

A report to the Atlantic Sea Turtle Strategy Steering Committee: Latitudinal distribution of sea turtles reported to the Sea Turtle Stranding and Salvage Network on the Northern East Coast of the United States using preliminary information from 1998- 2004.

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The Atlantic Sea Turtle Strategy Steering Committee requested a summary of reported sea turtles from 35 degrees latitude and north from the Sea Turtle Stranding and Salvage Network (STSSN) database as part of their examination of potential trawl regulations (72 FR 7382 Feb. 15, 2007). Specifically the steering committee wanted to examine, by species and STSSN report type, the relationship between latitude and turtle size, the number of turtles by latitude and Julian date, and the proportion of turtles that fall into species specific body depth size categories of; ≤ 4 , >4 to ≤ 6 , >6 to ≤ 12 , and >12 to ≤ 21 inches (≤ 10.2 , >10.2 to ≤ 15.2 , >15.2 to ≤ 30.5 , and >30.5 to ≤ 53.3 cm). The committee's rationale for examining these size categories is that they correspond to either current or proposed turtle excluder devices (TED's) dimensions of either bar spacing or escape openings. The general idea is that one could use reports from the STSSN as a surrogate for the presence of turtles and/or the density of turtle size distributions within the areas that proposed trawl rules would apply. This may not be a reasonable assumption because the spatial extent of the STSSN reports and the operations of the targeted trawl fisheries may not overlap. Furthermore the recording of turtles in the STSSN database is a complex function of oceanography, geography, vagaries of public reporting, and the unpredictable nature of the STSSN effort and data reporting. This document presents the requested summary in figures and tables and briefly explains the data.

We queried the STSSN database for all turtle reports with latitude data, and then collected the subset of these records that had straight carapace length (SCL) measurements for the years 1998 to 2004. These years of preliminary data were selected because they are the most complete and verified data within the STSSN database. Reports are strandings (including cold stuns), incidental captures, or posthatchlings. Strandings are those found dead or live but sick and/or injured (including cold stuns). Strandings may be found washed up on the beach or found floating. Incidental captures are those caught during a particular activity such as in active fishing gear, research activities, or power plants. We should note that the STSSN is not a clearing house for incidental captures, thus these records may be particularly biased. Posthatchling turtles in the STSSN database are those that are considered "young of the year" and are 10cm or less. When determining which size measurement to use we considered using curved carapace

length, but found that some zones did not regularly record curved carapace length. The zones with missing data types presumably correspond to particular regional methods. We are implicitly assuming that SCL data are representative of all reports across all zones (e.g., there is not a size bias within the SCL data relative to the sizes of all animals stranding).

We determined the proportion by species of all reports with SCL that fell into the specified size categories for loggerhead, green, and Kemp's ridley turtles. The body depth size classes, ≤ 4 , >4 to ≤ 6 , >6 to ≤ 12 , and >12 to ≤ 21 inches (≤ 10.2 , >10.2 to ≤ 15.2 , >15.2 to ≤ 30.5 , and >30.5 to ≤ 53.3 cm), were converted to straight carapace length (SCL) size classes using Epperly and Teas (2002). Conversions were not done for leatherback and hawksbill turtles because conversions for these species were not available in Epperly and Teas (2002). We accepted conversions for all size classes, although the largest size classes (the upper bounds of 21 inch [53.3cm] for all three species, and the upper bound of 12 inches [30.5cm] for green and Kemp's ridley turtles) are extrapolations and should be considered gross approximations.

We found 4377 reports of loggerhead turtle records with a complete latitude and Julian date, 408 green turtles, 1231 Kemp's ridley turtles, 496 leatherback turtles, and 230 other turtle species. The other turtle species category includes 4 records of hawksbill turtles, 4 records of possible hybrid turtles, and those reports where species was not confirmed. This summary represents all reports within the STSSN database 1998 to 2004 except for 5 reports for which a detailed latitudinal location could not be determined. These five excluded reports were for a loggerhead and a Kemp's ridley from Zone 37, a Kemp's ridley in zone 35, a Kemp's ridley in Zone 41 and an unknown turtle species in Zone 40. Of the complete latitude and Julian date records we found 2270 loggerhead turtle records with complete SCL data (51.9% of the total loggerhead records), 304 green turtles (74.5% of the total), 1033 Kemp's ridley turtles (83.9% of the total), 28 other turtle species (10.8% of the total), and 104 leatherback turtles (21.0% of the total). The other turtle species category includes 2 of the hawksbills and all 4 possible hybrids with complete latitude and Julian date reports. Leatherback SCL data are considered rough approximations as many leatherbacks are too large for the largest calipers typically used.

