). Life stage was removed as a variable in future analysis due to the high rate of juveniles seen in the raw data.

#### Sex

The raw datasets have a consistent rate of unknown sex records (85.9%, n= 2324) which was followed by females (10.2%, n= 275) and then males (3.99%, n= 108). Sex was taken out as a variable in future analysis due to the high rate of unknown sex records seen.

### *Data Analysis of Revised Records*

Over the span of 21 years (1997-2018) there was an increase over time in the number ( $R^2=0.607$ ) of stranded turtles taken to NC rehab locations (Figure 1). There was a mass stranding event in early 2016 that accounted for 838 records. Looking at the records as an average number of sea turtles seen every month (Figure 2), January had the most with an average of 49.9 turtles per year followed by December (23.6 turtles/yr) and then November (11.5 turtles/yr); removing the 2016 records produced a top 3 of December (23.25 turtles/yr), January (14.65 turtles/yr), and November (11.75 turtles/yr). Two sample z tests were conducted to compare analyses of all records to records with 2016 removed; p values for all data analysis

categories were statistically significant but overall patterns of distribution were not impacted with the removal of 2016. The records from 2016 are therefore included in the remaining data analysis results.

### Species

Green sea turtles were the most abundant species seen over the 21-year range (62%, n= 1607) followed by loggerhead (23.1%, n= 598) and Kemp's ridley (14.7%, n= 381). Both the leatherback (0.12%, n= 3) and hawksbill (0.15%, n= 4) species saw few records. In addition to the five species, one green-loggerhead hybrid was found representing 0.04% of the records.

### Stranding Location

Both datasets used the Coast Guard's COLREGS line to determine if a sea turtle had been stranded inshore, landward of the COLREGS line, or offshore, seaward of the COLREGS line. More live turtles were found stranded inshore (79.9%, n= 2072) as opposed to offshore (20.1%, n= 522) as shown geographically in Figure 3. Green, loggerhead, Kemp's ridley, and the one hybrid sea turtle also saw more strands inshore whereas hawksbill and leatherback species were more commonly stranded offshore.

### Stranding Causation

In total there were 13 categories of different stranding causes over the years. The top 5 stranding causes were found to be cold stunning (67.2%, n= 1744), incidental entanglement (11.8%, n= 307), disease (8.4%, n= 218), unknown (5.1%, n= 132), and watercraft collisions (5%, n= 130). The remaining 8 categories of stranding causes represented 2.4% (n= 63) of all records and includes mutilation/trauma, power plant entrainments, shark attacks, dredging activities, passive entanglement, neurological issues, storms, and pollution/debris. All species, including the one hybrid, had their top 3 stranding causes as one of the overall top 5 except for leatherback turtles whose top 3 stranding causes were watercraft collision, mutilation/trauma, and unknown (Table 1).

### Rehabilitation Location

Over the 21-year span, 37 locations were used in the rehabilitation process for the 2594 records and to analyze, were separated into 8 different location groups. The Karen Beasley Sea Turtle Rescue and Rehabilitation Center (KBSTRRC), the NC Aquarium at Fort Fisher (NCAFF), the NC Aquarium at Pine Knoll Shores (NCAPKS), and North Carolina State University's College of Veterinary Medicine located at the Center for Marine Sciences and Technology (CMAST) each became a group on their own. The NC Aquarium at Roanoke Island (NCARI) became a group that included any sea turtles sent to the aquarium, the STAR center, the Roanoke Island Animal Clinic next door as well as any sea turtles taken in by N.E.S.T. and its satellite site in Buxton. Any aquariums beyond the three North Carolina public ones became a group and included the SEA LIFE Charlotte-Concord Aquarium in North Carolina; the Georgia Aquarium; the South Carolina Aquarium and Ripley's Aquarium of Myrtle Beach in South Carolina; Sea World and Epcot Living Seas in Florida; and the OdySea Aquarium in Arizona which took in one sea turtle that was non-releasable. Any locations that did not fall into the above five categories but were still located in North Carolina became the 'NC Locations' groups which comprised of various volunteer homes, ranger stations, private vet/animal clinics, both the NOAA and Duke labs in Beaufort, the Greensboro Science Center, and two North Carolina museums. Every location left fell into the 'Out-of-State Locations' group composed of the Marine Mammal Stranding Center in NJ, the Georgia Sea Turtle Center, and the Virginia Aquarium Stranding Response Program.

