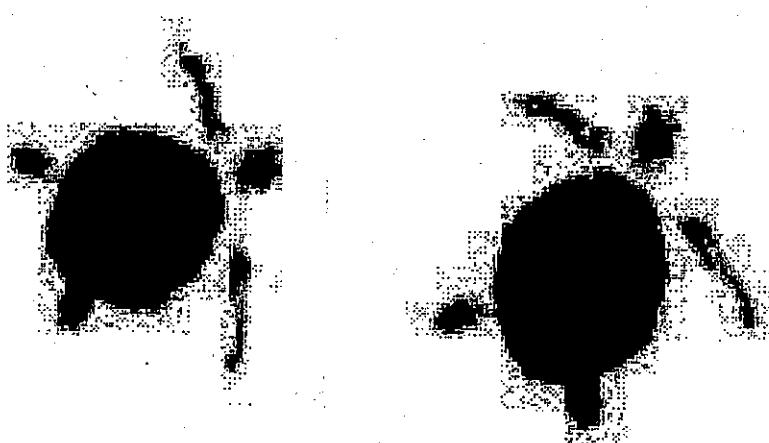




## **REVISIONS TO THE ESTIMATES OF INCIDENTAL SEA TURTLE CAPTURE ABOARD COMMERCIAL SHRIMP TRAWLING VESSELS**

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### Introduction

The ability to correctly estimate sea turtle catch per unit of effort (CPUE) is essential in the derivation of incidental sea turtle catch and mortality estimates and as an index of sea turtle abundance. Since the publication of "Alternatives to TEDs: Final Report" (GSAFDF 1998), various colleagues have pointed out discrepancies between the Foundation's CPUE estimates from those of Henwood and Stuntz (1987). This was most noticeable with the values derived from the same "old" NMFS data set. Given the importance of this information to the rational management of sea turtles in the region, effort was made to track the source of the discrepancies so that proper corrections could be made. Copies of the original Henwood and Stuntz (1987) article, errata sheet and drafts were reviewed and compared with the Foundation's report. Major inconsistencies were found in the mean catch per unit effort (CPUE) values and their corresponding confidence intervals. Further analysis showed that these deviations were primarily due to the difference in the actual statistical analysis used. Instead of calculating the mean CPUE as a ratio of the sums of sea turtles caught and fishing effort (Henwood and Stuntz 1987; Snedecor and Cochran 1980; Cochran 1977), GSAFDF (1998) employed the simple arithmetic mean of the calculated CPUEs per tow.<sup>1</sup>

Due to various difficulties encountered during the reconstruction of the original raw dataset, the revisions contained in this paper were confined mainly to corrections in the statistical analysis and corresponding SAS algorithms. This means that all of the computer runs were done on the same dataset similar to the one used in the original paper. Somehow, the "total 100 ft net hours" effort values for some of the depth and trimester strata came out slightly different compared to the original GSAFDF (1998) results. Attempts were made to reconcile these minor differences, however, recollections by the original GSAFDF researchers as to how the individual tow data were processed proved problematic. The same was true with respect to the original Henwood and Stuntz (1987) database as well as that of GSAFDF's (1998) reconstruction attempts. Considering that the errors in CPUE estimates resulting from these differences are negligible (2% and 5% for the whole Gulf and South Atlantic region, respectively),<sup>2</sup> efforts to fully reconcile the different data sets were not pursued any further.

Once similar statistical procedures were employed, general compatibility (i.e., same order of magnitude for calculated CPUEs and confidence intervals) between GSAFDF (1998) and Henwood and Stuntz (1987) estimates was achieved. As noted in the original paper, absolute

<sup>1</sup> Atchley et al. (1976) regard ratios as "peculiar variables with strange properties that few biologists appreciate." Krebs (1989) noted that ratios of two variables are not just like ordinary measurements and suggested the use of Cochran's (1977) formula for estimating the means, standard errors and confidence intervals of ecological ratios.

<sup>2</sup> Due to the small numbers of sea turtle bycatch relative to the amount of effort spent, CPUE estimates proved more sensitive to small differences in the number of sea turtles caught and less on the levels of fishing effort.

compatibility of results between this paper and the original "old" NMFS CPUE could not be assured due to basic differences in sampling distribution and stratification. For example, while the total sampling effort allocated by both studies for the Gulf of Mexico was essentially similar, the allocation of effort by depth zone was completely different. A significant portion (91%) of the sampling effort in the NMFS data set was concentrated in waters less than 15 fathom deep while only 9% was directed in deeper waters. The reverse is true for the GSAFDF data set where only 7% of the sampling effort was concentrated in waters less than 15 fathoms deep while 93% was conducted in deeper waters. In the South Atlantic, the effort allocation by depth was similar between the two data sets (99% in waters from 0-10 fathoms), however, the overall effort was very different (NMFS: 9,998 100' net hours vs. GSAFDF: 696 100' net hours).

This paper intends to supplement the original GSAFDF (1998) report. In order to facilitate comparison between the two papers, the original table numbering and presentation formats were followed. The symbols used in the formulas were modified and a more detailed presentation of the calculation procedures was also included.

### Analytical Method

As stated earlier, efforts were made to trace all of the possible causes of disparities in CPUE estimates of the two papers. A reconstruction of the raw data processing and correction procedures was attempted but was discontinued due to difficulties in recollection and basic differences in the sampling strategies followed by the authors of the two studies. Hence, subsequent corrections were limited to the major flaws in the statistical method and calculation algorithms used.

Fishing effort was standardized using the Henwood and Stuntz (1987)<sup>3</sup> procedure and reflects hours towed on a single trawl net with a 30.5 m long headrope. This procedure assumes that sea turtle catches are directly proportional to the size of the nets being fished. Therefore, all things being equal, it is assumed that a trawl net with a 100 feet headrope will catch twice as many sea turtles as a trawl net with a 50 feet headrope. A net with a head rope of 100 feet, or 30.5 m, is designated as the standard. Effort ( $e_i$  in 30.5 m net hours) was calculated as follows:

$$e_i = (\# \text{ nets} \times \text{length}/30.5) (\text{tow time}/60)$$

where  $e_i$  = standardized effort in hours relative to a single trawl with a 30.5 m headrope  
nets = number of nets towed  
length = length of the net's headrope (meters)  
tow time = minutes fished

<sup>3</sup> The corrected version of the formula shown in this section already incorporated the errata to page 814, line 3 of the Henwood & Stuntz (1987) article.