Figure 1 shows the latitudinal distribution of turtles by size (SCL). The vertical lines indicate upper bounds of body depth size categories, converted to SCL, that correspond to turtle excluder device dimensions. These vertical lines are included at the committees request and are not intended to imply that strandings could have been, or could be excluded from trawl fisheries operating within these latitudes. Among the reports of incidental captures in the STSSN database there was an unmeasured loggerhead turtle and 27.0cm SCL Kemp's ridley captured in otter trawl gear, both in zone 39 and both released alive. In both cases it is possible that these were commercial fishing operations but the reports were unclear. In the case of the loggerhead, the photo included with the written report shows three individuals wearing PFD's with calm seas and clear weather in the background, leading us to suspect this was a research vessel. In both cases it was the same entity reporting the incidental capture, further suggesting to us that these were research vessels. Two unusually large loggerhead reports with SCL's of 48.0inches and

54 inches (121.9 cm and 137.2 cm respectively) were not included in Figure 1a because the STSSN suspects these are inaccurate. Figure 2 shows the distribution of turtles by Julian date. Cold stunned turtles are defined as those strandings for which the time, place, and weather conditions suggested to either the STSSN state coordinator, or to the STSSN managers, that the animals stranded due to lowered body temperatures resulting in torpor and/or mortality. These tended to happen at a particular set of latitudes (Figures 1 and 2) and in the late fall (Figure 2). These latitudes correspond to Cape Cod in the North and the North Carolina estuarine system in the South. Presumably these stranding concentrations of cold stunned turtles are due in part to the geography of the regions in which they occur.

Table 1 shows the proportion of all turtles by latitudinal zone. Zones are defined as the lower limit bounded by the next zones lower limit. These proportions only represent those turtles reported to the STSSN and not size distributions of the sea turtle populations available to be encountered, nor the size distributions of sea turtles available to trawl fisheries.

A few general points should be kept in mind when examining this report. First, this report is only a summary of reports to the STSSN in response to a specific request from the Atlantic Sea Turtle Strategy Steering Committee, rather than a scientific evaluation of a hypothesis. Second, the general issue of what size turtles could interact with trawl fisheries is a multidimensional spatial and temporal problem. For the most part, these data represent only what appeared on the beaches and probably are representative only of what was in the nearshore waters. Third, strandings data from the STSSN represent a unique set of unexamined biases inherent to an informal survey, and may not represent what sea turtle populations are doing in the region (from which STSSN reports arise), let alone what sea turtle populations are doing in nearby or more distant regions (such as where a particular trawl fishery is operating). Reducing space to the single dimension latitude (e.g. Figure 1, Table 1) may be particularly misleading in this case when juxtapositioned with considerations of TED dimensions for fisheries that are possibly not operating at the same longitudes at which reported turtles were found. To argue that turtles reported to the STSSN found at similar latitudes could therefore be found at similar longitudes where the targeted fisheries are operating invokes a large, and possibly unjustified assumption in the absence of corroborating information. Temporal considerations (Figure 2) have a similar problem, if one assumes that what happens at a particular time at one location is necessarily related to what happens at that time at another location.

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Literature cited

Epperly, S. P. and W. G. Teas 2002. Turtle excluder devices – Are the escape openings large enough? Fishery Bulletin 100: 466-474.

Figure 1: Latitudinal distribution of turtles by straight carapace length (SCL) with report type indicated. Vertical lines indicate upper bounds of body depth size categories, converted to SCL, that correspond to turtle excluder device dimensions. These lines are not intended to imply that these turtles could have been or could be excluded from trawl fisheries operating within these latitudes. Number of turtles reported with SCL is indicated by N and report type categories are; “strandings”, “cold stunned”, and “incidental captures” indicated by symbols and color. Each species is displayed separately: (a) Loggerhead turtles, (b) Green turtles, (c) Kemp’s ridley turtles, (d) Other turtle species, and (e) Leatherback turtles.

