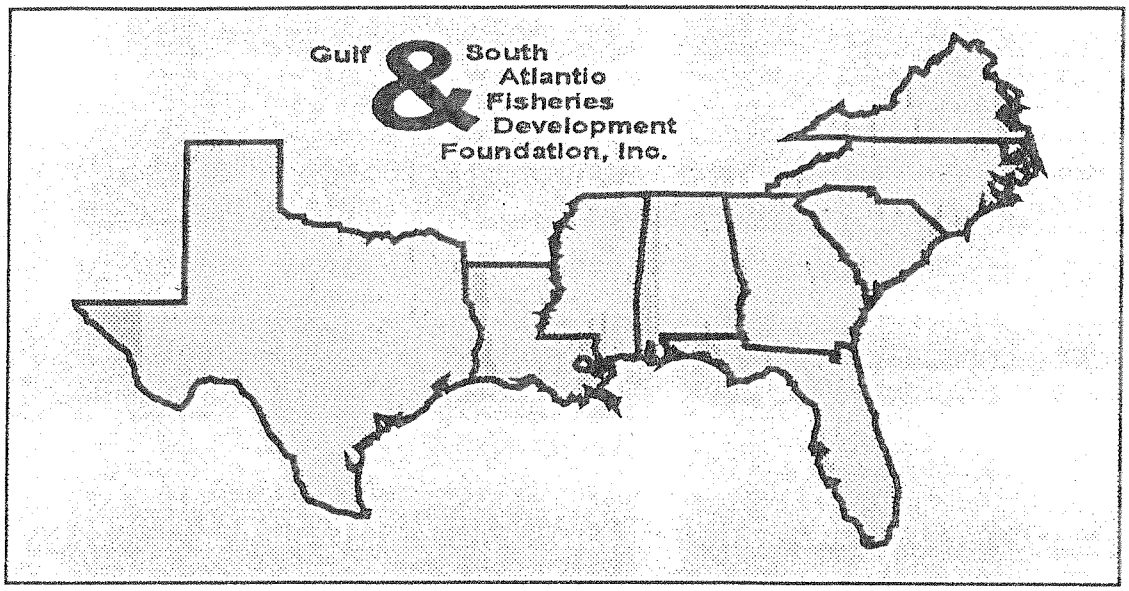

Alternatives to TEDs

Final Report

31 August 1998

A report of the Gulf and South Atlantic Fisheries Development Foundation, Inc. pursuant to National Oceanic and Atmospheric Administrication Contract 50WCNF606083. The views expressed herein are those of the author and do not necessarily reflect the views of NOAA or its subagencies.

FINAL PROGRESS REPORT

Contract No.	50WCNF606083 (Foundation #65)	
Amount:	Federal $493,398 Match -0- Total $493,398	
Project Title:	Alternative to Turtle Excluder Devices (TEDs)	
Grantee:	Gulf and South Atlantic Fisheries Development Foundation, Inc.	
Award Period:	From: 27 September 1996	To: 31 August 1998 (as amended)
Report Period:	From: 27 September 1996	To: 31 August 1998 (as amended)

The Contract, designated effective 27 September 1996, was modified (Modification #001) 15 November 1996 to extend the completion date from 31 December 1996 to 30 June 1998. Additional verbal and written negotiations continued through early July 1997 concerning the scope of work, culminating in Modification #002 received and executed by our office on 6 August 1997. Modification #004 extended the contract's completion date through 31 August 1998.

ABSTRACT

All turtle species found in the western North Atlantic are either endangered or threatened according the Endangered Species Act. These turtles suffer mortality from incidental interaction with shrimp trawlers fishing in southeastern U.S. waters, and to reduce this incidental mortality, turtle-excluder-devices (TEDs) have been mandated in this fishery since the early 1990s. The impact of TEDs, as well as better protection of nesting beaches in the U.S. and in neighboring countries, has allowed the stocks of these species to begin recovering. The status of turtle populations is poorly known however because of a lack of abundance information or surveys designed to monitor and assess the status of the populations. An analysis of a fishery-dependent sampling effort to document turtle interactions with the shrimp fishery (Henwood and Stuntz 1987) did provide an indirect estimate of abundance. This project conducted similar monitoring efforts aboard actively fishing commercial shrimp trawlers in the southeastern U.S. to monitor the current catch of turtles in nets not equipped with TEDs. A catch-per-unit-effort (CPUE) for this sampling effort was calculated based on the methodologies outlined in Henwood and Stuntz (1987) and the data collected under this project were then compared to the 1987 analysis. Because of a very different sampling distribution and stratification between the two studies, it was necessary to recreate the old NMFS database so that it could be re-analyzed based on the sampling distribution and stratification conducted under the current study. Complete reconciliation was not achieved, but the differences between our "new" analyses and the "old" original analyses of the NMFS database were minimal.

Between May 1997 and May 1998, observers made 42 trips aboard 17 different trawlers fishing throughout the southeastern United States. A total of 125 sea days were logged in the South Atlantic monitoring the catch and effort of 641 tows with dual or quad-trawl rigged trawlers. A total of 134 sea days were logged in nearshore (<15 fm) Gulf of Mexico waters, and 463 days were logged in offshore (> 15 fm) waters monitoring a total of 1,165 dual- or quad-rigged shrimp trawl tows. A total of 681 standardized net-hours of sampling occurred in the South Atlantic region, and 9200 standardized net-hours were monitored in the northwestern Gulf of Mexico (excluding one 32 tow trip in inshore Mississippi waters). For the South Atlantic, 293 turtles were documented, and excluding sighting and try-net catches, 274 were included in the analysis (201 loggerhead, 67 Kemp's ridley, 5 green, 1 leatherback). For the Gulf of Mexico, 30 turtles were documented of which 26 were included for analysis (8 loggerhead, 16 Kemp's ridley, 2 green). Catch rates of all the turtle species were substantially (3-35 times) higher in the current study than from the efforts monitored during the 1970's and 1980's.

Purpose -

Identification of Problem -

All sea turtle species found in the western North Atlantic Ocean are listed as endangered or threatened. The National Academy of Science (Magnuson et al. 1990) determined that shrimp trawling constituted the largest source of non-natural mortality on the group. Henwood and Stuntz (1987) estimated that about 48,000 sea turtles were caught by trawlers annually, with about 11,000 mortalities, and Magnuson et al. (1990) suggested that this estimate might be low by a factor of four. To alleviate incidental mortality from trawling in the southeast U.S., use of turtle-excluder-devices (TEDs) was mandated in 1989. Subsequent to the implementation of TEDs for portions of the fishery, Henwood et al. (1992) estimated that trawl-related turtle mortality had been reduced 67%, and Crowder et al. (1995) estimated that post-TED strandings of loggerheads were reduced 44% from the pre-TED period. Regulations for inclusive use of TEDs in southeast U.S. waters were phased in through 1994; except for extraordinary circumstances, all shrimp trawlers in the southeast U.S. must now use these devices year-round.

Obviously, not all turtles that strand do so because of an interaction with a shrimp trawler, but trawl interaction and subsequent mortality, especially for nearshore and inshore waters, can be monitored to some extent by the number of strandings that occur during the year on southeastern beaches. Turtle strandings for 1994 and 1995 were 2149 and 2175 respectively. Although these numbers are higher than the strandings recorded in the early 90's, they are less than pre-TED levels of the late 1980's. Strandings are concentrated in two southeast U.S. areas: Georgia-South Carolina and Texas-Louisiana. These are both areas of high shrimping intensity. Contrastingly, although the northwestern Gulf contributes ~75% of the total shrimp production compared to the South Atlantic's 10-15%, strandings in the South Atlantic region are nearly three times higher. On the other hand, the strandings in the Texas-Louisiana area consist of a high percentage (~50%) of Kemp's ridley turtles. This species is considered the most endangered of the five sea turtle species inhabiting the northwest Atlantic.

A review of turtle strandings by a Turtle Expert Working Group in 1996 noted that Kemp's ridley populations, along with other species, are increasing; however considering that TEDs should be 97% effective, they concluded that strandings are too high. According to several reports (Caillouet et al. 1991, 1996; Gallaway et al. 1995) current stranding rates have not changed significantly compared to pre-TED years. In part, this rate is affected by an increasing population size. An increasing pool of turtles is available which may interact with trawlers and shrimp fishing effort has remained constant, thus the probability of a trawler-turtle interaction has increased. Thus, even with a lower percent of the population actually interacting with trawlers, strandings have remained constant. The Working Group concluded that the status of turtle populations was uncertain because specific information concerning population size was lacking. Thus, it is impossible to tell if the current stranding rates are more typical than the very low stranding rates that occurred just after TED rules were implemented.

One of the major impediments in understanding the impacts of shrimping on turtle populations is a lack of abundance information that would allow estimation of stock size compared to the pre-TED period. Historical catch-per-unit-effort information is available from pre-TED period observer programs aboard commercial shrimp vessels. Henwood and Stuntz (1987) and Henwood et al. (1992) summarized CPUEs for turtles taken by commercial shrimp trawlers in the southeast

U.S. from 1970 through 1983. Subsequently, a NMFS observer program during 1988-1990 (Renaud et al. 1990; Renaud et al. 1991), intended to document the effectiveness of TEDs as both turtle and finfish excluders, used non-TED equipped nets for comparative purposes, found turtle catch rates were very similar to the Henwood and Stuntz results from a decade earlier. No substantive non-TED net sampling effort has been conducted since that time that could provide updated estimates of turtle catches by the shrimp fishery.

Project Goals and Objectives -

This project was designed to provide a better estimate of turtle abundance by measuring interactions of those populations with shrimp trawling activities in the northwestern Gulf of Mexico and the South Atlantic. A series of negotiations occurred between NMFS and the Foundation which altered the original scope of work and the proposed methodologies. Specific tasks to be accomplished were:

1) place observers aboard these vessels for a minimum of 700 days (450 days offshore {>15 fm) in the northwest Gulf of Mexico, 125 days in the nearshore {< 15 fm) northwest Gulf of Mexico, and 125 days in the nearshore South Atlantic) during a 12-month period to document the catch and effort of these vessels using "naked" nets {nets without TEDs); and

2) generate information on the catch-per-unit-effort (CPUE) for turtles by comparing the catch rates generated by this study to the data generated by observer programs during pre-TED years (prior to 1990).

Approach -

Description of work performed --

Personnel: A group of observers were contracted to work on this project. These observers received instruction and onboard training in proper sampling and data recording protocols modified from the Shrimp Trawl Bycatch Reduction Research Program. Observers also received appropriate training and certification in turtle handling and tagging techniques from qualified NMFS Galveston Lab and/or University of Georgia Marine Extension Service personnel. The Foundation worked closely with personnel in the Texas Sea Grant Marine Advisory Service and the University of Georgia Marine Extension Service who acted as local liaisons with the fishing industry to explain the purpose and objectives of the project. Western Gulf of Mexico observer activities were coordinated by an experienced observer, who also conducted observer activities. Two data management personnel were contracted to proof completed data sheets, and to enter the data into a standard data management software (dBase). A data analyst was contracted to conduct final analyses of the datasets using SAS.

Permits: With observers selected and trained, the Foundation applied to NMFS for authorization to use nets without TEDs, and to possess and handle all species of sea turtles. NMFS subsequently designated the Foundation's Program Director and the contracted observers as agents of NMFS under the Southeast Regional Administrator's research permit, PRT-676379, as amended, issued by the U.S. Fish and Wildlife Service. That designation was effective through 1 June 1998.