Sea turtle CPUE ( $\hat{C}$ ) and 95% confidence interval (C.I.) were calculated according to the methods described in Cochran (1977), Snedecor and Cochran (1980) and Krebs (1989). The population parameter to be estimated is the ratio,

$$C = \frac{\text{total number of sea turtles}}{\text{total standard effort}} = \frac{\sum s_i}{\sum e_i}$$

where the sums are taken over the population,  $i = 1, 2, \dots, N$  number of tows

$s_i$  = number of individual sea turtles caught per tow

$e_i$  = standardized effort (in 30.5 m net hour unit)

The corresponding sample estimate<sup>4</sup> is given by the formula

$$\hat{C} = \frac{\sum s_i}{\sum e_i} = \frac{(\bar{s})}{(\bar{e})}$$

where the sums are taken over the sample,  $i = 1, 2, \dots, n$  number of tows

$\hat{C}$  = estimated mean ratio (CPUE) of  $s$  to  $e$

$\bar{s}$  = observed mean value of  $s$

$\bar{e}$  = observed mean value of  $e$

The standard error for this estimated ratio<sup>5, 6</sup> is

$$S_{\hat{C}} = \frac{1}{\bar{E}} \sqrt{\frac{\sum (s_i - \hat{C} e_i)^2}{n(n-1)}} \sqrt{(1-\varnothing)}$$

where:

$\varnothing$  is the sampling fraction =  $\frac{n}{N}$

$S_{\hat{C}}$  is the estimated standard error of the ratio  $C$

$\bar{E}$  is the mean effort of the population

<sup>4</sup> In the GSADF (1998) Final Report, CPUEs were calculated for each tow, i.e.,  $C_i = s_i / e_i$ . Then the mean CPUE was determined from the formula,  $\hat{C} = \sum C_i / n$  for  $i = 1, 2, \dots, n$ . This resulted in large errors in the mean CPUE estimates due to the uneven levels of effort and presence of numerous tows with zero sea turtle catches.

<sup>5</sup> Standard error in the GSADF (1998) report was obtained using the formula,  $S_{\hat{C}} = \sqrt{\frac{\sum (C_i - \hat{C})^2}{(n-1)}}$ .

<sup>6</sup> This sample estimate contains a bias of the order  $1/n$ .

If  $\bar{E}$  is unknown, the sample estimate  $\bar{e}$  can be substituted in the denominator (Cochran 1977). In the last term,  $1 - \varnothing$  is the finite population correction or  $fpc$ . For small sampling fraction, the  $fpc$  is approximately 1.0 and so the size of the population has no effect on the size of the standard error. The  $fpc$  is usually ignored whenever the sampling fraction is less than 5% (Cochran 1977), as was the case in Henwood and Stuntz (1987) and in this paper.

$$\text{The 95\% C.I. on } C = \hat{C} \pm 1.96 S_C$$

The coefficient, 1.96, is the Student's  $t$  value for  $n-1$  degrees of freedom for the  $1 - \alpha$  level of confidence. The 95% confidence interval was selected to maintain direct comparability of results with the Henwood and Stuntz (1987) article. It should be noted that the estimation of confidence interval is not valid unless the sample size is "large"<sup>7</sup> since ratio variables are often skewed to the right and not normally distributed (Cochran 1977, Sukhatma and Sukhatma 1970). This is particularly true when the coefficient of variation of the denominator is relatively high (Atchley et al. 1976). Therefore, the computed confidence intervals of ratios should be treated only as an approximation unless the sample size is large (Krebs 1989). Since the lowest CPUE value is zero (i.e. no sea turtles caught), all negative values in the C.I. column of the attached tables should be read as zero.

## Results and Discussion

### (a) Reconciliation of NMFS and GSAFDF Data Set

The GSAFDF (1998) table comparing the "old" and "new" NMFS data set (**Table 2**) was recalculated to reflect corrected CPUE values. Refer to the original GSAFDF (1998) report for details on the samples included or excluded from the analysis and the reasons for doing so. Additional columns were included to show changes in CPUEs between the "old" NMFS and the "new" NMFS (or GSAFDF-standardized) dataset. The differences in the aggregate CPUE values between the "old" and the "new" datasets were minimal (2% for the Gulf and 5% for the Southeast Atlantic). This suggests that, all things being equal, the standardized dataset would be expected to produce reasonably similar CPUE estimates as the full NMFS data set.

In general, the former GSAFDF (1998) calculation algorithms tend to overestimate sea turtle CPUEs relative to the present revisions.<sup>8</sup> This problem was more pronounced for the Kemp's and green sea turtles where only a few individuals were caught in the Gulf of Mexico and the Southeast Atlantic regions. Because of this, caution should be exercised when interpreting derived values from sampling stratum containing only a few sea turtle samples as a difference of one or two individuals would be enough to create a large percentage change in

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<sup>7</sup> Cochran (1977) provides a "rule of thumb" for determining whether a sample size is "large" enough, which is useful for data that have a strong positive skew (see Sokal and Rohlf (1981) for Fisher's measure of skewness).

<sup>8</sup> These results are as expected (see Footnote no. 4).

calculated CPUEs. Furthermore, their confidence intervals should also be treated as approximations.

(b) Catch per Unit Effort

Regional differences in CPUEs were evident in both the NMFS and GSAFDF data sets which also reflects the relative level of abundance of sea turtles in those areas. Using the "standardized" NMFS data set (Table 3a), overall sea turtle CPUEs were 18 times greater in the Southeast Atlantic (0.0509 turtles/30.5 m net hours) than in the Gulf of Mexico (0.0028 turtles/30.5 m net hours). The same trend holds true for their component sea turtle species, i.e., CPUE is 23x higher for loggerheads (Table 4a), 3x more for Kemp's ridleys (Table 5a) and 10x greater for the greens (Table 6a) in the South Atlantic than in the Gulf.<sup>9</sup> A decade later, results of the GSAFDF survey showed a similar relationship. This time, however, the difference in sea turtle CPUEs between the Gulf and Southeast Atlantic was much greater. For example, the recent survey results indicate that, overall species, the Southeast Atlantic has 133x higher CPUE than the Gulf of Mexico (Table 3b); 318x higher for loggerheads (Table 4b), 53x for the Kemp's ridleys (Table 5b) and 32x greater for the green sea turtles (Table 6b).

The overall sea turtle CPUE in the Gulf was not significantly higher than estimates made ten years ago (i.e., from 0.00281 turtles/30.5 m net hr to only 0.00296 turtles/30.5 m net hr). During that time, however, the Southeast Atlantic's total sea turtle CPUE was not only higher than the Gulf's but also registered an 8 fold increase (i.e., from 0.05091 turtles/30.5 m net hr to 0.39388 turtles/30.5 m net hr). A similar pattern was evident for the loggerheads. Although the green turtle's CPUEs doubled in the Gulf and increased eight folds in the Southeast Atlantic, it still pales in comparison to the threefold increase in Kemp's ridley's CPUE in the Gulf and a huge (57x) CPUE increment in the Southeast Atlantic.

The large regional differences in the observed CPUEs adult sea turtles may be the result of notable increases in relative sea turtle abundance in the Southeast Atlantic relative to the Gulf. However, there are several factors that should be taken into consideration when doing this type of comparison. For example, David Bernhart of NOAA/NMFS Protected Resources Division (pers. comm.) pointed one key difference between the NMFS and the GSAFDF data that was not mentioned in the 1998 report. He noted that all of the NMFS data were collected prior to the implementation of Turtle Excluder Devices (TEDs) while in the 1997-98 GSAFDF data, only the observer vessels were fishing without TED. This leads us into a sampling-with-replacement versus sampling-without-replacement comparison problem. Continuation of the monitoring program to estimate incidental sea turtle capture by commercial shrimp trawls could shed some empirical light into this issue.