(a) Loggerhead turtles

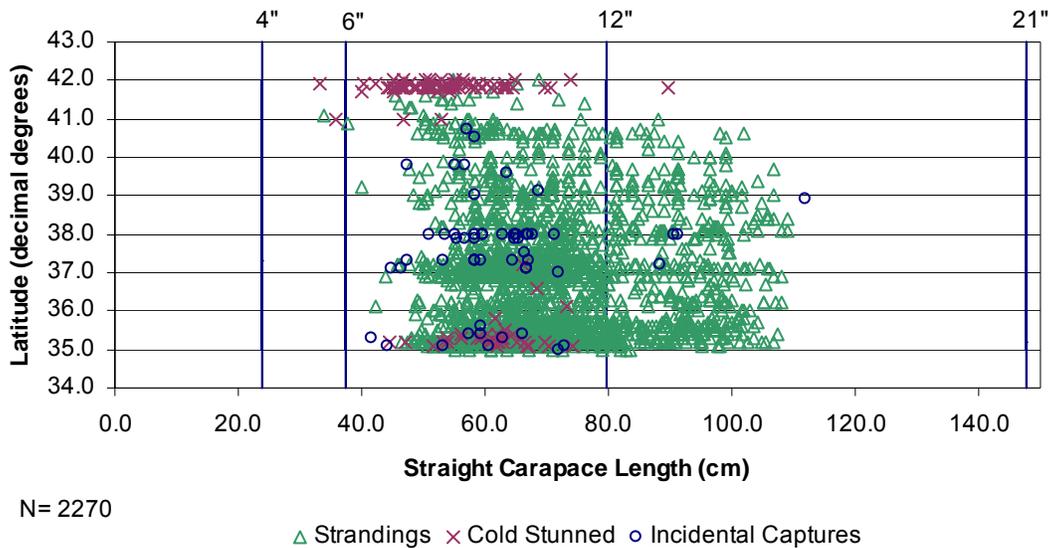
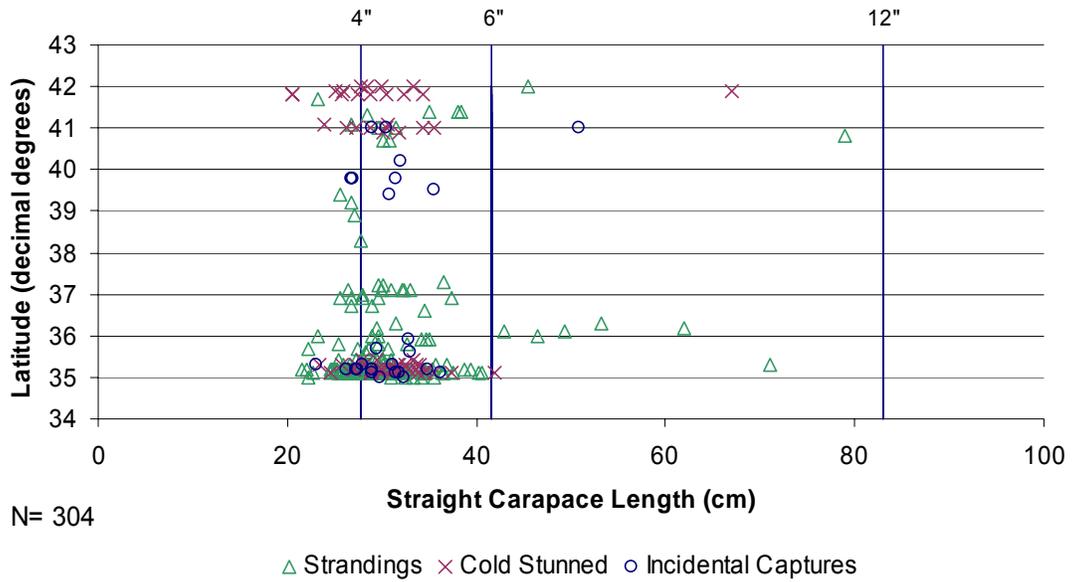


