NOAA Technical Memorandum NMFS-SEFSC-418

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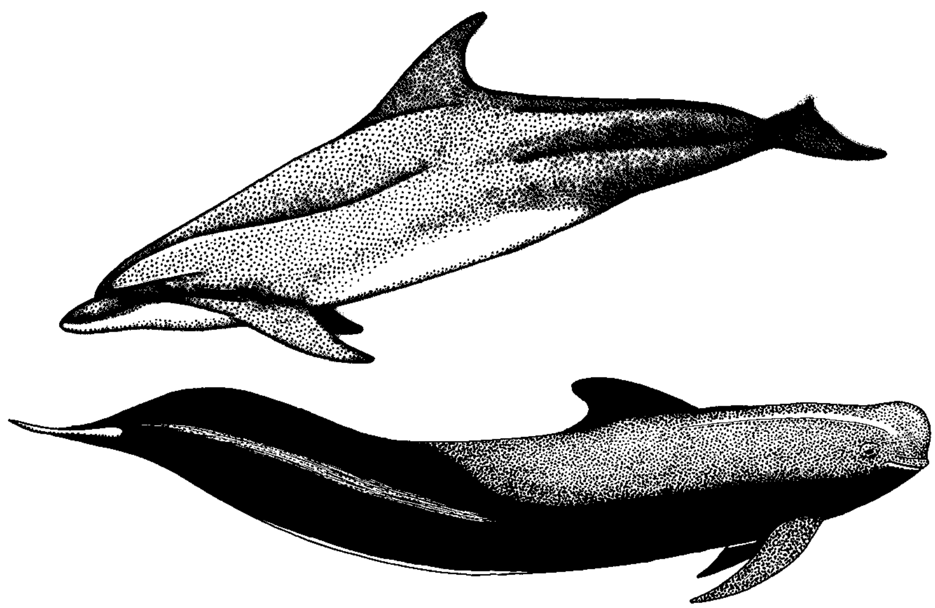

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April 1999

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NOTICE

This report should be cited as follows:
Johnson, Darlene R., Cynthia Yeung and Craig A. Brown. Estimates of marine mammal and marine turtle bycatch by the U.S. Atlantic pelagic longline fleet in 1992-1997. NOAA Technical Memorandum NMFS-SEFSC-418, 70p.

This report has an internal document number PRD-98/99-03.

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ESTIMATES OF MARINE MAMMAL AND MARINE TURTLE BYCATCH BY THE U.S. ATLANTIC PELAGIC LONGLINE FLEET IN 1992-1997.

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Contribution Number PRD-98/99-03

Abstract

This report presents estimates of the bycatch of marine mammal and sea turtle taken by the part of the U.S. Atlantic pelagic longline fleet that lands tuna and Atlantic swordfish. The information contained herein is required by NOAA Fisheries to meet its responsibility for management of interactions between protected species and commercial fisheries based on the level of incidental serious injury[1] and mortality. Under a broad interpretation of the Marine Mammal Protection Act (MMPA) definition, estimated bycatch might be equated to estimated injured marine mammals (Wade and Angliss 1997). Estimates were based on bycatch rates from a representative sample of the fleet recorded by scientific observers, and fishing effort reported by the fleet. Bycatch rates reported by the fleet were omitted. Estimates were constructed using the Delta-lognormal method as described by Pennington (1983). Robustness of the estimates to geographical and temporal effects was examined by pooling across strata (calendar quarters, fishing areas, and groups of species). Point estimates of bycatch were relatively insensitive to pooling treatments, but gains in precision of estimates (coefficient of variation) were attained in some cases. The most precise annual estimates (pooling within years, within the three major fishing areas, and grouping of species) indicate that the US pelagic longline fleet operating in the Atlantic caught between a low of 45 (12-163, 95%CI) marine mammals in 1997 and a high of 581 (318-1162, 95%CI) in 1992. Of these, estimates of the number of marine mammals in the bycatch that were released dead ranged from 0 in 1995 and 1997 to 50 (10-256, 95% CI) in 1992. Most of the marine mammals were caught in US Atlantic EEZ waters between South Carolina and Cape Cod. For marine turtles, it was estimated that the fleet caught a low of 664 (362-1247, 95%CI) in 1997 and a high of 3,136 (2,325-4,260, 95%CI) in 1995. Of these, the estimated number in the bycatch that were released dead ranged from 0 in 1995-1997 to 60 (11-307, 95% CI) in 1992. Most marine turtles were caught from the Grand Banks (NED) fishing area, outside of the US EEZ.

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[1] *Injury* is specifically defined in the Code of Federal Regulations 229.2 as: “a wound or other physical harm...”, and also includes impairment of physiological or locomotive functions. *Serious Injury* is defined as meaning ”any injury that will likely result in mortality.” “Any animal that ingests fishing gear, or any animal that is released with fishing gear entangling, trailing, or perforating any part of the body” is being considered for classification as seriously injured (Angliss and DeMaster 1998).

Introduction

Longline is the principal gear used to fish for tuna (*Thunnus spp.*) and swordfish (*Xiphias gladius*) in the U.S. North Atlantic (including the Gulf of Mexico) (see, e.g., Berkeley et al. 1981; Hoey and Bertolino 1988). Non-targeted bycatch of this fishery includes species of marine mammals and sea turtles, which are hooked or entangled in the longline. Under the 1994 Amendments to the Marine Mammal Protection Act, sect.118, all U. S. commercial fisheries are categorized according to the level of marine mammal mortality and serious injury they are associated with. The U.S. pelagic longline fishery operating in the Atlantic Ocean, Gulf of Mexico, and Caribbean is categorized as a Category I fishery and requires a monitoring program to establish the level of marine mammal takes and to collect data to aid in the development of take reduction plans.

Marine turtle bycatch in the U.S. Atlantic longline fleet has been estimated using several methods. Witzell and Cramer (1995) applied a generalized linear model (GLM), based on a Poisson error distribution assumption, to model marine turtle catch per set by U.S. Atlantic longline vessels during 1992-1993. The observer data used in that analysis were obtained from the Pelagic Observer Programs managed by NOAA Southeast Fisheries Science Center (SEFSC, Lee et al. 1994; 1995) and Northeast Fisheries Science Center (NEFSC). Turtle catch and effort were obtained from the Atlantic Large Pelagic Logbook managed by the SEFSC (Farber 1990; Farber and Cramer 1992; Cramer 1993a; 1994a; 1995a; 1996a). The GLM was also applied to estimate marine mammal bycatch in U.S. Atlantic and Gulf of Mexico marine mammal stock assessment documents (Blaylock et al. 1995), except that marine mammal self-reported catches came from the Marine Mammals/Vessel Interactions database of the Marine Mammal Exemption Program (MMEP) managed by the NOAA Fisheries Office of Protected Resources (V. Cornish 12/7/94, pers. comm. to J. Cramer). In this case, the MMEP data were matched and merged with the Atlantic Large Pelagic Logbook data by vessel identifications and dates to provide a self-reported database of marine mammal incidental catch and total fishing effort. This method allowed the estimation of uncertainty about the bycatch and provided a basis for modeling spatio-temporal and gear effects (e.g. fishing depth or the effect of light sticks) by taking advantage of the larger sample sizes from the self-reported data, relative to the sample sizes from observed catch rates only (e.g. Table 1 in Witzell and Cramer 1995).

An alternative method, a simple proportional extrapolation of the observed catch rates to the logbook-reported total effort ($catch_{total} = catch_{observed} \div effort_{observed} \times effort_{logbook}$), was summarized in Cramer (1995a) for calendar year 1993. This method was used to provide a national report to the International Commission for the Conservation of Atlantic Tunas (ICCAT) on estimated total catch (including marine mammals and marine turtles) composition and disposition of the U.S. Atlantic longline fleet. The method ignored self-reported information on catch rates available from the MMEP and Atlantic Large Pelagic Logbook data sets and did not provide a measure of uncertainty in the catch estimates.

Some differences in estimates can result from ignoring the self-reported data. For instance, for 1993, the point estimate of marine mammal bycatch using the simple extrapolation of observed data was 236 animals (Cramer 1995a), marginally outside the approximate 95% confidence range for estimated marine mammal bycatch using the Poisson error GLM of both self-reported and observed data (243-553). However, the simple extrapolation estimate of marine turtle bycatch in 1993 was 1,307 animals (Cramer 1995a), which was within the approximate 95% confidence range for the estimated marine turtle bycatch using the GLM approach (1,089-2,276, Witzell and Cramer 1995).

Scott and Brown (1997) estimated marine mammal and marine turtle bycatch for the U.S. Atlantic pelagic longline fleet for 1994-1995 using a modification of the simple extrapolation method which provided measures of uncertainty in bycatch estimates. They believed that their method was less complicated than the GLM approach, although it ignored axillary information (e.g. light sticks, depth, details regarding gear configurations and methods) in the self-reported data that might provide a basis for further refining the estimates through a structured hypothesis testing procedure. In this report, we have used the methods of Scott and Brown (1997) to estimate bycatch for the years 1992-1997.

Methods

***Data*:** Two types of data (observer-based and self-reported) and three databases were queried for accessibility and utility for this analysis. Observed catch and effort data were combined from the SEFSC and NEFSC Observer Program databases. The third database was the Atlantic Large Pelagic Logbook (maintained by the SEFSC) in which daily fishing effort was reported by all U.S. Atlantic longline vessels landing swordfish and tuna (Cramer 1993a; 1994a). A fourth, the Marine Mammal Exemption Program (MMEP) database of self-reported catch and effort data by the U.S. Atlantic pelagic longline fleet (maintained by NOAA Fisheries Office of Protected Species), was used in previous estimates of marine mammal and turtle bycatch, but was not used in this analysis. These databases are continually being revised and updated. This analysis is based on the most current data at the time.

<u>*Observer Data*</u>: Systematic sampling by scientific observers on board U.S. pelagic longline vessels in the Atlantic permitted to land and sell swordfish was implemented in 1992, under the mandate of the 1991 amendments to the U.S. Fishery Management Plan (FMP) for Swordfish. In order to assure compliance to international agreements and to meet national goals for the management of pelagic fisheries, there was an obvious need to implement data collection systems which could be used to confirm and augment self-reported and port sampling programs.

The objective of the observer sampling program was to provide a representative basis for estimating the total composition of the catch (retained and discarded, targeted and incidental). Among the demands on the data collected was to provide estimates of the (dead) discarded catch of species for which harvests are restricted by regulation (e.g. undersized swordfish, billfishes, bluefin tuna, sharks, etc.), and of unintentional catch of species protected from harvest by regulation (e.g. marine mammals, marine turtles, etc.). Observers record all relevant information as each hook of the longline set is retrieved.

A simple, random sampling design was instituted to derive a representative sample of the fleet (Cramer et al. 1993; Scott and Brown 1997). Vessels were selected for observation based on prior year performance information collected through the Atlantic Large Pelagic Logbook program (see below). The vessel selection process was based upon the amount of fishing effort (days fished) reported by permitted vessels and the selection was originally stratified by nine fishing areas (now eleven due to geographical expansion of the fleet, see Figure 1) and four calendar quarters. The probability of a vessel being selected for observation was proportional to the amount of effort reported for that vessel in the prior year-area-quarter. Vessels were sampled without replacement within a year-quarter (no single vessel is selected for observation more than one time per quarter). A target sampling level of 5% of the reported year-area-quarter effort was established based on available resources and estimated costs of the sampling, and not on the expected precision of the estimates.

Names of vessels selected for observation (Cramer et al. 1993; Cramer 1993b; 1994b; 1995b; 1996b; Scott and Brown 1997) are provided to the SEFSC and NEFSC observer field sampling programs which implement the design. At times, it is not possible to exactly implement the plan as drawn due to safety concerns, changes in vessel operations (no longer fishing, participating in another fishery, etc.), or other reasons. For this reason, an ordered draw representing 15% of prior year-area-quarter reported effort is provided to the field sampling programs.

During 1992-1997, field observer sampling was conducted by the SEFSC and the NEFSC. The SEFSC field sampling program for the longline fleet made use of both NOAA Fisheries and contracted field sampling program personnel. Data collected by the SEFSC field sampling program were entered into a database, quality-controlled and managed by SEFSC staff (Lee et al. 1994; 1995). The NEFSC field sampling program (1992-1995) was primarily conducted through a sea sampling contractor and data entry and initial quality control were the responsibility of the contractor. Upon delivery from the contractor, additional audits and quality control as well as management of the data were performed by NEFSC staff. Since October 1995, the SEFSC has assumed the responsibility of the field sampling for the entire Atlantic fishery.

Although the data collection systems used by the NEFSC and SEFSC field sampling programs were not identical, there was a high degree of overlap and each program collected information sufficient to characterize the composition, status and disposition of daily total catch and effort observed. For the purposes of this analysis, the total observed bycatch of marine mammals and marine turtles by pelagic longline vessels was classified by species, year, calendar quarter, fishing area, and condition of each animal upon release from the gear and returned to the sea as either alive, dead, or unknown. In addition, information which may be useful for future evaluation of the odds of death due to injury incurred by marine mammals/turtles observed caught by pelagic longlines was also examined.

The geographical zones used to classify observed and reported longline fishing effort are shown in Figure 1. In general, these classifications are based on latitude and longitudes reported for the observations. When in some cases specific location (latitude and longitude) information was not available for observed catch and effort, fishing areas (for catch and effort) were assigned based on examination of neighboring sets (neighboring days of fishing on the same trip), or examination of the individual data recording logs filled out by the observer. Where specific locations could not be determined or extrapolated from neighboring days, the most frequently observed latitude and longitude in the data for the fishing area were assigned.

Several coastal strata were combined for the purposes of estimation, in keeping with Witzell and Cramer (1995), Cramer (1995a) and Scott and Brown (1997), which provided previous estimates of bycatch of marine turtles and marine mammals by this fishery. The Southeast Coastal (SEC) stratum was defined as areas 3 and 4; the Northeast Coastal (NEC) stratum was defined as areas 5 and 6; and the Offshore South (OFS) was defined as areas 8, 9, 10, and 11 (Figure 1). The NEC, SEC, OFS, along with unpooled areas (CAR - area 1, GOM - area 2, and NED - area 7) will be referred to hereafter as grouped fishing areas or NAREA. For reporting, and for testing the sensitivity of the estimation method to pooling, three major regions were also defined as those generally within the U.S. Atlantic EEZ (US Atl: SEC and NEC), other Atlantic waters (OthAtl: NED, OFS, and CAR), and the Gulf of Mexico (GOM). These will be referred to hereafter as major areas or MAREA.

Large Pelagic Logbook Data: Daily logbook reports of catch and effort from permitted U.S. vessels targeting large pelagic fishes have been required under the Atlantic Swordfish Fishery Management Plan since 1986. The SEFSC is responsible for the entry, quality control and management of these data (Farber 1990; Farber and Cramer 1992; Cramer 1993a; 1994a; 1995a; 1996a; Scott and Brown 1997). The fleet reporting under the permit system targets a number of species of tuna and swordfish and these data are utilized in fishery resource stock assessment analyses. Expansion of logbook reporting requirements to other fisheries, utilization of several gear types for targeting swordfish and tunas, and the open access nature of the fishery results in a large number of fishermen presently reporting under this system which utilize gear other than pelagic longline and/or which target species other than swordfish and tunas.

The Large Pelagic Logbook data provide a basis for monitoring the permitted effort fished during the year and were used in our analyses as the sampling frame over which observed bycatch rates are expanded for estimating total bycatch. Although the total U.S. pelagic longline fishing effort in the Atlantic during a year could differ from the logbook data, due for example to errors in reporting, misclassification/misreporting of gears, or other reasons which could cause variations above or below summaries of the logbook effort reports, it has not yet been possible to implement independent sampling systems for estimating the possible error rates in the self-reported logbook effort data. Thus, the effort summaries from logbook data reports are taken as representing total effort expended during the year.

For our analyses, logbook-reported fishing effort for pelagic longline vessels targeting swordfish or tunas was defined as individual set records reporting at least 100 hooks fished, and which were not reported to be bottom longline sets or which did not indicate a target of sharks or species other than tunas or swordfish. The logbook effort data (hooks fished and sets fished) were classified by fishing area (Figure 1, see definitions in preceding section) and calendar quarters. For logbook reports classified as pelagic longline effort for which no specific area of fishing could be assigned (due to missing location data), this effort was proportionally distributed amongst fishing areas based on the distribution of known location set records for the year and calendar quarter of the record. For unknown calendar quarter sets within a fishing area, the effort data was proportionally distributed amongst quarters based on the distribution of effort across quarters within an area.

***Catch Estimation*:** Estimates of bycatch of marine mammals and marine turtles were constructed using the Delta-lognormal method described by Pennington (1983). The method assumes a lognormal distribution of the positive bycatch rate observations. The frequency distributions of the bycatch rate (per 1000 hooks) in positive sets for marine mammals and turtles in Figure 2 show a reasonably good correspondence to a lognormal distribution. Effectively, the estimates were constructed as a product of the proportion of successful occurrences of an event and the average rate at which the event occurs for those successful events. The variance was a function of the variability of the positive bycatch rates as well the number of successful and unsuccessful sets. Total bycatch in each fishing region (see Figure 1) and calendar quarter for species or species groups of concern (C_t), was estimated as:

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where H is the reported number of hooks set per analytical stratum, divided by 1000; m_c is the number of sets upon which a bycatch of the species or species group of concern was observed; N is the total number of sets observed per analytical stratum; Install Equation Editor and double-click here to view equation. is the average of the i =1,.., m_c observations of $\log_e$-transformed bycatch per 1000 hooks fished, Install Equation Editor and double-click here to view equation. ; Install Equation Editor and double-click here to view equation. is the sample variance of the $\log_e$-transformed positive bycatch rates; and the function Install Equation Editor and double-click here to view equation. is the cumulative

Install Equation Editor and double-click here to view equation.

probability from the Poisson distribution:

(2)

Numerically, the series was computed over j terms, until a convergence criterion of <0.001 change in the function was achieved (usually less than 10 terms were required). The estimate of variance of

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the bycatch takes the form:

(3)

Bycatch estimates by stratum were assumed independent and as such estimated bycatch and the associated variances were summed across strata to produce region-wide annual estimates. The

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coefficient of variation for the stratum-wise estimate of bycatch was taken as:

(4)

and approximate 1-a confidence intervals were constructed assuming a lognormal distribution as: Install Equation Editor and double-click here to view equation. where $U_{1\text{-a}/2}$ and $L_{1\text{-a}/2}$ represent the upper and lower confidence bounds, Install Equation Editor and double-click here to view equation. and z_{a} the associated 1-a z-score.

Estimates of animals returned to the sea alive and returned to the sea dead were likewise constructed, except that the appropriate number of positive sets, average log-transformed bycatch rates and variance terms were substituted into equations 1-4 above. Additionally, the robustness of the estimates to pooling across calendar quarters, large geographical regions, and within coarser taxonomic groupings (i.e. marine mammals and marine turtles) was examined. Also in these cases, the appropriate number of positive bycatch sets, average ($\log_e$) bycatch rates and variance terms were substituted.

***Expected Precision*:** Expected levels of precision for the data and estimation methods used herein were modeled as a function of the proportion of positive sets and the stratum-wise percent coverage. A GLM using a lognormal error assumption was applied to the stratified estimates of coefficients of variation (year-quarter-area and lowest taxonomic grouping) of the bycatch of all species observed for the data ranging from 1992-1997, controlling for the proportion of positive sets and sampling fractions (observed sets/logbook-reported sets) for each area-year-quarter stratum as defined above. The resulting model predictions were used to evaluate the relative contribution to precision of the two components for the species observed in this fishery. In addition, the same GLM model was estimated again after universally applying a finite population correction to all stratified estimates of coefficient of variation:

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where F is the (number of observed sets)/(total number of sets) (Snedecor and Cochran 1967). This step was taken to evaluate the sensitivity of the coefficient of variation to percent sampling coverage.

Results and Discussion

Logbook-reported and observed effort (by number of hooks and number of sets) for each year-calendar quarter-area stratum from 1992-1997 are summarized in Tables 1-4. Witzell (1999) also reported pelagic longline effort (number of hooks) targeting swordfish and tuna and the bycatch of marine turtles from the logbook for 1992-1995. There have been considerable changes in the logbook since he extracted his data from it in early 1996, and the higher logbook effort we report in this paper compared to Witzell (1999) reflects the revision of the logbook database since then. Total effort and the percent coverage (observed sets/logbook reported sets) for each grouped area (NAREA) are presented in Figures 3-8 and the latter ranged from 0-48%. Annual percent sampling coverage was slightly depressed (_1%) when sets were used instead of hooks in the calculation (Figure 9). By hooks, the annual percent coverage ranged from 2.7% in 1992 to 7.2% in 1993 across NAREA and quarters, while by sets the range was from 2.4% in 1992 to 6.1% in 1993. The patterns of the two effort measurements mirror each other even though they produce different levels of coverage. Number of hooks were used in all of the bycatch estimates. Less than 1% (0.08%) of the log reported effort data had missing quarterly and/or areal information. However, the logbook effort included in this analysis might not equate to the total pelagic longline fishing effort expended during 1992-1997, for reasons such as reporting errors and misclassification of gear types in the analysis. The direction and magnitude of difference between the logbook (as herein defined) and actual effort cannot be predicted on the basis of present information. If actual effort expended is greater than indicated in Tables 1, then the resulting estimates of bycatch would be higher. Likewise, if the actual effort expended was lower than indicated in Table 1, then the estimates of bycatch would be lower.

A summary of observed marine mammal bycatch by species, year, quarter, and area is shown in Table 5 (see Table 6 for a listing of the year-quarter-NAREA-species strata events used in the analyses). Between 1992-1997, 91 marine mammals were observed caught, ranging from 2 in 1997 to 24 in 1994. The bycatch occurred on 80 different fishing operations (sets) and the observed positive bycatch ranged from 1 to 5 animals on a single set, although 72 of the 80 positive sets captured only one animal. Most of the marine mammals observed caught were from U.S. Atlantic EEZ waters (MAB, SAB, and NEC), ranging from off the coast of South Carolina to east of Cape

Cod (Figure 10). The most common species observed caught (Table 6) were pilot whales (*Globicephala* spp.), including two shortfin pilot whale (*Globicephala macrorhyncus*), which accounted for 59 of the 91 observed animals. Risso's dolphin (*Grampus griseus*) ranked second with 21 animals observed, and in third rank were two bottlenose dolphins (*Tursiops truncatus*). One individual each of the pantropical spotted dolphin (*Stenella attenuata*), Atlantic spotted dolphin (*Stenella frontalis*), common dolphin (*Delphinus delphinus*), short-beaked spinner dolphin (*Stenella clymene*), and killer whale (*Orcinus orca*) was captured. One spotted dolphin and dolphin each of unknown species and two unidentified marine mammal comprised the remainder of the observed marine mammal bycatch. During these six years, four marine mammals were observed dead upon return to the sea. Three Risso's dolphins were reported dead (one from the MAB in 1994 and two from the GOM in 1993 and 1996). One pilot whale from the MAB was reported dead (1992). One animal was of unknown condition upon return to the sea, while the remaining 86 animals (95%) were observed to be living when returned to the sea.

Observed turtle bycatch was considerably larger than marine mammal bycatch (Figure 10). A summary of observed marine turtle bycatch by year, quarter, and area is shown in Tables 7 (see Table 8 for a listing of the year-quarter-NAREA-species strata events used in the analyses). Bycatch numbers were greatest in the northeast Atlantic fishing areas, specifically the offshore NED, and the coastal NEC and MAB areas (Figure 1), due to much higher average per set bycatch observed in those areas. The high bycatch per set from SAR (Figure 10) represents one turtle caught in one observed set. During 1992-1997, 516 marine turtles were observed captured, ranging from a low of 23 in 1996 to a high of 191 in 1995. Fifty-seven percent of the marine turtles were taken from Atlantic waters outside of the U.S. EEZ (specifically the NED fishing area). Seventy-eight percent of turtle bycatch was taken in the third and fourth quarters. Greatest bycatch occurred in the years 1993-1995. The total of 516 marine turtles were observed on 318 sets and the number of turtles caught per set ranged from 1 to 9 (229 sets caught 1 turtle, 42 caught 2, 20 caught 3, 8 caught 4, 10 caught 5, 5 caught 6, 2 caught 7, 1 set each caught 8 and 9). The most common species (Table 8) caught were loggerhead turtles (*Caretta caretta*), which accounted for 271 of the 516 observed animals. Leatherback turtles (*Dermochelys coriacea*) ranked second (215 animals observed). The relative frequency of observed bycatch of turtles was lower in 1996-1997 than 1992-1995. Three other species (15 green turtles *Chelonia mydas,* 2 Kemp's ridley *Lepidochelys kempi*, and 2 hawksbill *Eretmochelys imbricata*) and 11 unidentified marine turtles comprised the remainder of the observed marine turtle bycatch (Table 8). Witzell and Cramer (1995) noted that the identification of turtles as hawksbill, green and Kemp's ridley in the 1992-1993 observer and logbook records were questionable based on unlikely distributions and feeding preferences. Large hawksbill and green turtles are tropical spongivores and subtropical herbivores, respectively, that would be unlikely to be found in the temperate longline environment, and therefore unlikely to consume longline baits or become entangled in the branchlines (Witzell 1983). Witzell and Cramer (1995) stated that there was some photographic evidence that showed misidentification. Of the 15 green turtles in the observer records, 13 occurred in the NE Atlantic, one in the Gulf of Mexico, and one in the SE Atlantic. One Kemp's ridley turtle was caught in the NEC and the OFS fishing areas, and the one hawksbill each was reported in the SEC and the NEC.