With this designation in hand, the Foundation made similar applications to conduct work in the state-controlled waters of South Carolina, Georgia, the Atlantic coast of Florida, Alabama, and Mississippi. It was our understanding that no such authorizations were necessary for Louisiana and Texas. All states except Florida complied with this request and issued

permits and/or authorizations to conduct this experimental work in their respective waters, as necessary. Without a permit to work in Florida state waters, all work conducted off Florida was restricted to federal waters.

Additionally, NMFS developed a Section 7 Consultation including a Biological Opinion and an Incidental Take Statement outlining the restrictions and protocols required to conduct work under this project. That Biological Opinion restricted tow times in nearshore (<15 fm) waters to 55 minutes during April through October and 75 minutes from November through March. Tow time was measured from the time the shrimp trawl doors entered the water until they returned to the surface. Trawlers fishing in waters deeper than 15 fm were not restricted by tow times.

The Foundation also contacted NMFS Miami personnel to provide turtle handling and tagging protocols and tags. All turtles captured and tagged during the study were handled according to these standard protocols.

Observers were required to be in possession of all of these documents during their stay aboard commercial trawlers. The trawler was only exempt from using TEDs and possessing turtles when the observer was present onboard. To alleviate potential enforcement issues should the trawler be boarded by the Coast Guard or other regulatory/enforcement agency representative, the Foundation or its observers constantly updated the district or local Coast Guard offices, informing them of the times, areas, and trawlers that were participating in this study.

Vessels: Through the cooperative efforts of Texas Sea Grant, Georgia Marine Extension Service, industry associations, and the Foundation membership, the Foundation located vessels that wished to voluntarily participate in this survey. To offset the accommodation costs of the observers, offshore vessels were compensated at a rate of $100.00 per day to include observer accommodations and meals, as well as any work conducted by the crew helping the observer safely remove turtles from the nets, tag them, and return them safely to the waters. Because of the restricted tow times in nearshore waters, trawler owners, captains, and crews were rightfully concerned about lost production from their restricted fishing efforts and asked to be compensated at a higher $500.00 daily rate to offset this lost production. The restricted tow times equated to roughly 40-45 minutes of actual net fishing time (time the gear is actually on the bottom); trawler owners estimated that hauling back and setting gear this often during a normal working day would curtail their production by as much as 25%. Additionally, this restriction placed an extraordinary workload on the backdeck crew. In addition to the numerous retrievals and deployments of the trawls, the crew was constantly handling catch on the deck, sorting shrimp and marketable finfish from the bycatch. Under these circumstances, the Foundation agreed that this extra compensation was justified. Lastly, the Foundation secured vessel liability insurance that provided the trawler owner with protection to cover the observer's presence on the trawler.

Sampling Design: The sampling design for the project was a modification of that outlined for the Shrimp Trawl Bycatch Reduction Research Program. Observer placement on a specific trawler was only predicated by the trawler's intent to fish a general depth range (< or > 15 fm), as defined for tow time restrictions. Other than the predetermined number of days that would be sampled in both nearshore and offshore regions, the sampling occurred in a strictly fishery dependent manner. Observers participated in fishing trips that were under the full control of the trawler captain; the observers did not have any input as to the areas, times, or depths fished, nor the length of the tows. The only restriction on the captain was to comply with the tow-time by depth guidelines should the vessel move inshore of the 15 fathom contour.

At the beginning of each trip a complete and accurate description of the fishing gear was recorded, and any alterations to that gear specification during a trip were noted. For each tow, the locations, times, and depth were recorded for the start and end of the tow, and vessel speed and gear types deployed were noted. Based on a pre-defined list, the observer also assigned an "operation code" indicating the success and/or problems that occurred with each net for each tow. Tow times were only recorded for the primary nets, not try-nets.

Turtles were handled according to the NMFS/SEFSC Cooperative Marine Turtle Tagging Protocol. Captured turtles were identified, measured (straight line and/or over-the-curve), tagged with inconel tags and photographed; standard resuscitation procedures as outlined in the Incidental Take Statement prepared for this project (based on 50 CFR Ch. II, 227.72 (d) (e)) were followed for stressed turtles. As per the requirements of the Incidental Take Statement, both dead and live turtles were tagged (one tag in the leading edge of the foreflipper for dead, and one tag on the trailing edge of each foreflipper for live), and returned to the sea in an area away from current shrimping activities.

Data Processing: Upon return to port, observers turned over all data generated during the fishing trip to Foundation-contracted data management personnel. At that time the observer, along with the coordinator, reviewed the data sheets for completeness and accuracy, and provided them to a regional Data Manager for final proofing. The Data Manager entered the data set into a standard computer format (d-Base), cross-checked a print-out of the computer file against the original data sheets for keypunch errors, made corrections to the computer file, and re-checked the edited version against the previous version. Once the computerized database was certified correct by the Data Manager and the Regional Coordinator, the data were provided to NMFS Galveston Lab for archival, and an additional set of the data was supplied to Foundation personnel and a contracted Data Analyst for final interpretation.

Data Analysis: A catch-per-unit-effort (CPUE) for each tow was calculated following the methodology of Henwood and Stuntz (1987) and Henwood et al. (1992) based on the hours towed and the amount of net fished as represented by feet of trawl headrope. According to Henwood and Stuntz (1987), turtle catches are directly proportional to the size of the nets being fished; thus a 100' headrope length net will catch twice as many turtles as a 50' headrope length net, if both are towed under similar conditions for the same timeframe. The net size was standardized to 100' of headrope, and converted to meters. Effort (in 30.5 m net hours) was calculated using the formula:

$$\text{Effort} = (\#\ \text{nets} * \text{net length (m)}/30.5\ \text{m}) * (\text{minutes}/60)$$

Standard descriptive statistics (means, standard errors, etc.) for these values were calculated for trip or other unit of time. Turtle CPUE (R) was calculated as:

$$R = \sum_{i=1}^{n} T_i / \sum_{i=1}^{n} E_i$$

and 95% confidence intervals on $R = R + 1.96\ (1/E)$

$$\sqrt{\sum_{i=1} (T_i - RE_i)^2 / n(n-1)}$$

where R = CPUE (turtles per 30.5 m net hours)
R = estimated CPUE
T_i = number of individual turtles
E_i = effort (30.5 m net hours)
n = sample size (no. tows)

The values generated for turtle CPUEs during the present study were compared to the catch rates estimated during pre-TED years, using the database reported by Henwood and Stuntz (1987), Henwood et al. (1992), and Gallaway et al. (1995). We did not include a re-evaluation of the 1988-1990 NMFS turtle dataset; very few turtles were captured, and the CPUEs generated from that analysis (Renaud et al. 1990; Renaud et al. 1991) were very similar to the CPUEs generated by Henwood and Stuntz (1987). Current and historical catch rate data were compared between and among various depths, seasons, and areas. The Foundation's Program Director and the contracted data analyst worked closely with NMFS personnel to recreate the historical database and analytical results presented by Henwood and Stuntz (1987) and Henwood et al. (1992). This recreation was necessary as the current database did not exactly duplicate the historical effort in terms of areas, depths, and times, thus only appropriate portions of the historical database were used to make comparisons to the current data. To do so, we first needed to ensure that the historical database was incorporated correctly into the analytical program.

Project Management -

Responsibility for the overall project administration and coordination was assumed by personnel employed by the Gulf and South Atlantic Fisheries Development Foundation, Inc., in Tampa, Florida. The Foundation's Executive Director, Judy Jamison, had ultimate responsibility for all administrative and programmatic Foundation activities, with oversight by the Foundation's Board of Trustees. She ensured timely progress of activities to meet project objectives and confirmed compliance of all activities with NOAA/NMFS guidelines. The Program Director, Steve Branstetter, had overall responsibility of the technical aspects of the project to ensure that all project milestones were completed in a timely manner, coordinating analytical efforts, and preparing operational reports concerning project performance. Administrative staff tracked observer performance, processed reimbursement claims, maintained project accounting and bookkeeping records, and assisted auditors during their reviews. The Foundation worked cooperatively with Sea Grant and Marine Extension Service personnel who acted as regional liaisons to provide immediate contact with the local shrimping industry. One of the contracted observers also assumed day-to-day observer coordination responsibilities, handling final details between the observers and vessel owners/captains concerning specific trip dates and times. Data management personnel were responsible for transferring raw data into a manageable computer database for analysis and archival at the Foundation and at NMFS Galveston. Contracted observers were responsible for collecting accurate data according to established protocols.

Findings

Sampling Effort - Between May 1997 and May 1998, observers made 42 trips aboard 17 different trawlers working in the South Atlantic and Gulf of Mexico. Sampling occurred in all months except January and February, and no nearshore (<15 fm) Gulf of Mexico sampling occurred in December. For the South Atlantic, two trawlers were used to survey nearshore (< 15 fm) waters; one in South Carolina (3 trips) and one in Georgia-northwest Florida (9 trips) for a total of 125 sea-days. The 15 trawlers in the Gulf of Mexico made 30 trips; 12 trips were entirely in nearshore waters, 17 trips were focused in offshore waters (one trip did have one tow in < 15 fm), and one trip included a substantial number of tows in both nearshore and offshore areas. Nearshore Gulf efforts totalled 134 sea days; offshore efforts included 463 sea days.

Although number of seadays was the benchmark for measuring performance under the contract, effort was really to be measured in the number of tows and tow-hours monitored. In the South Atlantic, a total of 641 tows were monitored; only one tow was in water > 15 fm deep. All 641 tows were conducted under restricted tow times, but tow times varied according to season and other conditions. For the Gulf of Mexico, nearshore effort included 584 tows made under restricted tow times; offshore effort included 581 non-time-restricted tows. One 32 tow trip in Mississippi Sound waters, which caught no turtles, was excluded from the Gulf of Mexico analyses. This exclusion allowed us to restrict the Gulf of Mexico analysis to a dataset west of 91°00', or NMFS Statistical Zones 15-21. This restricted the Gulf analysis to 1,133 tows; 581 in offshore waters and 552 in nearshore waters. Although nearshore effort was restricted by tow times, no such restrictions applied offshore. Average tow time in offshore Gulf waters over the course of the project was 7.77 hr; this value varied seasonally with an average tow time of 10.05 hr in Mar.-Apr., 6.57 hr in May-Aug., and 8.75 hr in Sept.-Dec. Total tow hours in the nearshore Gulf was 505 hr (601 headrope-net-hr), 4,514 hr (8,599 headrope-net-hr) of towing was expended in the offshore Gulf, and 596 hr (682 headrope-net-hr) were fished in the South Atlantic.

Turtle Captures - Turtle interactions were divided into two groups: (1) turtles actually caught in the main nets and landed when the nets were brought onboard, and (2) turtles sighted in the main nets at haulback but that escaped before the nets were brought onboard, plus turtles caught and landed from try-net efforts. All totalled, 323 turtle observations were documented: 293 in the nearshore South Atlantic efforts, and 30 in the Gulf efforts (24 nearshore and 6 offshore) (**Table 1**). Turtles that crawled or fell out of the nets were not considered a capture for CPUE calculations. Try net catches could not be used in CPUE calculations because tow times were not recorded for these nets.