Out of the 2594 records, 78% (n= 2023) only visited one rehab location before their outcome, 18.6% (n= 482) visited two rehab locations, 3% (n= 78) visited three rehab locations, and 0.4% (n= 11) visited four rehab locations. Table 2 shows the number of records for each rehab location group at each stage (first through fourth) as well as the last location visited before each record's outcome.

### Rehabilitation Outcome

Overall, 77.3% (n= 2005) of sea turtles went on to be released after rehabilitation, 21.3% (n= 553) died while in rehab, 0.89% (n= 23) remain in rehab at the time of this analysis, 0.35% (n= 9) were euthanized during rehabilitation, and 0.15% (n= 4) were deemed unable to be

released and became permanent captures. Table 3 shows this along with the average, shortest, and longest number of days before outcome. Of the 562 sea turtles that either died while in rehab or were euthanized, 54.6% (n= 307) were then necropsied to determine stranding cause or for research purposes. While the number of sea turtles that died in rehab, either naturally or by euthanasia, increased over time ( $R^2= 0.65$ ) so too did the number of sea turtles that left the rehab locations alive ( $R^2= 0.51$ ), either released or kept as permanent captive (Figure 4).

### Release Location

A total of 2005 sea turtles were released over the 21-year period. Figure 3 shows the geographic points where each sea turtle was released excluding 328 records that were listed as released but did not have accompanying release coordinates.

## **DISCUSSION**

Green turtles were the most frequent species seen over the 21-year period followed by loggerhead and Kemp's ridley while juveniles were the most common life stage seen. This is contradictory to what has been historically reported; typically, loggerheads have been cited the most common sea turtle in North Carolina waters followed by juvenile green and then Kemp's ridley. Recent bycatch data analyses, however, have shown green sea turtle populations to be increasing at a faster rate relative to both loggerhead and Kemp's ridley populations (McNeill, Hall, & Richards, 2018). The records do correlate to the species least commonly seen in NC waters, that of the leatherback and hawksbill.

As the years progressed, more sea turtles were seen admitted to NC rehabilitation facilities. It is unclear from the data analyzed in this study whether the increase of sea turtles admitted to NC rehabilitation facilities over time can be attributed to an increase in the number of sea turtle strandings or the rehabilitation facilities within North Carolina becoming more equipped to rehabilitate in more sea turtles each year. Along with this increase, winter months (Nov, Dec, Jan) were the most frequent time for a sea turtle to be admitted which correlates to cold stunning as the most common stranding cause listed; cold stunning occurs when a sea turtle is exposed to prolonged water temperatures colder than their ideal range, leading to buoyancy issues, lethargy, paralysis, and eventual death. This typically happens when water temperatures suddenly drop, and the sea turtles have not yet migrated south and therefore is exclusively a

winter phenomenon. Following this, the summer months (May, June, July) were the next most frequent months to have a sea turtle strand which could correlate to a migration to the coast for the nesting season but could not be determined in this data analysis.

As stated above, cold stunning was the most prominent cause of stranding over the 21-year period and represented the majority cause of 2016 records, this could explain the large spike in sea turtles taken in during 2016 but more research is needed. The top five stranding causes, which accounted for 97.6% of all the records over the 21-year stretch, all increased over time with the remaining eight stranding causes being seen more as special circumstances. This increase could support the theory that rehabilitation facilities just became more equipped to handling sea turtle strandings, rather than one stranding cause correlating to the increase of records over time.