Estimates of marine mammal and marine turtle bycatch by the U.S. pelagic longline fleet operating in the Atlantic in 1992-1997 are shown in Tables 9-13. Table 9 presents stratum-specific (year, quarter, NAREA, and lowest taxonomic grouping available) estimates of total bycatch, bycatch observed dead, and bycatch observed to be alive upon return to the sea. Estimates of "unknown condition" bycatch are not shown in the tables, but can be calculated as the difference between the total bycatch and the sum of the dead and alive categories. There were only one mammal (92, 4, NEC, Risso's dolphin, Table 6) and one turtle (95, 4, NED, loggerhead, Table 8) caught that were of unknown condition.

The proportion of observed sets in a year-quarter-area stratum, in which at least one marine mammals was caught (Proportion of sets with Positive Catch) was between 1-13% (Table 9). Overall, at least one marine mammal was observed caught in 2.4% of observed sets. The proportion of observed sets on which at least one turtle was caught (PPC) was generally higher than that for marine mammals (1-100%, Table 9). Overall, at least one marine turtle was observed caught on 9.6% of the observed sets during 1992-1997. The NED fishing area (Figure 1) stood out with generally high proportions of observed sets on which at least one turtle was caught (Figure 10). Witzell and Cramer (1995) point out that some turtles observed caught in 1992-1993 had one or more hooks imbedded, indicating the possibility that some turtles may be caught multiple times. Thus, estimates of marine turtle bycatch might overestimate to some unknown (but presumably small) degree, the number of different individuals caught by the fleet, and therefore reflect "turtle captures", not "turtles captured". Estimates for those areas with at least 5% observer coverage is shown in Table 10.

Annual estimates of marine mammal and marine turtle bycatch for the NAREA fishing area strata and for the lowest taxonomic grouping available in the data are shown in Table 11. Annual estimates for larger ocean areas (MAREA - Gulf of Mexico waters, U.S. Atlantic EEZ waters, and other Atlantic waters) are provided in Table 12. The estimates and associated coefficients of variation in Tables 9-12 are based on estimation by year-NAREA or MAREA-quarter strata for the lowest taxonomic groupings available in the data. Robustness of the estimates to geographical and time of year effects was examined by pooling across strata. Estimates of bycatch in Table 13 were constructed by pooling within years, within the major ocean areas (MAREA) used in Table 12 and within the general taxonomic categories of marine mammals and marine turtles. Figures 11 and 12 contrast the resulting estimates by the stratified approach (Table 12) and the pooling approach (Table 13). It is apparent in examining Figures 11 and 12 that the point estimates of bycatch are relatively insensitive to this treatment of the data, but that considerable gains in precision of the estimates can be attained by pooling, particularly in the marine turtles group in which there are higher bycatch numbers.

The more precise pooled estimates (summing across regions and taxonomic groups - Table 13) indicate that the U.S. pelagic longline fleet operating in the Atlantic (including the Gulf of Mexico) during 1992-1997 caught a low of 45 (12-163, 95%CI) marine mammals in 1997 and a high of 581 (318-1162, 95%CI) marine mammals in 1992. Of these, it is estimated that no marine mammal was dead upon return to the sea in 1995 and 1997, and as many as 50 (10-256, 95% CI) were returned to the sea dead in 1992. The species recorded as dead are Risso's dolphin and pilot whale (Table 12). The estimated numbers of Risso's dolphins that were released dead are 36 in 1993, 10 in 1994, and 25 in 1996. The estimated number of pilot whales that were released dead is 50 in 1992. It is also estimated that the fleet caught a low of 664 (362-1,247, 95%CI) marine turtles in 1997 and a high of 3,136 (2,325-4,260 95%CI) marine turtles in 1995 (Table 13). Of these, it is estimated in Table 13 that the number of turtles that were returned to the sea dead ranged from 0 in 1995-1997 to 60 (11-307, 95%CI) in 1992. An estimated 10 loggerhead turtles were released dead in 1993, 12 in 1994, and none in other years (Table 12). Leatherback released dead was estimated at 43 in 1992, 12 in 1993, and none during other years. Estimated green turtle mortality in 1992 (17) may have been a misidentification as suggested by Witzell and Cramer (1995), who assigned them as loggerheads in their study.

A cautionary statement should be made regarding the pooled estimates. Although more precise than estimates made for individual regions and species, when sampling is inadequate for particular regions the pooled estimates assume that sampled bycatch rates are representative of the larger pooled area. An example of where this assumption may be violated can be seen for the NED region, for which there were no observer data in 1996. The NED appears to have a relatively high bycatch rate for marine turtles in other years; the absence of sufficient samples from this region might result in underestimates of bycatch for the OTHATL area in 1996.

Estimated bycatch of marine turtles from observer data was significantly greater than the total bycatch reported in logbooks (Figure 13), although both data sets showed the same pattern of high turtle catches in 1995 and low turtle catches in 1997. The discrepancy draws to attention the limitation of an assessment method that is heavily dependent on data reported by the fishery. It is perceivable that there would be under-reporting of bycatch and effort by the fishery, among other misinformation. The ability to quantify this error is hampered by the low percentage coverage of the fleet by observers. Until studies are made to validate logbook data, it is noted that the use of data reported by the fishery would introduce an uncertain degree of error in the estimates of bycatch.

Our bycatch estimates were compared with those from Scott and Brown (1997) for the years 1994-1995 (Table 14B). We found a miscalculation in the analyses of Scott and Brown (1997), which led to the inflation of observed effort and thus the underestimation of bycatch rates in some cases. Our estimates for total marine mammal bycatch were 38% greater for 1994 and 52% greater for 1995, while estimates for marine turtles were 6% greater for 1994 and 10% greater for 1995. Estimates of precision (CV) were virtually identical. Differences in effort (Table 14A) between the two studies are attributed to updated observer databases and logbook-reported effort which resulted from quality control procedures that fixed erroneous data entries. Another factor that might have minor contributions to the differences is that, in this analysis, logbook-reported effort with missing area and quarter information (0.08% of all effort data) was distributed proportionally among areas according to known effort, a step we believe necessary in order to not underestimate catch, but which was not taken in Scott and Brown (1997).

During 1996 and through 1997, resources for observer sampling of the pelagic longline fleet were reduced, with a concomitant reduction in the effort (from 5.9% in 1995 to 2.5% in 1996 by hooks, Figure 9). The precision of bycatch estimates is likely to be affected by 1) the percentage coverage by observer effort on the fleet (PERCOV), and 2) the proportion of positive catch observations (PPC). The contributions of these two factors to the variability of the CV ($\log_e$-transformed) of the bycatch estimates are examined with a loglinear regression model:

$$\log_e(CV) = b_0 + b_1(PERCOV) + b_2(PPC) + e,$$

where b_i (i=0-2) are the regression parameters and *e* is the error term. The analysis was run without the finite population correction (Table 15) and then also with the correction (Table 16). As expected, the models show that an increase in either PERCOV or PPC reduces $\log_e(CV)$. PPC has a highly significant effect in both models (Pr>F = 0.0001, whereas the effect of PERCOV only became significance in the model with the finite population correction (Pr>F = 0.7006 without correction, Table 15, compared to Pr>F = 0.0395 with correction, Table 16). The fit of the model itself is only improved slightly by the use of the finite population correction (from $r^2 = 0.3087$ to $r^2 = 0.3169$). Additional variability in the $\log_e$-transformed CV estimates could likely be explained by factors such as fishing area (NAREA), time of year, and other variables related to the catchability of different species.

The model estimated using the finite population correction (Table 16) was used to predict the precision of the estimates of bycatch (CV) as a function of PPC (proportion of observed effort with at least one animal in the bycatch) and PERCOV (observer coverage) (Figure 14). For rare event species, (generally defined as occurring less than 20% of the time), estimates of precision of less than 40% would require over 50% sampling coverage. In this study, marine mammals and turtles, respectively have an overall average bycatch rate of about 2.4% (range 1-13%) and 9.6% (range 1-100%) (Table 9). Attaining stratified estimates with precision of less than 40% in this case would require even greater observer coverage of the total fishery effort (Figure 14). In short, the present target observation effort of 5% coverage would be inadequate according to this scenario. Further reduction in observer coverage for the U.S. Atlantic pelagic longline fleet will likely result in heavier reliance on self-reported data, which are questionable for estimating bycatch of non-target and rare event species by the fleet (Figure 13).

Information useful for classifying marine mammals as injured according to the MMPA definition of injury (see footnote 1) is generally recorded as condition codes by NEFSC observers and as comments made by observers on field data sheets (by both SEFSC and NEFSC observers). The available information for marine mammals observed caught in 1994-1997 is provided in Table 17. As the MMPA definition can be broadly interpreted to mean that any marine mammal caught is injured in some way, estimates of total bycatch could be equated with estimates of the numbers of animals injured and killed. Estimates of the numbers of animals “seriously injured”, however, would require subjective (and for the authors who are not experts in veterinary medicine, possibly inappropriate) decisions about what observational data would indicate injury of sufficient severity to significantly increase the near-term probability of death of the animal. The Serious Injury Workshop (Angliss and DeMaster 1998) was convened to address the issue and to recommend research programs that could provide objective and consistent criteria that might be used by observers to classify marine mammals into such a category . It is anticipated that after the knowledge base for classifying seriously injured animals is developed, estimating the numbers of protected species both killed *and* likely to die as a result of incidental capture by U.S. pelagic longline vessels operating in the Atlantic will be possible. It is thus important to note that, until the effects of injury on animals can be assessed, mortality in the bycatch is likely to be underestimated.

Acknowledgments

This report is made possible by the work of the NEFSC observer program and the SEFSC observer and large pelagic logbook programs. Special thanks are due to D. Lee, C. J. Brown, and J. Cramer of the SEFSC and A. Williams of the NEFSC for assistance with accessing the data, and G. Scott for his guidance and the use of his programs which were used as a framework in the analyses.

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List of Tables

Table 1. Effort (number of hooks × 1000) reported in logbook for pelagic longline sets in the U.S. Atlantic by year, calendar quarter, and fishing area. Effort data lacking area and quarter information are designated unknown (UNK). Blank areas indicate no reported effort for that year, quarter, and area.

YR	QTR	CAR	FEC	GOM	MAB	NCA	NEC	NED	SAB	SAR	TUN	TUS	unk	Total
92	**unk**			9.4	0.8				0.7				4.0	14.9
92	**1**	245.4	208.5	606.0	124.6	131.9			37.0	46.4	52.8		106.1	1558.7
92	**2**	44.6	187.4	695.8	210.3	3.6	135.4	133.7	156.3	4.5	42.3		135.6	1749.4
92	**3**	0.8	130.1	667.7	411.1	0.8	514.9	467.4	116.7	1.4		0.0	95.3	2406.1
92	**4**	69.6	129.1	482.3	483.6	1.2	74.8	179.0	44.4	52.1	1.9		79.2	1597.2
93	**unk**	0.3	1.6	1.9		0.8		0.6	1.4				1.4	8.0
93	**1**	212.5	166.6	529.4	47.4	182.3	0.6		43.6	79.5	26.5		79.8	1368.3
93	**2**	66.3	147.6	591.5	99.9		171.4	88.0	281.4	3.9	35.4		69.8	1555.2
93	**3**	6.6	108.5	738.3	696.7		516.5	477.8	153.4	2.1			139.3	2839.1
93	**4**	81.3	107.2	527.6	509.3	0.9	49.9	220.9	72.8	72.9			53.1	1695.9
94	**unk**		1.1	7.1					0.3					8.4
94	**1**	213.1	171.3	434.2	93.3	101.2	2.2		101.5	107.8	14.4		9.7	1248.7
94	**2**	116.3	166.6	588.8	128.1	42.2	89.4	76.5	306.2	1.3	55.5		33.9	1604.9
94	**3**	33.4	99.3	579.1	800.5	4.9	275.5	450.7	139.2				39.6	2422.0
94	**4**	116.8	119.5	498.1	521.1	100.6	262.3	261.2	65.4	69.5	0.6		25.1	2040.1
95	**1**	264.5	143.6	506.7	91.8	465.0	2.5	2.3	109.1	6.8	90.5		34.6	1717.3
95	**2**	127.1	128.0	532.2	261.9	230.0	113.3	20.1	398.8		132.7	3.0	48.9	1996.0
95	**3**	88.2	111.9	620.6	846.0	21.5	538.2	541.8	77.6	2.0			16.6	2864.2
95	**4**	21.0	128.5	463.9	698.9	20.1	235.4	161.2	24.0	1.8			24.7	1779.4
96	**unk**			0.8	0.5		1.0	0.4					1.5	4.2
96	**1**	332.1	104.4	553.9	12.5	361.4			258.7	38.6	64.8	7.2	15.6	1749.2
96	**2**	101.9	132.6	869.5	173.2	19.0	244.7		577.1		222.5	107.8	27.2	2475.6
96	**3**	44.7	124.5	898.3	499.3	10.2	588.2	399.6	204.2		74.3	43.7	12.3	2899.2
96	**4**	118.5	118.4	604.7	152.8	121.1	92.4	185.4	276.0	38.4			33.6	1741.1
97	**unk**			2.0					0.4					2.4
97	**1**	272.8	169.7	708.5	4.4	131.0	2.6		185.7	1.9	52.4	249.4	30.0	1808.4
97	**2**	20.7	182.8	642.4	88.8	8.7	97.6	130.8	232.4	1.3	87.9	105.5	18.3	1617.0
97	**3**	18.6	169.4	919.6	440.6	0.2	611.2	508.3	135.3	1.0	26.5	3.4	25.6	2859.6
97	**4**	42.2	116.0	374.7	302.9	46.8	251.3	12.1	44.2	14.9	31.3	25.7	11.9	1274.1
	Total	2659.1	3374.2	14654.9	7699.9	2005.3	4871.2	4318.0	4043.8	548.0	1012.3	545.6	1172.5	46904.8

Table 2. Effort (number of sets) reported in logbook for pelagic longline sets in the U.S. Atlantic by year, calendar quarter, and fishing area. Set data lacking area and quarter information are designated unknown (UNK). Blank spaces indicate no reported effort for that year, quarter, and area.

YR	QTR	CAR	FEC	GOM	MAB	NCA	NEC	NED	SAB	SAR	TUN	TUS	unk	Total
92	**unk**			12	1				2				11	26
92	**1**	542	671	1044	247	205			95	83	79		167	3133
92	**2**	119	656	1028	382	6	226	212	388	7	59		200	3283
92	**3**	3	479	939	774	1	794	694	383	5		1	165	4238
92	**4**	180	477	661	791	2	113	256	157	88	5		143	2873
93	**unk**	1	4	4		1		1	1				5	17
93	**1**	531	578	711	86	293	1		96	141	42		148	2627
93	**2**	172	521	861	178		271	137	682	6	60		139	3027
93	**3**	17	385	1075	1151		737	635	447	3			234	4684
93	**4**	211	394	774	759	2	66	295	221	128			82	2932
94	**unk**		2	9					1					12
94	**1**	465	511	658	134	160	5		185	205	22		14	2359
94	**2**	233	575	803	212	64	125	108	701	2	83		48	2954
94	**3**	82	377	791	1170	8	374	570	411				59	3842
94	**4**	272	407	679	723	150	344	343	191	105	1		39	3254
95	**1**	614	434	770	136	665	5	4	184	13	124		46	2995
95	**2**	270	418	770	360	320	152	30	712		193	5	78	3308
95	**3**	210	331	878	1176	34	626	703	218	5			22	4203
95	**4**	49	409	643	977	31	275	197	64	2			37	2684
96	**unk**			1	1		1	1					4	8
96	**1**	643	340	856	21	510			375	77	90	8	28	2948
96	**2**	188	441	1241	267	31	315		1029		317	125	47	4001
96	**3**	96	396	1303	771	21	694	474	452		88	48	26	4369
96	**4**	221	398	876	248	146	120	222	502	49			54	2836
97	**unk**			3					1					4
97	**1**	539	463	1148	9	168	6		264	3	69	291	35	2995
97	**2**	44	585	915	155	14	126	153	413	2	118	140	39	2704
97	**3**	42	520	1296	667	1	739	543	336	1	32	5	48	4230
97	**4**	84	363	521	445	52	285	12	112	18	35	28	18	1973
	Total	5828	11135	21270	11841	2885	6400	5590	8623	943	1417	651	1936	78519

Table 3. Observed effort (number of hooks × 1000) for pelagic longline in the U.S. Atlantic by year, calendar quarter, and fishing area. Blank areas indicate no observed effort for that year, quarter, and area.

YEAR	QTR	CAR	FEC	GOM	MAB	NCA	NEC	NED	SAB	SAR	TUN	TUS	Total
92	**2**		3.50	5.79	3.55		0.30		4.21				17.35
92	**3**		2.39	5.85	2.52		26.58	24.33	5.09				66.77
92	**4**	4.41	3.86	26.54	35.20		4.55	39.25					113.80
93	**1**	10.09	10.82	37.38	23.20	33.88			7.20				122.57
93	**2**	4.37	10.09	62.41	15.35		12.36	3.46	11.28				119.31
93	**3**		3.96	41.45	34.32		38.23	23.16	7.63				148.77
93	**4**	4.20	5.76	54.19	44.40		1.95	30.39	2.98				143.87
94	**1**	14.92	4.69	22.67	18.95	11.95			6.68				79.86
94	**2**		7.95	23.56	8.47		23.71		10.39				74.09
94	**3**		6.26	33.64	47.46		23.10	17.13	9.98				137.57
94	**4**		3.34	33.23	33.21		19.87	39.47	1.23				130.35
95	**1**	9.30	2.34	37.94	27.63	42.84			0.58	7.44			128.07
95	**2**	5.35	3.35	58.36	11.27	17.50			19.01				114.84
95	**3**	5.97	2.43	38.34	39.34		26.13	29.72	2.69				144.61
95	**4**		4.55	37.56	27.20		15.09	19.05					103.44
96	**1**	0.88	1.22	17.90		30.68			7.18	3.37	6.21		67.44
96	**2**		1.00	10.87					31.83				43.69
96	**3**		1.17	34.08	8.88		10.12		3.60		12.02		69.86
96	**4**	1.30	7.55	26.28	0.53				8.96				44.61
97	**1**	4.13	6.65	29.02		13.22			12.13	0.36	2.86	7.53	75.89
97	**2**			32.78	3.66			2.05	14.83			8.34	61.65
97	**3**		6.52	27.22	15.18		37.40	35.52	4.52	0.88			127.24
97	**4**		4.41	25.17	3.60		19.14		0.34				52.66
	Total	64.91	103.78	722.22	403.92	150.07	258.53	263.52	172.34	12.05	21.09	15.87	2188.28

Table 4. Observed effort (number of sets) for pelagic longline in the U.S. Atlantic by year, calendar quarter, and fishing area. Blank areas indicate no observed effort for that year, quarter, and area.

YR	QTR	CAR	FEC	GOM	MAB	NCA	NEC	NED	SAB	SAR	TUN	TUS	Total
92	**2**		16	16	6		1		12				51
92	**3**		9	8	7		29	35	19				107
92	**4**	11	15	37	56		6	46					171
93	**1**	22	20	42	43	52			19				198
93	**2**	11	32	78	20		18	6	22				187
93	**3**		15	49	54		52	34	20				224
93	**4**	10	17	64	67		4	35	9				206
94	**1**	35	18	25	27	19			9				133
94	**2**		25	33	12		28		18				116
94	**3**		23	49	67		32	18	23				212
94	**4**		16	47	46		32	43	4				188
95	**1**	22	6	45	42	61			2	10			188
95	**2**	12	14	65	19	22			33				165
95	**3**	12	5	47	60		33	39	6				202
95	**4**		13	51	35		16	26					141
96	**1**	3	5	30		41			13	9	10		111
96	**2**		4	19					52				75
96	**3**		4	43	11		11		12		17		98
96	**4**	3	19	36	1				18				77
97	**1**	10	12	44		19			15	1	4	9	114
97	**2**			48	8			2	19			12	89
97	**3**		23	39	24		41	40	11	1			179
97	**4**		14	32	4		21		1				72
	Total	151	325	947	609	214	324	324	337	21	31	21	3304

Table 5. Observed marine mammal bycatch in pelagic longline sets in the U.S. Atlantic by year, calendar quarter, and fishing area. Blank areas indicate no observed effort for that year, quarter, and area.

YR	QTR	CAR	FEC	GOM	MAB	NCA	NEC	NED	SAB	SAR	TUN	TUS	Total
92	**2**		0	0	0		0		0				0
92	**3**		0	0	3		1	0	0				4
92	**4**	0	0	1	11		1	0					13
93	**1**	0	0	1	3	0			0				4
93	**2**	0	1	0	5		1	0	0				7
93	**3**		0	0	1		2	1	0				4
93	**4**	0	0	0	7		0	0	0				7
94	**1**	0	0	0	1	0			0				1
94	**2**		0	1	0		0		0				1
94	**3**		0	1	7		2	0	6				16
94	**4**		0	0	2		3	1	0				6
95	**1**	0	0	0	0	0			0	0			0
95	**2**	0	0	0	0	0			0				0
95	**3**	0	0	0	11		3	1	0				15
95	**4**		1	0	5		0	0					6
96	**1**	0	0	0		0			0	0	0		0
96	**2**		0	0					0				0
96	**3**		0	1	3		0		0		0		4
96	**4**	0	0	0	0				1				1
97	**1**	0	0	0		0			1	0	0	0	1
97	**2**			0	0			0	0			0	0
97	**3**		0	0	1		0	0	0	0			1
97	**4**		0	0	0		0		0				0
	Total	0	2	5	60	0	13	3	8	0	0	0	91

Table 6. Observed marine mammal bycatch for 1992-1997 from the U.S. Atlantic pelagic longline vessel trips used in the analyses in this report. Variables include year (YR), calendar quarter (QTR), fishing region (NAREA), vessel trip identifier (TRIP), set on which bycatch was observed (HAULNM), the number of hooks set (HOOKS), the total number of animals involved (ANIMLS), and the numbers that were classified by the observers as alive, dead, or of unknown (UNK) condition upon return back to the sea.