(b) Other Observation

Considering the dangers of making generalizations based on limited data, some interesting patterns could be discerned from a more detailed comparison of sea turtle distribution by species, depth, season and region. Based on the combined sea turtle CPUE data shown in

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<sup>9</sup> Henwood and Stuntz (1987) gives a 16x difference in turtle CPUEs between the Gulf and South Atlantic for all species, 5x for the Kemp's ridleys, 18x for the loggerheads and 7x for the greens.

Tables 3a and 3b, sea turtles showed greater concentration in waters shallower than 15 fathoms in both the Gulf of Mexico and Southeast Atlantic regions. Higher sea turtle CPUEs were also evident at the Gulf of Mexico during the second trimester (May – August) based on the NMFS data set and during the first and third trimester based on GSAFDF data set. For the Southeast Atlantic region, both the NMFS and GSAFDF data set showed higher overall sea turtle CPUEs during the first trimester (January – April) of the year.

During the NMFS survey, loggerheads were caught mostly within shallow (<15 fm) depths in both the Gulf and South Atlantic regions (Table 4a). Highest CPUEs were recorded during the second trimester in the Gulf and the first trimester in the South Atlantic. While the GSAFDF data set showed the same depth zonation pattern as the NMFS data set for the South Atlantic (Table 4b), loggerheads were caught mainly within 0 – 10 fathoms in the Gulf. Highest CPUEs were also recorded during the first and second trimester in the South Atlantic and on the third trimester in the Gulf.

The Kemp's ridley sea turtles were found mostly within the shallow waters of the Gulf of Mexico (0 – 5 fm; May - August) and Southeast Atlantic (5 – 10 fm; January – April ) based on either the NMFS (Table 5a) or GSAFDF (Table 5b) data sets. Seasonal or depth distribution patterns for green turtles cannot be discerned since only 3 green turtles were caught in the Gulf and 14 samples caught in the Southeast Atlantic.

Consistent with the findings of Renaud et al. (1991) and Epperly et al. (1995), both the NMFS and GSAFDF data sets clearly show the importance of inshore areas to sea turtles. The seasonal difference in the peak CPUE values between the Gulf and South Atlantic may be due to the species specific migration patterns in response to temporal changes the marine environment, availability of food, spawning conditions, etc.

### Acknowledgement

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Table 2. Comparison of Catch<sup>a</sup>, 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 CPUE	No. of Turtles	Total Effort	NMFS NEW CPUE	No. of Turtles	Total Effort	Difference Turtles	% Diff. Effort	From Old CPUE*
All Turtles									
Gulf	0.00310	52	16771	0.00315	52	16484	0	-287	0.00
South Atlantic	0.04848	482	9943	0.05091	509	9998	27	55	0.55
Loggerhead									
Gulf east (Zones 1-7)	0.00463	12	2589	0.00535	14	2618	2	29	16.67
Gulf central (Zones 8-17)	0.00220	14	6353	0.00201	12	5976	-2	-377	-14.29
Gulf west (Zones 18-21)	0.00204	16	7829	0.00203	16	7890	0	61	0.00
Gulf Combined	0.00250	42	16771	0.00255	42	16484	0	-287	0.00
South Atlantic	0.04556	453	9943	0.04791	479	9998	26	55	0.55
Kemps ridley									
Gulf east (Zones 1-7)	0.00000	0	2589	0.00000	0	2618	0	29	0.00
Gulf central (Zones 8-17)	0.00031	2	6353	0.00033	2	5976	0	-377	0.00
Gulf west (Zones 18-21)	0.00051	4	7829	0.00051	4	7890	0	61	0.00
Gulf Combined	0.00036	6	16771	0.00036	6	16484	0	-287	0.00
South Atlantic	0.00181	18	9943	0.00170	17	9998	-1	55	-5.56
Green									
Gulf east (Zones 1-7)	0.00000	0	2589	0.00000	0	2618	0	29	0.00
Gulf central (Zones 8-17)	0.00031	2	6353	0.00017	1	5976	-1	-377	-50.00
Gulf west (Zones 18-21)	0.00000	0	7829	0.00013	1	7890	1	61	0.00
Gulf Combined	0.00012	2	16771	0.00012	2	16484	0	-287	0.00
South Atlantic	0.00070	7	9943	0.00090	9	9998	2	55	28.57

\* Note: Differences between calculated and tabulated & change in CPUE values are due to the rounding off process.  
 "Old" NMFS CPUE is based on the Henwood and Stuntz (1987) estimates.

Table 3a. NMES Turtle Data: All turtles combined CPUE analysis based on Foundation stratification. Gulf data limited to west of 91 degrees longitude.

MEAN CPUE BY REGION, ALL SPECIES

REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	3210	30	0.009346	12557.28	3.91192	10688.99	3.32990	0.001806
SOUTH ATLANTIC	5586	509	0.091121	13471.58	2.41167	9986.15	1.78986	0.05909

MEAN CPUE BY REGION & DEPTH

REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	00-05	1029	0	0.00000	202.53	4.40290	400.84	0.71385	0.000000
GULF	05-10	1289	12	0.01166	3606.11	3.50448	2627.71	2.74802	0.001863
GULF	10-15	523	13	0.01099	5504.87	4.21065	4614.16	3.57165	0.001293
GULF	15+	0	0	0.00000	1939.56	1.95541	1647.83	3.53114	0.000331
SOUTH ATLANTIC	00-05	4	0	0.00000	1311.07	4.05903	998.45	3.09117	0.000000
SOUTH ATLANTIC	05-10	675	0	0.00000	7.08	1.77083	11.83	2.95148	0.000000
SOUTH ATLANTIC	10-15	127	0	0.00000	11862.99	2.43285	8411.61	1.72511	0.003636
SOUTH ATLANTIC	15+	14	1	0.0143	1529.92	2.26554	1480.10	2.20460	0.053779
SOUTH ATLANTIC	10-15	1	1	0.0143	28.00	2.00000	33.50	0.021191	0.028648
SOUTH ATLANTIC	15+	17	1	0.03862	44.00	2.56824	53.09	3.12220	0.01834

MEAN CPUE BY REGION & TRIMESTER

REGION	TRIMESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	JAN-APR	101	0	0.00000	658.95	6.52426	890.89	8.82073	0.000000
GULF	MAY-AUG	876	7	0.0799	2829.42	3.32993	2829.57	3.23011	0.000644
GULF	SEP-DEC	2233	23	0.1030	9068.91	4.06131	6968.52	3.12070	0.003330
SOUTH ATLANTIC	JAN-APR	37	27	0.12973	94.08	2.54279	146.84	3.96657	0.01675
SOUTH ATLANTIC	MAY-AUG	3500	364	0.10400	8304.32	2.37266	5765.63	1.68818	0.056133
SOUTH ATLANTIC	SEP-DEC	2049	118	0.05759	5073.18	2.47593	4082.68	1.99252	0.02890