It should be noted that most of the out-of-state aquarium locations and some out-of-state rehabilitation facilities only took in sea turtles when space ran out in NC facilities. As such, the majority of facilities used over the 21-year period were located entirely within North Carolina. Often, sea turtles deemed unfit for release will become permanent captures at one of these out-of-state aquariums whereas in-state facilities will receive sea turtles kept for educational purposes for a few years before being released back into North Carolina waters.

The data analysis revealed quite a high rate of success in terms of sea turtles being released compared to a low rate of deaths/euthanasia over the years. Both release and death/euthanasia rates did increase over time but this correlates to the total number of sea turtles coming in to rehabilitation facilities also increasing over time. This high rate of success also contradicts the studies done in Florida and Queensland, Australia which both saw higher death rates over time compared to low release rates. This discrepancy could be explained by the top stranding cause seen in North Carolina being cold stunning which is a much more recoverable cause compared to others such as disease and incidental entanglement. Both the Florida and Queensland, Australia study cited diseases and other disorders as primary stranding causes; Florida primarily takes in sea turtles afflicted with fibropapillomatosis (FP) while Queensland typically sees sea turtles afflicted with buoyancy disorders. One study out of the New England Aquarium shows the rate of cold stunned turtles either released or transported to be later released; between November 1999 and January 2000, 127 sea turtles were brought in to the New

England Aquarium alive due to cold stunning and 84% (n=107) were either successfully rehabilitated or transported to another facility for later release. This number represented three different species, green, Kemp's ridley, and loggerhead, and the high release rate correlates to the high release rate seen in this data analysis (Turnbull, 2002).

Currently, with the high success rate of sea turtles being released, efforts and funds appear to be properly allocated to take in more sea turtles as is to be expected in the coming years.

## **ACKNOWLEDGEMENTS**

I would like to thank Dr. Matthew Godfrey for his guidance. I would also like to thank the director of the Karen Beasley Sea Turtle Rescue and Rehabilitation Center, Jean Beasley, and the North Carolina Aquariums who gave permission for us to access their databases.

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## FIGURES

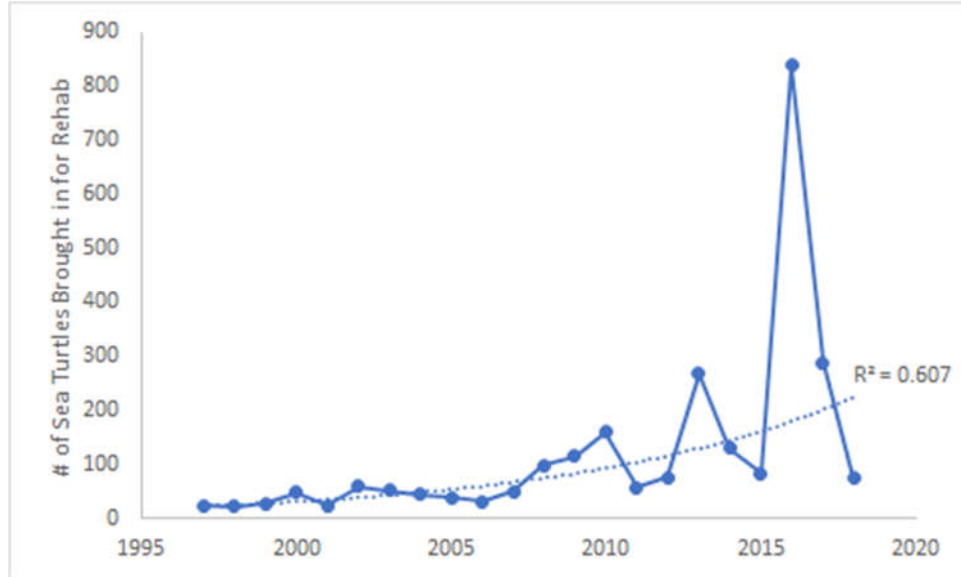


Figure 1: Sea turtles sent to rehab facilities in North Carolina between 1997 and 2018, n= 2594; blue dotted line represents the exponential trendline fitted to the entire data with an  $R^2$  value of 0.607.