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
ATLANTIC SPOTTED DOLPHIN	94	3	GOM	F16	7	810	1	1	0	0	SE
BOTTLENOSE DOLPHIN	93	1	NEC	A03	2	630	1	1	0	0	NE
BOTTLENOSE DOLPHIN	93	3	NED	M02	14	612	1	1	0	0	SE
COMMON DOLPHIN	92	4	NEC	A03	5	735	1	1	0	0	NE
DOLPHIN	92	3	NEC	A30	2	1074	1	1	0	0	NE
KILLER WHALE	94	4	NED	A54003	15	960	1	1	0	0	NE
PANTROPICAL SPOTTED DOLPHIN	94	2	GOM	F15	6	691	1	1	0	0	SE
PILOT WHALE	92	3	NEC	A27	4	360	1	1	0	0	NE
PILOT WHALE	92	3	NEC	A27	5	360	2	1	1	0	NE
PILOT WHALE	92	4	NEC	A02	1	650	1	1	0	0	NE
PILOT WHALE	92	4	NEC	A02	5	560	1	1	0	0	NE
PILOT WHALE	92	4	NEC	A40	5	950	1	1	0	0	NE
PILOT WHALE	92	4	NEC	A63	3	745	1	1	0	0	NE
PILOT WHALE	92	4	NEC	A63	4	750	2	2	0	0	NE
PILOT WHALE	92	4	NEC	A25	2	540	1	1	0	0	NE
PILOT WHALE	92	4	NEC	J03	1	400	1	1	0	0	SE
PILOT WHALE	92	4	NEC	J03	4	380	1	1	0	0	SE
PILOT WHALE	93	1	NEC	A03	3	450	1	1	0	0	NE
PILOT WHALE	93	2	NEC	A80	2	990	2	2	0	0	NE
PILOT WHALE	93	2	NEC	A80	5	990	1	1	0	0	NE
PILOT WHALE	93	2	NEC	A80	7	990	2	2	0	0	NE
PILOT WHALE	93	2	NEC	A04	6	816	1	1	0	0	NE
PILOT WHALE	93	2	SEC	I10	5	378	1	1	0	0	SE
PILOT WHALE	93	3	NEC	B02	14	812	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A02	9	430	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A11	3	792	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A11	4	990	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A11	5	990	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A14	2	390	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A88	1	700	1	1	0	0	NE
PILOT WHALE	93	4	NEC	A83	3	540	1	1	0	0	NE
PILOT WHALE	94	1	NEC	A02	1	840	1	1	0	0	NE
PILOT WHALE	94	3	NEC	A28030	3	586	1	1	0	0	NE
PILOT WHALE	94	3	NEC	A28030	10	768	1	1	0	0	NE
PILOT WHALE	94	3	NEC	A44004	4	850	1	1	0	0	NE
PILOT WHALE	94	3	NEC	A44004	5	768	1	1	0	0	NE
PILOT WHALE	94	3	NEC	A44004	7	768	1	1	0	0	NE
PILOT WHALE	94	3	SEC	A32006	2	775	5	5	0	0	NE
PILOT WHALE	94	3	SEC	A32006	3	345	1	1	0	0	NE
PILOT WHALE	94	4	NEC	A54005	1	1296	2	2	0	0	NE
PILOT WHALE	95	3	NEC	A44040	5	925	1	1	0	0	NE
PILOT WHALE	95	3	NEC	A62058	1	588	1	1	0	0	NE
PILOT WHALE	95	3	NEC	A62058	4	630	1	1	0	0	NE
PILOT WHALE	95	3	NEC	A41032	5	650	1	1	0	0	NE
PILOT WHALE	95	3	NEC	A44043	6	700	1	1	0	0	NE
PILOT WHALE	95	3	NEC	A25041	9	770	1	1	0	0	NE
PILOT WHALE	95	3	NEC	A41031	6	900	1	1	0	0	NE
PILOT WHALE	95	3	NED	A53034	15	561	1	1	0	0	NE
PILOT WHALE	95	4	NEC	A41034	1	1000	1	1	0	0	NE
PILOT WHALE	95	4	NEC	A41034	7	1000	1	1	0	0	NE
PILOT WHALE	95	4	NEC	A41034	8	1000	2	2	0	0	NE
PILOT WHALE	95	4	NEC	A44048	14	650	1	1	0	0	NE
PILOT WHALE	95	4	SEC	T12	3	357	1	1	0	0	SE
PILOT WHALE	97	3	NEC	B10045	9	550	1	1	0	0	SE
RISSOS DOLPHIN	92	4	GOM	J04	10	920	1	1	0	0	SE
RISSOS DOLPHIN	92	4	NEC	I02	2	500	1	0	0	1	SE
RISSOS DOLPHIN	92	4	NEC	I02	3	470	1	1	0	0	SE
RISSOS DOLPHIN	93	1	GOM	I05	1	300	1	0	1	0	SE
RISSOS DOLPHIN	93	3	NEC	B01	12	840	1	1	0	0	NE
RISSOS DOLPHIN	93	3	NEC	H08	1	500	1	1	0	0	SE

Table 6. (continued)

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
RISSOS DOLPHIN	94	3	NEC	A32008	2	880	1	0	1	0	NE
RISSOS DOLPHIN	94	3	NEC	A44004	6	672	1	1	0	0	NE
RISSOS DOLPHIN	94	3	NEC	A44004	8	768	1	1	0	0	NE
RISSOS DOLPHIN	94	3	NEC	A53037	13	803	1	1	0	0	NE
RISSOS DOLPHIN	94	4	NEC	A62002	3	630	1	1	0	0	NE
RISSOS DOLPHIN	94	4	NEC	A62002	7	672	1	1	0	0	NE
RISSOS DOLPHIN	94	4	NEC	A62002	9	672	1	1	0	0	NE
RISSOS DOLPHIN	95	3	NEC	A41031	9	950	1	1	0	0	NE
RISSOS DOLPHIN	95	3	NEC	A44040	9	850	1	1	0	0	NE
RISSOS DOLPHIN	95	3	NEC	A44043	3	653	1	1	0	0	NE
RISSOS DOLPHIN	95	3	NEC	A44043	11	490	1	1	0	0	NE
RISSOS DOLPHIN	96	3	GOM	F38	12	924	1	0	1	0	SE
RISSOS DOLPHIN	96	3	NEC	F39	4	1010	2	2	0	0	SE
RISSOS DOLPHIN	96	3	NEC	F39	8	900	1	1	0	0	SE
SHORT BEAKED SPINNER DOLPHIN	97	1	SEC	F45	8	996	1	1	0	0	SE
SHORTFIN PILOT WHALE	95	3	NEC	A62071	1	478	1	1	0	0	NE
SHORTFIN PILOT WHALE	95	3	NEC	A62071	2	478	1	1	0	0	NE
SPOTTED DOLPHIN	93	1	NEC	A01	6	735	1	1	0	0	NE
MARINE MAMMAL UNIDENTIFIED	95	3	NEC	F29	5	635	1	1	0	0	SE
MARINE MAMMAL UNIDENTIFIED	96	4	SEC	K17	1	552	1	1	0	0	SE

Table 7. Observed marine turtle bycatch in pelagic longline sets in the U.S. Atlantic by year, calendar quarter, and fishing area. Blank areas Indicate no effort for that year, quarter, and area.

YR	QTR	CAR	FEC	GOM	MAB	NCA	NEC	NED	SAB	SAR	TUN	TUS	Total
92	**2**		0	0	1		0		0				1
92	**3**		0	0	1		7	8	2				18
92	**4**	3	0	0	15		1	8					27
93	**1**	1	1	8	0	1			0				11
93	**2**	0	0	5	8		7	4	2				26
93	**3**		0	1	4		10	19	2				36
93	**4**	3	3	1	5		0	8	0				20
94	**1**	2	0	8	0	1			0				11
94	**2**		0	4	1		2		0				7
94	**3**		2	1	4		4	46	0				57
94	**4**		0	1	5		1	53	0				60
95	**1**	0	3	0	1	6			0	0			10
95	**2**	0	2	4	7	3			5				21
95	**3**	0	1	0	7		5	57	0				70
95	**4**		0	1	3		2	84					90
96	**1**	0	0	0		3			1	1	1		6
96	**2**		0	0					5				5
96	**3**		0	3	3		2		0		0		8
96	**4**	1	1	1	0				1				4
97	**1**	3	0	2		2			2	1	1	2	13
97	**2**			0	0			0	1			0	1
97	**3**		1	0	1		3	6	0	1			12
97	**4**		0	0	0		2		0				2
	Total	13	14	40	66	16	46	293	21	3	2	2	516

Table 8. Observed marine turtle bycatch for 1992-1997 from the U.S. Atlantic pelagic longline vessel trips used in the analyses in this report. Variables include year (YR), calendar quarter (QTR), fishing region (NAREA), vessel trip identifier (TRIP), set on which bycatch was observed (HAULNM), the number of hooks set (HOOKS), the total number of animals involved (ANIMLS), and the numbers that were classified by the observers as alive, dead, or of unknown (UNK) condition upon return back to the sea.

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
GREEN	92	3	NEC	A30	2	1074	1	1	0	0	NE
GREEN	92	3	NEC	A30	3	1074	1	0	1	0	NE
GREEN	92	4	NED	J99	6	850	1	1	0	0	NE
GREEN	92	4	NED	J99	8	900	2	2	0	0	NE
GREEN	92	4	NED	J99	10	900	3	3	0	0	NE
GREEN	92	4	NED	J99	11	900	2	2	0	0	NE
GREEN	93	1	GOM	I04	6	780	1	1	0	0	SE
GREEN	93	3	NED	K03	4	1000	1	1	0	0	SE
GREEN	94	2	NEC	A44001	6	1000	1	1	0	0	NE
GREEN	94	3	NEC	A31003	8	590	1	1	0	0	NE
GREEN	95	3	SEC	T10	1	470	1	1	0	0	SE
HAWKSBILL	92	4	NEC	A25	7	648	1	1	0	0	NE
HAWKSBILL	97	1	SEC	F45	8	996	1	1	0	0	SE
KEMPS RIDLEY	94	3	NEC	A53037	6	596	1	1	0	0	NE
KEMPS RIDLEY	97	1	OFS	M12	10	768	1	1	0	0	SE
LEATHERBACK	92	2	NEC	A69	4	702	1	1	0	0	NE
LEATHERBACK	92	3	NEC	A27	1	360	1	1	0	0	NE
LEATHERBACK	92	3	NEC	A07	6	800	1	1	0	0	NE
LEATHERBACK	92	3	NEC	A30	2	1074	2	2	0	0	NE
LEATHERBACK	92	3	NED	A31	4	675	1	1	0	0	NE
LEATHERBACK	92	3	NED	A31	5	675	1	1	0	0	NE
LEATHERBACK	92	3	NED	A31	6	580	1	1	0	0	NE
LEATHERBACK	92	3	NED	A31	7	700	1	1	0	0	NE
LEATHERBACK	92	3	NED	A31	12	850	1	1	0	0	NE
LEATHERBACK	92	3	NED	A31	15	850	1	1	0	0	NE
LEATHERBACK	92	3	SEC	B04	7	275	1	1	0	0	SE
LEATHERBACK	92	3	SEC	I01	1	300	1	1	0	0	SE
LEATHERBACK	92	4	NEC	A02	4	560	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A03	9	879	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A03	12	879	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A03	15	879	2	2	0	0	NE
LEATHERBACK	92	4	NEC	A40	2	950	2	2	0	0	NE
LEATHERBACK	92	4	NEC	A40	4	950	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A40	6	475	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A63	2	648	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A63	10	340	1	1	0	0	NE
LEATHERBACK	92	4	NEC	A03	4	840	1	1	0	0	NE
LEATHERBACK	92	4	CAR	C05	4	399	1	0	1	0	SE
LEATHERBACK	92	4	NEC	J03	2	350	1	1	0	0	SE
LEATHERBACK	92	4	NEC	J03	3	400	1	1	0	0	SE
LEATHERBACK	93	1	GOM	F05	2	910	1	1	0	0	SE
LEATHERBACK	93	1	GOM	F05	3	920	2	2	0	0	SE
LEATHERBACK	93	1	GOM	F06	7	1168	1	1	0	0	SE
LEATHERBACK	93	1	GOM	H06	5	784	1	1	0	0	SE
LEATHERBACK	93	1	GOM	H06	7	784	2	2	0	0	SE
LEATHERBACK	93	2	NEC	A04	4	900	3	3	0	0	NE
LEATHERBACK	93	2	NEC	A61	9	700	1	0	1	0	NE
LEATHERBACK	93	2	NEC	A80	9	860	1	1	0	0	NE
LEATHERBACK	93	2	NEC	A04	5	850	1	1	0	0	NE
LEATHERBACK	93	2	NEC	A04	9	900	1	1	0	0	NE
LEATHERBACK	93	2	NEC	A04	10	900	1	1	0	0	NE
LEATHERBACK	93	2	SEC	A61	7	700	1	1	0	0	NE

Table 8. (continued)

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
LEATHERBACK	93	2	GOM	F07	5	1120	1	1	0	0	SE
LEATHERBACK	93	2	GOM	F08	4	1086	1	1	0	0	SE
LEATHERBACK	93	2	GOM	F08	8	1120	1	1	0	0	SE
LEATHERBACK	93	2	GOM	P01	1	900	1	1	0	0	SE
LEATHERBACK	93	2	NEC	K02	4	520	1	1	0	0	SE
LEATHERBACK	93	2	NEC	K02	14	680	1	1	0	0	SE
LEATHERBACK	93	2	NEC	K02	6	720	1	1	0	0	SE
LEATHERBACK	93	2	NEC	K02	8	508	1	1	0	0	SE
LEATHERBACK	93	2	NED	M02	1	426	2	2	0	0	SE
LEATHERBACK	93	2	NED	M02	2	623	1	1	0	0	SE
LEATHERBACK	93	2	NED	M02	3	639	1	1	0	0	SE
LEATHERBACK	93	3	NEC	A68	4	800	1	1	0	0	NE
LEATHERBACK	93	3	NEC	B05	3	396	1	1	0	0	NE
LEATHERBACK	93	3	NEC	A15	5	896	2	2	0	0	NE
LEATHERBACK	93	3	NEC	A91	1	800	3	3	0	0	NE
LEATHERBACK	93	3	NEC	A91	2	800	2	2	0	0	NE
LEATHERBACK	93	3	NEC	A91	3	800	2	2	0	0	NE
LEATHERBACK	93	3	GOM	I11	2	385	1	1	0	0	SE
LEATHERBACK	93	3	NED	L03	6	600	1	1	0	0	SE
LEATHERBACK	93	3	NED	M02	10	596	1	1	0	0	SE
LEATHERBACK	93	3	NED	M02	11	633	5	5	0	0	SE
LEATHERBACK	93	3	NED	M02	12	628	1	1	0	0	SE
LEATHERBACK	93	3	NED	L03	11	700	1	1	0	0	SE
LEATHERBACK	93	3	NED	L03	13	560	1	1	0	0	SE
LEATHERBACK	93	3	NED	L03	14	730	1	1	0	0	SE
LEATHERBACK	93	3	SEC	B07	3	404	1	1	0	0	SE
LEATHERBACK	93	4	NEC	A11	4	990	1	1	0	0	NE
LEATHERBACK	93	4	NEC	A11	5	990	1	1	0	0	NE
LEATHERBACK	93	4	NEC	A11	8	990	1	1	0	0	NE
LEATHERBACK	93	4	NEC	A52	3	1080	1	1	0	0	NE
LEATHERBACK	93	4	NEC	A52	7	1040	1	1	0	0	NE
LEATHERBACK	93	4	NED	A01	5	833	1	1	0	0	NE
LEATHERBACK	93	4	NED	A01	8	833	1	1	0	0	NE
LEATHERBACK	93	4	NED	A01	9	833	1	1	0	0	NE
LEATHERBACK	93	4	NED	A01	12	833	1	1	0	0	NE
LEATHERBACK	93	4	NED	A01	15	833	1	1	0	0	NE
LEATHERBACK	93	4	CAR	G11	2	420	1	1	0	0	SE
LEATHERBACK	93	4	SEC	J15	3	350	1	1	0	0	SE
LEATHERBACK	93	4	SEC	J15	4	340	1	1	0	0	SE
LEATHERBACK	93	4	NED	K03	15	720	1	1	0	0	SE
LEATHERBACK	94	1	CAR	J16	4	280	1	1	0	0	SE
LEATHERBACK	94	1	GOM	P07	4	984	1	1	0	0	SE
LEATHERBACK	94	1	GOM	P07	6	980	1	1	0	0	SE
LEATHERBACK	94	1	GOM	E02	5	900	2	2	0	0	SE
LEATHERBACK	94	1	GOM	F13	1	931	1	1	0	0	SE
LEATHERBACK	94	1	GOM	F13	3	810	1	1	0	0	SE
LEATHERBACK	94	1	GOM	P07	8	1000	1	1	0	0	SE
LEATHERBACK	94	1	OFS	M03	11	561	1	1	0	0	SE
LEATHERBACK	94	2	GOM	F14	2	675	1	1	0	0	SE
LEATHERBACK	94	2	GOM	F14	5	645	1	1	0	0	SE
LEATHERBACK	94	2	GOM	P10	4	900	1	1	0	0	SE
LEATHERBACK	94	2	GOM	F15	3	655	1	1	0	0	SE
LEATHERBACK	94	2	NEC	K04	14	690	1	1	0	0	SE
LEATHERBACK	94	3	NEC	A44004	3	672	1	1	0	0	NE
LEATHERBACK	94	3	NEC	A53037	5	803	1	1	0	0	NE
LEATHERBACK	94	3	NEC	A31003	4	600	1	1	0	0	NE
LEATHERBACK	94	3	NEC	A31003	9	590	1	1	0	0	NE
LEATHERBACK	94	3	NEC	A31003	10	600	1	1	0	0	NE
LEATHERBACK	94	3	NED	A44002	1	960	1	1	0	0	NE

Table 8. (continued)

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
LEATHERBACK	94	3	SEC	D04	6	360	1	1	0	0	SE
LEATHERBACK	94	3	SEC	B11	1	340	1	1	0	0	SE
LEATHERBACK	94	3	GOM	F16	9	760	1	1	0	0	SE
LEATHERBACK	94	4	NEC	A25018	2	580	2	2	0	0	NE
LEATHERBACK	94	4	NEC	A25018	9	600	1	1	0	0	NE
LEATHERBACK	94	4	NEC	A24018	5	870	1	1	0	0	NE
LEATHERBACK	94	4	NED	A54003	4	960	1	1	0	0	NE
LEATHERBACK	94	4	NED	A54003	6	1032	4	4	0	0	NE
LEATHERBACK	94	4	NED	A54003	10	960	1	1	0	0	NE
LEATHERBACK	94	4	NED	A54003	11	960	1	1	0	0	NE
LEATHERBACK	94	4	NED	A54003	12	960	3	3	0	0	NE
LEATHERBACK	94	4	NED	A54003	13	864	1	1	0	0	NE
LEATHERBACK	94	4	NED	A54003	16	960	1	1	0	0	NE
LEATHERBACK	94	4	NED	A54003	19	960	1	1	0	0	NE
LEATHERBACK	94	4	NED	A53040	3	1088	1	1	0	0	NE
LEATHERBACK	94	4	GOM	F20	1	792	1	1	0	0	SE
LEATHERBACK	95	1	OFS	K06	3	572	1	1	0	0	SE
LEATHERBACK	95	1	OFS	K06	10	572	1	1	0	0	SE
LEATHERBACK	95	1	OFS	L08	5	800	1	1	0	0	SE
LEATHERBACK	95	2	NEC	A25038	9	600	1	1	0	0	NE
LEATHERBACK	95	2	GOM	F24	4	1152	1	1	0	0	SE
LEATHERBACK	95	2	GOM	U02	2	1008	1	1	0	0	SE
LEATHERBACK	95	2	GOM	U02	3	1008	1	1	0	0	SE
LEATHERBACK	95	2	GOM	F25	4	720	1	1	0	0	SE
LEATHERBACK	95	2	OFS	N06	12	798	2	2	0	0	SE
LEATHERBACK	95	2	OFS	N06	14	798	1	1	0	0	SE
LEATHERBACK	95	2	SEC	K07	4	372	1	1	0	0	SE
LEATHERBACK	95	2	SEC	M07	6	770	1	1	0	0	SE
LEATHERBACK	95	3	NEC	A44040	3	910	1	1	0	0	NE
LEATHERBACK	95	3	NED	A60038	4	720	1	1	0	0	NE
LEATHERBACK	95	3	NED	A60038	5	900	2	2	0	0	NE
LEATHERBACK	95	3	NED	A60038	6	875	1	1	0	0	NE
LEATHERBACK	95	3	NED	A60038	8	585	1	1	0	0	NE
LEATHERBACK	95	3	NED	A60038	10	810	1	1	0	0	NE
LEATHERBACK	95	3	NED	A60038	11	900	2	2	0	0	NE
LEATHERBACK	95	3	NED	A60038	12	585	1	1	0	0	NE
LEATHERBACK	95	3	NED	A60038	20	720	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	1	744	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	3	756	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	4	762	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	5	858	4	4	0	0	NE
LEATHERBACK	95	3	NED	A53034	7	822	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	8	807	2	2	0	0	NE
LEATHERBACK	95	3	NED	A53034	9	681	3	3	0	0	NE
LEATHERBACK	95	3	NED	A53034	10	855	5	5	0	0	NE
LEATHERBACK	95	3	NED	A53034	11	822	2	2	0	0	NE
LEATHERBACK	95	3	NED	A53034	12	882	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	14	876	2	2	0	0	NE
LEATHERBACK	95	3	NED	A53034	15	561	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	17	735	1	1	0	0	NE
LEATHERBACK	95	3	NED	A53034	18	630	2	2	0	0	NE
LEATHERBACK	95	3	NEC	K08	3	875	1	1	0	0	SE
LEATHERBACK	95	4	NED	A31049	1	720	1	1	0	0	NE
LEATHERBACK	95	4	NED	A31049	3	756	4	4	0	0	NE
LEATHERBACK	95	4	NED	A31049	5	648	1	1	0	0	NE
LEATHERBACK	95	4	NED	A31049	8	756	2	2	0	0	NE
LEATHERBACK	95	4	NED	A90001	6	810	1	1	0	0	NE
LEATHERBACK	95	4	GOM	K10	2	793	1	1	0	0	SE
LEATHERBACK	96	2	SEC	T18	4	360	1	1	0	0	SE

Table 8. (continued)

COMMON NAME	YR	QTR	NAREA	TRIP	HAUL NM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
LEATHERBACK	96	3	GOM	F38	1	1164	1	1	0	0	SE
LEATHERBACK	96	3	GOM	F38	13	972	1	1	0	0	SE
LEATHERBACK	96	3	GOM	K15	3	399	1	1	0	0	SE
LEATHERBACK	96	3	NEC	F39	3	860	1	1	0	0	SE
LEATHERBACK	96	3	NEC	F39	5	1050	1	1	0	0	SE
LEATHERBACK	96	3	NEC	M10	4	960	1	1	0	0	SE
LEATHERBACK	96	4	CAR	T21	2	432	1	1	0	0	SE
LEATHERBACK	96	4	SEC	K17	2	609	1	1	0	0	SE
LEATHERBACK	96	4	GOM	F41	8	720	1	1	0	0	SE
LEATHERBACK	97	1	CAR	T23	5	400	1	1	0	0	SE
LEATHERBACK	97	1	CAR	T23	6	440	2	2	0	0	SE
LEATHERBACK	97	1	OFS	M12	2	774	1	1	0	0	SE
LEATHERBACK	97	1	OFS	M12	9	720	1	1	0	0	SE
LEATHERBACK	97	3	SEC	T26	3	319	1	1	0	0	SE
LEATHERBACK	97	3	NED	A31077	2	864	1	1	0	0	SE
LOGGERHEAD	92	3	NEC	A30	4	960	1	1	0	0	NE
LOGGERHEAD	92	3	NED	A31	6	580	1	1	0	0	NE
LOGGERHEAD	92	3	NED	A04	2	700	1	1	0	0	NE
LOGGERHEAD	92	4	NEC	A03	8	879	1	1	0	0	NE
LOGGERHEAD	92	4	CAR	C05	2	390	1	1	0	0	SE
LOGGERHEAD	92	4	CAR	C05	3	420	1	1	0	0	SE
LOGGERHEAD	93	1	CAR	L02	16	650	1	1	0	0	SE
LOGGERHEAD	93	1	SEC	K01	7	820	1	0	1	0	SE
LOGGERHEAD	93	1	OFS	M01	6	720	1	1	0	0	SE
LOGGERHEAD	93	2	NEC	A04	5	850	1	1	0	0	NE
LOGGERHEAD	93	2	NEC	A04	7	900	1	1	0	0	NE
LOGGERHEAD	93	2	NEC	K02	15	540	1	1	0	0	SE
LOGGERHEAD	93	2	SEC	G08	6	480	1	1	0	0	SE
LOGGERHEAD	93	3	NEC	B02	2	735	1	1	0	0	NE
LOGGERHEAD	93	3	NEC	B02	5	728	1	1	0	0	NE
LOGGERHEAD	93	3	NED	L03	6	600	2	2	0	0	SE
LOGGERHEAD	93	3	NED	L03	8	600	1	1	0	0	SE
LOGGERHEAD	93	3	NED	M02	14	612	1	1	0	0	SE
LOGGERHEAD	93	3	NED	M02	15	633	1	1	0	0	SE
LOGGERHEAD	93	3	NED	M02	20	606	1	1	0	0	SE
LOGGERHEAD	93	3	NED	L03	10	525	1	1	0	0	SE
LOGGERHEAD	93	3	SEC	J11	1	500	1	1	0	0	SE
LOGGERHEAD	93	4	NED	A01	3	833	1	1	0	0	NE
LOGGERHEAD	93	4	NED	A01	11	882	1	1	0	0	NE
LOGGERHEAD	93	4	CAR	G11	4	420	1	1	0	0	SE
LOGGERHEAD	93	4	CAR	G11	9	420	1	1	0	0	SE
LOGGERHEAD	93	4	SEC	J15	5	320	1	1	0	0	SE
LOGGERHEAD	93	4	GOM	I13	6	325	1	1	0	0	SE
LOGGERHEAD	94	1	CAR	J16	4	280	1	1	0	0	SE
LOGGERHEAD	94	2	NEC	A44001	8	480	1	1	0	0	NE
LOGGERHEAD	94	3	NEC	A32005	1	875	1	1	0	0	NE
LOGGERHEAD	94	3	NED	A44002	1	960	2	2	0	0	NE
LOGGERHEAD	94	3	NED	A44002	2	960	1	1	0	0	NE
LOGGERHEAD	94	3	NED	A44002	5	960	1	1	0	0	NE
LOGGERHEAD	94	3	NED	A44002	6	960	1	1	0	0	NE
LOGGERHEAD	94	3	NED	A44002	7	960	1	1	0	0	NE
LOGGERHEAD	94	3	NED	A44002	8	960	2	2	0	0	NE
LOGGERHEAD	94	3	NED	A44002	9	960	2	2	0	0	NE
LOGGERHEAD	94	3	NED	A44002	10	960	2	2	0	0	NE
LOGGERHEAD	94	3	NED	A44002	11	960	6	6	0	0	NE
LOGGERHEAD	94	3	NED	A44002	12	960	2	2	0	0	NE
LOGGERHEAD	94	3	NED	A44002	13	960	6	6	0	0	NE
LOGGERHEAD	94	3	NED	A44002	14	960	3	3	0	0	NE
LOGGERHEAD	94	3	NED	A44002	15	960	4	4	0	0	NE