MEAN CPUE BY REGION, DEPTH & TRIMESTER

REGION	DEPTH RANGE	TRIMESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	MAY-AUG	45	0	0.00000	198.28	4.4063	392.34	8.7187	0.000000	0.000000
GULF	SEP-DEC	1	0	0.00000	4.25	4.2500	8.49	8.4944	0.000000	0.000000
GULF	JAN-APR	56	0	0.00000	288.87	5.1883	382.34	6.8275	0.000000	0.02786
GULF	00-05	101	3	0.02970	249.68	2.47121	223.29	2.2108	-0.009985	0.01344
GULF	00-05	872	9	0.01032	3067.56	3.5178	2222.09	2.5483	0.001425	0.00405
GULF	05-10	22	0	0.00000	132.00	6.0000	243.37	11.0621	0.000000	0.00942
GULF	05-10	192	2	0.01042	565.40	2.9448	507.48	2.6431	-0.001534	0.00394
GULF	10-15	11	0	0.01023	4807.47	4.4721	3863.32	3.5938	0.001176	0.00452
GULF	10-15	13	0	0.00000	118.00	9.0769	160.39	12.3381	0.000000	0.000000
GULF	10-15	405	2	0.00494	1319.23	3.2774	1312.73	3.1452	-0.000612	0.00375
GULF	10-15	105	3	0.02857	495.47	4.7187	414.71	3.9496	-0.000957	0.00723
GULF	10-15	15+	0	0.00000	120.08	12.0083	104.79	10.4795	0.000000	0.000000
GULF	15+	133	0	0.00000	496.82	3.7355	433.73	2.2612	0.000000	0.000000
GULF	15+	180	0	0.00000	694.17	3.8565	459.92	2.5551	0.000000	0.000000
GULF	MAY-AUG	2	0	0.00000	4.00	2.0000	6.80	3.3978	0.000000	0.000000
SOUTH ATLANTIC	SEP-DEC	2	0	0.00000	3.08	1.5417	5.04	5.04	0.000000	0.000000
SOUTH ATLANTIC	JAN-APR	2	3	1.50000	6.25	3.1250	9.99	4.9967	0.049152	0.30020
SOUTH ATLANTIC	00-05	3062	282	0.09210	7272.78	2.3152	4975.85	1.5924	0.050784	0.06496
SOUTH ATLANTIC	00-05	1812	95	0.05243	4583.55	2.5796	3525.77	1.9458	0.02221	0.03267
SOUTH ATLANTIC	05-10	26	23	0.08462	67.17	2.5333	103.80	3.9923	-0.002425	0.22158
SOUTH ATLANTIC	05-10	417	81	0.19424	981.87	2.3546	837.91	2.0094	0.022661	0.06667
SOUTH ATLANTIC	05-10	232	23	0.09914	480.88	2.0728	546.40	2.0552	0.024072	0.04209
SOUTH ATLANTIC	10-15	13	1	0.07692	27.33	2.1028	33.17	2.5515	-0.027632	0.03013
SOUTH ATLANTIC	10-15	1	0	0.00000	0.67	0.6667	0.33	0.3331	0.02694	0.02694
SOUTH ATLANTIC	15+	9	1	0.11111	20.67	2.2563	33.04	3.67	-0.026468	0.03026
SOUTH ATLANTIC	15+	6	0	0.00000	18.33	3.0556	14.91	2.845	0.000000	0.000000
SOUTH ATLANTIC	15+	2	0	0.00000	5.00	2.5000	5.14	2.5712	0.000000	0.000000

Table 3b. GSAFDF Turtle Data: All turtles combined. Gulf data limited to west of 91 degrees longitude.

MEAN CPUE BY REGION, ALL SPECIES

REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	1133	26	0.02295	5018.2	4.42913	8775.28	7.74518	0.00173
S.A.	641	274	0.42746	596.5	0.93058	695.65	1.08526	0.32273

MEAN CPUE BY REGION & DEPTH

REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	00-05	362	20	0.05525	325.9	0.90028	320.98	0.8867	0.03251
GULF	05-10	59	1	0.01695	61.9	1.04915	76.89	1.3032	-0.01244
GULF	10-15	131	0	0.00000	116.9	0.89237	203.20	1.5512	0.00000
GULF	15+	581	5	0.00861	4513.5	7.76850	8174.21	14.0692	0.00008
S.A.	00-05	442	151	0.34163	402.2	0.90995	457.87	0.26187	0.32978
S.A.	05-10	196	121	0.61735	191.0	0.97149	234.12	1.1945	0.35546
S.A.	10-15	2	2	1.00000	2.4	1.20000	3.12	1.5590	0.64145
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396	0.00000

MEAN CPUE BY REGION & TRIMESTER

REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	JAN-APR	177	6	0.03390	814.8	4.60339	1369.31	7.73619	0.00074
GULF	MAY-AUG	494	6	0.01215	2164.8	4.38219	3710.64	7.51141	0.00032
GULF	SEP-DEC	462	14	0.03030	2038.6	4.41255	3695.34	7.99858	0.00151
S.A.	JAN-APR	114	95	0.83333	117.8	1.03333	153.04	1.30245	0.39160
S.A.	MAY-AUG	384	155	0.40365	327.8	0.85365	327.71	0.85341	0.37853
S.A.	SEP-DEC	143	24	0.16783	150.9	1.05524	214.90	1.50279	0.06626

MEAN CPUE BY REGION, DEPTH & TRIMESTER

REGION	NUMBER TURTLES	TOTAL OF TOWS	HOURS OF TURTLES	100 FOOT PER TOW AVERAGE	100 FOOT TOW PER TOW HOURS	100 FOOT PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF	00-05 JAN-APR	89	5	0.05618	81.9	0.9202	79.42	0.8923	0.00882
GULF	00-05 MAY-AUG	48	4	0.08333	47.4	0.9875	29.84	0.6217	-0.01623
GULF	00-05 SEP-DEC	225	11	0.04889	196.6	0.8738	211.72	0.9410	0.01630
GULF	05-10 JAN-APR	17	1	0.05882	19.5	1.1471	23.38	1.3756	-0.04084
GULF	05-10 MAY-AUG	12	0	0.00000	10.6	0.8833	14.83	1.2359	0.00000
GULF	05-10 SEP-DEC	30	0	0.00000	31.8	1.0600	38.67	1.2892	0.00000
GULF	10-15 MAY-AUG	131	0	0.00000	116.9	0.8924	203.20	1.5512	0.00000
GULF	15+ JAN-APR	71	0	0.00000	713.4	10.0479	1266.50	17.8381	0.00000
GULF	15+ MAY-AUG	303	2	0.00660	1989.9	6.5673	3462.76	11.4283	-0.00022
GULF	15+ SEP-DEC	207	3	0.01449	1810.2	8.7449	3444.95	16.6423	0.00011
S.A.	00-05 JAN-APR	24	3	0.12500	211.7	0.9042	28.19	1.1746	-0.00891
S.A.	00-05 MAY-AUG	317	135	0.42587	271.2	0.8555	263.71	0.8319	0.40302
S.A.	00-05 SEP-DEC	101	13	0.12871	109.3	1.0822	165.97	1.6433	0.03755
S.A.	05-10 JAN-APR	88	90	1.02273	93.7	1.0648	121.73	1.3833	0.45813
S.A.	05-10 MAY-AUG	66	20	0.30303	55.7	0.8439	63.46	0.9615	0.13638
S.A.	05-10 SEP-DEC	42	11	0.26190	41.6	0.9905	48.93	1.1649	0.08776
S.A.	10-15 JAN-APR	2	2	1.00000	2.4	1.2000	3.12	1.5590	0.64145
S.A.	15+ MAY-AUG	1	0	0.00000	0.9	0.9000	0.54	0.5396	0.00000

Table 1a: NNESTurtle Data: Loggerhead CPUE based on Foundation stratification. Gulf data limited to West UI 24 degrees longitude.