Of the 293 South Atlantic turtles (219 loggerhead, 68 Kemp's ridley, 5 green, and 1 leatherback.), 12 escaped from the nets after being seen and 7 were caught in try-nets. Total turtles used for analysis in the South Atlantic equalled 274: 201 loggerhead, 67 Kemp's ridley, 5 green, and 1 leatherback. Of these, only 5 loggerhead and 1 Kemp's ridley turtle died because of the interaction.

Gulf of Mexico nearshore observations (24 turtles) included 1 unknown species and 2 try-net catches; offshore observations (6 turtles) included 1 turtle lost from the net. For the Gulf efforts, 26 turtles (8 loggerhead, 16 Kemp's ridley, 2 green) were included in the CPUE analysis; 5 loggerhead, 15 Kemp's ridley, and 1 green in nearshore efforts; 3 loggerhead, 1 Kemp's ridley, and 1 green in offshore efforts. For nearshore efforts, 1 loggerhead died, 1 dead Kemp's ridley had fresh propeller cuts and 1 Kemp's ridley with similar propeller cuts was putrid. One loggerhead and one green turtle were killed in offshore efforts.

Prior to the start of this program, the Incidental Take Statement was calculated based on the catch rates from previous studies and the estimated effort that would be expended during the current study. The catch rates of all species were much higher than anticipated by these calculations. The Foundation kept the Technical Monitor informed on a timely basis concerning the catch levels and the mortality levels. NMFS modified the total-allowable-catches to incorporate these higher catch rates, and allow for greater live captures of the various species, but NMFS did not increase the total-allowable-mortality for any species; that level was not exceeded for any species. The final adjusted incidental takes and mortalities, by species, and the actual take levels realized were:

Species	Total Allowable Catch		Actual Catch	Allowable mortality	Actual mortality
	Initial	Adjusted			
Loggerhead	120	447	229	12	7
Kemp's ridley	48	108	85	9	3*
Green	7	7	7	2	1
Hawksbill	6	6	0**	2	0
Leatherback	7	7	1	2	0

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* Two of these mortalities were from propeller wounds; wound appeared fresh on one, the other turtle was long-dead. The third mortality occurred when a large heavy object fell on a resuscitating turtle while it was onboard the trawler.

** One turtle which crawled out of a net at night was tentatively identified as a hawksbill; it was more likely a loggerhead.

CPUE- In order to compare our results to those reported by Henwood and Stuntz (1987), it was first necessary to recreate the database they used for their analysis. Complete restoration and re-creation of the original analytical results was not achieved, but very similar numbers were generated (**Table 2**). To accomplish this recreation the Foundation's Program Director and the Foundation's contracted data analyst met with Dr. Henwood at the NMFS Pascagoula facility for three days, and then continued timely communications for the next 3 weeks during our attempts to reconcile the database. To do so required that Dr. Henwood revisit his field notes, and SAS programming notes.

With his help, we were able to recreate the Gulf of Mexico database, accounting for all the turtles used in his analysis, and closely approximating the effort data. Total Gulf of Mexico effort in our re-creation was 16,484 100'-net-hours vs. 16,771 100'-net-hours used by Henwood and Stuntz. Differences were greatest between regions within the Gulf, and may be from differing placement of some tows in the various analytical cells.

For the South Atlantic database, neither we nor Dr. Henwood could recreate the numbers used in the original analysis. Although our analysis of the effort datafiles generated very comparable numbers, we could not recreate the turtle catches analyzed by Henwood and Stuntz. According to the manuscript that led to Henwood and Stuntz (1987), which contained additional information not found in the final publication, a total of 523 turtles were taken in South Atlantic sampling, excluding the area around Cape Canaveral, FL; of these, Henwood and Stuntz used 482, excluding 41 of the total number of turtles. From our evaluations of the NMFS datafiles, there appears to be some inconsistencies within the various database files that cause problems in the SAS treatments; we generated a turtle file consisting of 548 turtles, Dr. Henwood's efforts resulted in a count of 542 turtles. A further evaluation of the existing datafiles by the Foundation's analyst produced a total count of 509 turtles; 14 less than the "target" number of 523 total turtles; 11 loggerheads (479 vs. 490), and 3 Kemp's ridleys less (17 vs. 20). According to Dr. Henwood, he cannot find documentation of why he reduced this 500+

turtles to 482 (453 loggerhead, 18 Kemp's ridley, 7 green, and 4 others). Therefore, to the best of our ability, we believe that we have fairly approximated the database used in the 1987 analysis, and can thus use that recreated database to compare to our new dataset. The CPUEs for the "new" vs. "old" analysis of the NMFS dataset for Gulf of Mexico were nearly identical for "all turtles combined" and for each species, but the CPUE categories were somewhat higher for the South Atlantic because of the increased turtle records used during this analysis (**Table 2**).

For the Gulf of Mexico analyses, the NMFS dataset covered the entire Gulf of Mexico, while the Foundation dataset (excluding one trip) was entirely west of 91 degrees longitude (Statistical Zones 15-21). The NMFS database, spanning a decade and a much broader geographic area, also had very different depth stratification. Over 60% of the tows in the NMFS database were conducted inshore of 10 fathoms during the third trimester (**Table 3a**); by contrast, only about 22% of our data came from the same cells (**Table 3b**). A total of 63% of the Foundation data were collected offshore of 10 fathoms; the largest Gulf cell, comprising 38% of all Gulf tows was >10 fm during the second trimester. Because of the differences in the two sampling efforts, we re-analyzed the NMFS dataset according to our stratification. Detailed results of the various analyses are presented in **Tables 3** (all species combined), **Table 4** (loggerhead), **Table 5** (Kemp's), and **Table 6** (green) where "a" is the NMFS dataset and "b" is the Foundation dataset. Because of the substantial detail created by the stratification (by depth, by trimester, by depth-X-trimester), only highlights of the various analyses are presented in the text. Given that turtle captures are still a rather uncommon event, for the more specific stratifications where effort is low and/or turtle captures are zero, the resulting CPUEs are probably meaningless; however in some instances, some insights can be gleaned from the results.

Total turtles: The CPUEs for our current survey were generally 10-fold higher than the CPUEs from the NMFS dataset. The vast differences in the CPUEs generated from the Foundation dataset compared to the NMFS dataset far outshadowed any minor discrepancies between our re-created version of the NMFS dataset and that of the analysis by Henwood and Stuntz. For many of the stratification cells, the CPUE differences were tens-of-fold higher. For example, our sampling produced 20 turtles in 0-5 fm in the Gulf for only 362 tows (CPUE= 0.095), whereas the NMFS effort resulted in only 13 turtles during 1570 tows (0.003) (32X higher). This CPUE was most effected by the great increase in catch of Kemp's ridley turtles (see below), where CPUE increased from 0.0007 to 0.02341 (33X higher).

Seasonal and seasonal-by-depth differences in abundance also existed , but are probably more reflective of interannual variations in temperature and weather conditions that might effect turtle movements and migrations. The largest Gulf catch in the depth-X-trimester analysis of the NMFS database was 13 turtles in the 5-10 fm depth range during the third trimester (Sept. - Dec.); this timeperiod also had the largest effort of any Gulf cell (4253 100'-net-hours). Although our sampling was not great in these intermediate ranges, we did not catch any turtles here. Our largest catch (and effort) during the third trimester was in the 0-5 fm depth range where 11 turtles were taken during 212 100'-net-hours, and we also took turtles during this trimester in the >15 fm range.

Loggerheads: Overall, loggerhead catch rates were three times higher in the Gulf, and more than seven times higher in the South Atlantic. Six of the eight Gulf loggerheads were taken during the third trimester; four in 0-5 fm, and 2 in > 15 fm.

This was similar to the distribution from the NMFS dataset: 17 of 22 loggerheads were taken during this same trimester, with 5 of those taken in the 0-5 fm depth range, and 9 taken in the 5-10 fm depth range. For the South Atlantic, most were taken in the 0-5 fm depth range during the summer (May-Aug.).

Kemp's ridley: As noted above, catch rates of Kemp's ridley turtles increased about 33-fold in the Gulf of Mexico, with 15 of 16 being taken in 0-5 fm depth, and 12 of the 15 being taken during spring and fall (Jan.-Apr. and Sept.-Dec.). Lack of catches, and effort, for the summer period were programmatic restrictions stemming from the Section 7 Biological Opinion which prohibited sampling in the southern Texas area during April through June, and the Texas shrimping closure further restricted our May-July sampling to Louisiana waters. Thus, only a few tows were completed in this nearshore region during the summer months (48 out of a total of 362 tows in the 0-5 fm depth range). Thus, although only 3 turtles were taken during the "summer" period, the CPUE (0.1390) for the May-Aug. period for the 0-5 fm depth range was substantially higher than in the winter-spring period (0.0786) or fall (0.0554).

For the South Atlantic, most effort is in the 0-5 fm depth range. The CPUE from the NMFS dataset was similar for both the 0-5 fm and 5-10 fm ranges, but in the Foundation dataset the CPUE was much higher in the 5-10 fm range. As with the loggerhead data, this may reflect local annual weather and water conditions.

Green: Given the low number of captures of this species, both in the NMFS dataset and the Foundation dataset, analysis beyond total catch and total regional effort were fairly meaningless. For total regional efforts however, CPUE increased 6-7 fold for both the western Gulf and the South Atlantic.

Impacts and Evaluation -

This project generated substantial amounts of observer coverage documenting turtle-trawler interactions during shrimping operations in the northwestern Gulf of Mexico and in the South Atlantic. The objectives were quantifiable and all were attained; the proposed (as modified and amended) number of sea days were met, without exceeding the allowable captures or kills of endangered/threatened sea turtles. Results of these analyses were compared to similarly generated historical data to ascertain trends over the last decade. This information will allow federal management groups to better assess the current situation, and thus make more informed decisions concerning various alternative strategies related to the reduction of turtle-trawler interactions in the northwestern Gulf of Mexico.

A well conceived fishery strategy has many benefits. It will provide user-groups with the opportunity for continued utilization of this important marine resource without unnecessary impact on other marine fauna, and provide long-term ecological stability of the southeastern U.S. ecosystem. Additionally, this information can be used by interest groups to better understand the current stock of turtles that do coexist with the shrimp fleet, and the current impact that these interactions have on the stock(s). As such, the completion of this project, as reflected in this report, should have direct or indirect benefit to a wide variety of user- and interest-groups throughout the region and Nation.

Table 1. Listing of sampling trips, effort, and catch for this project.