Table 8. (continued)

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
LOGGERHEAD	94	3	NED	A44002	16	960	1	1	0	0	NE
LOGGERHEAD	94	3	NED	A44002	17	960	7	7	0	0	NE
LOGGERHEAD	94	3	NED	A44002	18	1000	3	3	0	0	NE
LOGGERHEAD	94	4	NEC	A41052	6	750	1	0	1	0	NE
LOGGERHEAD	94	4	NEC	A62002	2	685	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A54003	2	720	3	3	0	0	NE
LOGGERHEAD	94	4	NED	A54003	3	720	2	2	0	0	NE
LOGGERHEAD	94	4	NED	A54003	5	960	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A54003	6	1032	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A54003	7	576	3	3	0	0	NE
LOGGERHEAD	94	4	NED	A54003	8	960	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A54003	9	960	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A54003	10	960	2	2	0	0	NE
LOGGERHEAD	94	4	NED	A54003	11	960	4	4	0	0	NE
LOGGERHEAD	94	4	NED	A54003	12	960	2	2	0	0	NE
LOGGERHEAD	94	4	NED	A54003	14	864	3	3	0	0	NE
LOGGERHEAD	94	4	NED	A54003	15	960	6	6	0	0	NE
LOGGERHEAD	94	4	NED	A54003	16	960	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A53040	1	542	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A53040	6	1191	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A53040	13	1191	5	5	0	0	NE
LOGGERHEAD	94	4	NED	A53040	16	1031	1	1	0	0	NE
LOGGERHEAD	94	4	NED	A53040	18	975	1	1	0	0	NE
LOGGERHEAD	95	1	NEC	A24001	3	1000	1	1	0	0	NE
LOGGERHEAD	95	1	SEC	T01	4	400	1	1	0	0	SE
LOGGERHEAD	95	1	OFS	K06	6	572	1	1	0	0	SE
LOGGERHEAD	95	1	OFS	M06	10	765	1	1	0	0	SE
LOGGERHEAD	95	1	OFS	M06	19	726	1	1	0	0	SE
LOGGERHEAD	95	2	NEC	A32006	11	960	1	1	0	0	NE
LOGGERHEAD	95	2	NEC	A25038	3	720	2	2	0	0	NE
LOGGERHEAD	95	2	NEC	A25038	4	720	1	1	0	0	NE
LOGGERHEAD	95	2	NEC	A25038	6	720	1	1	0	0	NE
LOGGERHEAD	95	2	NEC	A25038	7	720	1	1	0	0	NE
LOGGERHEAD	95	2	SEC	A32006	9	960	1	1	0	0	NE
LOGGERHEAD	95	2	SEC	T02	7	252	1	1	0	0	SE
LOGGERHEAD	95	2	SEC	K07	8	389	1	1	0	0	SE
LOGGERHEAD	95	3	NEC	A44040	9	850	1	1	0	0	NE
LOGGERHEAD	95	3	NEC	A41032	1	800	1	1	0	0	NE
LOGGERHEAD	95	3	NEC	A44043	3	653	2	2	0	0	NE
LOGGERHEAD	95	3	NEC	A44043	4	490	1	1	0	0	NE
LOGGERHEAD	95	3	NEC	A44043	9	840	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A60038	6	875	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A60038	8	585	2	2	0	0	NE
LOGGERHEAD	95	3	NED	A60038	11	900	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A60038	12	585	4	4	0	0	NE
LOGGERHEAD	95	3	NED	A53034	1	744	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A53034	2	756	2	2	0	0	NE
LOGGERHEAD	95	3	NED	A53034	3	756	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A53034	4	762	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A53034	8	807	2	2	0	0	NE
LOGGERHEAD	95	3	NED	A53034	13	861	2	2	0	0	NE
LOGGERHEAD	95	3	NED	A53034	16	840	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A53034	17	735	1	1	0	0	NE
LOGGERHEAD	95	3	NED	A53034	18	630	1	1	0	0	NE
LOGGERHEAD	95	3	NEC	K08	1	840	1	1	0	0	SE
LOGGERHEAD	95	3	NEC	K08	2	825	2	2	0	0	SE
LOGGERHEAD	95	3	NEC	K08	6	735	1	1	0	0	SE
LOGGERHEAD	95	4	NEC	A44048	2	728	1	1	0	0	NE
LOGGERHEAD	95	4	NEC	A44048	12	910	1	1	0	0	NE

Table 8. (continued)

COMMON NAME	YR	QTR	NAREA	TRIP	HAULNM	HOOKS	ANIMLS	ALIVE	DEAD	UNK	SOURCE
LOGGERHEAD	95	4	NEC	A44048	13	910	1	1	0	0	NE
LOGGERHEAD	95	4	NEC	A44051	7	936	1	1	0	0	NE
LOGGERHEAD	95	4	NEC	A44051	10	936	1	1	0	0	NE
LOGGERHEAD	95	4	NED	A31049	1	720	7	7	0	0	NE
LOGGERHEAD	95	4	NED	A31049	2	720	5	5	0	0	NE
LOGGERHEAD	95	4	NED	A31049	4	756	4	4	0	0	NE
LOGGERHEAD	95	4	NED	A31049	5	648	4	4	0	0	NE
LOGGERHEAD	95	4	NED	A31049	6	540	3	3	0	0	NE
LOGGERHEAD	95	4	NED	A31049	7	450	2	2	0	0	NE
LOGGERHEAD	95	4	NED	A31049	8	756	4	4	0	0	NE
LOGGERHEAD	95	4	NED	A31049	9	756	6	6	0	0	NE
LOGGERHEAD	95	4	NED	A31049	10	756	3	3	0	0	NE
LOGGERHEAD	95	4	NED	A31049	11	720	4	4	0	0	NE
LOGGERHEAD	95	4	NED	A31049	12	540	5	5	0	0	NE
LOGGERHEAD	95	4	NED	A31049	13	612	7	7	0	0	NE
LOGGERHEAD	95	4	NED	A31049	14	648	9	9	0	0	NE
LOGGERHEAD	95	4	NED	A90001	5	812	3	3	0	0	NE
LOGGERHEAD	95	4	NED	A90001	6	810	3	2	0	1	NE
LOGGERHEAD	95	4	NED	A90001	7	896	4	4	0	0	NE
LOGGERHEAD	95	4	NED	A90001	8	810	2	2	0	0	NE
LOGGERHEAD	96	1	OFS	N11	1	783	1	1	0	0	SE
LOGGERHEAD	96	1	OFS	N11	6	792	1	1	0	0	SE
LOGGERHEAD	96	1	OFS	L11	5	624	1	1	0	0	SE
LOGGERHEAD	96	1	SEC	M09	4	616	1	1	0	0	SE
LOGGERHEAD	96	1	OFS	M08	1	380	1	1	0	0	SE
LOGGERHEAD	96	1	OFS	L11	19	624	1	1	0	0	SE
LOGGERHEAD	96	2	SEC	K12	9	984	2	2	0	0	SE
LOGGERHEAD	96	2	SEC	K12	11	960	1	1	0	0	SE
LOGGERHEAD	96	2	SEC	K12	12	972	1	1	0	0	SE
LOGGERHEAD	96	3	NEC	F39	3	860	1	1	0	0	SE
LOGGERHEAD	96	3	NEC	M10	3	900	1	1	0	0	SE
LOGGERHEAD	96	4	SEC	K17	6	464	1	1	0	0	SE
LOGGERHEAD	97	1	GOM	P26	5	1000	1	1	0	0	SE
LOGGERHEAD	97	1	OFS	L16	11	720	1	1	0	0	SE
LOGGERHEAD	97	1	SEC	F45	4	996	1	1	0	0	SE
LOGGERHEAD	97	1	OFS	N20	1	358	1	1	0	0	SE
LOGGERHEAD	97	2	SEC	M13	12	1014	1	1	0	0	SE
LOGGERHEAD	97	3	NEC	K20	11	906	1	1	0	0	SE
LOGGERHEAD	97	3	NEC	B01029	1	948	1	1	0	0	SE
LOGGERHEAD	97	3	NEC	B01029	5	1008	1	1	0	0	SE
LOGGERHEAD	97	3	NEC	A28062	3	760	1	1	0	0	SE
LOGGERHEAD	97	3	NED	A54033	3	1100	3	3	0	0	SE
LOGGERHEAD	97	3	NED	A54033	17	960	1	1	0	0	SE
LOGGERHEAD	97	3	NED	A54033	25	1080	1	1	0	0	SE
LOGGERHEAD	97	3	OFS	B01029	10	882	1	1	0	0	SE
LOGGERHEAD	97	4	NEC	M14	4	1024	1	1	0	0	SE
LOGGERHEAD	97	4	NEC	M14	12	896	1	1	0	0	SE
TURTLE UNIDENTIFIED	92	3	NEC	A30	5	1074	1	1	0	0	NE
TURTLE UNIDENTIFIED	93	3	NEC	A22	5	623	1	1	0	0	NE
TURTLE UNIDENTIFIED	94	3	NED	A44002	7	960	1	1	0	0	NE
TURTLE UNIDENTIFIED	93	2	GOM	Q02	1	850	1	1	0	0	SE
TURTLE UNIDENTIFIED	94	1	GOM	Q08	5	900	1	1	0	0	SE
TURTLE UNIDENTIFIED	95	1	SEC	T01	1	350	1	1	0	0	SE
TURTLE UNIDENTIFIED	95	1	SEC	T01	5	400	1	1	0	0	SE
TURTLE UNIDENTIFIED	95	2	SEC	T04	2	300	1	1	0	0	SE
TURTLE UNIDENTIFIED	95	2	SEC	T04	3	360	1	1	0	0	SE
TURTLE UNIDENTIFIED	97	1	GOM	U16	5	850	1	1	0	0	SE
TURTLE UNIDENTIFIED	97	1	OFS	L16	11	720	1	1	0	0	SE

Table 9. Quarterly (QTR) estimated bycatch (CATCH) of marine mammals and marine turtles in the U.S. Atlantic longline fishery, for years (YR) 1992-1997, stratified by species-NAREA (grouped fishing areas)-year-quarter. Also indicated are the number of sets observed in the stratum (N), the estimated number of animals dead (CDEAD) and animals alive (CALIVE) upon return to the sea, and the estimated coefficients of variation for the bycatch estimates (CV_C, CV_D, CV_A for total, dead, and alive catches, respectively), and upper and lower 95% lognormal confidence bounds (UCAT, LCAT for total catch; UDED, LDED for dead animals; and ULIVE, LLIVE for living animals). The proportion of positive bycatch (PPC) is the proportion of sets in which at least one marine mammal or turtle was captured; PPD is the subset of PPC in which the animal was observed to be dead (PPD); PPA is the subset of PPC in which the animal was observed to be alive. No listing for a species-NAREA-year-quarter stratum implies an estimate of 0 if there is observer coverage, or if the stratum has no observer coverage, that there is no estimate available.

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE MAMMALS																			
DOLPHIN	NEC	92	3	36	0.03	25	1.00	128	5	0.00	0	.	.	.	0.03	25	1.00	128	5
PILOT WHALE	NEC	92	3	36	0.06	223	0.74	811	61	0.03	74	1	378	14	0.06	149	0.70	511	43
total		**92**	**3**			**248**					**74**					**174**			
RISSOS DOLPHIN	GOM	92	4	37	0.03	15	1.00	77	3	0.00	0	.	.	.	0.03	15	1.00	77	3
COMMON DOLPHIN	NEC	92	4	62	0.02	13	1.00	66	3	0.00	0	.	.	.	0.02	13	1.00	66	3
PILOT WHALE	NEC	92	4	62	0.13	146	0.35	285	75	0.00	0	.	.	.	0.13	146	0.35	285	75
RISSOS DOLPHIN	NEC	92	4	62	0.03	39	0.70	135	11	0.00	0	.	.	.	0.02	20	1.00	102	4
total		**92**	**4**			**213**					**0**					**194**			
RISSOS DOLPHIN	GOM	93	1	42	0.02	45	1.00	230	9	0.02	45	1	230	9	0.00	0	.	.	.
BOTTLENOSE DOLPHIN	NEC	93	1	42	0.02	2	1.00	10	0	0.00	0	.	.	.	0.02	2	1.00	10	0
PILOT WHALE	NEC	93	1	42	0.02	3	1.00	15	1	0.00	0	.	.	.	0.02	3	1.00	15	1
SPOTTED DOLPHIN	NEC	93	1	42	0.02	2	1.00	10	0	0.00	0	.	.	.	0.02	2	1.00	10	0
total		**93**	**1**			**52**					**45**					**7**			
PILOT WHALE	NEC	93	2	38	0.11	47	0.50	119	19	0.00	0	.	.	.	0.11	47	0.50	119	19
PILOT WHALE	SEC	93	2	54	0.02	22	1.00	112	4	0.00	0	.	.	.	0.02	22	1.00	112	4
total		**93**	**2**			**69**					**0**					**69**			
PILOT WHALE	NEC	93	3	106	0.01	15	1.00	77	3	0.00	0	.	.	.	0.01	15	1.00	77	3
RISSOS DOLPHIN	NEC	93	3	106	0.02	38	0.73	136	11	0.00	0	.	.	.	0.02	38	0.73	136	11
BOTTLENOSE DOLPHIN	NED	93	3	34	0.03	24	1.00	123	5	0.00	0	.	.	.	0.03	24	1.00	123	5
total		**93**	**3**			**77**					**0**					**77**			
PILOT WHALE	NEC	93	4	71	0.10	93	0.39	193	45	0.00	0	.	.	.	0.10	93	0.39	193	45
total		**93**	**4**			**93**					**0**					**93**			
PILOT WHALE	NEC	94	1	27	0.04	4	1.00	20	1	0.00	0	.	.	.	0.04	4	1.00	20	1
total		**94**	**1**			**4**					**0**					**4**			
PANTROPICAL SPOTTED DOLPHIN	GOM	94	2	33	0.03	26	1.00	133	5	0.00	0	.	.	.	0.03	26	1.00	133	5
total		**94**	**2**			**26**					**0**					**26**			
ATLANTIC SPOTTED DOLPHIN	GOM	94	3	49	0.02	15	1.00	77	3	0.00	0	.	.	.	0.02	15	1.00	77	3
PILOT WHALE	NEC	94	3	99	0.05	75	0.44	172	33	0.00	0	.	.	.	0.05	75	0.44	172	33
RISSOS DOLPHIN	NEC	94	3	99	0.04	57	0.49	143	23	0.01	13	1	66	3	0.03	45	0.57	128	16
PILOT WHALE	SEC	94	3	46	0.04	49	0.75	182	13	0.00	0	.	.	.	0.04	49	0.75	182	13
total		**94**	**3**			**196**					**13**					**184**			
PILOT WHALE	NEC	94	4	78	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
RISSOS DOLPHIN	NEC	94	4	78	0.04	46	0.57	130	16	0.00	0	.	.	.	0.04	46	0.57	130	16
KILLER WHALE	NED	94	4	43	0.02	6	1.00	31	1	0.00	0	.	.	.	0.02	6	1.00	31	1
total		**94**	**4**			**68**					**0**					**68**			

Table 9. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE MAMMALS																			
MARINE MAMMAL UNIDENTIFIED	NEC	95	3	93	0.01	24	1.00	123	5	0.00	0	.	.	.	0.01	24	1	123	5
PILOT WHALE	NEC	95	3	93	0.08	146	0.37	295	72	0.00	0	.	.	.	0.08	146	0.37	295	72
RISSOS DOLPHIN	NEC	95	3	93	0.04	87	0.51	223	34	0.00	0	.	.	.	0.04	87	0.51	223	34
SHORTFIN PILOT WHALE	NEC	95	3	93	0.02	63	0.70	218	18	0.00	0	.	.	.	0.02	63	0.70	218	18
PILOT WHALE	NED	95	3	39	0.03	25	1.00	128	5	0.00	0	.	.	.	0.03	25	1.00	128	5
total		**95**	**3**			**345**					**0**					**345**			
PILOT WHALE	NEC	95	4	51	0.08	103	0.51	263	40	0.00	0	.	.	.	0.08	103	0.51	263	40
PILOT WHALE	SEC	95	4	13	0.08	33	1.00	169	6	0.00	0	.	.	.	0.08	33	1.00	169	6
total		**95**	**4**			**136**					**0**					**136**			
RISSOS DOLPHIN	GOM	96	3	43	0.02	23	1.00	118	4	0.02	23	1	118	4	0.00	0	.	.	.
RISSOS DOLPHIN	NEC	96	3	22	0.09	153	0.72	543	43	0.00	0	.	.	.	0.09	153	0.72	543	43
total		**96**	**3**			**176**					**23**					**153**			
MARINE MAMMAL UNIDENTIFIED	SEC	96	4	37	0.03	20	1.00	102	4	0.00	0	.	.	.	0.03	20	1.00	102	4
total		**96**	**4**			**20**					**0**					**20**			
SHORT BEAKED SPINNER DOLPHIN	SEC	97	1	27	0.04	13	1.00	66	3	0.00	0	.	.	.	0.04	13	1.00	66	3
total		**97**	**1**			**13**					**0**					**13**			
PILOT WHALE	NEC	97	3	65	0.02	30	1.00	153	6	0.00	0	.	.	.	0.02	30	1.00	153	6
total		**97**	**3**			**30**					**0**					**30**			
MARINE TURTLES																			
LEATHERBACK	NEC	92	2	7	0.14	76	1.00	389	15	0.00	0	.	.	.	0.14	76	1.00	389	15
total		**92**	**2**			**76**					**0**					**76**			
GREEN	NEC	92	3	36	0.06	50	0.70	172	15	0.03	25	1	128	5	0.03	25	1.00	128	5
LEATHERBACK	NEC	92	3	36	0.08	158	0.59	462	54	0.00	0	.	.	.	0.08	158	0.59	462	54
LOGGERHEAD	NEC	92	3	36	0.03	28	1.00	143	5	0.00	0	.	.	.	0.03	28	1.00	143	5
TURTLE	NEC	92	3	36	0.03	25	1.00	128	5	0.00	0	.	.	.	0.03	25	1.00	128	5
LEATHERBACK	NED	92	3	35	0.17	118	0.38	243	57	0.00	0	.	.	.	0.17	118	0.38	243	57
LOGGERHEAD	NED	92	3	35	0.06	44	0.70	152	13	0.00	0	.	.	.	0.06	44	0.70	152	13
LEATHERBACK	SEC	92	3	28	0.07	64	0.69	219	19	0.00	0	.	.	.	0.07	64	0.69	219	19
total		**92**	**3**			**487**					**25**					**462**			
LEATHERBACK	CAR	92	4	11	0.09	17	1.00	87	3	0.09	17	1	87	3	0.00	0	.	.	.
LOGGERHEAD	CAR	92	4	11	0.18	33	0.67	109	10	0.00	0	.	.	.	0.18	33	0.67	109	10
HAWKSBILL	NEC	92	4	62	0.02	15	1.00	77	3	0.00	0	.	.	.	0.02	15	1.00	77	3
LEATHERBACK	NEC	92	4	62	0.19	215	0.28	370	125	0.00	0	.	.	.	0.19	215	0.28	370	125
LOGGERHEAD	NEC	92	4	62	0.02	11	1.00	56	2	0.00	0	.	.	.	0.02	11	1.00	56	2
GREEN	NED	92	4	46	0.09	37	0.52	96	14	0.00	0	.	.	.	0.09	37	0.52	96	14
total		**92**	**4**			**328**					**17**					**311**			
LOGGERHEAD	CAR	93	1	22	0.05	16	1.00	82	3	0.00	0	.	.	.	0.05	16	1.00	82	3
GREEN	GOM	93	1	42	0.02	17	1.00	87	3	0.00	0	.	.	.	0.02	17	1.00	87	3
LEATHERBACK	GOM	93	1	42	0.12	106	0.46	252	45	0.00	0	.	.	.	0.12	106	0.46	252	45
LOGGERHEAD	OFS	93	1	52	0.02	8	1.00	41	2	0.00	0	.	.	.	0.02	8	1.00	41	2
LOGGERHEAD	SEC	93	1	39	0.03	7	1.00	36	1	0.03	7	1	36	1	0.00	0	.	.	.
total		**93**	**1**			**154**					**7**					**147**			
LEATHERBACK	GOM	93	2	78	0.05	30	0.49	75	12	0.00	0	.	.	.	0.05	30	0.49	75	12
TURTLE UNIDENTIFIED	GOM	93	2	78	0.01	9	1.00	46	2	0.00	0	.	.	.	0.01	9	1.00	46	2
LEATHERBACK	NEC	93	2	38	0.26	119	0.30	210	68	0.03	11	1	56	2	0.24	109	0.32	200	59
LOGGERHEAD	NEC	93	2	38	0.08	31	0.58	89	11	0.00	0	.	.	.	0.08	31	0.58	89	11
LEATHERBACK	NED	93	2	6	0.50	119	0.54	323	44	0.00	0	.	.	.	0.50	119	0.54	323	44
LEATHERBACK	SEC	93	2	54	0.02	12	1.00	61	2	0.00	0	.	.	.	0.02	12	1.00	61	2

LOGGERHEAD	SEC	93	2	54	0.02	17	1.00	87	3	0.00	0	.	.	.	0.02	17	1.00	87	3
total		**93**	**2**			**337**					**11**					**327**			