Table 4b GESAFEDE Turtle Data: Loggerhead CPUE. Gulf data limited to west of 91 degrees longitude.

Table 5a. NMFS Turtle Data: Kemp's ridley CPUE analysis based on Foundation stratification. Gulf data limited to west of 91 degrees longitude.

MEAN CPUE BY REGION			CPUE ± 95% C.I. ON CPUE			CPUE ± 95% C.I. ON CPUE		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE
GULF ATLANTIC	3210	6	.0018692	12557.28	3.91192	10688.94	3.32990	.0005613
SOUTH ATLANTIC	5506	17	.0030433	13471.58	2.41167	9998.15	1.78986	.0010102
<b>MEAN CPUE BY REGION &amp; DEPTH</b>								
REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE
GULF	00-05	46	0	.0000000	202.53	4.40290	400.84	8.71305
GULF	05-10	1029	5	.0048591	3606.11	3.50448	2827.71	2.74802
GULF	10-15	1289	1	.0007758	5504.87	4.2065	4614.16	3.57955
GULF	15+	523	0	.0000000	1932.70	3.65541	1847.83	3.53314
GULF	00-05	4	0	.0000000	1311.07	4.05903	998.45	3.09117
SOUTH ATLANTIC	00-05	4876	14	.0000000	14662.58	1.77083	111.83	2.95848
SOUTH ATLANTIC	05-10	675	3	.0044444	1529.92	2.43285	8411.61	1.72551
SOUTH ATLANTIC	10-15	14	0	.0000000	28.00	2.26654	1488.10	2.20460
SOUTH ATLANTIC	15+	17	0	.0000000	44.00	2.58824	33.50	2.39307
<b>MEAN CPUE BY REGION &amp; TRIMESTER</b>								
REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE
GULF	JAN-APR	101	0	0.0000000	658.95	6.52426	890.89	8.82073
GULF	MAY-AUG	876	1	0.001142	2629.42	3.29993	2829.57	3.23011
GULF	SEP-DEC	2233	5	0.02239	9668.91	4.06131	6968.52	3.12070
SOUTH ATLANTIC	JAN-APR	37	1	0.027027	94.08	2.51279	146.04	3.96657
SOUTH ATLANTIC	MAY-AUG	3500	11	0.001143	8304.32	2.31266	5768.63	1.6488
SOUTH ATLANTIC	SEP-DEC	2049	5	0.002440	5073.10	2.41593	4082.68	1.99252
<b>MEAN CPUE BY REGION, DEPTH &amp; TRIMESTER</b>								
REGION	DEPTH RANGE	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL
GULF	MAY-AUG	45	0	0.0000000	198.28	4.4063	392.34	8.7187
GULF	SEP-DEC	1	0	0.0000000	4.25	4.2500	8.49	8.4944
GULF	00-05	56	0	0.0000000	288.87	5.1583	382.34	6.875
GULF	MAY-AUG	101	1	0.009901	249.68	2.4721	223.29	2.2108
GULF	SEP-DEC	872	4	0.04587	3067.56	3.5178	2222.08	2.5483
GULF	00-05	22	0	0.0000000	132.00	2.0000	243.31	11.6201
GULF	05-10	192	0	0.0000000	565.40	2.9448	507.48	2.6431
GULF	10-15	1075	1	0.000930	4807.47	4.4721	3863.32	3.5938
GULF	15+	13	0	0.0000000	118.00	9.0769	160.93	12.3381
GULF	MAY-AUG	405	0	0.0000000	1319.73	3.2574	1272.73	3.1425
GULF	10-15	105	0	0.0000000	495.47	4.7187	414.71	3.9496
GULF	15+	10	0	0.0000000	120.08	12.0083	104.79	10.4795
GULF	MAY-AUG	133	0	0.0000000	496.82	3.7355	433.73	3.2612
GULF	10-15	180	0	0.0000000	694.17	3.5655	459.92	2.5551
GULF	15+	2	0	0.0000000	4.00	2.0000	6.80	3.3978
SOUTH ATLANTIC	MAY-AUG	2	0	0.0000000	3.08	1.5417	5.04	2.3192
SOUTH ATLANTIC	SEP-DEC	2	0	0.0000000	6.25	3.1250	9.99	4.9967
SOUTH ATLANTIC	00-05	3062	11	0.0016592	7272.78	2.3752	4875.85	1.5924
SOUTH ATLANTIC	00-05	1812	13	0.0016566	4583.55	2.5296	3225.77	1.9458
SOUTH ATLANTIC	05-10	26	1	0.038462	67.17	2.5833	103.80	3.9924
SOUTH ATLANTIC	05-10	417	0	0.0000000	981.87	2.3548	837.91	2.0094
SOUTH ATLANTIC	SEP-DEC	232	2	0.0086621	480.88	2.0728	546.40	2.3552
SOUTH ATLANTIC	10-15	13	0	0.0000000	27.33	2.1026	33.17	0.002167
SOUTH ATLANTIC	10-15	1	0	0.0000000	0.87	0.6667	0.33	0.003313
SOUTH ATLANTIC	15+	9	0	0.0000000	20.67	2.2963	33.04	3.6717
SOUTH ATLANTIC	15+	6	0	0.0000000	18.33	3.0556	14.91	2.4845
SOUTH ATLANTIC	15+	2	0	0.0000000	5.00	2.5000	5.14	2.5712

Table 5b. GSAFDF Turtle Data: Kemp's ridley CPUE. Gulf data limited to west of 91 degrees longitude.