Gulf and South Atlantic Fisheries Development Foundation Turtle Project
Final Numbers

	Trip No.	Month	Paid Vessel Days	Tows	Cc Alive	Cc Dead	Cc try/lost	Lk Alive	Lk Dead	Lk try/lost	Other (A=alive, D=dead)
S. Atl.	SN97	5	5	40	7	0		1	0		
	SN98	5-6	5	33	20	0	3/0	1	0		1 leather A
	SN99	6	9	66	31	0	4/1	1	0		
	SN100	6-7	10	58	19	0		13	0		1 green A
	SN101	7	13	71	27	4		1	1		
	SN102	7-8	11	65	18	1	0/1	0	0		
	SN103	8	7	40	7	0		0	0		
	SN104	8-9	11	44	6	0	0/2	1	0		
	SN107	10-11	23	110	12	0		6	0		
	SN108	3	5	17	13	0	0/3	9	0		
	SN109	3	3	11	20	0	0/1	25	0	0/1	2 green A
	SN110	3-4	23	86	16	0	0/3	8	0		2 green A
TOTAL			125	641	196	5	7/11	66	1	0/1	6 TOTAL 293 Eval. 274
Gulf nearshore	FN94	6-7	12	85	0	0		0	0		
	FN98	7-8	1	1	0	0		0	0		
	FN101	7	8	58	0	0		0	0		1 ? A
	FN103	8	5	25	0	0		2	0		1 green A
	FN104	8	4	22	0	0		1	0		
	FN105	9	9	16	0	0		0	0		
	FN107	9-10	25	79	0	0		2	1***	1/0	
	FN109	9	10	59	2*	0		3*	1**		
	FN110	9	15	54	1	1		0	0		
	FN112	10	6	32	0	0		0	0		
	FN115	10-11	13	47	0	0		0	0		
	FN125	3	7	23	1	0		1	0		
	FN129	4	7	33	0	0		2	0		
	FN130	4	12	50	0	0	1/0	2	0		
TOTAL--#			134 excl. 112 =	584 552	4	1	1/0	13	2	1/0	2 Total 24
	* count includes a turtle caught twice							? turtle lost, not included in eval.			Eval. 21
	** fresh dead with prop cuts										
	*** putrid with prop cuts (was tagged with unknown NMFS tag)										
Gulf Offshore	NMFS trip*								1*		
	FN91	5-6	31	41	0	0		0	0		
	FN92	5-6	44	29	0	0		0	0		
	FN93	6	17	15	0	0		0	0		
	FN94	6-7	18	17	0	0		0	0		
	FN95	7-8	47	76	1	0		0	0		
	FN96	7-8	29	45	0	0		1	0		
	FN97	7-8	36	56	0	0		0	0		
	FN98	7-8	21	24	0	0		0	0		
	FN113	10-11	18	25	1	0		0	0		
	FN114	10	3	2	0	0		0	0		
	FN116	11-12	34	44	0	0		0	0		
	FN117	11	19	19	0	0		0	0		
	FN118	11-12	33	48	0	0	0/1	0	0		
	FN119	11	8	5	0	0		0	0		
	FN120	11-12	25	47	0	1		0	0		
	FN121	12	18	17	0	0		0	0		1 green D
	FN127	3-4	22	18	0	0		0	0		
	FN128	3-4	40	53	0	0		0	0		
TOTAL--#			463	581	2	1	0/1	1	1		1
	*this was a NMFS-sponsored trip; the Foundation did not seek nor receive information on this trip or capture										Total 6 Eval. 5

Table 2. Comparison of Catch, Effort, and CPUE for the NMFS database as calculated by Henwood and Stuntz (1987) "old" vs. our re-creation of the dataset "new".

	NMFS OLD			NMFS NEW			Diff. new from old		Effort % Diff.
	CPUE	n =	effort	CPUE	n =	effort	n =	effort	from old
All turtles									
Gulf	0.0031	52	16771	0.0038	52	16484	0	-287	-1.7
South Atlantic	0.0487	482	9943	0.0548	509	9998	27	55	0.6
Loggerhead									
Gulf east (Zones 1-7)	0.0046	12	2589	0.0058	14	2618	2	29	1.1
Gulf central (Zones 8-17)	0.0022	14	6353	0.0027	12	5976	-2	-377	-5.9
Gulf west (Zones 18-21)	0.0020	16	7829	0.0019	16	7890	0	61	0.8
Gulf Combined	0.0025	42	16771	0.0029	42	16484	0	-287	-1.7
South Atlantic	0.0456	453	9943	0.0506	479	9998	26	55	0.6
Kemps ridley									
Gulf east (Zones 1-7)	0	0	2589	0	0	2618	0	29	1.1
Gulf central (Zones 8-17)	0.0003	2	6353	0.0004	2	5976	0	-377	-5.9
Gulf west (Zones 18-21)	0.0005	4	7829	0.0007	4	7890	0	61	0.8
Gulf Combined	0.0004	6	16771	0.0004	6	16484	0	-287	-1.7
South Atlantic	0.0018	18	9943	0.0027	17	9998	-1	55	0.6
Green									
Gulf east (Zones 1-7)	0	0	2589	0	0	2618	0	29	1.1
Gulf central (Zones 8-17)	0.0003	2	6353	0.0004	1	5976	-1	-377	-5.9
Gulf west (Zones 18-21)	0	0	7829	0.0004	1	7890	1	61	0.8
Gulf Combined	0.0001	2	16771	0.0003	2	16484	0	-287	-1.7
South Atlantic	0.0007	7	9943	0.0012	9	9998	2	55	0.6

Table 3a. NMFS Turtle data - All turtles combined CPUE analysis based on Foundation stratification (Gulf data limited to west of 91 degrees longitude)

ID	Region	Depth	Trimester	Number of Tows	Number of Turtles	Turtles Per Tow Average	Turtles Per Tow Std. Error	Total Tow Hours	Hours Per Tow Average	Hours Per Tow Std Error	100 Foot Net Hours Total	100 Foot Net Hours Average	100 Foot Net Hours Std Error	Turtles Per 100' Net Hours	Turtles Per 100' Net Hours
BY REGION SPECIES ALL															
	GULF			3210	30	0.0093	0.0017	12557	3.91	0.036	10689	3.33	0.047	0.00339	0.00082
	SOUTH ATLANTIC			5586	509	0.0911	0.0048	13472	2.41	0.012	9998.1	1.79	0.015	0.05482	0.00346
BY REGION DEPTH SPECIES ALL															
	GULF			46	0	0	0	202.53	4.4	0.226	400.84	8.71	0.472	0	0
	GULF	00-05		1029	12	0.0117	0.0033	3606.1	3.5	0.053	2827.7	2.75	0.064	0.00378	0.00128
	GULF	05-10		1289	13	0.0101	0.0028	5504.9	4.27	0.053	4614.2	3.58	0.075	0.00324	0.0011
	GULF	10-15		523	5	0.0096	0.0043	1932.7	3.7	0.097	1847.8	3.53	0.134	0.00539	0.00337
	GULF	15+		323	0	0	0	1311.1	4.06	0.153	998.45	3.09	0.137	0	0
	SOUTH ATLANTIC			4	0	0	0	7.08	1.77	0.423	11.83	2.96	0.799	0	0
	SOUTH ATLANTIC	00-05		4876	380	0.0779	0.0043	11863	2.43	0.012	8411.6	1.73	0.014	0.04604	0.00286
	SOUTH ATLANTIC	05-10		675	127	0.1881	0.0243	1529.9	2.27	0.039	1488.1	2.2	0.06	0.12038	0.01962
	SOUTH ATLANTIC	10-15		14	1	0.0714	0.0714	28	2	0.337	33.5	2.39	0.521	0.01833	0.01833
	SOUTH ATLANTIC	15+		17	1	0.0588	0.0588	44	2.59	0.183	53.09	3.12	0.259	0.01162	0.01162
BY REGION TRIMESTR SPECIES ALL															
	GULF		JAN-APR	101	0	0	0	658.95	6.52	0.341	890.89	8.82	0.539	0	0
	GULF		MAY-AUG	876	7	0.008	0.003	2829.4	3.23	0.058	2829.6	3.23	0.088	0.00398	0.00212
	GULF		SEP-DEC	2233	23	0.0103	0.0021	9068.9	4.06	0.041	6968.5	3.12	0.046	0.00331	0.00083
	SOUTH ATLANTIC		JAN-APR	37	27	0.7297	0.314	94.08	2.54	0.163	146.84	3.97	0.274	0.21513	0.09308
	SOUTH ATLANTIC		MAY-AUG	3500	364	0.104	0.0059	8304.3	2.37	0.015	5768.6	1.65	0.017	0.0702	0.00513
	SOUTH ATLANTIC		SEP-DEC	2049	118	0.0576	0.0057	5073.2	2.48	0.018	4082.7	1.99	0.026	0.02563	0.00294
BY REGION DEPTH TRIMESTR SPECIES ALL															
	GULF		MAY-AUG	45	0	0	0	198.28	4.41	0.231	392.34	8.72	0.483	0	0
	GULF		SEP-DEC	1	0	0		4.25	4.25		8.49	8.49		0	
	GULF	00-05	JAN-APR	56	0	0	0	288.87	5.16	0.362	382.34	6.83	0.655	0	0
	GULF	00-05	MAY-AUG	101	3	0.0297	0.017	249.68	2.47	0.112	223.29	2.21	0.169	0.00516	0.00297
	GULF	00-05	SEP-DEC	872	9	0.0103	0.0034	3067.6	3.52	0.054	2222.1	2.55	0.048	0.00386	0.00147
	GULF	05-10	JAN-APR	22	0	0	0	132	6	0.562	243.37	11.06	1.106	0	0
	GULF	05-10	MAY-AUG	192	2	0.0104	0.0073	565.4	2.94	0.099	507.48	2.64	0.141	0.00503	0.00359
	GULF	05-10	SEP-DEC	1075	11	0.0102	0.0031	4807.5	4.47	0.057	3863.3	3.59	0.075	0.00299	0.00116
	GULF	10-15	JAN-APR	13	0	0	0	118	9.08	0.851	160.39	12.34	1.66	0	0
	GULF	10-15	MAY-AUG	405	2	0.0049	0.0035	1319.2	3.26	0.09	1272.7	3.14	0.121	0.00494	0.0042
	GULF	10-15	SEP-DEC	105	3	0.0286	0.0163	495.47	4.72	0.229	414.71	3.95	0.303	0.00777	0.0045
	GULF	15+	JAN-APR	10	0	0	0	120.08	12.01	0.407	104.79	10.48	1.064	0	0
	GULF	15+	MAY-AUG	133	0	0	0	496.82	3.74	0.157	433.73	3.26	0.18	0	0
	GULF	15+	SEP-DEC	180	0	0	0	694.17	3.86	0.204	459.92	2.56	0.147	0	0
	SOUTH ATLANTIC		MAY-AUG	2	0	0	0	4	2	0.833	6.8	3.4	1.416	0	0
	SOUTH ATLANTIC		SEP-DEC	2	0	0	0	3.08	1.54	0.525	5.04	2.52	1.198	0	0
	SOUTH ATLANTIC	00-05	JAN-APR	2	3	1.5	0.5	6.25	3.13	0.292	9.99	5	0.466	0.31226	0.12921
	SOUTH ATLANTIC	00-05	MAY-AUG	3062	282	0.0921	0.0058	7272.8	2.38	0.015	4875.9	1.59	0.016	0.0592	0.0042
	SOUTH ATLANTIC	00-05	SEP-DEC	1812	95	0.0524	0.0058	4583.5	2.53	0.019	3525.8	1.95	0.026	0.02351	0.00294
	SOUTH ATLANTIC	05-10	JAN-APR	26	23	0.8846	0.4379	67.17	2.58	0.217	103.8	3.99	0.366	0.27453	0.13024
	SOUTH ATLANTIC	05-10	MAY-AUG	417	81	0.1942	0.0244	981.87	2.35	0.051	837.91	2.01	0.071	0.15394	0.02977
	SOUTH ATLANTIC	05-10	SEP-DEC	232	23	0.0991	0.0223	480.88	2.07	0.059	546.4	2.36	0.102	0.04278	0.01211
	SOUTH ATLANTIC	10-15	MAY-AUG	13	1	0.0769	0.0769	27.33	2.1	0.347	33.17	2.55	0.536	0.01974	0.01974
	SOUTH ATLANTIC	10-15	SEP-DEC	1	0	0		0.67	0.67		0.33	0.33		0	
	SOUTH ATLANTIC	15+	JAN-APR	9	1	0.1111	0.1111	20.67	2.3	0.224	33.04	3.67	0.359	0.02194	0.02194
	SOUTH ATLANTIC	15+	MAY-AUG	6	0	0	0	18.33	3.06	0.317	14.91	2.48	0.059	0	0
	SOUTH ATLANTIC	15+	SEP-DEC	2	0	0	0	5	2.5	0.417	5.14	2.57	1.26	0	0

Table 3b. G&SAFE turtle data - All turtles combined - Gulf data limited to west of 91 degrees longitude.