Table 9. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																			
LEATHERBACK	GOM	93	3	49	0.02	41	1.00	210	8	0.00	0	.	.	.	0.02	41	1.00	210	8
LEATHERBACK	NEC	93	3	106	0.06	178	0.42	392	81	0.00	0	.	.	.	0.06	178	0.42	392	81
LOGGERHEAD	NEC	93	3	106	0.02	33	0.70	114	10	0.00	0	.	.	.	0.02	33	0.70	114	10
TURTLE UNIDENTIFIED	NEC	93	3	106	0.01	19	1.00	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
GREEN	NED	93	3	34	0.03	15	1.00	77	3	0.00	0	.	.	.	0.03	15	1.00	77	3
LEATHERBACK	NED	93	3	34	0.21	241	0.41	519	112	0.00	0	.	.	.	0.21	241	0.41	519	112
LOGGERHEAD	NED	93	3	34	0.18	173	0.39	363	83	0.00	0	.	.	.	0.18	173	0.39	363	83
LEATHERBACK	SEC	93	3	35	0.03	19	1.00	97	4	0.00	0	.	.	.	0.03	19	1.00	97	4
LOGGERHEAD	SEC	93	3	35	0.03	16	1.00	82	3	0.00	0	.	.	.	0.03	16	1.00	82	3
total		**93**	**3**			**735**					**0**					**735**			
LEATHERBACK	CAR	93	4	10	0.10	20	1.00	102	4	0.00	0	.	.	.	0.10	20	1.00	102	4
LOGGERHEAD	CAR	93	4	10	0.20	40	0.67	131	12	0.00	0	.	.	.	0.20	40	0.67	131	12
LOGGERHEAD	GOM	93	4	64	0.02	26	1.00	133	5	0.00	0	.	.	.	0.02	26	1.00	133	5
LEATHERBACK	NEC	93	4	71	0.07	40	0.43	90	18	0.00	0	.	.	.	0.07	40	0.43	90	18
LEATHERBACK	NED	93	4	35	0.17	48	0.38	98	23	0.00	0	.	.	.	0.17	48	0.38	98	23
LOGGERHEAD	NED	93	4	35	0.06	15	0.70	51	4	0.00	0	.	.	.	0.06	15	0.70	51	4
LEATHERBACK	SEC	93	4	26	0.08	41	0.69	140	12	0.00	0	.	.	.	0.08	41	0.69	140	12
LOGGERHEAD	SEC	93	4	26	0.04	22	1.00	112	4	0.00	0	.	.	.	0.04	22	1.00	112	4
total		**93**	**4**			**252**					**0**					**252**			
LEATHERBACK	CAR	94	1	35	0.03	22	1.00	112	4	0.00	0	.	.	.	0.03	22	1.00	112	4
LOGGERHEAD	CAR	94	1	35	0.03	22	1.00	112	4	0.00	0	.	.	.	0.03	22	1.00	112	4
LEATHERBACK	GOM	94	1	25	0.24	132	0.38	272	64	0.00	0	.	.	.	0.24	132	0.38	272	64
TURTLE UNIDENTIFIED	GOM	94	1	25	0.04	19	1.00	97	4	0.00	0	.	.	.	0.04	19	1.00	97	4
LEATHERBACK	OFS	94	1	19	0.05	21	1.00	107	4	0.00	0	.	.	.	0.05	21	1.00	107	4
total		**94**	**1**			**216**					**0**					**216**			
LEATHERBACK	GOM	94	2	33	0.12	103	0.48	252	42	0.00	0	.	.	.	0.12	103	0.48	252	42
GREEN	NEC	94	2	40	0.03	6	1.00	31	1	0.00	0	.	.	.	0.03	6	1.00	31	1
LEATHERBACK	NEC	94	2	40	0.03	8	1.00	41	2	0.00	0	.	.	.	0.03	8	1.00	41	2
LOGGERHEAD	NEC	94	2	40	0.03	12	1.00	61	2	0.00	0	.	.	.	0.03	12	1.00	61	2
total		**94**	**2**			**129**					**0**					**129**			
LEATHERBACK	GOM	94	3	49	0.02	16	1.00	82	3	0.00	0	.	.	.	0.02	16	1.00	82	3
GREEN	NEC	94	3	99	0.01	19	1.00	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
KEMPS RIDLEY	NEC	94	3	99	0.01	19	1.00	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
LEATHERBACK	NEC	94	3	99	0.05	86	0.44	197	38	0.00	0	.	.	.	0.05	86	0.44	197	38
LOGGERHEAD	NEC	94	3	99	0.01	13	1.00	66	3	0.00	0	.	.	.	0.01	13	1.00	66	3
LEATHERBACK	NED	94	3	18	0.06	27	1.00	138	5	0.00	0	.	.	.	0.06	27	1.00	138	5
LOGGERHEAD	NED	94	3	18	0.89	1154	0.20	1699	784	0.00	0	.	.	.	0.89	1154	0.20	1699	784
TURTLE UNIDENTIFIED	NED	94	3	18	0.06	27	1.00	138	5	0.00	0	.	.	.	0.06	27	1.00	138	5
LEATHERBACK	SEC	94	3	46	0.04	30	0.70	103	9	0.00	0	.	.	.	0.04	30	0.70	103	9
total		**94**	**3**			**1391**					**0**					**1391**			
LEATHERBACK	GOM	94	4	47	0.02	14	1.00	72	3	0.00	0	.	.	.	0.02	14	1.00	72	3
LEATHERBACK	NEC	94	4	78	0.04	63	0.62	194	20	0.00	0	.	.	.	0.04	63	0.62	194	20
LOGGERHEAD	NEC	94	4	78	0.03	28	0.70	97	8	0.01	14	1	72	3	0.01	15	1.00	77	3
LEATHERBACK	NED	94	4	43	0.21	85	0.35	165	44	0.00	0	.	.	.	0.21	85	0.35	165	44
LOGGERHEAD	NED	94	4	43	0.42	271	0.25	439	167	0.00	0	.	.	.	0.42	271	0.25	439	167
total		**94**	**4**			**461**					**14**					**448**			

Table 9. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																			
LOGGERHEAD	NEC	95	1	42	0.02	2	1.00	10	0	0.00	0	.	.	.	0.02	2	1.00	10	0
LEATHERBACK	OFS	95	1	71	0.04	38	0.58	109	13	0.00	0	.	.	.	0.04	38	0.58	109	13
LOGGERHEAD	OFS	95	1	71	0.04	36	0.57	102	13	0.00	0	.	.	.	0.04	36	0.57	102	13
LOGGERHEAD	SEC	95	1	8	0.13	81	1.00	414	16	0.00	0	.	.	.	0.13	81	1.00	414	16
TURTLE UNIDENTIFIED	SEC	95	1	8	0.25	173	0.66	559	54	0.00	0	.	.	.	0.25	173	0.66	559	54
total		**95**	**1**			**330**					**0**					**330**			
LEATHERBACK	GOM	95	2	65	0.06	36	0.50	90	14	0.00	0	.	.	.	0.06	36	0.50	90	14
LEATHERBACK	NEC	95	2	19	0.05	34	1.00	174	7	0.00	0	.	.	.	0.05	34	1.00	174	7
LOGGERHEAD	NEC	95	2	19	0.26	161	0.42	356	73	0.00	0	.	.	.	0.26	161	0.42	356	73
LEATHERBACK	OFS	95	2	22	0.09	64	0.73	231	18	0.00	0	.	.	.	0.09	64	0.73	231	18
LEATHERBACK	SEC	95	2	47	0.04	46	0.74	169	13	0.00	0	.	.	.	0.04	46	0.74	169	13
LOGGERHEAD	SEC	95	2	47	0.06	88	0.64	279	28	0.00	0	.	.	.	0.06	88	0.64	279	28
TURTLE UNIDENTIFIED	SEC	95	2	47	0.04	70	0.70	242	20	0.00	0	.	.	.	0.04	70	0.70	242	20
total		**95**	**2**			**499**					**0**					**499**			
LEATHERBACK	NEC	95	3	93	0.02	34	0.70	118	10	0.00	0	.	.	.	0.02	34	0.70	118	10
LOGGERHEAD	NEC	95	3	93	0.09	204	0.36	406	102	0.00	0	.	.	.	0.09	204	0.36	406	102
LEATHERBACK	NED	95	3	39	0.56	657	0.18	928	465	0.00	0	.	.	.	0.56	657	0.18	928	465
LOGGERHEAD	NED	95	3	39	0.33	381	0.27	646	225	0.00	0	.	.	.	0.33	381	0.27	646	225
GREEN	SEC	95	3	11	0.09	37	1.00	189	7	0.00	0	.	.	.	0.09	37	1.00	189	7
total		**95**	**3**			**1313**					**0**					**1313**			
LEATHERBACK	GOM	95	4	51	0.02	12	1.00	61	2	0.00	0	.	.	.	0.02	12	1.00	61	2
LOGGERHEAD	NEC	95	4	51	0.10	106	0.43	238	47	0.00	0	.	.	.	0.10	106	0.43	238	47
LEATHERBACK	NED	95	4	26	0.19	75	0.48	182	31	0.00	0	.	.	.	0.19	75	0.48	182	31
LOGGERHEAD	NED	95	4	26	0.65	689	0.18	984	482	0.00	0	.	.	.	0.65	683	0.19	986	473
total		**95**	**4**			**882**					**0**					**876**			
LOGGERHEAD	OFS	96	1	60	0.08	66	0.45	153	29	0.00	0	.	.	.	0.08	66	0.45	153	29
LOGGERHEAD	SEC	96	1	18	0.06	33	1.00	169	6	0.00	0	.	.	.	0.06	33	1.00	169	6
total		**96**	**1**			**99**					**0**					**99**			
LEATHERBACK	SEC	96	2	56	0.02	36	1.00	184	7	0.00	0	.	.	.	0.02	36	1.00	184	7
LOGGERHEAD	SEC	96	2	56	0.05	52	0.60	153	18	0.00	0	.	.	.	0.05	52	0.60	153	18
total		**96**	**2**			**88**					**0**					**88**			
LEATHERBACK	GOM	96	3	43	0.07	91	0.62	279	30	0.00	0	.	.	.	0.07	91	0.62	279	30
LEATHERBACK	NEC	96	3	22	0.14	157	0.55	431	57	0.00	0	.	.	.	0.14	157	0.55	431	57
LOGGERHEAD	NEC	96	3	22	0.09	113	0.69	384	33	0.00	0	.	.	.	0.09	113	0.69	384	33
total		**96**	**3**			**361**					**0**					**361**			
LEATHERBACK	CAR	96	4	3	0.33	93	1.00	476	18	0.00	0	.	.	.	0.33	93	1.00	476	18
LEATHERBACK	GOM	96	4	36	0.03	24	1.00	123	5	0.00	0	.	.	.	0.03	24	1.00	123	5
LEATHERBACK	SEC	96	4	37	0.03	18	1.00	92	4	0.00	0	.	.	.	0.03	18	1.00	92	4
LOGGERHEAD	SEC	96	4	37	0.03	23	1.00	118	4	0.00	0	.	.	.	0.03	23	1.00	118	4
total		**96**	**4**			**158**					**0**					**158**			
LEATHERBACK	CAR	97	1	10	0.20	195	0.70	673	56	0.00	0	.	.	.	0.20	195	0.70	673	56
LOGGERHEAD	GOM	97	1	44	0.02	16	1.00	82	3	0.00	0	.	.	.	0.02	16	1.00	82	3
TURTLE UNIDENTIFIED	GOM	97	1	44	0.02	19	1.00	97	4	0.00	0	.	.	.	0.02	19	1.00	97	4
KEMPS RIDLEY	OFS	97	1	33	0.03	17	1.00	87	3	0.00	0	.	.	.	0.03	17	1.00	87	3
LEATHERBACK	OFS	97	1	33	0.06	36	0.70	123	10	0.00	0	.	.	.	0.06	36	0.70	123	10
LOGGERHEAD	OFS	97	1	33	0.06	56	0.74	204	15	0.00	0	.	.	.	0.06	56	0.74	204	15
TURTLE UNIDENTIFIED	OFS	97	1	33	0.03	19	1.00	97	4	0.00	0	.	.	.	0.03	19	1.00	97	4
HAWKSBILL	SEC	97	1	27	0.04	13	1.00	66	3	0.00	0	.	.	.	0.04	13	1.00	66	3
LOGGERHEAD	SEC	97	1	27	0.04	13	1.00	66	3	0.00	0	.	.	.	0.04	13	1	66	3
total		**97**	**1**			**384**					**0**					**384**			

Table 9. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																			
LOGGERHEAD	SEC	97	2	19	0.05	22	1.00	112	4	0.00	0	.	.	.	0.05	22	1.00	112	4
total		**97**	**2**			**22**					**0**					**22**			
LOGGERHEAD	NEC	97	3	65	0.06	73	0.49	182	29	0.00	0	.	.	.	0.06	73	0.49	182	29
LEATHERBACK	NED	97	3	40	0.03	15	1.00	77	3	0.00	0	.	.	.	0.03	15	1.00	77	3
LOGGERHEAD	NED	97	3	40	0.08	59	0.62	182	19	0.00	0	.	.	.	0.08	59	0.62	182	19
LOGGERHEAD	OFS	97	3	1	1.00	35	1.00	179	7	0.00	0	.	.	.	1.00	35	1.00	179	7
LEATHERBACK	SEC	97	3	34	0.03	28	1.00	143	5	0.00	0	.	.	.	0.03	28	1.00	143	5
total		**97**	**3**			**210**					**0**					**210**			
LOGGERHEAD	NEC	97	4	25	0.08	47	0.69	161	14	0.00	0	.	.	.	0.08	47	0.69	161	14
total		**97**	**4**			**47**					**0**					**47**			

Table 10. Quarterly (QTR) estimated bycatch (CATCH) of marine mammals and marine turtles in the U.S. Atlantic longline fishery, for years (YR) 1992-1997, stratified by species-NAREA (grouped fishing areas)-year-quarter for those strata with at least 5% coverage. Also indicated are the number of sets observed in the stratum (N), the estimated number of animals dead (CDEAD) and animals alive (CALIVE) upon return to the sea, and the estimated coefficients of variation for the bycatch estimates (CV_C, CV_D, CV_A for total, dead, and alive catches, respectively), and upper and lower 95% lognormal confidence bounds (UCAT, LCAT for total catch; UDED, LDED for dead animals; and ULIVE, LLIVE for living animals). The proportion of positive bycatch (PPC) is the proportion of sets in which at least one marine mammal or turtle was captured; PPD is the subset of PPC in which the animal was observed to be dead (PPD); PPA is the subset of PPC in which the animal was observed to be alive. No listing for a species-NAREA-year-quarter stratum implies an estimate of 0 if there is observer coverage, or if the stratum has no observer coverage, that there is no estimate available.

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
RISSOS DOLPHIN	GOM	92	4	37	0.03	15	1.00	77	3	0.00	0	.	.	.	0.03	15	1.00	77	3
COMMON DOLPHIN	NEC	92	4	62	0.02	13	1.00	66	3	0.00	0	.	.	.	0.02	13	1.00	66	3
PILOT WHALE	NEC	92	4	62	0.13	146	0.35	285	75	0.00	0	.	.	.	0.13	146	0.35	285	75
RISSOS DOLPHIN	NEC	92	4	62	0.03	39	0.70	135	11	0.00	0	.	.	.	0.02	20	1.00	102	4
total		92	4			**213**					**0**					**194**			
RISSOS DOLPHIN	GOM	93	1	42	0.02	45	1.00	230	9	0.02	45	1	230	9	0.00	0	.	.	.
BOTTLENOSE DOLPHIN	NEC	93	1	43	0.02	2	1.00	10	0	0.00	0	.	.	.	0.02	2	1.00	10	0
PILOT WHALE	NEC	93	1	43	0.02	3	1.00	15	1	0.00	0	.	.	.	0.02	3	1.00	15	1
SPOTTED DOLPHIN	NEC	93	1	43	0.02	2	1.00	10	0	0.00	0	.	.	.	0.02	2	1.00	10	0
total		**93**	**1**			**52**					**45**					**7**			
PILOT WHALE	NEC	93	2	38	0.11	47	0.50	119	19	0.00	0	.	.	.	0.11	47	0.50	119	19
PILOT WHALE	SEC	93	2	54	0.02	22	1.00	112	4	0.00	0	.	.	.	0.02	22	1.00	112	4
total		**93**	**2**			**69**					**0**					**69**			
PILOT WHALE	NEC	93	3	106	0.01	15	1.00	77	3	0.00	0	.	.	.	0.01	15	1.00	77	3
RISSOS DOLPHIN	NEC	93	3	106	0.02	38	0.73	136	11	0.00	0	.	.	.	0.02	38	0.73	136	11
BOTTLENOSE DOLPHIN	NED	93	3	34	0.03	24	1.00	123	5	0.00	0	.	.	.	0.03	24	1.00	123	5
total		**93**	**3**			**77**					**0**					**77**			
PILOT WHALE	NEC	93	4	71	0.10	93	0.39	193	45	0.00	0	.	.	.	0.10	93	0.39	193	45
total		**93**	**4**			**93**					**0**					**93**			
PILOT WHALE	NEC	94	1	27	0.04	4	1.00	20	1	0.00	0	.	.	.	0.04	4	1.00	20	1
total		**94**	**1**			**4**					**0**					**4**			
ATLANTIC SPOTTED DOLPHIN	GOM	94	3	49	0.02	15	1.00	77	3	0.00	0	.	.	.	0.02	15	1.00	77	3
PILOT WHALE	NEC	94	3	99	0.05	75	0.44	172	33	0.00	0	.	.	.	0.05	75	0.44	172	33
RISSOS DOLPHIN	NEC	94	3	99	0.04	57	0.49	143	23	0.01	13	1	66	3	0.03	45	0.57	128	16
PILOT WHALE	SEC	94	3	46	0.04	49	0.75	182	13	0.00	0	.	.	.	0.04	49	0.75	182	13
total		**94**	**3**			**196**					**13**					**184**			
PILOT WHALE	NEC	94	4	78	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
RISSOS DOLPHIN	NEC	94	4	78	0.04	46	0.57	130	16	0.00	0	.	.	.	0.04	46	0.57	130	16
KILLER WHALE	NED	94	4	43	0.02	6	1.00	31	1	0.00	0	.	.	.	0.02	6	1.00	31	1
total		**94**	**4**			**68**					**0**					**68**			

Table 10. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE MAMMALS																			
MARINE MAMMAL UNIDENTIFIED	NEC	95	3	93	0.01	24	1.00	123	5	0.00	0	.	.	.	0.01	24	1.00	123	5
PILOT WHALE	NEC	95	3	93	0.08	146	0.37	295	72	0.00	0	.	.	.	0.08	146	0.37	295	72
RISSOS DOLPHIN	NEC	95	3	93	0.04	87	0.51	223	34	0.00	0	.	.	.	0.04	87	0.51	223	34
SHORTFIN PILOT WHALE	NEC	95	3	93	0.02	63	0.70	218	18	0.00	0	.	.	.	0.02	63	0.70	218	18
PILOT WHALE	NED	95	3	39	0.03	25	1.00	128	5	0.00	0	.	.	.	0.03	25	1.00	128	5
total		**95**	**3**			**345**					**0**					**345**			
PILOT WHALE	NEC	95	4	51	0.08	103	0.51	263	40	0.00	0	.	.	.	0.08	103	0.51	263	40
total		**95**	**4**			**103**					**0**					**103**			
SHORT BEAKED SPINNER DOLPHIN	SEC	97	1	27	0.04	13	1.00	66	3	0.00	0	.	.	.	0.04	13	1.00	66	3
total		**97**	**1**			**13**					**0**					**13**			
PILOT WHALE	NEC	97	3	65	0.02	30	1.00	153	6	0.00	0	.	.	.	0.02	30	1.00	153	6
total		**97**	**3**			**30**					**0**					**30**			
MARINE TURTLES																			
LEATHERBACK	NED	92	3	35	0.17	118	0.38	243	57	0.00	0	.	.	.	0.17	118	0.38	243	57
LOGGERHEAD	NED	92	3	35	0.06	44	0.7	152	13	0.00	0	.	.	.	0.06	44	0.70	152	13
total		**92**	**3**			**162**					**0**					**162**			
LEATHERBACK	CAR	92	4	11	0.09	17	1	87	3	0.09	17	1	87	3	0.00	0	.	.	.
LOGGERHEAD	CAR	92	4	11	0.18	33	0.67	109	10	0.00	0	.	.	.	0.18	33	0.67	109	10
HAWKSBILL	NEC	92	4	62	0.02	15	1	77	3	0.00	0	.	.	.	0.02	15	1.00	77	3
LEATHERBACK	NEC	92	4	62	0.19	215	0.28	370	125	0.00	0	.	.	.	0.19	215	0.28	370	125
LOGGERHEAD	NEC	92	4	62	0.02	11	1	56	2	0.00	0	.	.	.	0.02	11	1.00	56	2
GREEN	NED	92	4	46	0.09	37	0.52	96	14	0.00	0	.	.	.	0.09	37	0.52	96	14
total		**92**	**4**			**328**					**17**					**311**			
LOGGERHEAD	CAR	93	1	22	0.05	16	1	82	3	0.00	0	.	.	.	0.05	16	1.00	82	3
GREEN	GOM	93	1	42	0.02	17	1	87	3	0.00	0	.	.	.	0.02	17	1.00	87	3
LEATHERBACK	GOM	93	1	42	0.12	106	0.46	252	45	0.00	0	.	.	.	0.12	106	0.46	252	45
LOGGERHEAD	OFS	93	1	52	0.02	8	1	41	2	0.00	0	.	.	.	0.02	8	1.00	41	2
LOGGERHEAD	SEC	93	1	39	0.03	7	1	36	1	0.03	7	1	36	1	0.00	0	.	.	.
total		**93**	**1**			**154**					**7**					**147**			
LEATHERBACK	GOM	93	2	78	0.05	30	0.49	75	12	0.00	0	.	.	.	0.05	30	0.49	75	12
TURTLE UNIDENTIFIED	GOM	93	2	78	0.01	9	1	46	2	0.00	0	.	.	.	0.01	9	1.00	46	2
LEATHERBACK	NEC	93	2	38	0.26	119	0.3	210	68	0.03	11	1	56	2	0.24	108	0.32	198	59
LOGGERHEAD	NEC	93	2	38	0.08	31	0.58	89	11	0.00	0	.	.	.	0.08	31	0.58	89	11
LEATHERBACK	SEC	93	2	54	0.02	12	1	61	2	0.00	0	.	.	.	0.02	12	1.00	61	2
LOGGERHEAD	SEC	93	2	54	0.02	17	1	87	3	0.00	0	.	.	.	0.02	17	1.00	87	3
total		**93**	**2**			**218**					**11**					**207**			
LEATHERBACK	GOM	93	3	49	0.02	41	1	210	8	0.00	0	.	.	.	0.02	41	1.00	210	8
LEATHERBACK	NEC	93	3	106	0.06	178	0.42	392	81	0.00	0	.	.	.	0.06	178	0.42	392	81
LOGGERHEAD	NEC	93	3	106	0.02	33	0.7	114	10	0.00	0	.	.	.	0.02	33	0.70	114	10
TURTLE UNIDENTIFIED	NEC	93	3	106	0.01	19	1	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
GREEN	NED	93	3	34	0.03	15	1	77	3	0.00	0	.	.	.	0.03	15	1.00	77	3
LEATHERBACK	NED	93	3	34	0.21	241	0.41	519	112	0.00	0	.	.	.	0.21	241	0.41	519	112
LOGGERHEAD	NED	93	3	34	0.18	173	0.39	363	83	0.00	0	.	.	.	0.18	173	0.39	363	83
total		**93**	**3**			**700**					**0**					**700**			

Table 10. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																			
LEATHERBACK	CAR	93	4	10	0.10	20	1	102	4	0.00	0	.	.	.	0.10	20	1.00	102	4
LOGGERHEAD	CAR	93	4	10	0.20	40	0.67	131	12	0.00	0	.	.	.	0.20	40	0.67	131	12
LOGGERHEAD	GOM	93	4	64	0.02	26	1	133	5	0.00	0	.	.	.	0.02	26	1.00	133	5
LEATHERBACK	NEC	93	4	71	0.07	40	0.43	90	18	0.00	0	.	.	.	0.07	40	0.43	90	18
LEATHERBACK	NED	93	4	35	0.17	48	0.38	98	23	0.00	0	.	.	.	0.17	48	0.38	98	23
LOGGERHEAD	NED	93	4	35	0.06	15	0.7	51	4	0.00	0	.	.	.	0.06	15	0.70	51	4
LEATHERBACK	SEC	93	4	26	0.08	41	0.69	140	12	0.00	0	.	.	.	0.08	41	0.69	140	12
LOGGERHEAD	SEC	93	4	26	0.04	22	1	112	4	0.00	0	.	.	.	0.04	22	1.00	112	4
total		**93**	**4**			**252**					**0**					**252**			
LEATHERBACK	CAR	94	1	35	0.03	22	1	112	4	0.00	0	.	.	.	0.03	22	1.00	112	4
LOGGERHEAD	CAR	94	1	35	0.03	22	1	112	4	0.00	0	.	.	.	0.03	22	1.00	112	4
LEATHERBACK	GOM	94	1	25	0.24	132	0.38	272	64	0.00	0	.	.	.	0.24	132	0.38	272	64
TURTLE UNIDENTIFIED	GOM	94	1	25	0.04	19	1	97	4	0.00	0	.	.	.	0.04	19	1.00	97	4
LEATHERBACK	OFS	94	1	19	0.05	21	1	107	4	0.00	0	.	.	.	0.05	21	1.00	107	4
total		**94**	**1**			**216**					**0**					**216**			
GREEN	NEC	94	2	40	0.03	6	1	31	1	0.00	0	.	.	.	0.03	6	1.00	31	1
LEATHERBACK	NEC	94	2	40	0.03	8	1	41	2	0.00	0	.	.	.	0.03	8	1.00	41	2
LOGGERHEAD	NEC	94	2	40	0.03	12	1	61	2	0.00	0	.	.	.	0.03	12	1.00	61	2
total		**94**	**2**			**26**					**0**					**26**			
LEATHERBACK	GOM	94	3	49	0.02	16	1	82	3	0.00	0	.	.	.	0.02	16	1.00	82	3
GREEN	NEC	94	3	99	0.01	19	1	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
KEMPS RIDLEY	NEC	94	3	99	0.01	19	1	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
LEATHERBACK	NEC	94	3	99	0.05	86	0.44	197	38	0.00	0	.	.	.	0.05	86	0.44	197	38
LOGGERHEAD	NEC	94	3	99	0.01	13	1	66	3	0.00	0	.	.	.	0.01	13	1.00	66	3
LEATHERBACK	SEC	94	3	46	0.04	30	0.7	103	9	0.00	0	.	.	.	0.04	30	0.70	103	9
total		**94**	**3**			**183**					**0**					**183**			
LEATHERBACK	GOM	94	4	47	0.02	14	1	72	3	0.00	0	.	.	.	0.02	14	1.00	72	3
LEATHERBACK	NEC	94	4	78	0.04	63	0.62	194	20	0.00	0	.	.	.	0.04	63	0.62	194	20
LOGGERHEAD	NEC	94	4	78	0.03	28	0.7	97	8	0.01	14	1	72	3	0.01	15	1.00	77	3
LEATHERBACK	NED	94	4	43	0.21	85	0.35	165	44	0.00	0	.	.	.	0.21	85	0.35	165	44
LOGGERHEAD	NED	94	4	43	0.42	271	0.25	439	167	0.00	0	.	.	.	0.42	271	0.25	439	167
total		**94**	**4**			**461**					**14**					**448**			
LOGGERHEAD	NEC	95	1	42	0.02	2	1	10	0	0.00	0	.	.	.	0.02	2	1.00	10	0
LEATHERBACK	OFS	95	1	71	0.04	38	0.58	109	13	0.00	0	.	.	.	0.04	38	0.58	109	13
LOGGERHEAD	OFS	95	1	71	0.04	36	0.57	102	13	0.00	0	.	.	.	0.04	36	0.57	102	13
total		**95**	**1**			**76**					**0**					**76**			
LEATHERBACK	GOM	95	2	65	0.06	36	0.5	90	14	0.00	0	.	.	.	0.06	36	0.50	90	14
LEATHERBACK	OFS	95	2	22	0.09	64	0.73	231	18	0.00	0	.	.	.	0.09	64	0.73	231	18
total		**95**	**2**			**100**					**0**					**100**			
LEATHERBACK	NEC	95	3	93	0.02	34	0.7	118	10	0.00	0	.	.	.	0.02	34	0.70	118	10
LOGGERHEAD	NEC	95	3	93	0.09	204	0.36	406	102	0.00	0	.	.	.	0.09	204	0.36	406	102
LEATHERBACK	NED	95	3	39	0.56	657	0.18	928	465	0.00	0	.	.	.	0.56	657	0.18	928	465
LOGGERHEAD	NED	95	3	39	0.33	381	0.27	646	225	0.00	0	.	.	.	0.33	381	0.27	646	225
total		**95**	**3**			**1276**					**0**					**1276**			