MEAN CPUE BY REGION			MEAN CPUE BY REGION & DEPTH			MEAN CPUE BY REGION, DEPTH & TRIMESTER		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF S.A.	1133 641	16 67	5018.2 596.5	4.42913 0.93058	8775.28 695.65	7.74518 1.08526	0.000865 0.063083	0.001823 0.096313
MEAN CPUE BY REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	00-05	362	15	0.04144	325.9	0.90028	320.98	0.8867
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032
GULF	10-15	131	0	0.00000	116.9	0.89337	203.20	1.5512
GULF	15+	581	1	0.001172	4513.5	7.76650	8174.21	-0.0012
S.A.	00-05	442	22	0.04977	402.2	0.9095	457.87	1.0359
S.A.	05-10	196	45	0.22959	191.0	0.97449	234.12	1.1945
S.A.	10-15	2	0	0.00000	2.4	1.20000	3.12	1.5590
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396
MEAN CPUE BY REGION	TRI-NESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	JAN-APR	177	5	0.02825	814.8	4.66339	1369.31	7.73619
GULF	MAY-AUG	494	4	0.00810	2164.8	4.36219	3710.64	7.51141
GULF	SEP-DEC	462	7	0.01515	2038.6	4.41255	3695.34	7.99858
S.A.	JAN-APR	114	42	0.36842	117.8	1.03333	153.04	1.34245
S.A.	MAY-AUG	384	18	0.04688	327.8	0.85365	327.71	0.85341
S.A.	SEP-DEC	143	7	0.04895	150.9	1.05524	214.90	1.50279
MEAN CPUE BY REGION	DEPTH RANGE	TRI-NESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF	00-05	JAN-APR	89	5	0.05618	81.9	0.9202	79.42
GULF	00-05	MAY-AUG	48	3	0.06250	47.4	0.9875	29.84
GULF	00-05	SEP-DEC	225	7	0.03111	196.6	0.8738	211.72
GULF	05-10	JAN-APR	17	0	0.00000	19.5	1.1471	23.38
GULF	05-10	MAY-AUG	12	0	0.00000	10.6	0.8833	14.83
GULF	05-10	SEP-DEC	30	0	0.00000	31.8	1.0600	38.67
GULF	10-15	MAY-AUG	131	0	0.00000	116.9	0.8924	203.20
GULF	15+	JAN-APR	71	0	0.00000	713.4	1.0479	1266.50
GULF	15+	MAY-AUG	303	1	0.00330	1989.9	6.5673	3462.76
GULF	15+	SEP-DEC	207	0	0.00000	1810.2	8.7449	3444.95
S.A.	00-05	JAN-APR	24	0	0.00000	21.7	0.9042	28.19
S.A.	00-05	MAY-AUG	317	17	0.05363	271.2	0.8555	263.71
S.A.	00-05	SEP-DEC	101	5	0.04950	109.3	1.0822	165.97
S.A.	05-10	JAN-APR	88	42	0.47727	93.7	1.0648	121.73
S.A.	05-10	MAY-AUG	66	1	0.01515	55.7	0.8439	63.46
S.A.	05-10	SEP-DEC	42	2	0.04762	41.6	0.9905	48.93
S.A.	10-15	JAN-APR	2	0	0.00000	2.4	1.2000	3.12
S.A.	15+	MAY-AUG	1	0	0.00000	0.9	0.9000	0.54

MEAN CPUE BY REGION			MEAN CPUE BY REGION & DEPTH			MEAN CPUE BY REGION, DEPTH & TRIMESTER		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF S.A.	1133 641	16 67	5018.2 596.5	4.42913 0.93058	8775.28 695.65	7.74518 1.08526	0.000865 0.063083	0.001823 0.096313
MEAN CPUE BY REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	00-05	362	15	0.04144	325.9	0.90028	320.98	0.8867
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032
GULF	10-15	131	0	0.00000	116.9	0.89337	203.20	1.5512
GULF	15+	581	1	0.001172	4513.5	7.76650	8174.21	-0.0012
S.A.	00-05	442	22	0.04977	402.2	0.9095	457.87	1.0359
S.A.	05-10	196	45	0.22959	191.0	0.97449	234.12	1.1945
S.A.	10-15	2	0	0.00000	2.4	1.20000	3.12	1.5590
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396

MEAN CPUE BY REGION			MEAN CPUE BY REGION & DEPTH			MEAN CPUE BY REGION, DEPTH & TRIMESTER		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF S.A.	1133 641	16 67	5018.2 596.5	4.42913 0.93058	8775.28 695.65	7.74518 1.08526	0.000865 0.063083	0.001823 0.096313
MEAN CPUE BY REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	00-05	362	15	0.04144	325.9	0.90028	320.98	0.8867
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032
GULF	10-15	131	0	0.00000	116.9	0.89337	203.20	1.5512
GULF	15+	581	1	0.001172	4513.5	7.76650	8174.21	-0.0012
S.A.	00-05	442	22	0.04977	402.2	0.9095	457.87	1.0359
S.A.	05-10	196	45	0.22959	191.0	0.97449	234.12	1.1945
S.A.	10-15	2	0	0.00000	2.4	1.20000	3.12	1.5590
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396

MEAN CPUE BY REGION			MEAN CPUE BY REGION & DEPTH			MEAN CPUE BY REGION, DEPTH & TRIMESTER		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF S.A.	1133 641	16 67	5018.2 596.5	4.42913 0.93058	8775.28 695.65	7.74518 1.08526	0.000865 0.063083	0.001823 0.096313
MEAN CPUE BY REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	00-05	362	15	0.04144	325.9	0.90028	320.98	0.8867
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032
GULF	10-15	131	0	0.00000	116.9	0.89337	203.20	1.5512
GULF	15+	581	1	0.001172	4513.5	7.76650	8174.21	-0.0012
S.A.	00-05	442	22	0.04977	402.2	0.9095	457.87	1.0359
S.A.	05-10	196	45	0.22959	191.0	0.97449	234.12	1.1945
S.A.	10-15	2	0	0.00000	2.4	1.20000	3.12	1.5590
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396

MEAN CPUE BY REGION			MEAN CPUE BY REGION & DEPTH			MEAN CPUE BY REGION, DEPTH & TRIMESTER		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF S.A.	1133 641	16 67	5018.2 596.5	4.42913 0.93058	8775.28 695.65	7.74518 1.08526	0.000865 0.063083	0.001823 0.096313
MEAN CPUE BY REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	00-05	362	15	0.04144	325.9	0.90028	320.98	0.8867
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032
GULF	10-15	131	0	0.00000	116.9	0.89337	203.20	1.5512
GULF	15+	581	1	0.001172	4513.5	7.76650	8174.21	-0.0012
S.A.	00-05	442	22	0.04977	402.2	0.9095	457.87	1.0359
S.A.	05-10	196	45	0.22959	191.0	0.97449	234.12	1.1945
S.A.	10-15	2	0	0.00000	2.4	1.20000	3.12	1.5590
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396

MEAN CPUE BY REGION			MEAN CPUE BY REGION & DEPTH			MEAN CPUE BY REGION, DEPTH & TRIMESTER		
REGION	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE
GULF S.A.	1133 641	16 67	5018.2 596.5	4.42913 0.93058	8775.28 695.65	7.74518 1.08526	0.000865 0.063083	0.001823 0.096313
MEAN CPUE BY REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS
GULF	00-05	362	15	0.04144	325.9	0.90028	320.98	0.8867
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032
GULF	10-15	131	0	0.00000	116.9	0.89337	203.20	1.5512
GULF	15+	581	1	0.001172	4513.5	7.76650	8174.21	-0.0012
S.A.	00-05	442	22	0				

Table 6a. NMES Turtle Data: Green CPUE analysis based on Foundation stratification. Gulf data limited to west of 91 degrees longitude.