GSAFDE TURTLE DATA ALL SPECIES

BY REGION:

REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	1133	26	0.02295	0.004788	5018.2	4.42913	0.12373	9200.05	8.12008	0.24721	0.03131	0.008389
S.A.	641	274	0.42746	0.038966	596.5	0.93058	0.00645	681.46	1.06312	0.02135	0.48455	0.044067

BY DEPTH:

REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	362	20	0.05525	0.01324	325.9	0.90028	0.01456	320.98	0.8867	0.02939	0.09499	0.025890
GULF	05-10	59	1	0.01695	0.01695	61.9	1.04915	0.02099	76.89	1.3032	0.02088	0.01178	0.011778
GULF	10-15	131	0	0.00000	0.00000	116.9	0.89237	0.00609	203.20	1.5512	0.02242	0.00000	0.000000
GULF	15+	581	5	0.00861	0.00384	4513.5	7.76850	0.13679	8598.98	14.8003	0.27234	0.00068	0.000321
S.A.	00-05	442	151	0.34163	0.03416	402.2	0.90995	0.00709	446.52	1.0102	0.02633	0.47482	0.053423
S.A.	05-10	196	121	0.61735	0.10027	191.0	0.97449	0.01311	231.28	1.1800	0.03512	0.50737	0.079229
S.A.	10-15	2	2	1.00000	0.00000	2.4	1.20000	0.00000	3.12	1.5590	0.00000	0.64145	0.000000
S.A.	15+	1	0	0.00000	.	0.9	0.90000	.	0.54	0.5396	.	0.00000	.

BY TRIMESTER:

REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	JAN-APR	177	6	0.03390	0.01364	814.8	4.60339	0.37388	1477.52	8.34756	0.76196	0.04345	0.01982
GULF	MAY-AUG	494	6	0.01215	0.00493	2164.8	4.38219	0.15483	4027.19	8.15221	0.30899	0.01844	0.00898
GULF	SEP-DEC	462	14	0.03030	0.00908	2038.6	4.41255	0.21048	3695.34	7.99858	0.41694	0.04043	0.01654
S.A.	JAN-APR	114	95	0.83333	0.16050	117.8	1.03333	0.01550	153.04	1.34245	0.02013	0.57130	0.10390
S.A.	MAY-AUG	384	155	0.40365	0.04026	327.8	0.85365	0.00456	313.52	0.81646	0.02193	0.58088	0.06433
S.A.	SEP-DEC	143	24	0.16783	0.03436	150.9	1.05524	0.01605	214.90	1.50279	0.05018	0.15672	0.03790

BY DEPTH - TRIMESTER:

REGION	DEPTH RANGE	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	JAN-APR	89	5	0.05618	0.02455	81.9	0.9202	0.01280	79.42	0.8923	0.03702	0.07860	0.03838
GULF	00-05	MAY-AUG	48	4	0.08333	0.04031	47.4	0.9875	0.09828	29.84	0.6217	0.17731	0.18531	0.08965
GULF	00-05	SEP-DEC	225	11	0.04889	0.01694	196.6	0.8738	0.00897	211.72	0.9410	0.02323	0.08221	0.03377
GULF	05-10	JAN-APR	17	1	0.05882	0.05882	19.5	1.1471	0.02859	23.38	1.3756	0.03429	0.04088	0.04088
GULF	05-10	MAY-AUG	12	0	0.00000	0.00000	10.6	0.8833	0.01124	14.83	1.2359	0.01572	0.00000	0.00000
GULF	05-10	SEP-DEC	30	0	0.00000	0.00000	31.8	1.0600	0.02979	38.67	1.2892	0.03374	0.00000	0.00000
GULF	10-15	MAY-AUG	131	0	0.00000	0.00000	116.9	0.8924	0.00609	203.20	1.5512	0.02242	0.00000	0.00000
GULF	15+	JAN-APR	71	0	0.00000	0.00000	713.4	10.0479	0.41062	1374.71	19.3622	0.86145	0.00000	0:00000
GULF	15+	MAY-AUG	303	2	0.00660	0.00466	1989.9	6.5673	0.15054	3779.32	12.4730	0.30500	0.00071	0.00050
GULF	15+	SEP-DEC	207	3	0.01449	0.00833	1810.2	8.7449	0.23677	3444.95	16.6423	0.45871	0.00087	0.00052
S.A.	00-05	JAN-APR	24	3	0.12500	0.06896	21.7	0.9042	0.02790	28.19	1.1746	0.03624	0.10691	0.05898
S.A.	00-05	MAY-AUG	317	135	0.42587	0.04529	271.2	0.8555	0.00460	252.36	0.7961	0.02366	0.61614	0.07184
S.A.	00-05	SEP-DEC	101	13	0.12871	0.03349	109.3	1.0822	0.01810	165.97	1.6433	0.04736	0.11868	0.03849
S.A.	05-10	JAN-APR	88	90	1.02273	0.20250	93.7	1.0648	0.01664	121.73	1.3833	0.02162	0.69636	0.13060
S.A.	05-10	MAY-AUG	66	20	0.30303	0.08628	55.7	0.8439	0.01466	60.62	0.9185	0.05654	0.42033	0.14415
S.A.	05-10	SEP-DEC	42	11	0.26190	0.08389	41.6	0.9905	0.03120	48.93	1.1649	0.11224	0.24818	0.08923
S.A.	10-15	JAN-APR	2	2	1.00000	0.00000	2.4	1.2000	0.00000	3.12	1.5590	0.00000	0.64145	0.00000
S.A.	15+	MAY-AUG	1	0	0.00000	.	0.9	0.9000	.	0.54	0.5396	.	0.00000	.

Table 4a. NMFS TURTLE DATA - Loggerhead CPUE based on Foundation stratification (Gulf data limite to west of 91 degrees longitude).

ID	Region	Depth	Trimester	Number of Tows	Number of Turtles	Turtles Per Tow Average	Turtles Per Tow Std. Error	Total Tow Hours	Hours Per Tow Average	Hours Per Tow Std. Error	100 Foot Net Hours Total	100 Foot Net Hours Average	100 Foot Net Hours Std. Error	Turtles Per 100' Net Hours	Turtles Per 100' Net Hours
BY REGION															
SPECIES LOGGERHEAD															
	GULF			3210	22	0.0069	0.0015	12557	3.91	0.036	10689	3.33	0.047	0.00225	0.00067
	SOUTH ATLANTIC			5586	479	0.0858	0.0047	13472	2.41	0.012	9998.1	1.79	0.015	0.05062	0.0032
BY REGION DEPTH															
SPECIES LOGGERHEAD															
	GULF			46	0	0	0	202.53	4.4	0.226	400.84	8.71	0.472	0	0
	GULF	00-05		1029	7	0.0068	0.0026	3606.1	3.5	0.053	2827.7	2.75	0.064	0.00199	0.00085
	GULF	05-10		1289	10	0.0078	0.0024	5504.9	4.27	0.053	4614.2	3.58	0.075	0.00184	0.00066
	GULF	10-15		523	5	0.0096	0.0043	1932.7	3.7	0.097	1847.8	3.53	0.134	0.00539	0.00337
	GULF	15+		323	0	0	0	1311.1	4.06	0.153	998.45	3.09	0.137	0	0
	SOUTH ATLANTIC			4	0	0	0	7.08	1.77	0.423	11.83	2.96	0.799	0	0
	SOUTH ATLANTIC	00-05		4876	360	0.0738	0.0042	11863	2.43	0.012	8411.6	1.73	0.014	0.04276	0.00274
	SOUTH ATLANTIC	05-10		675	117	0.1733	0.0237	1529.9	2.27	0.039	1488.1	2.2	0.06	0.10939	0.01745
	SOUTH ATLANTIC	10-15		14	1	0.0714	0.0714	28	2	0.337	33.5	2.39	0.521	0.01833	0.01833
	SOUTH ATLANTIC	15+		17	1	0.0588	0.0588	44	2.59	0.183	53.09	3.12	0.259	0.01162	0.01162
BY REGION TRIMESTR															
SPECIES LOGGERHEAD															
	GULF		JAN-APR	101	0	0	0	658.95	6.52	0.341	890.89	8.82	0.539	0	0
	GULF		MAY-AUG	876	5	0.0057	0.0025	2829.4	3.23	0.058	2829.6	3.23	0.088	0.00332	0.00206
	GULF		SEP-DEC	2233	17	0.0076	0.0018	9068.9	4.06	0.041	6968.5	3.12	0.046	0.00194	0.00052
	SOUTH ATLANTIC		JAN-APR	37	24	0.6486	0.3105	94.08	2.54	0.163	146.84	3.97	0.274	0.19504	0.09141
	SOUTH ATLANTIC		MAY-AUG	3500	344	0.0983	0.0057	8304.3	2.37	0.015	5768.6	1.65	0.017	0.06506	0.00472
	SOUTH ATLANTIC		SEP-DEC	2049	111	0.0542	0.0055	5073.2	2.48	0.018	4082.7	1.99	0.026	0.02336	0.00279
BY REGION DEPTH TRIMESTR															
SPECIES LOGGERHEAD															
	GULF		MAY-AUG	45	0	0	0	198.28	4.41	0.231	392.34	8.72	0.483	0	0
	GULF		SEP-DEC	1	0	0		4.25	4.25		8.49	8.49		0	
	GULF	00-05	JAN-APR	56	0	0	0	288.87	5.16	0.362	382.34	6.83	0.655	0	0
	GULF	00-05	MAY-AUG	101	2	0.0198	0.0139	249.68	2.47	0.112	223.29	2.21	0.169	0.00347	0.00246
	GULF	00-05	SEP-DEC	872	5	0.0057	0.0026	3067.6	3.52	0.054	2222.1	2.55	0.048	0.00195	0.00096
	GULF	05-10	JAN-APR	22	0	0	0	132	6	0.562	243.37	11.06	1.106	0	0
	GULF	05-10	MAY-AUG	192	1	0.0052	0.0052	565.4	2.94	0.099	507.48	2.64	0.141	0.0029	0.0029
	GULF	05-10	SEP-DEC	1075	9	0.0084	0.0028	4807.5	4.47	0.057	3863.3	3.59	0.075	0.00169	0.0006
	GULF	10-15	JAN-APR	13	0	0	0	118	9.08	0.851	160.39	12.34	1.66	0	0
	GULF	10-15	MAY-AUG	405	2	0.0049	0.0035	1319.2	3.26	0.09	1272.7	3.14	0.121	0.00494	0.0042
	GULF	10-15	SEP-DEC	105	3	0.0286	0.0163	495.47	4.72	0.229	414.71	3.95	0.303	0.00777	0.0045
	GULF	15+	JAN-APR	10	0	0	0	120.08	12.01	0.407	104.79	10.48	1.064	0	0
	GULF	15+	MAY-AUG	133	0	0	0	496.82	3.74	0.157	433.73	3.26	0.18	0	0
	GULF	15+	SEP-DEC	180	0	0	0	694.17	3.86	0.204	459.92	2.56	0.147	0	0
	SOUTH ATLANTIC		MAY-AUG	2	0	0	0	4	2	0.833	6.8	3.4	1.416	0	0
	SOUTH ATLANTIC		SEP-DEC	2	0	0	0	3.08	1.54	0.525	5.04	2.52	1.198	0	0
	SOUTH ATLANTIC	00-05	JAN-APR	2	2	1	1	6.25	3.13	0.292	9.99	5	0.466	0.22073	0.22073
	SOUTH ATLANTIC	00-05	MAY-AUG	3062	268	0.0875	0.0057	7272.8	2.38	0.015	4875.9	1.59	0.016	0.05505	0.00401
	SOUTH ATLANTIC	00-05	SEP-DEC	1812	90	0.0497	0.0056	4583.5	2.53	0.019	3525.8	1.95	0.026	0.02178	0.00282
	SOUTH ATLANTIC	05-10	JAN-APR	26	21	0.8077	0.4333	67.17	2.58	0.217	103.8	3.99	0.366	0.25299	0.12795
	SOUTH ATLANTIC	05-10	MAY-AUG	417	75	0.1799	0.0235	981.87	2.35	0.051	837.91	2.01	0.071	0.14115	0.02623
	SOUTH ATLANTIC	05-10	SEP-DEC	232	21	0.0905	0.0216	480.88	2.07	0.059	546.4	2.36	0.102	0.03621	0.01094
	SOUTH ATLANTIC	10-15	MAY-AUG	13	1	0.0769	0.0769	27.33	2.1	0.347	33.17	2.55	0.536	0.01974	0.01974
	SOUTH ATLANTIC	10-15	SEP-DEC	1	0	0		0.67	0.67		0.33	0.33		0	
	SOUTH ATLANTIC	15+	JAN-APR	9	1	0.1111	0.1111	20.67	2.3	0.224	33.04	3.67	0.359	0.02194	0.02194
	SOUTH ATLANTIC	15+	MAY-AUG	6	0	0	0	18.33	3.06	0.317	14.91	2.48	0.059	0	0
	SOUTH ATLANTIC	15+	SEP-DEC	2	0	0	0	5	2.5	0.417	5.14	2.57	1.26	0	0