Table 10. (continued)

	NAREA	YR	QTR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																			
LEATHERBACK	GOM	95	4	51	0.02	12	1	61	2	0.00	0	.	.	.	0.02	12	1.00	61	2
LOGGERHEAD	NEC	95	4	51	0.10	106	0.43	238	47	0.00	0	.	.	.	0.10	106	0.43	238	47
LEATHERBACK	NED	95	4	26	0.19	75	0.48	182	31	0.00	0	.	.	.	0.19	75	0.48	182	31
LOGGERHEAD	NED	95	4	26	0.65	689	0.18	984	482	0.00	0	.	.	.	0.65	683	0.19	986	473
total		**95**	**4**			**882**					**0**					**876**			
LOGGERHEAD	OFS	96	1	60	0.08	66	0.45	153	29	0.00	0	.	.	.	0.08	66	0.45	153	29
total		**96**	**1**			**66**					**0**					**66**			
LEATHERBACK	SEC	96	2	56	0.02	36	1	184	7	0.00	0	.	.	.	0.02	36	1.00	184	7
LOGGERHEAD	SEC	96	2	56	0.05	52	0.6	153	18	0.00	0	.	.	.	0.05	52	0.60	153	18
total		**96**	**2**			**88**					**0**					**88**			
KEMPS RIDLEY	OFS	97	1	33	0.03	17	1	87	3	0.00	0	.	.	.	0.03	17	1.00	87	3
LEATHERBACK	OFS	97	1	33	0.06	36	0.7	123	10	0.00	0	.	.	.	0.06	36	0.70	123	10
LOGGERHEAD	OFS	97	1	33	0.06	56	0.74	204	15	0.00	0	.	.	.	0.06	56	0.74	204	15
TURTLE UNIDENTIFIED	OFS	97	1	33	0.03	19	1	97	4	0.00	0	.	.	.	0.03	19	1.00	97	4
HAWKSBILL	SEC	97	1	27	0.04	13	1	66	3	0.00	0	.	.	.	0.04	13	1.00	66	3
LOGGERHEAD	SEC	97	1	27	0.04	13	1	66	3	0.00	0	.	.	.	0.04	13	1.00	66	3
total		**97**	**1**			**154**					**0**					**154**			
LOGGERHEAD	NEC	97	3	65	0.06	73	0.49	182	29	0.00	0	.	.	.	0.06	73	0.49	182	29
LEATHERBACK	NED	97	3	40	0.03	15	1	77	3	0.00	0	.	.	.	0.03	15	1.00	77	3
LOGGERHEAD	NED	97	3	40	0.08	59	0.62	182	19	0.00	0	.	.	.	0.08	59	0.62	182	19
total		**97**	**3**			**147**					**0**					**147**			

Table 11. Annual (YR, 1992-1997) estimated bycatch (CATCH) of marine mammals and marine turtles in the U.S. Atlantic longline fishery, stratified by species-NAREA (grouped fishing areas)-year. Also indicated are the number of sets observed in the stratum (N), the estimated number of animals dead (CDEAD) and animals alive (CALIVE) upon return to the sea, and the estimated coefficients of variation for the bycatch estimates (CV_C, CV_D, CV_A for total, dead, and alive catches, respectively), and upper and lower 95% lognormal confidence bounds (UCAT, LCAT for total catch; UDED, LDED for dead animals; and ULIVE, LLIVE for living animals). The estimates here represent a summation of the stratum-wise estimates in Table 9. In some cases, considerable gains in precision about the estimates could be attained through pooling across stratum (quarters). No listing for a species-year-NAREA stratum implies an estimate of 0 if there is observer coverage, or if the stratum has no observer coverage, that there is no estimate available.

	NAREA	YR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE MAMMALS																		
RISSOS DOLPHIN	GOM	92	61	0.02	47	1.00	240	9	0.00	0	.	.	.	0.02	47	1.00	240	9
COMMON DOLPHIN	NEC	92	105	0.01	27	1.00	138	5	0.00	0	.	.	.	0.01	27	1.00	138	5
DOLPHIN	NEC	92	105	0.01	18	1.00	92	4	0.00	0	.	.	.	0.01	18	1.00	92	4
PILOT WHALE	NEC	92	105	0.10	465	0.33	881	246	0.01	55	1.00	281	11	0.10	415	0.32	765	225
RISSOS DOLPHIN	NEC	92	105	0.02	82	0.70	284	24	0.00	0	.	.	.	0.01	42	1.00	215	8
total		92			639					55					549			
RISSOS DOLPHIN	GOM	93	233	0.00	36	1.00	184	7	0.00	36	1.00	184	7	0.00	0	.	.	.
BOTTLENOSE DOLPHIN	NEC	93	258	0.00	13	1.00	66	3	0.00	0	.	.	.	0.00	13	1.00	66	3
PILOT WHALE	NEC	93	258	0.05	180	0.29	312	104	0.00	0	.	.	.	0.05	180	0.29	312	104
RISSOS DOLPHIN	NEC	93	258	0.01	27	0.73	97	8	0.00	0	.	.	.	0.01	27	0.73	97	8
SPOTTED DOLPHIN	NEC	93	258	0.00	12	1.00	61	2	0.00	0	.	.	.	0.00	12	1.00	61	2
BOTTLENOSE DOLPHIN	NED	93	75	0.01	18	1.00	92	4	0.00	0	.	.	.	0.01	18	1.00	92	4
PILOT WHALE	SEC	93	154	0.01	20	1.00	102	4	0.00	0	.	.	.	0.01	20	1.00	102	4
total		**93**			**306**					**36**					**270**			
ATLANTIC SPOTTED DOLPHIN	GOM	94	154	0.01	17	1.00	87	3	0.00	0	.	.	.	0.01	17	1.00	87	3
PANTROPICAL SPOTTED DOLPHIN	GOM	94	154	0.01	20	1.00	102	4	0.00	0	.	.	.	0.01	20	1.00	102	4
PILOT WHALE	NEC	94	244	0.03	86	0.38	176	42	0.00	0	.	.	.	0.03	86	0.38	176	42
RISSOS DOLPHIN	NEC	94	244	0.03	88	0.38	179	43	0.00	10	1.00	51	2	0.02	78	0.41	168	36
KILLER WHALE	NED	94	61	0.02	14	1.00	72	3	0.00	0	.	.	.	0.02	14	1.00	72	3
PILOT WHALE	SEC	94	136	0.01	82	0.75	306	22	0.00	0	.	.	.	0.01	82	0.75	306	22
total		**94**			**307**					**10**					**297**			
MARINE MAMMAL UNIDENTIFIED	NEC	95	205	0.00	22	1.00	112	4	0.00	0	.	.	.	0.00	22	1.00	112	4
PILOT WHALE	NEC	95	205	0.05	211	0.30	376	118	0.00	0	.	.	.	0.05	211	0.30	376	118
RISSOS DOLPHIN	NEC	95	205	0.02	80	0.51	206	31	0.00	0	.	.	.	0.02	80	0.51	206	31
SHORTFIN PILOT WHALE	NEC	95	205	0.01	58	0.71	202	17	0.00	0	.	.	.	0.01	58	0.71	202	17
PILOT WHALE	NED	95	65	0.02	20	1.00	102	4	0.00	0	.	.	.	0.02	20	1.00	102	4
PILOT WHALE	SEC	95	79	0.01	40	1.00	205	8	0.00	0	.	.	.	0.01	40	1.00	205	8
total		**95**			**431**					**0**					**431**			
RISSOS DOLPHIN	GOM	96	128	0.01	25	1.00	128	5	0.01	25	1.00	128	5	0.00	0	.	.	.
RISSOS DOLPHIN	NEC	96	23	0.09	240	0.72	852	68	0.00	0	.	.	.	0.09	240	0.72	852	68
MARINE MAMMAL UNIDENTIFIED	SEC	96	127	0.01	26	1.00	133	5	0.00	0	.	.	.	0.01	26	1.00	133	5
total		**96**			**291**					**25**					**266**			
PILOT WHALE	NEC	97	98	0.01	34	1.00	174	7	0.00	0	.	.	.	0.01	34	1.00	174	7
SHORT BEAKED SPINNER DOLPHIN	SEC	97	95	0.01	13	1.00	66	3	0.00	0	.	.	.	0.01	13	1.00	66	3
total		**97**			**47**					**0**					**47**			

Table 11. (continued)

	NAREA	YR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																		
LEATHERBACK	CAR	92	11	0.09	87	1.00	445	17	0.09	87	1.00	445	17	0.00	0	.	.	.
LOGGERHEAD	CAR	92	11	0.18	172	0.67	569	52	0.00	0	.	.	.	0.18	172	0.67	569	52
GREEN	NEC	92	105	0.02	37	0.70	128	11	0.01	18	1.00	92	4	0.01	18	1.00	92	4
HAWKSBILL	NEC	92	105	0.01	30	1.00	153	6	0.00	0	.	.	.	0.01	30	1.00	153	6
LEATHERBACK	NEC	92	105	0.15	592	0.25	955	367	0.00	0	.	.	.	0.15	592	0.25	955	367
LOGGERHEAD	NEC	92	105	0.02	43	0.70	149	12	0.00	0	.	.	.	0.02	43	0.70	149	12
TURTLE UNIDENTIFIED	NEC	92	105	0.01	18	1.00	92	4	0.00	0	.	.	.	0.01	18	1.00	92	4
GREEN	NED	92	81	0.05	92	0.52	242	35	0.00	0	.	.	.	0.05	92	0.52	242	35
LEATHERBACK	NED	92	81	0.07	87	0.40	185	41	0.00	0	.	.	.	0.07	87	0.40	185	41
LOGGERHEAD	NED	92	81	0.02	32	0.71	111	9	0.00	0	.	.	.	0.02	32	0.71	111	9
LEATHERBACK	SEC	92	71	0.03	105	0.70	363	30	0.00	0	.	.	.	0.03	105	0.70	363	30
total		**92**			**1295**					**105**					**1189**			
LEATHERBACK	CAR	93	43	0.02	21	1.00	107	4	0.00	0	.	.	.	0.02	21	1.00	107	4
LOGGERHEAD	CAR	93	43	0.07	56	0.58	160	20	0.00	0	.	.	.	0.07	56	0.58	160	20
GREEN	GOM	93	233	0.00	14	1.00	72	3	0.00	0	.	.	.	0.00	14	1.00	72	3
LEATHERBACK	GOM	93	233	0.04	153	0.34	292	80	0.00	0	.	.	.	0.04	153	0.34	292	80
LOGGERHEAD	GOM	93	233	0.00	33	1.00	169	6	0.00	0	.	.	.	0.00	33	1.00	169	6
TURTLE	GOM	93	233	0.00	13	1.00	66	3	0.00	0	.	.	.	0.00	13	1.00	66	3
LEATHERBACK	NEC	93	258	0.08	302	0.23	472	193	0.00	12	1.00	61	2	0.08	290	0.24	459	183
LOGGERHEAD	NEC	93	258	0.02	58	0.45	135	25	0.00	0	.	.	.	0.02	58	0.45	135	25
TURTLE	NEC	93	258	0.00	14	1.00	72	3	0.00	0	.	.	.	0.00	14	1.00	72	3
GREEN	NED	93	75	0.01	11	1.00	56	2	0.00	0	.	.	.	0.01	11	1.00	56	2
LEATHERBACK	NED	93	75	0.21	341	0.26	562	207	0.00	0	.	.	.	0.21	341	0.26	562	207
LOGGERHEAD	NED	93	75	0.11	154	0.35	302	79	0.00	0	.	.	.	0.11	154	0.35	302	79
LOGGERHEAD	OFS	93	52	0.02	11	1.00	56	2	0.00	0	.	.	.	0.02	11	1.00	56	2
LEATHERBACK	SEC	93	154	0.03	72	0.52	187	28	0.00	0	.	.	.	0.03	72	0.52	187	28
LOGGERHEAD	SEC	93	154	0.03	62	0.52	162	24	0.01	9	1.00	46	2	0.02	53	0.59	154	18
total		**93**			**1315**					**21**					**1294**			
LEATHERBACK	CAR	94	35	0.03	50	1.00	256	10	0.00	0	.	.	.	0.03	50	1.00	256	10
LOGGERHEAD	CAR	94	35	0.03	50	1.00	256	10	0.00	0	.	.	.	0.03	50	1.00	256	10
LEATHERBACK	GOM	94	154	0.08	219	0.29	379	126	0.00	0	.	.	.	0.08	219	0.29	379	126
TURTLE UNIDENTIFIED	GOM	94	154	0.01	15	1.00	77	3	0.00	0	.	.	.	0.01	15	1.00	77	3
GREEN	NEC	94	244	0.01	24	0.73	86	7	0.00	0	.	.	.	0.01	24	0.73	86	7
KEMPS RIDLEY	NEC	94	244	0.00	15	1.00	77	3	0.00	0	.	.	.	0.00	15	1.00	77	3
LEATHERBACK	NEC	94	244	0.04	139	0.34	267	72	0.00	0	.	.	.	0.04	139	0.34	267	72
LOGGERHEAD	NEC	94	244	0.02	54	0.51	138	21	0.00	12	1.00	61	2	0.01	42	0.59	123	14
LEATHERBACK	NED	94	61	0.16	195	0.33	367	103	0.00	0	.	.	.	0.16	195	0.33	367	103
LOGGERHEAD	NED	94	61	0.56	1175	0.17	1638	843	0.00	0	.	.	.	0.56	1175	0.17	1638	843
TURTLE UNIDENTIFIED	NED	94	61	0.02	14	1.00	72	3	0.00	0	.	.	.	0.02	14	1.00	72	3
LEATHERBACK	OFS	94	19	0.05	47	1.00	240	9	0.00	0	.	.	.	0.05	47	1.00	240	9
LEATHERBACK	SEC	94	136	0.01	50	0.70	174	14	0.00	0	.	.	.	0.01	50	0.70	174	14
total		**94**			**2047**					**12**					**2035**			

Table 11. (continued)

	NAREA	YR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																		
LEATHERBACK	GOM	95	208	0.02	57	0.45	132	25	0.00	0	.	.	.	0.02	57	0.45	132	25
LEATHERBACK	NEC	95	205	0.01	54	0.58	156	19	0.00	0	.	.	.	0.01	54	0.58	156	19
LOGGERHEAD	NEC	95	205	0.09	389	0.23	610	248	0.00	0	.	.	.	0.09	389	0.23	610	248
LEATHERBACK	NED	95	65	0.42	667	0.18	942	472	0.00	0	.	.	.	0.42	667	0.18	942	472
LOGGERHEAD	NED	95	65	0.46	1586	0.20	2346	1072	0.00	0	.	.	.	0.46	1567	0.20	2320	1058
LEATHERBACK	OFS	95	93	0.05	90	0.45	210	39	0.00	0	.	.	.	0.05	90	0.45	210	39
LOGGERHEAD	OFS	95	93	0.03	47	0.58	134	16	0.00	0	.	.	.	0.03	47	0.58	134	16
GREEN	SEC	95	79	0.01	31	1.00	159	6	0.00	0	.	.	.	0.01	31	1.00	159	6
LEATHERBACK	SEC	95	79	0.03	57	0.75	210	15	0.00	0	.	.	.	0.03	57	0.75	210	15
LOGGERHEAD	SEC	95	79	0.05	147	0.55	400	54	0.00	0	.	.	.	0.05	147	0.55	400	54
TURTLE UNIDENTIFIED	SEC	95	79	0.05	165	0.49	412	66	0.00	0	.	.	.	0.05	165	0.49	412	66
total		**95**			**3290**					**0**					**3271**			
LEATHERBACK	CAR	96	6	0.17	233	1.00	1191	46	0.00	0	.	.	.	0.17	233	1.00	1191	46
LEATHERBACK	GOM	96	128	0.03	133	0.53	355	50	0.00	0	.	.	.	0.03	133	0.53	355	50
LEATHERBACK	NEC	96	23	0.13	245	0.55	674	89	0.00	0	.	.	.	0.13	245	0.55	674	89
LOGGERHEAD	NEC	96	23	0.09	176	0.69	599	52	0.00	0	.	.	.	0.09	176	0.69	599	52
LOGGERHEAD	OFS	96	77	0.06	121	0.45	281	52	0.00	0	.	.	.	0.06	121	0.45	281	52
LEATHERBACK	SEC	96	127	0.02	63	0.73	226	18	0.00	0	.	.	.	0.02	63	0.73	226	18
LOGGERHEAD	SEC	96	127	0.04	113	0.46	268	48	0.00	0	.	.	.	0.04	113	0.46	268	48
total		**96**			**1084**					**0**					**1084**			
LEATHERBACK	CAR	97	10	0.20	252	0.70	870	73	0.00	0	.	.	.	0.20	252	0.70	870	73
LOGGERHEAD	GOM	97	163	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
TURTLE UNIDENTIFIED	GOM	97	163	0.01	19	1.00	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
LOGGERHEAD	NEC	97	98	0.06	122	0.40	259	57	0.00	0	.	.	.	0.06	122	0.40	259	57
LEATHERBACK	NED	97	42	0.02	18	1.00	92	4	0.00	0	.	.	.	0.02	18	1.00	92	4
LOGGERHEAD	NED	97	42	0.07	73	0.62	225	24	0.00	0	.	.	.	0.07	73	0.62	225	24
KEMPS RIDLEY	OFS	97	46	0.02	23	1.00	118	4	0.00	0	.	.	.	0.02	23	1.00	118	4
LEATHERBACK	OFS	97	46	0.04	46	0.70	159	13	0.00	0	.	.	.	0.04	46	0.70	159	13
LOGGERHEAD	OFS	97	46	0.07	92	0.61	275	31	0.00	0	.	.	.	0.07	92	0.61	275	31
TURTLE UNIDENTIFIED	OFS	97	46	0.02	24	1.00	123	5	0.00	0	.	.	.	0.02	24	1.00	123	5
HAWKSBILL	SEC	97	95	0.01	13	1.00	66	3	0.00	0	.	.	.	0.01	13	1.00	66	3
LEATHERBACK	SEC	97	95	0.01	41	1.00	210	8	0.00	0	.	.	.	0.01	41	1.00	210	8
LOGGERHEAD	SEC	97	95	0.02	26	0.70	90	8	0.00	0	.	.	.	0.02	26	0.70	90	8
total		**97**			**765**					**0**					**765**			

Table 12. Annual (YR, 1992-1997) estimated bycatch (CATCH) of marine mammals and marine turtles in the U.S. Atlantic longline fishery, stratified by species-MAREA (major ocean regions)-year. Also indicated are the number of sets observed in the stratum (N), the estimated number of animals dead (CDEAD) and animals alive (CALIVE) upon return to the sea, and the estimated coefficients of variation for the bycatch estimates (CV_C, CV_D, CV_A for total, dead, and alive catches, respectively), and upper and lower 95% lognormal confidence bounds (UCAT, LCAT for total catch; UDED, LDED for dead animals; and ULIVE, LLIVE for living animals). These estimates are provided for large ocean areas which generally correspond to Atlantic waters within (USATL) or outside (OTHATL) of the U.S. EEZ. Gulf of Mexico (GOM) estimates can result from effort both within and outside of the U.S. EEZ in the Gulf of Mexico. The estimates here represent a summation of the stratum-wise estimates in Table 9. In some cases, considerable gains in precision about the estimates could be attained through pooling across strata (quarters and NAREA). No listing for a species-year-MAREA stratum implies an estimate of 0 if there is observer coverage, or if the stratum has no observer coverage, that there is no estimate available.