MEAN CPUE BY REGION										CPUE ± 95% C.I. ON CPUE		
REGION	NUMBER OF TONS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS AVERAGE	100 FOOT NET HOURS AVERAGE	
GULF	3210	1	.0003115	12557.28	3.91192	10668.99	3.32990	-	-	.00009355	.0002770	
SOUTH ATLANTIC	5586	9	.0016112	13471.58	2.41167	9988.15	1.78986	-	-	.000031283	.0014875	
MEAN CPUE BY REGION & DEPTH												
REGION	DEPTH RANGE	NUMBER OF TONS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS AVERAGE	
GULF	00-05	46	0	.0000000	202.53	4.40290	400.84	8.71385	0.0000000	0.0000000	.0000000	
GULF	05-10	1029	0	.0000000	3606.11	3.50448	2827.71	2.74802	0.0000000	0.0000000	.0000000	
GULF	10-15	1289	1	.0001758	5504.87	4.27065	464.16	3.57965	-	-	.0002167	
GULF	15+	523	0	.0000000	1932.70	3.69541	1847.83	3.53314	0.0000000	0.0000000	.0000000	
GULF	323	0	.0000000	1311.07	4.05903	988.45	3.09117	0.0000000	0.0000000	.0000000	.0000000	
SOUTH ATLANTIC	4	0	.0000000	7.08	1.77083	11.83	2.95848	0.0000000	0.0000000	.0000000	.0000000	
SOUTH ATLANTIC	00-05	4876	5	.0010254	11862.58	2.33285	8411.61	1.72511	0.00007385	0.005944	.0011150	
SOUTH ATLANTIC	05-10	675	4	.0009259	1529.92	2.26654	1488.10	2.02460	0.00005951	0.0326880	.0053165	
SOUTH ATLANTIC	10-15	14	0	.0000000	28.00	2.00000	33.50	2.33307	0.0000000	0.0000000	.0000000	
SOUTH ATLANTIC	15+	17	0	.0000000	44.00	2.58824	53.09	3.12320	0.0000000	0.0000000	.0000000	
MEAN CPUE BY REGION TRIESTER												
REGION	TRI-MESTER	NUMBER OF TONS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS AVERAGE	
GULF	JAN-APR	101	0	0.0000000	658.35	6.52426	890.89	8.82073	0.0000000	0.0000000	.0000000	
GULF	MAY-AUG	876	0	0.0000000	2829.42	3.22993	2823.57	3.23011	0.0000000	0.0000000	.0000000	
GULF	SEP-DEC	2233	1	0.0004488	9068.91	4.06131	6968.52	3.12070	-	-	.0001379	
SOUTH ATLANTIC	JAN-APR	37	2	0.054054	94.08	2.54279	146.84	3.96507	-	-	.0036400	
SOUTH ATLANTIC	MAY-AUG	3500	5	0.001429	8304.32	2.37266	5761.63	1.68018	0.0001078	0.0000867	.0001626	
SOUTH ATLANTIC	SEP-DEC	2049	2	0.000976	5073.18	2.47593	4082.68	1.99252	-	-	.0000190	
MEAN CPUE BY REGION, DEPTH & TRIMESTER												
REGION	TRI-MESTER	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	
GULF	MAY-AUG	45	0	0.00000	198.28	4.4063	392.34	8.7187	0.0000000	0.0000000	.0.00000	
GULF	SEP-DEC	1	0	0.00000	4.25	4.2500	8.49	8.4944	0.0000000	0.0000000	.0.00000	
GULF	00-05	JAN-AUG	56	0	0.00000	268.87	5.1583	382.34	6.1275	0.0000000	0.0000000	.0.00000
GULF	00-05	MAY-AUG	101	0	0.00000	249.68	2.4721	223.29	2.2108	0.0000000	0.0000000	.0.00000
GULF	00-05	SEP-DEC	872	0	0.00000	3067.56	3.5178	2222.08	2.5483	0.0000000	0.0000000	.0.00000
GULF	05-10	JAN-AUG	22	0	0.00000	132.00	6.0000	243.37	11.0621	0.0000000	0.0000000	.0.00000
GULF	05-10	MAY-AUG	192	0	0.00000	565.40	2.9448	507.48	2.6431	0.0000000	0.0000000	.0.00077
GULF	05-10	SEP-DEC	1075	1	0.000093	4807.47	4.4721	5833.32	3.53938	-	-	.0.000249
GULF	10-15	JAN-APR	13	0	0.00000	118.00	9.0769	160.39	12.381	0.0000000	0.0000000	.0.00000
GULF	10-15	MAY-AUG	405	0	0.00000	1319.23	3.2374	1272.73	3.1425	0.0000000	0.0000000	.0.00000
GULF	10-15	SEP-DEC	105	0	0.00000	479.77	4.7887	414.71	3.9496	0.0000000	0.0000000	.0.00000
GULF	15+	JAN-AUG	10	0	0.00000	120.08	12.0083	104.79	10.795	0.0000000	0.0000000	.0.00000
GULF	15+	MAY-AUG	133	0	0.00000	496.82	3.7355	433.73	3.2612	0.0000000	0.0000000	.0.00000
GULF	15+	SEP-DEC	180	0	0.00000	694.17	3.8555	459.92	2.5551	0.0000000	0.0000000	.0.00000
GULF	15+	MAY-AUG	2	0	0.00000	4.00	2.0000	6.80	3.978	0.0000000	0.0000000	.0.00000
GULF	SEP-DEC	2	0	0.00000	3.08	1.5117	5.04	5.2192	0.0000000	0.0000000	.0.00000	
GULF	00-05	JAN-APR	2	1	0.50000	6.25	3.1250	9.99	4.9967	-	.0.00007	
GULF	00-05	MAY-AUG	3062	2	0.00065	7272.78	2.3752	4815.85	1.524	-	.0.00041	
GULF	00-05	SEP-DEC	1812	2	0.00110	4583.55	2.5296	3525.77	1.9558	-	.0.00135	
GULF	05-10	JAN-APR	26	1	0.03846	67.17	2.5833	103.80	3.9223	-	.0.00552	
GULF	05-10	MAY-AUG	417	3	0.0719	981.87	2.3446	837.91	2.0994	-	.0.00459	
GULF	05-10	SEP-DEC	232	0	0.00000	480.88	2.0128	546.40	2.3552	0.0000000	0.0000000	.0.00000
GULF	10-15	MAY-AUG	13	0	0.00000	27.33	2.1026	33.17	2.5515	0.0000000	0.0000000	.0.00000
GULF	10-15	SEP-DEC	1	0	0.00000	0.67	0.66667	0.33	0.3331	-	.0.000158	
GULF	15+	JAN-APR	9	0	0.00000	20.67	2.2963	33.04	3.6717	0.0000000	0.0000000	.0.00000
GULF	15+	MAY-AUG	6	0	0.00000	18.33	3.0556	14.91	2.4845	0.0000000	0.0000000	.0.00000
GULF	15+	SEP-DEC	2	2	0.00000	18.00	2.5000	2.5712	2.5712	0.0000000	0.0000000	.0.00000
SOUTH ATLANTIC	00-05	JAN-APR	2	1	0.00000	3.1250	9.99	4.9967	4.9967	-	.0.00007	
SOUTH ATLANTIC	00-05	MAY-AUG	13	0	0.00000	27.33	2.1026	33.17	2.5515	0.0000000	0.0000000	.0.00000
SOUTH ATLANTIC	10-15	MAY-AUG	13	0	0.00000	0.67	0.66667	0.33	0.3331	-	.0.000158	
SOUTH ATLANTIC	10-15	SEP-DEC	1	0	0.00000	20.67	2.2963	33.04	3.6717	0.0000000	0.0000000	.0.00000
SOUTH ATLANTIC	15+	JAN-APR	9	0	0.00000	18.33	3.0556	14.91	2.4845	0.0000000	0.0000000	.0.00000
SOUTH ATLANTIC	15+	MAY-AUG	6	0	0.00000	18.00	2.5000	2.5712	2.5712	0.0000000	0.0000000	.0.00000
SOUTH ATLANTIC	15+	SEP-DEC	2	2	0.00000	2.5000	2.5000	2.5000	2.5000	0.0000000	0.0000000	.0.00000