Table 4b. G&SAF[illegible]urtle data - Loggerhead CPUE - Gulf data limited to west of 91 degrees longitude.

G&SAFDF Dataset LOGGERHEAD

BY REGION:

REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	1133	8	0.00706	0.002489	5018.2	4.42913	0.12373	9200.05	8.12008	0.24721	0.00617	0.003009
S.A.	641	201	0.31357	0.029124	596.5	0.93058	0.00645	681.46	1.06312	0.02135	0.37971	0.039530

BY DEPTH:

REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	362	4	0.01105	0.00550	325.9	0.90028	0.01456	320.98	0.8867	0.02939	0.01667	0.00920
GULF	05-10	59	1	0.01695	0.01695	61.9	1.04915	0.02099	76.89	1.3032	0.02088	0.01178	0.01178
GULF	10-15	131	0	0.00000	0.00000	116.9	0.89237	0.00609	203.20	1.5512	0.02242	0.00000	0.00000
GULF	15+	581	3	0.00516	0.00298	4513.5	7.76850	0.13679	8598.98	14.8003	0.27234	0.00045	0.00027
S.A.	00-05	442	126	0.28507	0.03220	402.2	0.90995	0.00709	446.52	1.0102	0.02633	0.40155	0.05059
S.A.	05-10	196	74	0.37755	0.06139	191.0	0.97449	0.01311	231.28	1.1800	0.03512	0.33299	0.06079
S.A.	10-15	2	1	0.50000	0.50000	2.4	1.20000	0.00000	3.12	1.5590	0.00000	0.32072	0.32072
S.A.	15+	1	0	0.00000	.	0.9	0.90000	.	0.54	0.5396	.	0.00000	.

BY TRIMESTER:

REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	JAN-APR	177	1	0.00565	0.005650	814.8	4.60339	0.37388	1477.52	8.34756	0.76196	0.00393	0.003926
GULF	MAY-AUG	494	1	0.00202	0.002024	2164.8	4.38219	0.15483	4027.19	8.15221	0.30899	0.00024	0.000240
GULF	SEP-DEC	462	6	0.01299	0.005273	2038.6	4.41255	0.21048	3695.34	7.99858	0.41694	0.01338	0.007212
S.A.	JAN-APR	114	49	0.42982	0.089825	117.8	1.03333	0.01550	153.04	1.34245	0.02013	0.29747	0.059552
S.A.	MAY-AUG	384	135	0.35156	0.038459	327.8	0.85365	0.00456	313.52	0.81646	0.02193	0.50119	0.061416
S.A.	SEP-DEC	143	17	0.11888	0.030572	150.9	1.05524	0.01605	214.90	1.50279	0.05018	0.11906	0.034715

BY DEPTH - TRIMESTER:

REGION	DEPTH RANGE	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	JAN-APR	89	0	0.00000	0.00000	81.9	0.9202	0.01280	79.42	0.8923	0.03702	0.00000	0.00000
GULF	00-05	MAY-AUG	48	0	0.00000	0.00000	47.4	0.9875	0.09828	29.84	0.6217	0.17731	0.00000	0.00000
GULF	00-05	SEP-DEC	225	4	0.01778	0.00883	196.6	0.8738	0.00897	211.72	0.9410	0.02323	0.02683	0.01477
GULF	05-10	JAN-APR	17	1	0.05882	0.05882	19.5	1.1471	0.02859	23.38	1.3756	0.03429	0.04088	0.04088
GULF	05-10	MAY-AUG	12	0	0.00000	0.00000	10.6	0.8833	0.01124	14.83	1.2359	0.01572	0.00000	0.00000
GULF	05-10	SEP-DEC	30	0	0.00000	0.00000	31.8	1.0600	0.02979	38.67	1.2892	0.03374	0.00000	0.00000
GULF	10-15	MAY-AUG	131	0	0.00000	0.00000	116.9	0.8924	0.00609	203.20	1.5512	0.02242	0.00000	0.00000
GULF	15+	JAN-APR	71	0	0.00000	0.00000	713.4	10.0479	0.41062	1374.71	19.3622	0.86145	0.00000	0.00000
GULF	15+	MAY-AUG	303	1	0.00330	0.00330	1989.9	6.5673	0.15054	3779.32	12.4730	0.30500	0.00039	0.00039
GULF	15+	SEP-DEC	207	2	0.00966	0.00682	1810.2	8.7449	0.23677	3444.95	16.6423	0.45871	0.00069	0.00049
S.A.	00-05	JAN-APR	24	2	0.08333	0.05763	21.7	0.9042	0.02790	28.19	1.1746	0.03624	0.07127	0.04929
S.A.	00-05	MAY-AUG	317	116	0.36593	0.04304	271.2	0.8555	0.00460	252.36	0.7961	0.02366	0.52545	0.06823
S.A.	00-05	SEP-DEC	101	8	0.07921	0.02701	109.3	1.0822	0.01810	165.97	1.6433	0.04736	0.09116	0.03720
S.A.	05-10	JAN-APR	88	46	0.52273	0.11311	93.7	1.0648	0.01664	121.73	1.3833	0.02162	0.35863	0.07458
S.A.	05-10	MAY-AUG	66	19	0.28788	0.08573	55.7	0.8439	0.01466	60.62	0.9185	0.05654	0.39225	0.14259
S.A.	05-10	SEP-DEC	42	9	0.21429	0.08018	41.6	0.9905	0.03120	48.93	1.1649	0.11224	0.18613	0.07706
S.A.	10-15	JAN-APR	2	1	0.50000	0.50000	2.4	1.2000	0.00000	3.12	1.5590	0.00000	0.32072	0.32072
S.A.	15+	MAY-AUG	1	0	0.00000	.	0.9	0.9000	.	0.54	0.5396	.	0.00000	.

Table 5a. NMFS TURTLE DATA - Kemp's ridley CPUE analysis based on Foundation stratification (gulf data limited to west of 91 degrees longitude).