	MAREA	YR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE MAMMAL																		
RISSOS DOLPHIN	GOM	92	61	0.02	47	1.00	240	9	0.00	0	.	.	.	0.02	47	1.00	240	9
COMMON DOLPHIN	US ATL	92	176	0.01	24	1.00	123	5	0.00	0	.	.	.	0.01	24	1.00	123	5
DOLPHIN	US ATL	92	176	0.01	17	1.00	87	3	0.00	0	.	.	.	0.01	17	1.00	87	3
PILOT WHALE	US ATL	92	176	0.06	420	0.34	803	220	0.01	50	1	256	10	0.06	375	0.33	698	201
RISSOS DOLPHIN	US ATL	92	176	0.01	74	0.71	257	21	0.00	0	.	.	.	0.01	38	1.00	194	7
RISSOS DOLPHIN	GOM	93	233	0.00	36	1.00	184	7	0.00	36	1	184	7	0.00	0	.	.	.
BOTTLENOSE DOLPHIN	OTHATL	93	170	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
BOTTLENOSE DOLPHIN	US ATL	93	412	0.00	13	1.00	66	3	0.00	0	.	.	.	0.00	13	1.00	66	3
PILOT WHALE	US ATL	93	412	0.03	193	0.28	330	113	0.00	0	.	.	.	0.03	193	0.28	330	113
RISSOS DOLPHIN	US ATL	93	412	0.00	26	0.73	93	7	0.00	0	.	.	.	0.00	26	0.73	93	7
SPOTTED DOLPHIN	US ATL	93	412	0.00	11	1.00	56	2	0.00	0	.	.	.	0.00	11	1.00	56	2
ATLANTIC SPOTTED DOLPHIN	GOM	94	154	0.01	17	1.00	87	3	0.00	0	.	.	.	0.01	17	1.00	87	3
PANTROPICAL SPOTTED DOLPHIN	GOM	94	154	0.01	20	1.00	102	4	0.00	0	.	.	.	0.01	20	1.00	102	4
KILLER WHALE	OTHATL	94	115	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
PILOT WHALE	US ATL	94	380	0.02	161	0.38	328	79	0.00	0	.	.	.	0.02	161	0.38	328	79
RISSOS DOLPHIN	US ATL	94	380	0.02	87	0.38	178	43	0.00	10	1	51	2	0.02	77	0.41	166	36
PILOT WHALE	OTHATL	95	204	0.00	20	1.00	102	4	0.00	0	.	.	.	0.00	20	1	102	4
MARINE MAMMAL UNIDENTIFIED	US ATL	95	284	0.00	22	1.00	112	4	0.00	0	.	.	.	0.00	22	1	112	4
PILOT WHALE	US ATL	95	284	0.04	252	0.30	444	143	0.00	0	.	.	.	0.04	252	0.30	444	143
RISSOS DOLPHIN	US ATL	95	284	0.01	81	0.51	209	31	0.00	0	.	.	.	0.01	81	0.51	209	31
SHORTFIN PILOT WHALE	US ATL	95	284	0.01	58	0.71	202	17	0.00	0	.	.	.	0.01	58	0.71	202	17
RISSOS DOLPHIN	GOM	96	128	0.01	25	1.00	128	5	0.01	25	1	128	5	0.00	0	.	.	.
MARINE MAMMAL UNIDENTIFIED	US ATL	96	150	0.01	43	1.00	220	8	0.00	0	.	.	.	0.01	43	1.00	220	8
RISSOS DOLPHIN	US ATL	96	150	0.01	74	0.73	267	20	0.00	0	.	.	.	0.01	74	0.73	267	20
PILOT WHALE	US ATL	97	193	0.01	29	1.00	148	6	0.00	0	.	.	.	0.01	29	1.00	148	6
SHORT BEAKED SPINNER DOLPHIN	US ATL	97	193	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
MARINE TURTLES																		
GREEN	OTHATL	92	92	0.04	153	0.53	403	58	0.00	0	.	.	.	0.04	153	0.53	403	58
LEATHERBACK	OTHATL	92	92	0.08	187	0.38	382	92	0.01	43	1	220	8	0.07	144	0.40	307	68
LOGGERHEAD	OTHATL	92	92	0.04	138	0.51	352	54	0.00	0	.	.	.	0.04	138	0.51	352	54
GREEN	US ATL	92	176	0.01	33	0.71	115	10	0.01	17	1	87	3	0.01	17	1.00	87	3
HAWKSBILL	US ATL	92	176	0.01	28	1.00	143	5	0.00	0	.	.	.	0.01	28	1.00	143	5
LEATHERBACK	US ATL	92	176	0.10	661	0.24	1057	413	0.00	0	.	.	.	0.10	661	0.24	1057	413

Table 12. (continued)

	MAREA	YR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE TURTLES																		
LOGGERHEAD	US ATL	92	176	0.01	39	0.71	136	11	0.00	0	.	.	.	0.01	39	0.71	136	11
TURTLE	US ATL	92	176	0.01	17	1.00	87	3	0.00	0	.	.	.	0.01	17	1.00	87	3
GREEN	GOM	93	233	0.00	14	1.00	72	3	0.00	0	.	.	.	0.00	14	1.00	72	3
LEATHERBACK	GOM	93	233	0.04	153	0.34	292	80	0.00	0	.	.	.	0.04	153	0.34	292	80
LOGGERHEAD	GOM	93	233	0.00	33	1.00	169	6	0.00	0	.	.	.	0.00	33	1.00	169	6
TURTLE	GOM	93	233	0.00	13	1.00	66	3	0.00	0	.	.	.	0.00	13	1.00	66	3
GREEN	OTHATL	93	170	0.01	10	1.00	51	2	0.00	0	.	.	.	0.01	10	1.00	51	2
LEATHERBACK	OTHATL	93	170	0.10	321	0.26	533	193	0.00	0	.	.	.	0.10	321	0.26	533	193
LOGGERHEAD	OTHATL	93	170	0.07	209	0.29	366	119	0.00	0	.	.	.	0.07	209	0.29	366	119
LEATHERBACK	US ATL	93	412	0.06	366	0.21	554	242	0.00	12	1	61	2	0.06	354	0.22	541	232
LOGGERHEAD	US ATL	93	412	0.02	123	0.35	238	63	0.00	10	1	51	2	0.02	113	0.37	228	56
TURTLE	US ATL	93	412	0.00	13	1.00	66	3	0.00	0	.	.	.	0.00	13	1.00	66	3
LEATHERBACK	GOM	94	154	0.08	219	0.29	379	126	0.00	0	.	.	.	0.08	219	0.29	379	126
TURTLE	GOM	94	154	0.01	15	1.00	77	3	0.00	0	.	.	.	0.01	15	1.00	77	3
LEATHERBACK	OTHATL	94	115	0.10	316	0.32	579	173	0.00	0	.	.	.	0.10	316	0.32	579	173
LOGGERHEAD	OTHATL	94	115	0.30	1455	0.19	2095	1011	0.00	0	.	.	.	0.30	1455	0.19	2095	1011
TURTLE	OTHATL	94	115	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
GREEN	US ATL	94	380	0.01	24	0.73	86	7	0.00	0	.	.	.	0.01	24	0.73	86	7
KEMPS RIDLEY	US ATL	94	380	0.00	15	1.00	77	3	0.00	0	.	.	.	0.00	15	1.00	77	3
LEATHERBACK	US ATL	94	380	0.03	188	0.32	344	103	0.00	0	.	.	.	0.03	188	0.32	344	103
LOGGERHEAD	US ATL	94	380	0.01	54	0.51	139	21	0.00	12	1	61	2	0.01	42	0.59	123	14
LEATHERBACK	GOM	95	208	0.02	57	0.45	132	25	0.00	0	.	.	.	0.02	57	0.45	132	25
LEATHERBACK	OTHATL	95	204	0.16	736	0.18	1052	515	0.00	0	.	.	.	0.16	736	0.18	1052	515
LOGGERHEAD	OTHATL	95	204	0.16	1568	0.22	2382	1032	0.00	0	.	.	.	0.16	1550	0.22	2355	1020
GREEN	US ATL	95	284	0.00	30	1.00	153	6	0.00	0	.	.	.	0.00	30	1.00	153	6
LEATHERBACK	US ATL	95	284	0.02	110	0.47	263	46	0.00	0	.	.	.	0.02	110	0.47	263	46
LOGGERHEAD	US ATL	95	284	0.08	532	0.22	812	348	0.00	0	.	.	.	0.08	532	0.22	812	348
TURTLE	US ATL	95	284	0.01	160	0.50	404	63	0.00	0	.	.	.	0.01	160	0.50	404	63
LEATHERBACK	GOM	96	128	0.03	133	0.53	355	50	0.00	0	.	.	.	0.03	133	0.53	355	50
LEATHERBACK	OTHATL	96	83	0.01	65	1.00	332	13	0.00	0	.	.	.	0.01	65	1.00	332	13
LOGGERHEAD	OTHATL	96	83	0.06	233	0.45	543	100	0.00	0	.	.	.	0.06	233	0.45	543	100
LEATHERBACK	US ATL	96	150	0.03	180	0.47	435	74	0.00	0	.	.	.	0.03	180	0.47	435	74
LOGGERHEAD	US ATL	96	150	0.05	243	0.39	505	117	0.00	0	.	.	.	0.05	243	0.39	505	117
LOGGERHEAD	GOM	97	163	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
TURTLE	GOM	97	163	0.01	19	1.00	97	4	0.00	0	.	.	.	0.01	19	1.00	97	4
KEMPS RIDLEY	OTHATL	97	98	0.01	24	1.00	123	5	0.00	0	.	.	.	0.01	24	1.00	123	5
LEATHERBACK	OTHATL	97	98	0.05	198	0.49	495	79	0.00	0	.	.	.	0.05	198	0.49	495	79
LOGGERHEAD	OTHATL	97	98	0.06	184	0.44	418	81	0.00	0	.	.	.	0.06	184	0.44	418	81
TURTLE	OTHATL	97	98	0.01	26	1.00	133	5	0.00	0	.	.	.	0.01	26	1.00	133	5
HAWKSBILL	US ATL	97	193	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
LEATHERBACK	US ATL	97	193	0.01	50	1.00	256	10	0.00	0	.	.	.	0.01	50	1.00	256	10
LOGGERHEAD	US ATL	97	193	0.04	136	0.35	264	70	0.00	0	.	.	.	0.04	136	0.35	264	70

Table 13. A) Annual observed and logbook-reported effort by hooks (×1000) and sets by large areas of the ocean (MAREA). An adjustment was made to the logbook-reported effort by distributing effort with unknown area information proportionally among the areas with known effort. B) Annual (YR, 1992-1997) estimated bycatch (CATCH) of marine mammals and marine turtles in the U.S. Atlantic longline fishery, stratified by group (marine mammal or marine turtle)-MAREA (major ocean regions)-year. Also indicated are the number of sets observed in the stratum (N), the estimated number of animals dead (CDEAD) and animals alive (CALIVE) upon return to the sea, and the estimated coefficients of variation for the bycatch estimates (CV_C, CV_D, CV_A for total, dead, and alive catches, respectively), and upper and lower 95% lognormal confidence bounds (UCAT, LCAT for total catch; UDED, LDED for dead animals; and ULIVE, LLIVE for living animals). These estimates are provided for large ocean areas which generally correspond to Atlantic waters within (USATL) or outside (OTHATL) of the U.S. EEZ. Gulf of Mexico (GOM) estimates can result from effort both within and outside of the U.S. EEZ in the Gulf of Mexico. The estimates here represent a summation of the of stratum-wise estimates in Table 9. In some cases, considerable gains in precision about the estimates could be attained through pooling across strata (species, quarters, and NAREA. No listing for a stratum implies an estimate of 0 if there is observer coverage, or if the stratum has no observer coverage, that there is no estimate available.

A. Annual Effort Statistics:

YR	MAREA	OBSERVED HOOKS	OBSERVED SETS	REPORTED HOOKS	REPORTED SETS
92	GOM	38185	61	2610889.27	3880.41
92	OTHATL	67984	92	1569483.53	2682.79
92	US ATL	91750	176	3146014.20	6989.80
93	GOM	195421	233	2503846.69	3589.24
93	OTHATL	109543	170	1633801.79	2804.32
93	US ATL	229538	412	3328878.52	6893.44
94	GOM	113097	154	2138878.32	2978.37
94	OTHATL	83472	115	1792501.02	2910.49
94	US ATL	225290	380	3392811.66	6532.14
95	GOM	172200	208	2155528.55	3104.07
95	OTHATL	137160	204	2232779.02	3517.81
95	US ATL	181601	284	3968585.43	6568.13
96	GOM	89122	128	2957228.34	4325.56
96	OTHATL	54453	83	2315064.37	3393.10
96	US ATL	82025	150	3597028.29	6443.34
97	GOM	114195	163	2677589.89	3929.20
97	OTHATL	74882	98	1813787.59	2422.49
97	US ATL	128363	193	3070055.53	5554.31

Table 13. (continued)

B. Annual Species Group Estimates:

MAREA	YR	N	PPC	CATCH	CV_CC	UCAT	LCAT	PPD	CDEAD	CV_CD	UDED	LDED	PPA	CALIVE	CV_CA	ULIVE	LLIVE
MARINE MAMMAL																	
GOM	92	61	0.02	47	1.00	240	9	0.00	0	.	.	.	0.02	47	1.00	240	9
GOM	93	233	0.00	36	1.00	184	7	0.00	36	1.00	184	7	0.00	0	.	.	.
GOM	94	154	0.01	37	0.71	129	11	0.00	0	.	.	.	0.01	37	0.71	129	11
GOM	96	128	0.01	25	1.00	128	5	0.01	25	1.00	128	5	0.00	0	.	.	.
OTHATL	93	170	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
OTHATL	94	115	0.01	16	1.00	82	3	0.00	0	.	.	.	0.01	16	1.00	82	3
OTHATL	95	204	0.00	20	1.00	102	4	0.00	0	.	.	.	0.00	20	1.00	102	4
US ATL	92	176	0.08	534	0.28	922	309	0.01	50	1.00	256	10	0.07	455	0.29	789	262
US ATL	93	412	0.04	242	0.24	387	151	0.00	0	.	.	.	0.04	242	0.24	387	151
US ATL	94	380	0.04	246	0.27	412	147	0.00	10	1.00	51	2	0.04	236	0.28	402	138
US ATL	95	284	0.07	414	0.23	648	264	0.00	0	.	.	.	0.07	414	0.23	648	264
US ATL	96	150	0.02	118	0.59	345	40	0.00	0	.	.	.	0.02	118	0.59	345	40
US ATL	97	193	0.01	45	0.73	163	12	0.00	0	.	.	.	0.01	45	0.73	163	12
MARINE TURTLE																	
GOM	93	233	0.06	212	0.30	375	120	0.00	0	.	.	.	0.06	212	0.30	375	120
GOM	94	154	0.08	235	0.27	398	139	0.00	0	.	.	.	0.08	235	0.27	398	139
GOM	95	208	0.02	57	0.45	132	25	0.00	0	.	.	.	0.02	57	0.45	132	25
GOM	96	128	0.03	133	0.53	355	50	0.00	0	.	.	.	0.03	133	0.53	355	50
GOM	97	163	0.01	36	0.71	125	10	0.00	0	.	.	.	0.01	36	0.71	125	10
OTHATL	92	92	0.16	477	0.25	775	293	0.01	43	1.00	220	8	0.15	434	0.26	719	262
OTHATL	93	170	0.18	539	0.19	772	376	0.00	0	.	.	.	0.18	539	0.19	772	376
OTHATL	94	115	0.42	1776	0.15	2385	1323	0.00	0	.	.	.	0.42	1776	0.15	2385	1323
OTHATL	95	204	0.32	2245	0.14	2943	1713	0.00	0	.	.	.	0.32	2228	0.14	2920	1700
OTHATL	96	83	0.07	298	0.41	647	137	0.00	0	.	.	.	0.07	298	0.41	647	137
OTHATL	97	98	0.13	430	0.29	752	246	0.00	0	.	.	.	0.13	430	0.29	752	246
US ATL	92	176	0.14	775	0.21	1167	515	0.01	17	1.00	87	3	0.13	758	0.22	1150	499
US ATL	93	412	0.08	502	0.18	707	356	0.00	21	0.71	73	6	0.08	481	0.18	686	337
US ATL	94	380	0.05	281	0.24	449	176	0.00	12	1.00	61	2	0.04	269	0.25	437	166
US ATL	95	284	0.12	834	0.18	1185	587	0.00	0	.	.	.	0.12	834	0.18	1185	587
US ATL	96	150	0.08	423	0.30	745	240	0.00	0	.	.	.	0.08	423	0.30	745	240
US ATL	97	193	0.05	198	0.33	370	106	0.00	0	.	.	.	0.05	198	0.33	370	106

Table 14. Comparison of 1994-1995 marine mammal and marine turtle bycatch estimates in the U.S. pelagic longline fishery in three major areas (MAREA) of the Atlantic (Gulf of Mexico (GOM), U.S. Atlantic (USATL), and other Atlantic areas (OTHATL)) with those of Scott and Brown (1997). A) Logbook-reported effort and observed effort used in each study. B) Bycatch estimates with upper and lower 95% lognormal confidence bounds (UCAT, LCAT), and coefficients of variation (CV).

A.		**THIS STUDY**		**SCOTT AND BROWN**	
		Logbook reported effort (hooks)	**Observed effort (hooks)**	**Logbook reported effort (hooks)**	**Observed effort (hooks)**
GOM					
	1994	2,100,179	113,079	2,084,896	113,573
	1995	2,123,343	172,200	2,112,447	168,309
USATL					
	1994	3,341,387	225,290	3,485,664	369,596
	1995	3,909,328	181,601	3,887,460	275,189
OTHATL					
	1994	1,766,019	83,472	1,791,207	83,472
	1995	2,199,440	137,160	2,199,540	137,958

B.		**THIS STUDY**				**SCOTT AND BROWN**			
YEAR	**MAREA**	**CATCH**	**UCAT**	**LCAT**	**CV**	**CATCH**	**UCAT**	**LCAT**	**CV**
MARINE MAMMALS									
1994	GOM	37	129	11	0.71	36	125	10	0.7
	OTHATL	16	82	3	1	16	82	3	1
	USATL	246	412	147	0.27	165	277	98	0.27
	TOTAL	299	623	161		217	484	111	
1995	GOM	0				0			
	OTHATL	20	102	4	1	19	97	4	1
	USATL	414	648	264	0.23	267	425	168	0.24
	TOTAL	434	750	268		286	522	172	
MARINE TURTLES									
1994	GOM	235	398	139	0.27	228	386	135	0.27
	OTHATL	1776	2385	1323	0.15	1750	2345	1306	0.15
	USATL	281	449	176	0.24	188	302	117	0.25
	TOTAL	2292	3232	1638		2166	3033	1558	
1995	GOM	57	132	25	0.45	55	128	24	0.45
	OTHATL	2245	2943	1713	0.14	2218	2885	1705	0.13
	USATL	834	1185	587	0.18	568	811	398	0.18
	TOTAL	3136	4260	2325		2841	3824	2127	

Table 15. Analysis of variance results for the loglinear model $\log_e(CV) = b_0 + b_1(PERCOV) + b_2(PPC) + e$. The variable CV is the stratum-wise (year-NAREA-quarter) coefficient of variation for the estimated bycatch for the species observed caught by U.S. pelagic longline vessels operating in the Atlantic during 1992-1997. The variable PPC represent the proportion of positive sets for each species category in the year-NAREA-quarter strata. The variable PERCOV is the percent coverage per year-NAREA-quarter, expressed as sets observed divided by sets reported in logbooks. In the analysis, the percent coverage and the proportion positive were treated as continuous variables to predict the CV as shown in Figure 14.

Dependent Variable: Log_e(CV)

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7.9791	3.9895	33.04	0.0001
Error	148	17.8716	0.1208		
Corrected Total	150	25.8507			

R-Square	C.V.	Root MSE	Log_e(CV) Mean
0.3087	-106.8333	0.3475	-0.3253

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PERCOV	1	0.0179	0.0179	0.15	0.7006
PPC	1	7.9698	7.9698	66	0.0001

Parameter	Estimate	T for H_0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT	-0.1666	-3.76	0.0002	0.0443
PERCOV	-0.1550	-0.39	0.7006	0.4024
PPC	-1.6444	-8.12	0.0001	0.2024

Table 16. Analysis of variance results for the loglinear model $\log_e(CV) = b_0 + b_1\ (PERCOV) + b_2\ (PPC) + e$, where a finite population correction was used to calculate the coefficient of variation. The variable CV is the stratum-wise (year-NAREA-quarter) coefficient of variation for the estimated bycatch for the species observed caught by U.S. pelagic longline vessels operating in the Atlantic during 1992-1997. The variable PPC represent the proportion of positive sets for each species category in the year-NAREA-quarter strata. The variable PERCOV is the percent coverage per year-NAREA-quarter, expressed as sets observed divided by sets reported in logbooks. In the analysis, the percent coverage and the proportion positive were treated as continuous variables to predict the CV as shown in Figure 14.

Dependent Variable: $\mathbf{Log_e(CV)}$, with finite population correction

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	8.2117	4.1058	34.32	0.0001
Error	148	17.7043	0.1196		
Corrected Total	150	25.9160			

R-Square	C.V.	Root MSE	Log_e(CV) Mean
0.316858	-95.5154	0.3459	-0.3621

Source	DF	Type III SS	Mean Square	F Value	Pr > F
PERCOV	1	0.5161	0.5161	4.31	0.0395
PPC	1	7.9716	7.9716	66.64	0.0001

Parameter	Estimate	T for H_0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT	-0.1574	-3.57	0.0005	0.0441
PERCOV	-0.8319	-2.08	0.0395	0.4005
PPC	-1.6446	-8.16	0.0001	0.2015

Table 17. Observer comments relating to the condition of marine mammals observed caught in 1994-1997 by U.S. pelagic longline vessels operating in the Atlantic. Listing includes unique trip identifier (TRIP #), date of capture, species taken, latitude (Lat), longitude (Lon), and comments.

Trip #	Date	Species	Lat	Lon	Comments
A02	1/8/94	Pilot whale	37 15	74 20	alive; cut from gear; condition unknown
A28030	8/9/94	Pilot whale	39 01	72 41	alive; mainline wrapped around fluke; one end of line cut and the other pulled to free animal; animal swam away
	8/16/94	Pilot whale	38 55	72 51	hooked in pectoral fin; gangion cut and animal swam away
A32006	8/11/94	Pilot whale	37 15	74 29	alive; gangion cut; animal swam away
	8/11/94	Pilot whale	37 15	74 29	same as previous entry
	8/11/94	Pilot whale	37 15	74 29	same as previous entry
	8/11/94	Pilot whale	37 15	74 29	same as previous entry
	8/11/94	Pilot whale	37 15	74 29	same as previous entry
	8/12/94	Pilot whale	37 20	74 20	tangled in mainline; cut free; swam away
A32008	8/26/94	Risso's dolphin	38 45	72 54	dead; animal wrapped in gear; mainline wrapped around body immediately adjacent to flukes
A44004	9/16/94	Pilot whale	38 24	73 24	alive; hooked in dorsal fin; mainline cut to release animal with gangion still attached
	9/17/94	Pilot whale	38 16	73 30	animal cut from mainline several wraps of mainline and part of gangion around base of flukes/tail; animal swam off slowly
	9/18/94	Risso's dolphin	38 02	73 17	hooked in mouth; broke gangion from mainline; released alive
	9/19/94	Pilot whale	37 50	73 19	hooked in mouth; broke gangion from mainline; swam away strongly trailing 50 fathoms of mainline from its mouth
	9/21/94	Risso's dolphin	39 52	70 02	hooked in tail fluke and mainline; gear cut to release animal; swam away with mainline and leader around tail
A53037	9/21/94	Risso's dolphin	39 55	69 20	alive; gear wrapped around animal; cut loose by crew; swam away quickly
A54003	9/21/94	Killer whale	47 24	40 48	alive
A62002	10/21/94	Risso's dolphin	39 48	69 59	a good amount of mainline was tangled around animal; released with a fair amount of mainline around fluke; some blood noticed around caudal peduncle
	10/25/94	Risso's dolphin	39 44	70 54	hooked in mouth; animal released with hook in mouth and approximately 7 fathoms of 4001 b test line trailing from mouth
	10/27/94	Risso's dolphin	39 46	70 56	apparently hooked in mouth; appeared to be wound up the midsection of the body with line; animal swam off quite sluggishly

Table 17. (continued)

Trip #	Date	Species	Lat	Lon	Comments
A54005	12/9/94	Pilot whale	35 42	74 42	alive; gear around flipper
	12/9/94	Pilot whale	35 42	74 42	alive; gear around body
F15	6/18/94	Pantropical spotted dolphin	27 37	88 25	alive; tail wrapped in dropline; all line removed
F16	7/14/94	Atlantic spotted dolphin	29 07	87 20	alive; hook in corner of mouth, gangion line wrapped around mouth; line was removed but hook remained
A53034	8/30/95	Pilot whale	46 13	40 07	animal cut free; swam away quickly
A41031	8/9/95	Pilot whale	40 20	67 55	cut loose with leader still attached- line parted as it neared the vessel; "mouth hooked"
	8/12/95	Risso's dolphin	40 25	67 30	hooked in mouth; gangion cut to free animal; alive
A25041	8/10/95	Pilot whale	40 15	67 53	alive; animal hooked or maybe wrapped in monofilament line; condition unknown
A44040	8/4/95	Pilot whale	37 33	74 10	hooked in flipper; cut from gangion; alive
	8/13/95	Risso's dolphin	39 25	72 02	alive; mainline and gangion wrapped around tail; all gear cut before animal released
A62058	8/11/95	Pilot whale	37 01	74 31	animal extensively wrapped in mainline around caudal peduncle; most of the line cut away; animal released with the remaining line trailing
A62058	8/14/95	Pilot whale	37 09	74 24	gear cut from animal; alive
A41032	8/30/95	Pilot whale	38 04	73 46	mouth hooked; line snapped and animal swam off
A44043	8/31/95	Risso's dolphin	39 43	71 49	mainline cut from around tail flukes and pulled from mouth; animal swam away quickly
	9/3/95	Pilot whale	39 05	72 30	hooked in flipper; gangion broke off as it was hauled
	9/7/95	Risso's dolphin	39 05	72 32	mainline cut from around tail flukes; animal swam off slowly after blowing
A62071	9/28/95	Shortfin pilot whale	38 28	73 30	adult; hook imbedded in peduncle with one or two wraps of gangion; swam away slowly; lingered at surface; seemed stressed and exhausted
	9/28/95	Shortfin pilot whale	38 29	73 28	young; hooked in mouth; gangion clipped as close to the mouth as possible; released with hook in mouth
A41034	10/4/95	Pilot whale	37 00	74 36	animal swam away after breaking line; condition unknown
	10/10/95	Pilot whale	35 43	74 37	hooked in mouth; leader cut to free animal; condition unknown
	10/11/95	Pilot whale	35 46	74 42	Leader cut to free animal; condition unknown
	10/11/95	Pilot whale	35 46	74 42	same as previous entry except animal swam towards 3 other "waiting" whales and swam away with them

Table 17. (continued)

Trip #	Date	Species	Lat	Lon	Comments
A44048	10/16/95	Pilot whale	37 45	73 25	hooked in mouth; cut from mainline; swam away trailing gangion and 100 feet of mainline
T12	10/23/95	Pilot whale	26 42	79 40	alive; entangled in mainline, monofilament line cut away
F29	8/4/95	Unidentified	39 24	72 17	animal not seen by observer; crew was pulling in gangion when they noticed it was a marine mammal; line broke and animal swam away; crew called
F38	7/28/96	Risso=s dolphin	29 01	87 47	Samples (mandible, skin, blubber, and muscle tissue from the head) taken, and the lower jaw was also saved. The animal was entangled in the main line and brought aboard dead
F39	8/30/96	Risso=s dolphin	39 24	72 17	Mainline wrapped around flukes, unwrapped flukes, swam away
		Risso=s dolphin	39 24	72 17	Mainline wrapped around flukes, unwrapped flukes, swam away
		Risso=s dolphin	38 15	73 18	Hooked in mouth, line cut, 914 cm of line left attached (animal pulling very lively) swam away uninjured
K17	12/14/96	Unidentified	30 26	76 55	Was tangled in line, black tail section seen just before dive, animal was free with no line attached
F45	2/25/97	short-beaked spinner dolphin			Tail wrapped in mainline; mainline cut free. Animal swam away healthy
B10045	8/3/97	Pilot whale			Pilot whale brought up; animal sluggish but swimming at side of vessel. Gear was tangled and wrapped around flukes only. Mainline and gangions were cut and all gear removed. Animal then swam slowly away. Only injury suffered were lacerations around flukes from gear, no knives used to free animal.