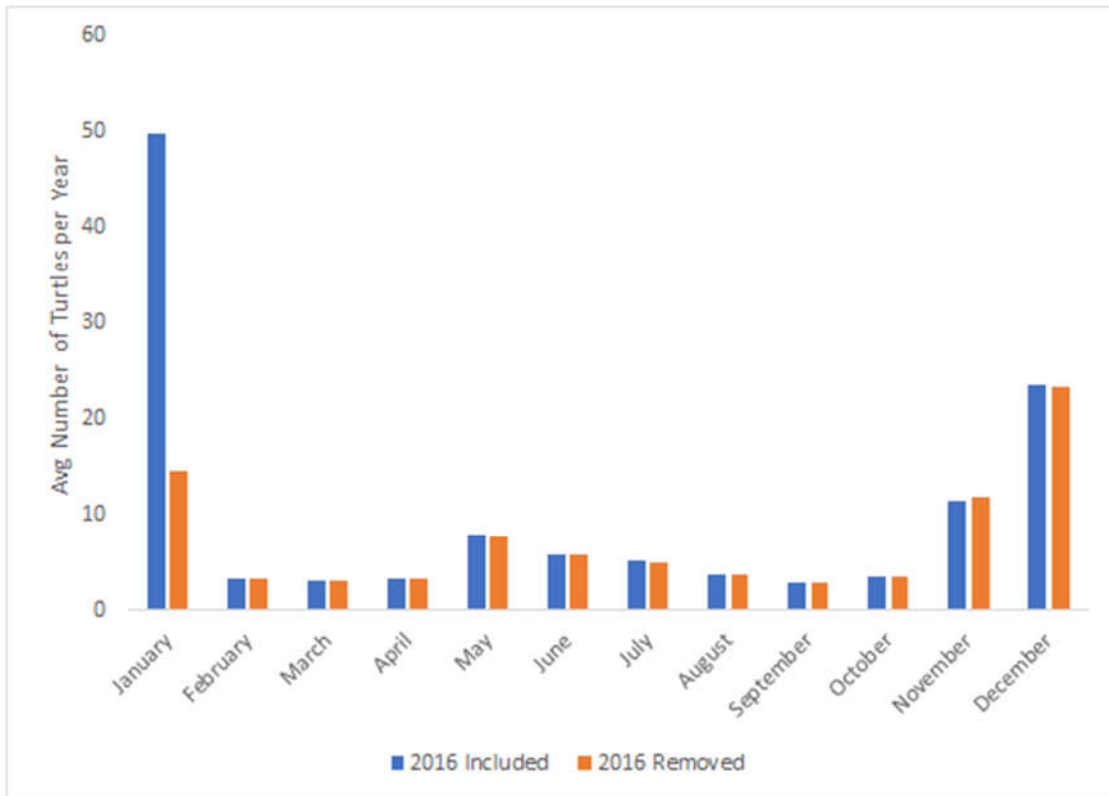


Figure 2: Average number of sea turtles sent to rehab facilities per month between 1997 and 2018; blue bars are the original data analysis; orange bars are with 2016 records removed