ID	Region	Depth	Trimester	Number of Tows	Number of Turtles	Turtles Per Tow Average	Turtles Per Tow Std. Error	Total Tow Hours	Hours Per Tow Average	Hours Per Tow Std. Error	100 Foot Net Hours Total	100 Foot Net Hours Average	100 Foot Net Hours Std. Error	Turtles Per 100' Net Hours	Turtles Per 100' Net Hours
BY REGION															
SPECIES KEMPS															
	GULF			3210	6	0.0019	0.0008	12557	3.91	0.036	10689	3.33	0.047	0.0007	0.00033
	SOUTH ATLANTIC			5586	17	0.003	0.0007	13472	2.41	0.012	9998.1	1.79	0.015	0.00272	0.00076
BY REGION DEPTH															
SPECIES KEMPS															
	GULF			46	0	0	0	202.53	4.4	0.226	400.84	8.71	0.472	0	0
	GULF	00-05		1029	5	0.0049	0.0022	3606.1	3.5	0.053	2827.7	2.75	0.064	0.00179	0.00096
	GULF	05-10		1289	1	0.0008	0.0008	5504.9	4.27	0.053	4614.2	3.58	0.075	0.00033	0.00033
	GULF	10-15		523	0	0	0	1932.7	3.7	0.097	1847.8	3.53	0.134	0	0
	GULF	15+		323	0	0	0	1311.1	4.06	0.153	998.45	3.09	0.137	0	0
	SOUTH ATLANTIC			4	0	0	0	7.08	1.77	0.423	11.83	2.96	0.799	0	0
	SOUTH ATLANTIC	00-05		4876	14	0.0029	0.0008	11863	2.43	0.012	8411.6	1.73	0.014	0.00276	0.00083
	SOUTH ATLANTIC	05-10		675	3	0.0044	0.0026	1529.9	2.27	0.039	1488.1	2.2	0.06	0.00256	0.00188
	SOUTH ATLANTIC	10-15		14	0	0	0	28	2	0.337	33.5	2.39	0.521	0	0
	SOUTH ATLANTIC	15+		17	0	0	0	44	2.59	0.183	53.09	3.12	0.259	0	0
BY REGION TRIMESTR															
SPECIES KEMPS															
	GULF		JAN-APR	101	0	0	0	658.95	6.52	0.341	890.89	8.82	0.539	0	0
	GULF		MAY-AUG	876	1	0.0011	0.0011	2829.4	3.23	0.058	2829.6	3.23	0.088	0.00019	0.00019
	GULF		SEP-DEC	2233	5	0.0022	0.001	9068.9	4.06	0.041	6968.5	3.12	0.046	0.00094	0.00047
	SOUTH ATLANTIC		JAN-APR	37	1	0.027	0.027	94.08	2.54	0.163	146.84	3.97	0.274	0.00548	0.00548
	SOUTH ATLANTIC		MAY-AUG	3500	11	0.0031	0.0009	8304.3	2.37	0.015	5768.6	1.65	0.017	0.00324	0.0011
	SOUTH ATLANTIC		SEP-DEC	2049	5	0.0024	0.0011	5073.2	2.48	0.018	4082.7	1.99	0.026	0.00177	0.00086
BY REGION DEPTH TRIMESTR															
SPECIES KEMPS															
	GULF		MAY-AUG	45	0	0	0	198.28	4.41	0.231	392.34	8.72	0.483	0	0
	GULF		SEP-DEC	1	0	0		4.25	4.25		8.49	8.49		0	
	GULF	00-05	JAN-APR	56	0	0	0	288.87	5.16	0.362	382.34	6.83	0.655	0	0
	GULF	00-05	MAY-AUG	101	1	0.0099	0.0099	249.68	2.47	0.112	223.29	2.21	0.169	0.00169	0.00169
	GULF	00-05	SEP-DEC	872	4	0.0046	0.0023	3067.6	3.52	0.054	2222.1	2.55	0.048	0.00191	0.00111
	GULF	05-10	JAN-APR	22	0	0	0	132	6	0.562	243.37	11.06	1.106	0	0
	GULF	05-10	MAY-AUG	192	0	0	0	565.4	2.94	0.099	507.48	2.64	0.141	0	0
	GULF	05-10	SEP-DEC	1075	1	0.0009	0.0009	4807.5	4.47	0.057	3863.3	3.59	0.075	0.00039	0.00039
	GULF	10-15	JAN-APR	13	0	0	0	118	9.08	0.851	160.39	12.34	1.66	0	0
	GULF	10-15	MAY-AUG	405	0	0	0	1319.2	3.26	0.09	1272.7	3.14	0.121	0	0
	GULF	10-15	SEP-DEC	105	0	0	0	495.47	4.72	0.229	414.71	3.95	0.303	0	0
	GULF	15+	JAN-APR	10	0	0	0	120.08	12.01	0.407	104.79	10.48	1.064	0	0
	GULF	15+	MAY-AUG	133	0	0	0	496.82	3.74	0.157	433.73	3.26	0.18	0	0
	GULF	15+	SEP-DEC	180	0	0	0	694.17	3.86	0.204	459.92	2.56	0.147	0	0
	SOUTH ATLANTIC		MAY-AUG	2	0	0	0	4	2	0.833	6.8	3.4	1.416	0	0
	SOUTH ATLANTIC		SEP-DEC	2	0	0	0	3.08	1.54	0.525	5.04	2.52	1.198	0	0
	SOUTH ATLANTIC	00-05	JAN-APR	2	0	0	0	6.25	3.13	0.292	9.99	5	0.466	0	0
	SOUTH ATLANTIC	00-05	MAY-AUG	3062	11	0.0036	0.0011	7272.8	2.38	0.015	4875.9	1.59	0.016	0.00371	0.00126
	SOUTH ATLANTIC	00-05	SEP-DEC	1812	3	0.0017	0.001	4583.5	2.53	0.019	3525.8	1.95	0.026	0.00116	0.00069
	SOUTH ATLANTIC	05-10	JAN-APR	26	1	0.0385	0.0385	67.17	2.58	0.217	103.8	3.99	0.366	0.0078	0.0078
	SOUTH ATLANTIC	05-10	MAY-AUG	417	0	0	0	981.87	2.35	0.051	837.91	2.01	0.071	0	0
	SOUTH ATLANTIC	05-10	SEP-DEC	232	2	0.0086	0.0061	480.88	2.07	0.059	546.4	2.36	0.102	0.00656	0.00539
	SOUTH ATLANTIC	10-15	MAY-AUG	13	0	0	0	27.33	2.1	0.347	33.17	2.55	0.536	0	0
	SOUTH ATLANTIC	10-15	SEP-DEC	1	0	0		0.67	0.67		0.33	0.33		0	
	SOUTH ATLANTIC	15+	JAN-APR	9	0	0	0	20.67	2.3	0.224	33.04	3.67	0.359	0	0
	SOUTH ATLANTIC	15+	MAY-AUG	6	0	0	0	18.33	3.06	0.317	14.91	2.48	0.059	0	0
	SOUTH ATLANTIC	15+	SEP-DEC	2	0	0	0	5	2.5	0.417	5.14	2.57	1.26	0	0

Table 5b. G&SAFE turtle data - Kemp's ridley CPUE - Gulf data limited to west of 91 degrees longitude.

Error
Do not use data from this table.

G&SAFDE Dataset KEMPS

BY REGION:

REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	1133	16	0.01412	0.003723	5018.2	4.42913	0.12373	9200.05	8.12008	0.24721	0.023145	0.007079
S.A.	641	67	0.10452	0.018473	596.5	0.93058	0.00645	681.46	1.06312	0.02135	0.096786	0.016347

BY DEPTH

REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	362	15	0.04144	0.011195	325.9	0.90028	0.01456	320.98	0.8867	0.02939	0.07218	0.021955
GULF	05-10	59	0	0.00000	0.000000	61.9	1.04915	0.02099	76.89	1.3032	0.02088	0.00000	0.000000
GULF	10-15	131	0	0.00000	0.000000	116.9	0.89237	0.00609	203.20	1.5512	0.02242	0.00000	0.000000
GULF	15+	581	1	0.00172	0.001721	4513.5	7.76850	0.13679	8598.98	14.8003	0.27234	0.00016	0.000164
S.A.	00-05	442	22	0.04977	0.011303	402.2	0.90995	0.00709	446.52	1.0102	0.02633	0.06594	0.016735
S.A.	05-10	196	45	0.22959	0.053810	191.0	0.97449	0.01311	231.28	1.1800	0.03512	0.16784	0.037447
S.A.	10-15	2	0	0.00000	0.000000	2.4	1.20000	0.00000	3.12	1.5590	0.00000	0.00000	0.000000
S.A.	15+	1	0	0.00000	.	0.9	0.90000	.	0.54	0.5396	.	0.00000	.

BY TRIMESTER:

REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	JAN-APR	177	5	0.02825	0.012489	814.8	4.60339	0.37388	1477.52	8.34756	0.76196	0.03952	0.019473
GULF	MAY-AUG	494	4	0.00810	0.004036	2164.8	4.38219	0.15483	4027.19	8.15221	0.30899	0.01370	0.007783
GULF	SEP-DEC	462	7	0.01515	0.006462	2038.6	4.41255	0.21048	3695.34	7.99858	0.41694	0.02697	0.013290
S.A.	JAN-APR	114	42	0.36842	0.089213	117.8	1.03333	0.01550	153.04	1.34245	0.02013	0.24945	0.058425
S.A.	MAY-AUG	384	18	0.04688	0.011994	327.8	0.85365	0.00456	313.52	0.81646	0.02193	0.07348	0.019566
S.A.	SEP-DEC	143	7	0.04895	0.018107	150.9	1.05524	0.01605	214.90	1.50279	0.05018	0.03766	0.017167

BY DEPTH-TRIMESTER

REGION	DEPTH RANGE	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	JAN-APR	89	5	0.05618	0.02455	81.9	0.9202	0.01280	79.42	0.8923	0.03702	0.07860	0.038385
GULF	00-05	MAY-AUG	48	3	0.06250	0.03531	47.4	0.9875	0.09828	29.84	0.6217	0.17731	0.13898	0.078514
GULF	00-05	SEP-DEC	225	7	0.03111	0.01320	196.6	0.8738	0.00897	211.72	0.9410	0.02323	0.05539	0.027191
GULF	05-10	JAN-APR	17	0	0.00000	0.00000	19.5	1.1471	0.02859	23.38	1.3756	0.03429	0.00000	0.000000
GULF	05-10	MAY-AUG	12	0	0.00000	0.00000	10.6	0.8833	0.01124	14.83	1.2359	0.01572	0.00000	0.000000
GULF	05-10	SEP-DEC	30	0	0.00000	0.00000	31.8	1.0600	0.02979	38.67	1.2892	0.03374	0.00000	0.000000
GULF	10-15	MAY-AUG	131	0	0.00000	0.00000	116.9	0.8924	0.00609	203.20	1.5512	0.02242	0.00000	0.000000
GULF	15+	JAN-APR	71	0	0.00000	0.00000	713.4	10.0479	0.41062	1374.71	19.3622	0.86145	0.00000	0.000000
GULF	15+	MAY-AUG	303	1	0.00330	0.00330	1989.9	6.5673	0.15054	3779.32	12.4730	0.30500	0.00032	0.000315
GULF	15+	SEP-DEC	207	0	0.00000	0.00000	1810.2	8.7449	0.23677	3444.95	16.6423	0.45871	0.00000	0.000000
S.A.	00-05	JAN-APR	24	0	0.00000	0.00000	21.7	0.9042	0.02790	28.19	1.1746	0.03624	0.00000	0.000000
S.A.	00-05	MAY-AUG	317	17	0.05363	0.01416	271.2	0.8555	0.00460	252.36	0.7961	0.02366	0.08317	0.022947
S.A.	00-05	SEP-DEC	101	5	0.04950	0.02169	109.3	1.0822	0.01810	165.97	1.6433	0.04736	0.02752	0.012158
S.A.	05-10	JAN-APR	88	42	0.47727	0.11311	93.7	1.0648	0.01664	121.73	1.3833	0.02162	0.32315	0.073958
S.A.	05-10	MAY-AUG	66	1	0.01515	0.01515	55.7	0.8439	0.01466	60.62	0.9185	0.05654	0.02808	0.028077
S.A.	05-10	SEP-DEC	42	2	0.04762	0.03326	41.6	0.9905	0.03120	48.93	1.1649	0.11224	0.06204	0.050869
S.A.	10-15	JAN-APR	2	0	0.00000	0.00000	2.4	1.2000	0.00000	3.12	1.5590	0.00000	0.00000	0.000000
S.A.	15+	MAY-AUG	1	0	0.00000	.	0.9	0.9000	.	0.54	0.5396	.	0.00000	.

Table 6a NMFS TURTLE DATA - Green CPUE analysis based on Foundation stratification (Gulf data limited to west of 91 degrees longitude).