Figure 1 continued
b) Green turtles



c) Kemp's ridley turtles

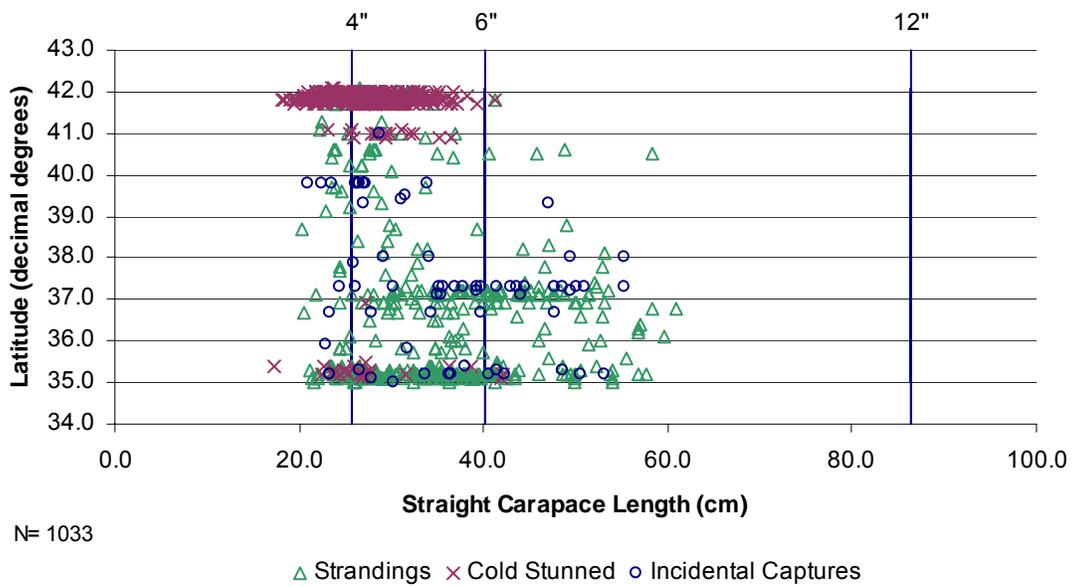
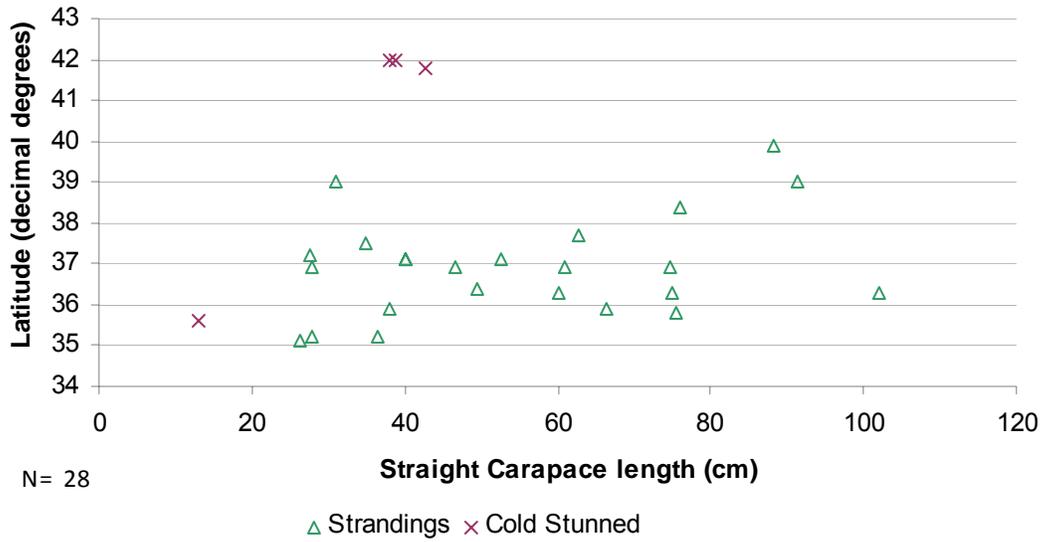


Figure 1 continued
d) Other turtle species



e) Leatherbacks: all were “strandings”