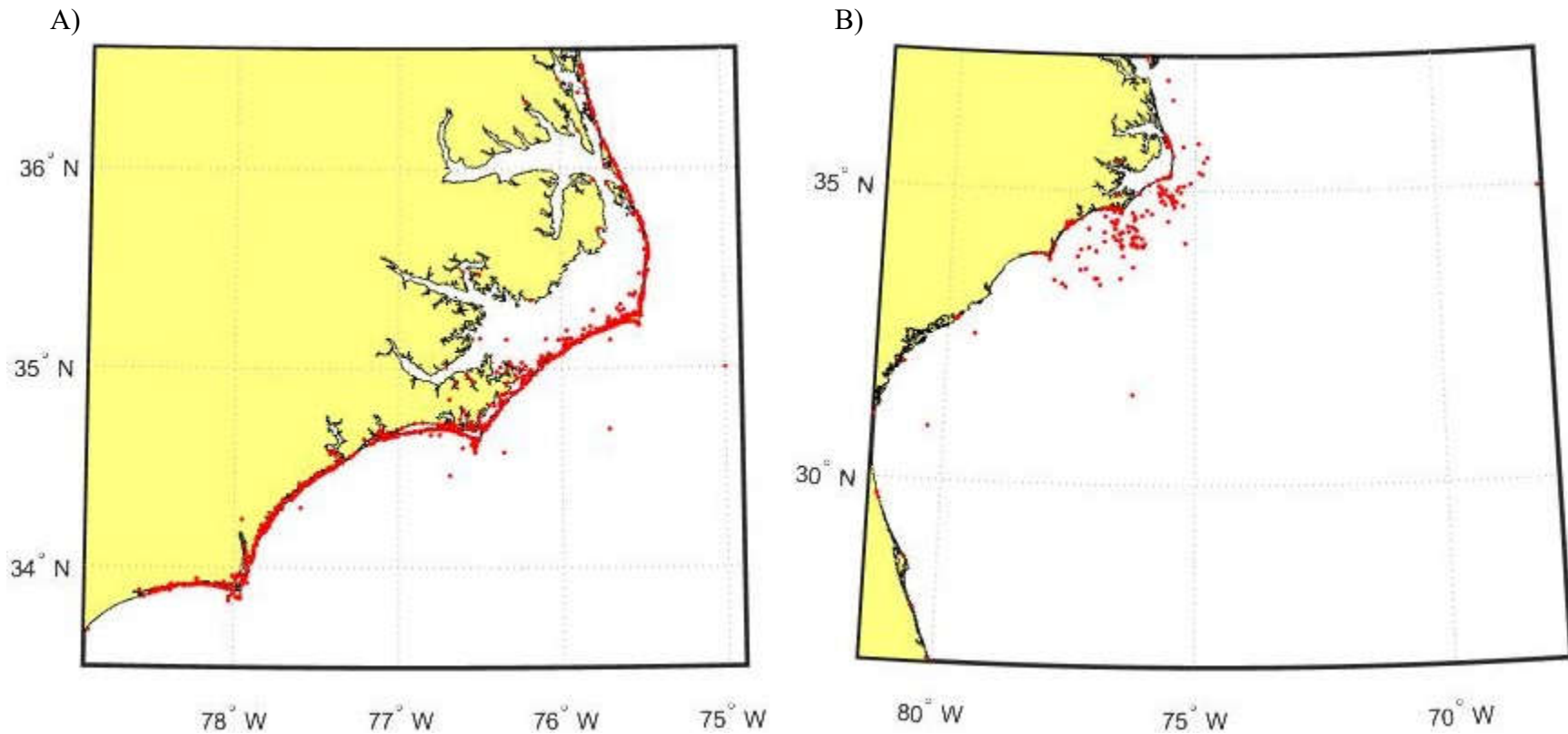


Figure 3: a) Coordinates for every record where the sea turtle was initially stranded. Top map shows strand locations for all sea turtle records with the exclusion of one sea turtle that was stranded in NJ but rehabilitated in NC. b) Coordinates of every sea turtle released after rehabilitation and the location of their release; excludes 328 records that were listed as released but did not have any coordinates listed for release location.