ID	Region	Depth	Trimester	Number of Tows	Number of Turtles	Turtles Per Tow Average	Turtles Per Tow Std. Error	Total Tow Hours	Hours Per Tow Average	Hours Per Tow Std. Error	100 Foot Net Hours Total	100 Foot Net Hours Average	100 Foot Net Hours Std. Error	Turtles Per 100' Net Hours	Turtles Per 100' Net Hours
BY REGION															
SPECIES GREEN															
	GULF			3210	1	0.0003	0.0003	12557	3.91	0.036	10689	3.33	0.047	0.00031	0.00031
	SOUTH ATLANTIC			5586	9	0.0016	0.0005	13472	2.41	0.012	9998.1	1.79	0.015	0.00118	0.00065
BY REGION DEPTH															
SPECIES GREEN															
	GULF			46	0	0	0	202.53	4.4	0.226	400.84	8.71	0.472	0	0
	GULF	00-05		1029	0	0	0	3606.1	3.5	0.053	2827.7	2.75	0.064	0	0
	GULF	05-10		1289	1	0.0008	0.0008	5504.9	4.27	0.053	4614.2	3.58	0.075	0.00076	0.00076
	GULF	10-15		523	0	0	0	1932.7	3.7	0.097	1847.8	3.53	0.134	0	0
	GULF	15+		323	0	0	0	1311.1	4.06	0.153	998.45	3.09	0.137	0	0
	SOUTH ATLANTIC			4	0	0	0	7.08	1.77	0.423	11.83	2.96	0.799	0	0
	SOUTH ATLANTIC	00-05		4876	5	0.001	0.0005	11863	2.43	0.012	8411.6	1.73	0.014	0.00043	0.0002
	SOUTH ATLANTIC	05-10		675	4	0.0059	0.003	1529.9	2.27	0.039	1488.1	2.2	0.06	0.00664	0.00515
	SOUTH ATLANTIC	10-15		14	0	0	0	28	2	0.337	33.5	2.39	0.521	0	0
	SOUTH ATLANTIC	15+		17	0	0	0	44	2.59	0.183	53.09	3.12	0.259	0	0
BY REGION TRIMESTR															
SPECIES GREEN															
	GULF		JAN-APR	101	0	0	0	658.95	6.52	0.341	890.89	8.82	0.539	0	0
	GULF		MAY-AUG	876	0	0	0	2829.4	3.23	0.058	2829.6	3.23	0.088	0	0
	GULF		SEP-DEC	2233	1	0.0004	0.0004	9068.9	4.06	0.041	6968.5	3.12	0.046	0.00044	0.00044
	SOUTH ATLANTIC		JAN-APR	37	2	0.0541	0.0377	94.08	2.54	0.163	146.84	3.97	0.274	0.01461	0.01073
	SOUTH ATLANTIC		MAY-AUG	3500	5	0.0014	0.0006	8304.3	2.37	0.015	5768.6	1.65	0.017	0.00143	0.001
	SOUTH ATLANTIC		SEP-DEC	2049	2	0.001	0.0007	5073.2	2.48	0.018	4082.7	1.99	0.026	0.0005	0.00036
BY REGION DEPTH TRIMESTR															
SPECIES GREEN															
	GULF		MAY-AUG	45	0	0	0	198.28	4.41	0.231	392.34	8.72	0.483	0	0
	GULF		SEP-DEC	1	0	0		4.25	4.25		8.49	8.49		0	
	GULF	00-05	JAN-APR	56	0	0	0	288.87	5.16	0.362	382.34	6.83	0.655	0	0
	GULF	00-05	MAY-AUG	101	0	0	0	249.68	2.47	0.112	223.29	2.21	0.169	0	0
	GULF	00-05	SEP-DEC	872	0	0	0	3067.6	3.52	0.054	2222.1	2.55	0.048	0	0
	GULF	05-10	JAN-APR	22	0	0	0	132	6	0.562	243.37	11.06	1.106	0	0
	GULF	05-10	MAY-AUG	192	0	0	0	565.4	2.94	0.099	507.48	2.64	0.141	0	0
	GULF	05-10	SEP-DEC	1075	1	0.0009	0.0009	4807.5	4.47	0.057	3863.3	3.59	0.075	0.00091	0.00091
	GULF	10-15	JAN-APR	13	0	0	0	118	9.08	0.851	160.39	12.34	1.66	0	0
	GULF	10-15	MAY-AUG	405	0	0	0	1319.2	3.26	0.09	1272.7	3.14	0.121	0	0
	GULF	10-15	SEP-DEC	105	0	0	0	495.47	4.72	0.229	414.71	3.95	0.303	0	0
	GULF	15+	JAN-APR	10	0	0	0	120.08	12.01	0.407	104.79	10.48	1.064	0	0
	GULF	15+	MAY-AUG	133	0	0	0	496.82	3.74	0.157	433.73	3.26	0.18	0	0
	GULF	15+	SEP-DEC	180	0	0	0	694.17	3.86	0.204	459.92	2.56	0.147	0	0
	SOUTH ATLANTIC		MAY-AUG	2	0	0	0	4	2	0.833	6.8	3.4	1.416	0	0
	SOUTH ATLANTIC		SEP-DEC	2	0	0	0	3.08	1.54	0.525	5.04	2.52	1.198	0	0
	SOUTH ATLANTIC	00-05	JAN-APR	2	1	0.5	0.5	6.25	3.13	0.292	9.99	5	0.466	0.09152	0.09152
	SOUTH ATLANTIC	00-05	MAY-AUG	3062	2	0.0007	0.0005	7272.8	2.38	0.015	4875.9	1.59	0.016	0.00029	0.0002
	SOUTH ATLANTIC	00-05	SEP-DEC	1812	2	0.0011	0.0008	4583.5	2.53	0.019	3525.8	1.95	0.026	0.00057	0.00041
	SOUTH ATLANTIC	05-10	JAN-APR	26	1	0.0385	0.0385	67.17	2.58	0.217	103.8	3.99	0.366	0.01375	0.01375
	SOUTH ATLANTIC	05-10	MAY-AUG	417	3	0.0072	0.0041	981.87	2.35	0.051	837.91	2.01	0.071	0.00988	0.00829
	SOUTH ATLANTIC	05-10	SEP-DEC	232	0	0	0	480.88	2.07	0.059	546.4	2.36	0.102	0	0
	SOUTH ATLANTIC	10-15	MAY-AUG	13	0	0	0	27.33	2.1	0.347	33.17	2.55	0.536	0	0
	SOUTH ATLANTIC	10-15	SEP-DEC	1	0	0		0.67	0.67		0.33	0.33		0	
	SOUTH ATLANTIC	15+	JAN-APR	9	0	0	0	20.67	2.3	0.224	33.04	3.67	0.359	0	0
	SOUTH ATLANTIC	15+	MAY-AUG	6	0	0	0	18.33	3.06	0.317	14.91	2.48	0.059	0	0
	SOUTH ATLANTIC	15+	SEP-DEC	2	0	0	0	5	2.5	0.417	5.14	2.57	1.26	0	0

Table 6b. G&SAF[illegible]rtle data - Green CPUE - Gulf data limited to west of 91 degrees longitude.

GSAFDF TURTLE DATA GREEN

BY REGION:

REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	1135	2	.0017652	.0012477	5018.2	4.42913	0.12373	9200.05	8.12008	0.24721	.0019952	.0019629
S.A.	641	5	.0078003	.0034775	596.5	0.93058	0.00645	681.46	1.06312	0.02135	.0070049	.0034420

BY DEPTH:

REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	00-05	362	1	0.00276	0.00276	325.9	0.90028	0.01456	320.98	0.8867	0.02939	0.00614	0.00614
GULF	05-10	59	0	0.00000	0.00000	61.9	1.04915	0.02099	76.89	1.3032	0.02088	0.00000	0.00000
GULF	10-15	131	0	0.00000	0.00000	116.9	0.89237	0.00609	203.20	1.5512	0.02242	0.00000	0.00000
GULF	15+	581	1	0.00172	0.00172	4513.5	7.76850	0.13679	8598.98	14.8003	0.27234	0.00006	0.00006
S.A.	00-05	442	2	0.00452	0.00320	402.2	0.90995	0.00709	446.52	1.0102	0.02633	0.00580	0.00432
S.A.	05-10	196	2	0.01020	0.00720	191.0	0.97449	0.01311	231.28	1.1800	0.03512	0.00655	0.00462
S.A.	10-15	2	1	0.50000	0.50000	2.4	1.20000	0.00000	3.12	1.5590	0.00000	0.32072	0.32072
S.A.	15+	1	0	0.00000	.	0.9	0.90000	.	0.54	0.5396	.	0.00000	.

BY TRIMESTER:

REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	TURTLES PER 100FT NET HOURS AVERAGE	TURTLES PER 100FT NET HOURS ST.ERR
GULF	JAN-APR	177	0	0.000000	0.000000	814.8	4.60339	0.37388	1477.52	8.34756	0.76196	0.000000	0.000000
GULF	MAY-AUG	494	1	0.002024	0.002024	2164.8	4.38219	0.15483	4027.19	8.15221	0.30899	0.004501	0.004501
GULF	SEP-DEC	462	1	0.002165	0.002165	2038.6	4.41255	0.21048	3695.34	7.99858	0.41694	0.000080	0.000080
S.A.	JAN-APR	114	4	0.035088	0.017309	117.8	1.03333	0.01550	153.04	1.34245	0.02013	0.024382	0.012138
S.A.	MAY-AUG	384	1	0.002604	0.002604	327.8	0.85365	0.00456	313.52	0.81646	0.02193	0.004454	0.004454
S.A.	SEP-DEC	143	0	0.000000	0.000000	150.9	1.05524	0.01605	214.90	1.50279	0.05018	0.000000	0.000000

BY DEPTH - TRIMESTER:

REGION	DEPTH RANGE	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TURTLES PER TOW ST.ERR	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	HOURS PER TOW ST.ERR	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS ST.ERR	PER 100FT NET HOURS AVERAGE	PER 100FT NET HOURS ST.ERR
GULF	00-05	JAN-APR	89	0	0.00000	0.00000	81.9	0.9202	0.01280	79.42	0.8923	0.03702	0.00000	0.00000
GULF	00-05	MAY-AUG	48	1	0.02083	0.02083	47.4	0.9875	0.09828	29.84	0.6217	0.17731	0.04633	0.04633
GULF	00-05	SEP-DEC	225	0	0.00000	0.00000	196.6	0.8738	0.00897	211.72	0.9410	0.02323	0.00000	0.00000
GULF	05-10	JAN-APR	17	0	0.00000	0.00000	19.5	1.1471	0.02859	23.38	1.3756	0.03429	0.00000	0.00000
GULF	05-10	MAY-AUG	12	0	0.00000	0.00000	10.6	0.8833	0.01124	14.83	1.2359	0.01572	0.00000	0.00000
GULF	05-10	SEP-DEC	30	0	0.00000	0.00000	31.8	1.0600	0.02979	38.67	1.2892	0.03374	0.00000	0.00000
GULF	10-15	MAY-AUG	131	0	0.00000	0.00000	116.9	0.8924	0.00609	203.20	1.5512	0.02242	0.00000	0.00000
GULF	15+	JAN-APR	71	0	0.00000	0.00000	713.4	10.0479	0.41062	1374.71	19.3622	0.86145	0.00000	0.00000
GULF	15+	MAY-AUG	303	0	0.00000	0.00000	1989.9	6.5673	0.15054	3779.32	12.4730	0.30500	0.00000	0.00000
GULF	15+	SEP-DEC	207	1	0.00483	0.00483	1810.2	8.7449	0.23677	3444.95	16.6423	0.45871	0.00018	0.00018
S.A.	00-05	JAN-APR	24	1	0.04167	0.04167	21.7	0.9042	0.02790	28.19	1.1746	0.03624	0.03564	0.03564
S.A.	00-05	MAY-AUG	317	1	0.00315	0.00315	271.2	0.8555	0.00460	252.36	0.7961	0.02366	0.00540	0.00540
S.A.	00-05	SEP-DEC	101	0	0.00000	0.00000	109.3	1.0822	0.01810	165.97	1.6433	0.04736	0.00000	0.00000
S.A.	05-10	JAN-APR	88	2	0.02273	0.01598	93.7	1.0648	0.01664	121.73	1.3833	0.02162	0.01458	0.01025
S.A.	05-10	MAY-AUG	66	0	0.00000	0.00000	55.7	0.8439	0.01466	60.62	0.9185	0.05654	0.00000	0.00000
S.A.	05-10	SEP-DEC	42	0	0.00000	0.00000	41.6	0.9905	0.03120	48.93	1.1649	0.11224	0.00000	0.00000
S.A.	10-15	JAN-APR	2	1	0.50000	0.50000	2.4	1.2000	0.00000	3.12	1.5590	0.00000	0.32072	0.32072
S.A.	15+	MAY-AUG	1	0	0.00000	.	0.9	0.9000	.	0.54	0.5396	.	0.00000	.