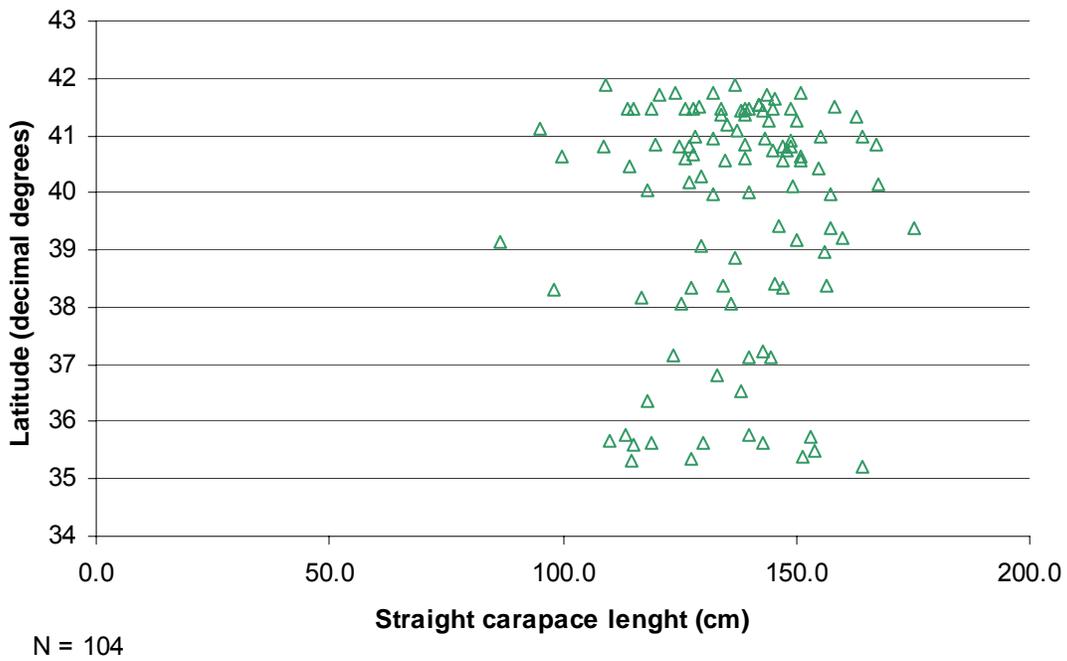
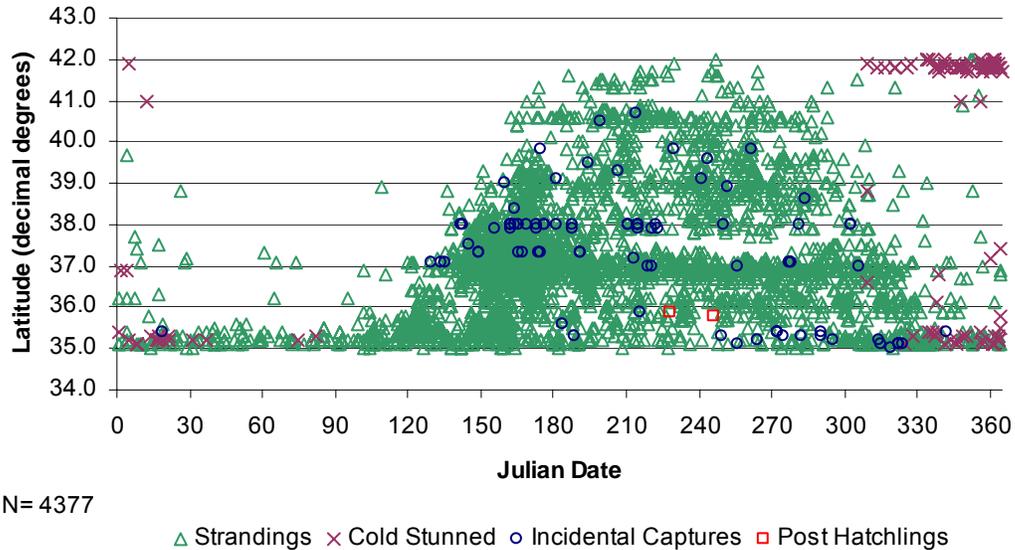


Figure 2: Latitudinal distribution of turtles by Julian date. Number of turtles is indicated by N and report type categories are; “strandings”, “cold stunned”, “incidental captures” and “post hatchlings” indicated by symbols and color, see text for descriptions of report types. Each species is displayed separately: (a) Loggerhead turtles, (b) Green turtles, (c) Kemp’s ridley turtles, (d) Other turtle species, and (e) Leatherback turtles.