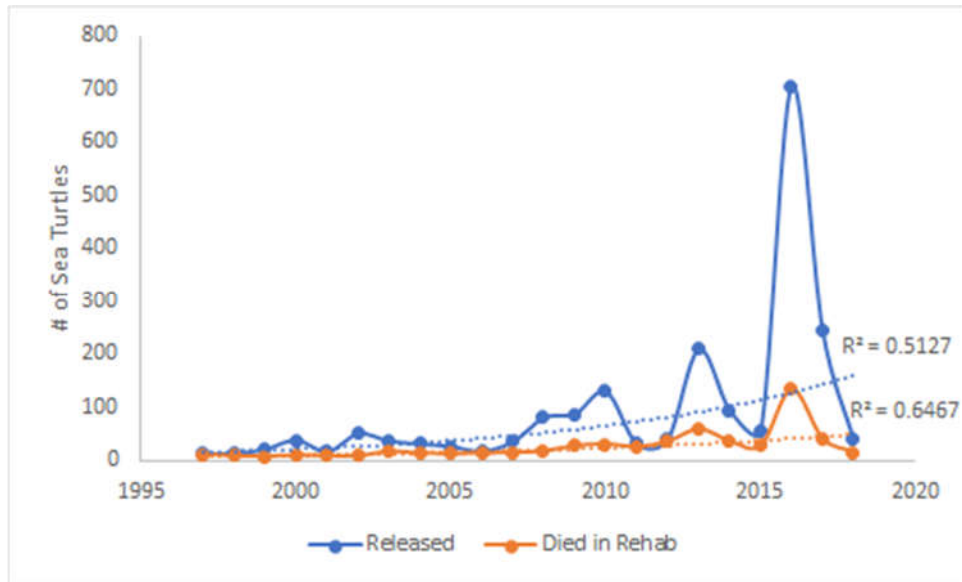


Figure 4: Sea turtles that were either released (n= 2005) or died in care/were euthanized (n= 562) over the 21-year period of analysis (1997-2018). Blue dotted line represents the exponential trendline fitted to records that were released with an  $R^2$  value of 0.51, orange dotted line represents the exponential trendline fitted to records that died/were euthanized with an  $R^2$  value of 0.65.

## TABLES

Table 1: Cause of stranding by species reported as proportion per species as well as per all records combined

Stranding Cause	Green	Loggerhead	Hawksbill	Leatherback	Kemp's Ridley	Hybrid	Total
Cold Stun	0.86	0.31	0.5	0	0.44	1	0.67
Entanglement - Incidental	0.04	0.18	0	0	0.35	0	0.12
Disease	0.04	0.23	0	0	0.04	0	0.08
Unknown	0.03	0.09	0.5	0.33	0.07	0	0.05
Watercraft	0.02	0.14	0	0.33	0.06	0	0.05
Mutilation	0	0.02	0	0.33	0.02	0	0.007
Power Plant	0.001	0.02	0	0	0.01	0	0.005
Shark	0.002	0.01	0	0	0.03	0	0.004
Dredge	0.002	0.01	0	0	0.01	0	0.003
Entanglement - Passive	0.001	0.003	0	0	0.01	0	0.003
Neurological Issues	0	0	0	0	0.01	0	0.001
Pollution	0	0.002	0	0	0	0	0.0004
Storm	0.001	0	0	0	0	0	0.0004

Table 2: Number of records for each rehab location divided into first through fourth location, the total number of visits, and the last location visited

<b>Rehab Location</b>	<b>1st Location</b>	<b>2nd Location</b>	<b>3rd Location</b>	<b>4th Location</b>	<b>Total Visits</b>	<b>Last Location Visited</b>
CMAST	487	15	2	0	504	288
KBSTRRC	582	151	18	0	751	728
NC Locations	28	16	0	0	44	32
NCAFF	20	34	12	0	66	52
NCAPKS	52	155	31	1	239	227
NCARI	1424	156	6	4	1590	1204
Other Aquariums	0	29	11	2	42	38
Out-of-State Locations	1	15	9	4	29	25
<b>Total</b>	<b>2594</b>	<b>571</b>	<b>89</b>	<b>11</b>	<b>3265</b>	<b>2594</b>

Table 3: Number of records for every rehab outcome reported as percentages along with the average, shortest, and longest length of time in rehab in days before outcome

<b>Rehab Outcome</b>	<b>Percentage of Records</b>	<b>Average # of Days in Rehab</b>	<b>Shortest # of Days in Rehab</b>	<b>Longest # of Days in Rehab</b>
Released	77.3	100.95	0	3327
Died in Rehab	21.3	32.26	0	3666
Still in Rehab	0.89	210.65	56	414
Euthanized	0.35	3.67	0	14
Permanent Capture	0.15	546.75	41	1001