Table Gb. GSAFDF Turtle Data: Green CPUE B Gulf data limited to west of 91 degrees longitude.

MEAN CPUE BY REGION		NUMBER OF TOWS		TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
REGION	NUMBER OF TURTLES	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
GULF S.A.	11.33	2	.0017652	.5018.2	4.42913	8775.28	7.74518	.00008767	0.000543	
S.A.	6.41	5	.0078003	.596.5	0.93058	695.65	1.08526	.00009097	0.013465	

MEAN CPUE BY REGION & DEPTH		NUMBER OF TOWS		TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
REGION	DEPTH RANGE	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
GULF	00-05	362	1	0.00276	325.9	0.90028	320.98	0.8867	-0.00300	0.00312
GULF	05-10	59	0	0.00000	61.9	1.04915	76.89	1.3032	0.00000	0.00000
GULF	1.0-15	131	0	0.00000	116.9	0.89237	203.20	1.5512	0.00000	0.00000
GULF	15+	581	1	0.00172	4513.5	7.76850	8174.21	14.0692	-0.00012	0.00012
GULF	00-05	442	2	0.00452	402.2	0.90995	457.87	1.0359	-0.00169	0.00437
S.A.	05-10	196	2	0.01020	191.0	0.97449	234.12	1.1945	-0.00324	0.00854
S.A.	10-15	2	0.50000	2.4	1.20000	3.12	1.5590	-0.30789	0.32072	0.94934
S.A.	15+	1	0	0.00000	0.9	0.90000	0.54	0.5396	0.00000	0.00000

MEAN CPUE BY REGION & TRIMESTER		NUMBER OF TOWS		TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
REGION	TRI-MESTER	NUMBER OF TOWS	NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
GULF	JAN-APR	177	0	0.00000	814.8	4.60339	1369.31	7.73619	0.000000	0.000000
GULF	MAY-AUG	494	1	0.00204	2164.8	4.38219	3710.64	7.51141	0.002601	0.002679
GULF	SEP-DEC	462	1	0.002165	2038.6	4.41255	3695.34	7.99858	-0.002578	0.000271
S.A.	JAN-APR	114	4	0.035088	117.8	1.03333	153.04	1.34245	0.009350	0.026137
S.A.	MAY-AUG	384	1	0.002604	327.8	0.85365	327.71	0.85341	-0.029366	0.003051
S.A.	SEP-DEC	143	0	0.000000	150.9	1.05524	214.90	1.50279	0.000000	0.000000

MEAN CPUE BY REGION, DEPTH & TRIESTER		NUMBER OF TOWS		NUMBER OF TURTLES	TURTLES PER TOW AVERAGE	TOTAL TOW HOURS	HOURS PER TOW AVERAGE	100 FOOT NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
REGION	DEPTH RANGE	TRI-MESTER	NUMBER OF TOWS	TURTLES	TURTLES PER TOW AVERAGE	TOW HOURS	HOURS PER TOW AVERAGE	NET HOURS TOTAL	100 FOOT NET HOURS AVERAGE	CPUE ± 95% C.I. ON CPUE	
GULF	00-05	JAN-APR	89	0	0.00000	81.9	0.9202	79.42	0.8923	0.00000	0.00000
GULF	00-05	MAY-AUG	48	1	0.02083	47.4	0.9875	79.84	0.6217	-0.03516	0.03351
GULF	00-05	SEP-DEC	225	0	0.00000	196.6	0.8738	211.72	0.9410	0.00000	0.00000
GULF	05-10	JAN-APR	17	0	0.00000	19.5	1.1471	23.38	1.3756	0.00000	0.00000
GULF	05-10	MAY-AUG	12	0	0.00000	10.6	0.8833	14.83	1.2359	0.00000	0.00000
GULF	05-10	SEP-DEC	30	0	0.00000	31.8	1.0600	38.67	1.2892	0.00000	0.00000
GULF	10-15	MAY-AUG	131	0	0.00000	116.9	0.8924	203.20	1.5512	0.00000	0.00000
GULF	10-15	SEP-DEC	71	0	0.00000	713.4	1.0479	1266.50	17.8381	0.00000	0.00000
GULF	15+	JAN-APR	303	0	0.00000	1989.9	6.5673	3462.76	11.4283	0.00000	0.00000
GULF	15+	SEP-DEC	207	1	0.00483	1810.2	8.7449	3444.95	16.6423	-0.0028	0.00029
S.A.	00-05	JAN-APR	24	1	0.04167	21.7	0.9042	28.19	1.1746	-0.03410	0.03547
S.A.	00-05	MAY-AUG	317	1	0.00315	271.2	0.8555	263.71	0.8319	-0.00365	0.01123
S.A.	00-05	SEP-DEC	101	0	0.00000	109.3	1.0822	165.97	1.6433	0.00000	0.00000
S.A.	05-10	JAN-APR	88	2	0.02273	93.7	1.0648	121.73	1.3833	-0.00615	0.01643
S.A.	05-10	MAY-AUG	66	0	0.00000	55.7	0.8439	63.46	0.9615	0.00000	0.00000
S.A.	05-10	SEP-DEC	42	0	0.00000	41.6	0.9905	48.93	1.1649	0.00000	0.00000
S.A.	10-15	JAN-APR	2	1	0.50000	2.4	1.2000	3.12	1.5590	-0.30789	0.32072
S.A.	15+	MAY-AUG	1	0	0.00000	0.9	0.9000	0.54	0.5396	0.00000	0.00000