a) Loggerhead turtles



b) Green turtles

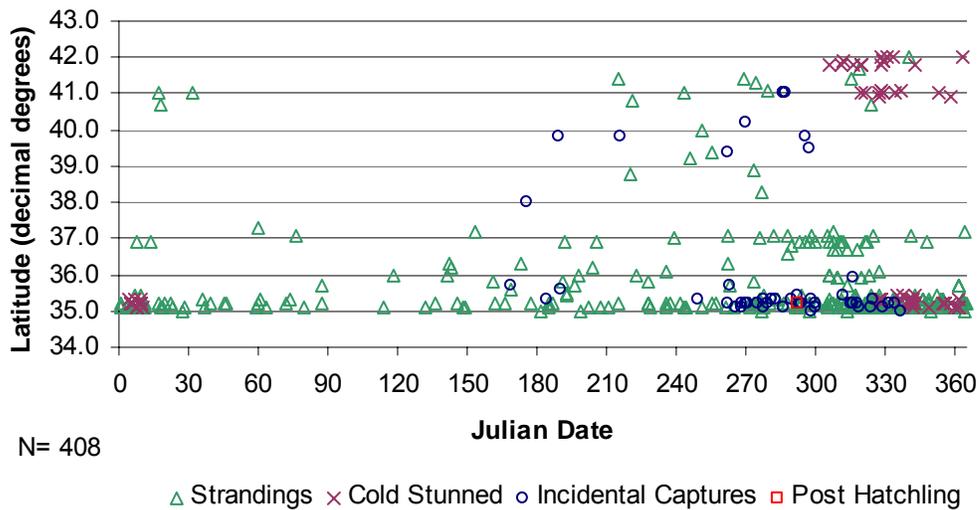
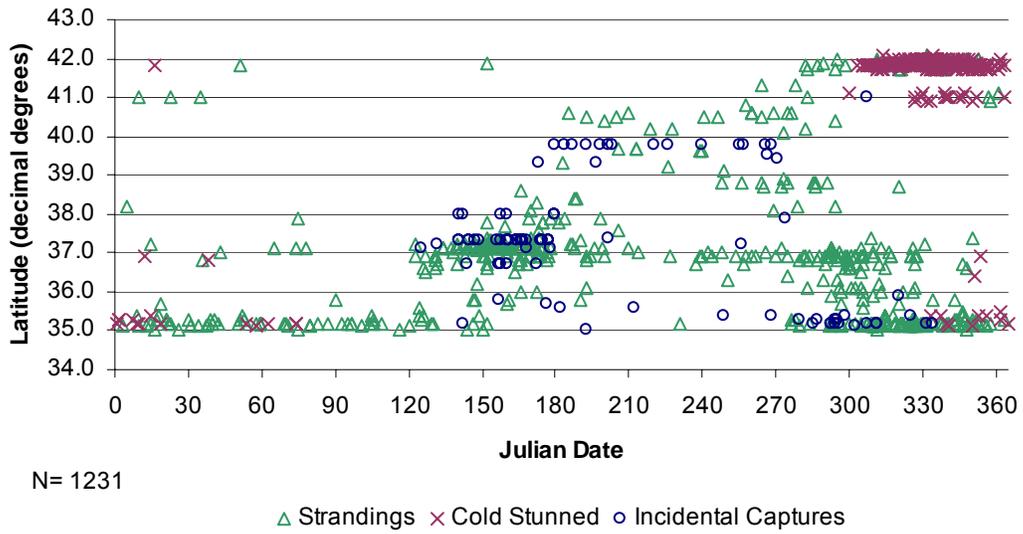


Figure 2 continued
c) Kemp's ridley turtles



d) Other turtle species

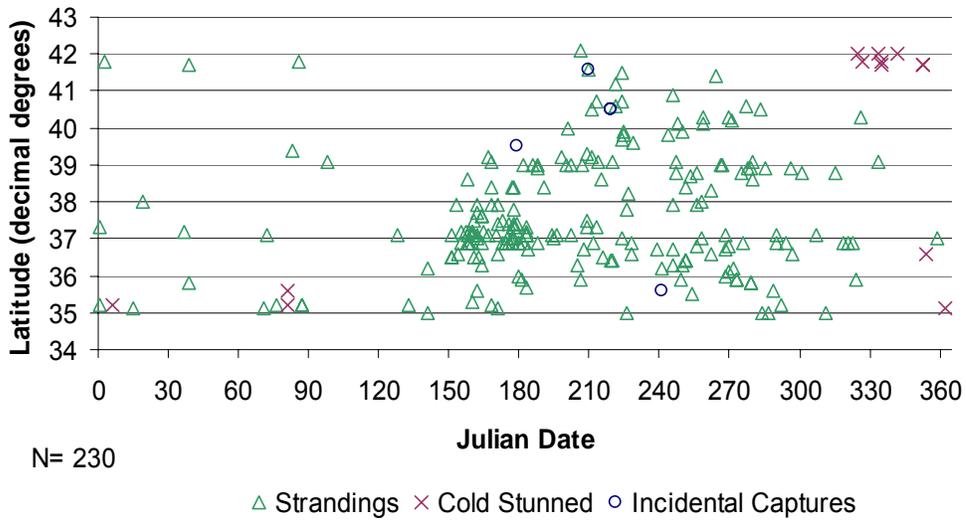


Figure 2 continued
e) Leatherback turtles

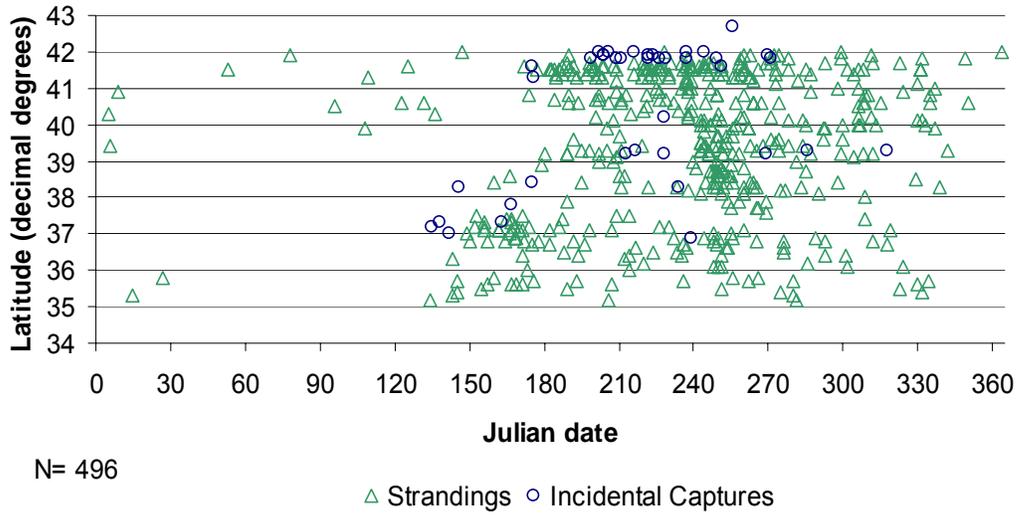


Table 1: Percent of turtles with SCL reported 35 degrees latitude and north by the lower bound of a latitudinal zone (bounded by the next integer zone north) and body depth size category by species (rows sum to 100%). The number of turtles by zone is also provided. These proportions only represent those turtles reported to the STSSN and not size distributions of the sea turtle populations available to be encountered, nor the size distributions of sea turtles available to trawl fisheries.

(a) Loggerhead turtles

Zone	≤4"	>4" to ≤6"	>6" to ≤12"	>12" to ≤21"	Number
42	0.00	0.00	100.00	0.00	5
41	0.00	2.13	95.74	2.13	96
40	0.00	0.98	79.71	19.32	93
39	0.00	0.00	67.37	32.63	144
38	0.00	0.00	63.00	37.00	200
37	0.00	0.00	87.00	13.00	508
36	0.00	0.00	79.00	21.00	362
35	0.00	0.00	81.21	18.79	862

b) Green turtles

Zone	≤4"	>4" to ≤6"	>6" to ≤12"	>12" to ≤21"	Number
42	0.00	50.00	50.00	0.00	2
41	36.68	59.98	3.34	0.00	30
40	0.00	77.70	22.30	0.00	9
39	57.14	42.86	0.00	0.00	7
38	50.00	50.00	0.00	0.00	2
37	10.03	89.97	0.00	0.00	10
36	28.63	42.73	28.63	0.00	14
35	22.18	76.51	1.31	0.00	230

c) Kemp's ridley turtles

Zone	≤4"	>4" to ≤6"	>6" to ≤12"	>12" to ≤21"	Number
42	24.47	75.53	0.00	0.00	49
41	36.27	63.37	0.36	0.00	546
40	17.71	67.90	14.39	0.00	28
39	38.05	52.38	9.57	0.00	21
38	7.94	61.11	30.95	0.00	13
37	4.33	45.11	50.56	0.00	93
36	6.84	54.21	38.95	0.00	59
35	17.41	62.05	20.54	0.00	224