Information provided by M Tork (NEFSC) and D. Lee (SEFSC).

List of Figures

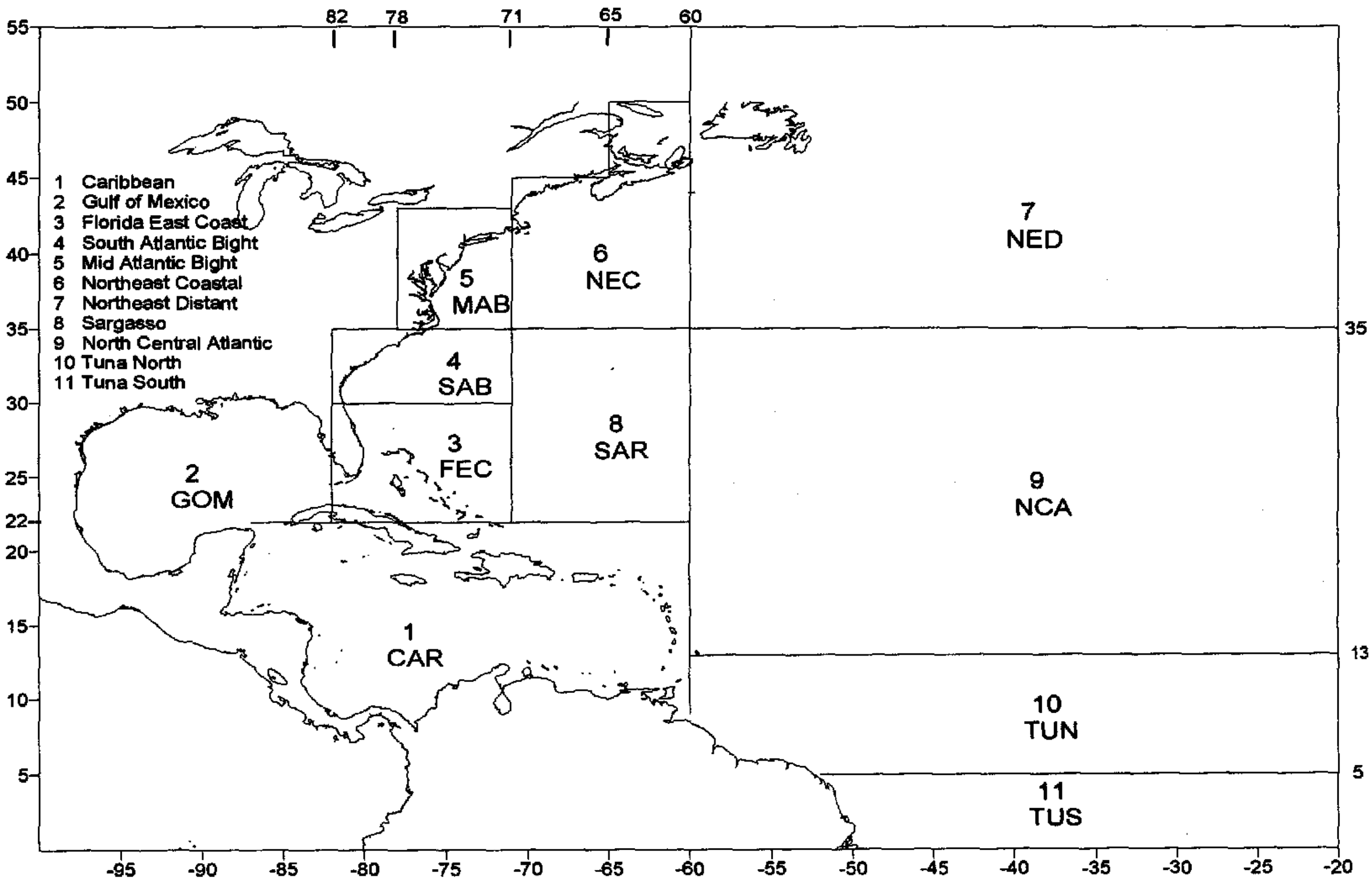
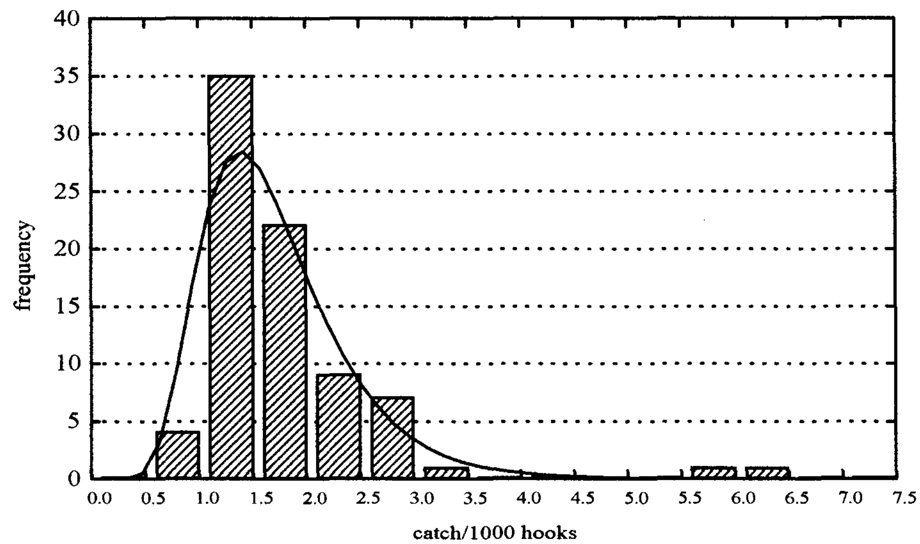


Figure 1. The geographical zones used to classify observed and reported U.S. Atlantic pelagic longline fishing effort. For the purpose of estimation, several strata were combined. The Southeast Coastal (SEC) stratum was defined as areas 3 and 4; the Northeast Coastal (NEC) stratum was defined as areas 5 and 6; and the Offshore South (OFS) was defined as areas 8, 9, 10, and 11. Larger regions were also defined as those generally within the US Atlantic EEZ (USATL: SEC, NEC), other Atlantic waters (OTHATL: OFS, areas 1 and 7); and the Gulf of Mexico (GOM: area 2).

Marine Mammals - lognormal distribution
Kolmogorov-Smirnov d = .0601642, p = n.s.



Marine Turtles - lognormal distribution
Kolmogorov-Smirnov d = .0699953, p < .10

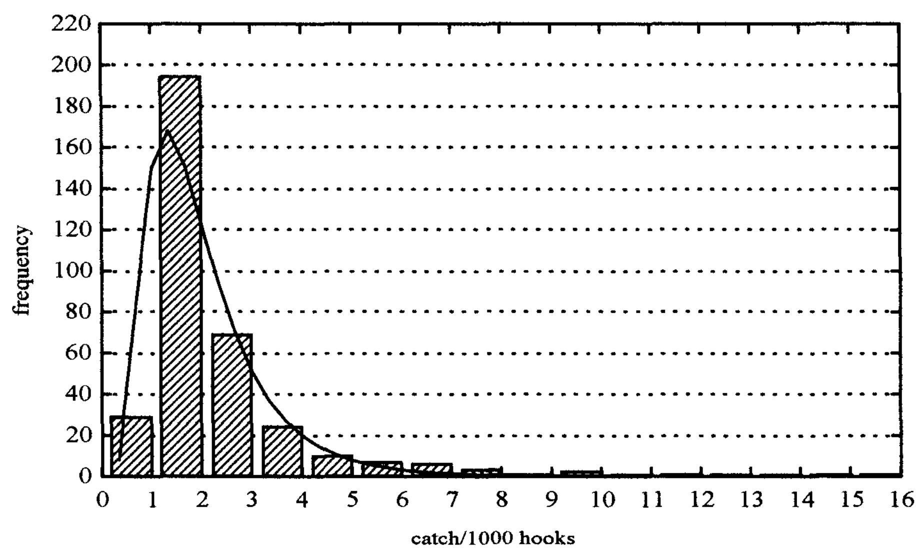


Figure 2. Frequency distributions of marine mammals (upper) and turtles (lower) bycatch rates (per 1000 hooks). A lognormal distribution is fitted over the frequency distribution histograms of the bycatch rates of each group, and corresponding Kolmogorov-Smirnov goodness-of-fit test statistic (d) and probability (p; n.s. = not significant) are given.

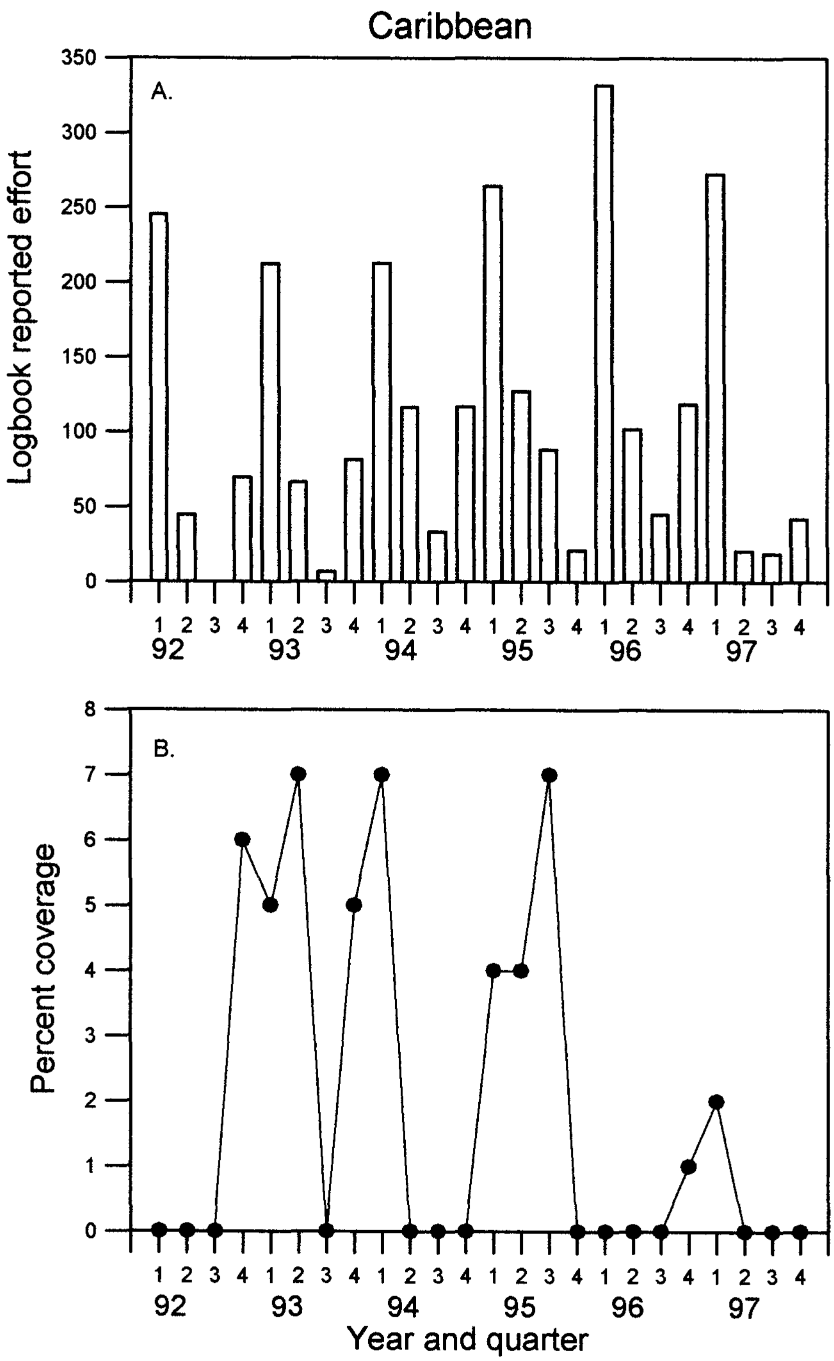


Figure 3. A) Effort (number of hooks H 10^3) reported in logbook for Caribbean area by year (1992-1997) and calendar quarter. B) Percent coverage (observed hooks/logbook-reported hooks) by year and quarter.

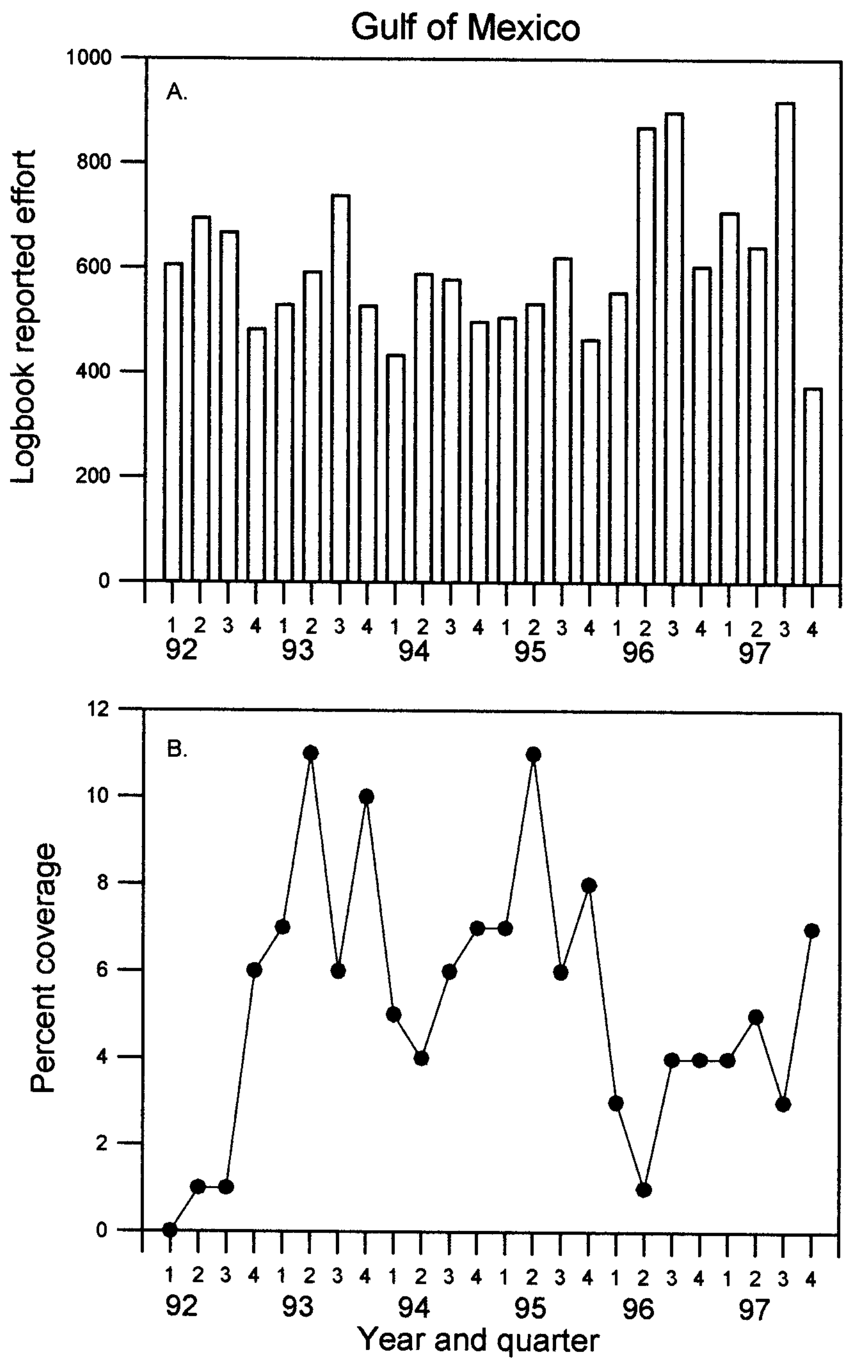


Figure 4. A) Effort (number of hooks H 10^3) reported in logbook for Gulf of Mexico area by year (1992-1997) and calendar quarter. B) Percent coverage (observed hooks/logbook-reported hooks) by year and quarter.

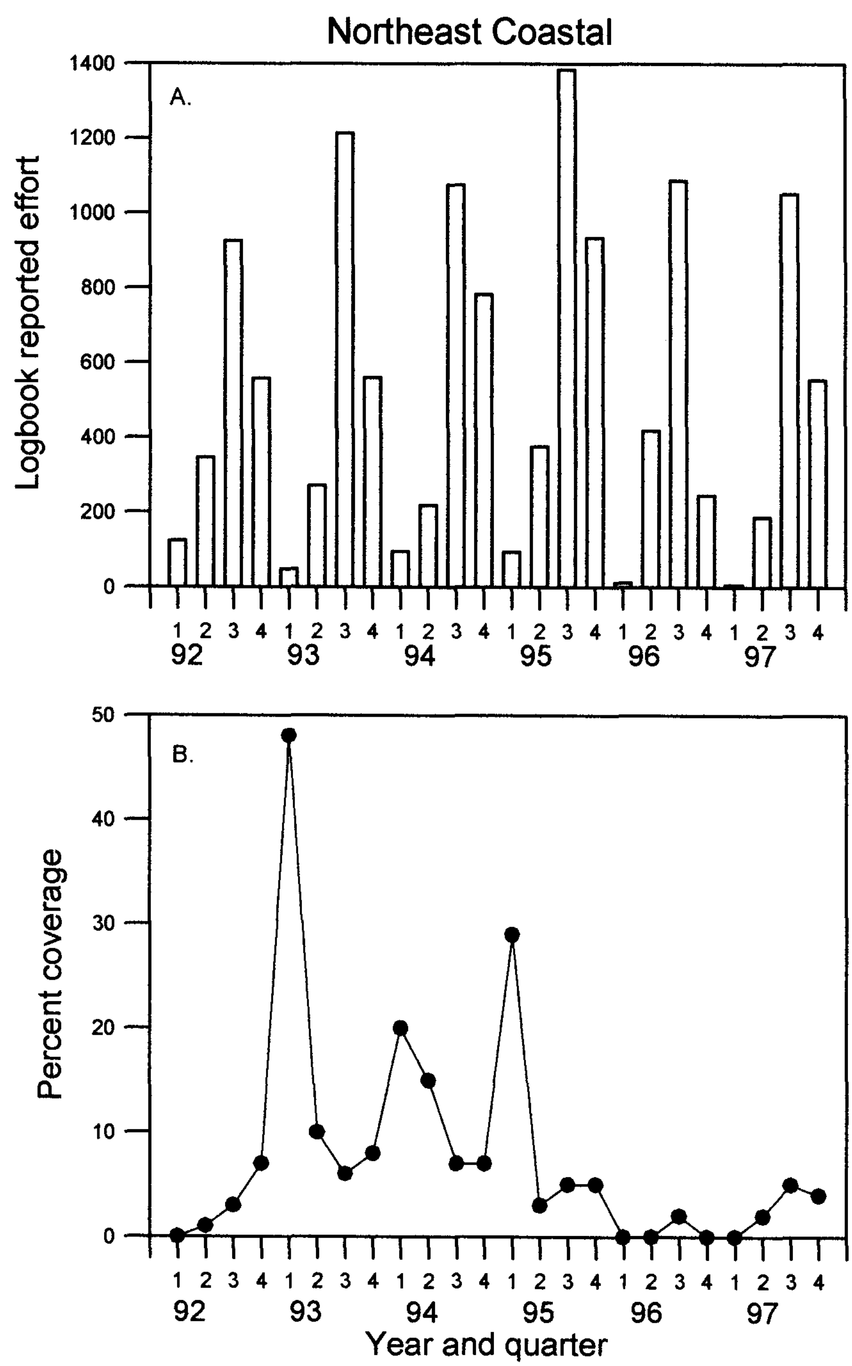


Figure 5. A) Effort (number of hooks H 10^3) reported in logbook for Northeast Coastal area by year (1992-1997) and calendar quarter. B) Percent coverage (observed hooks/logbook-reported hooks) by year and quarter.

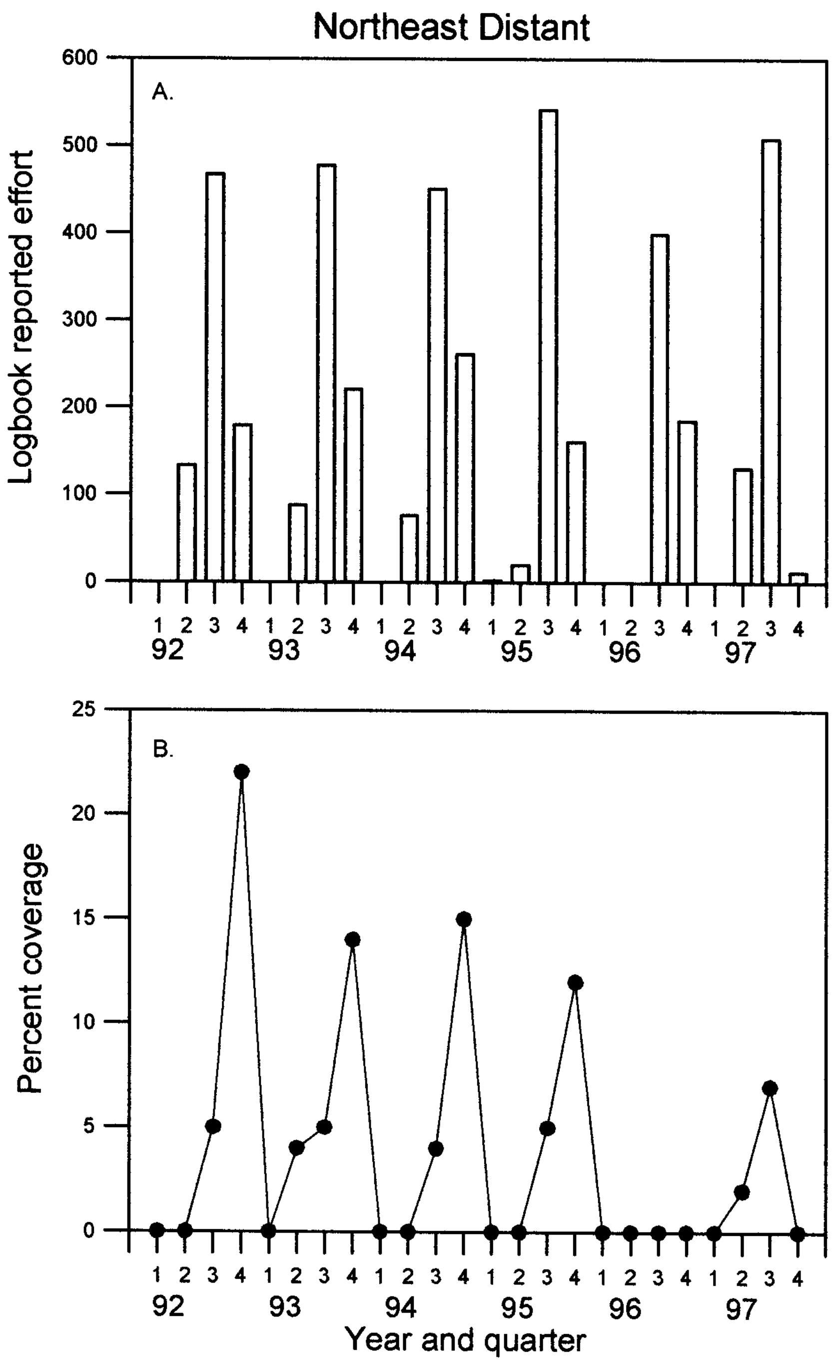


Figure 6. A) Effort (number of hooks H 10^3) reported in logbook for Northeast Distant area by year (1992-1997) and calendar quarter. B) Percent coverage (observed hooks/logbook reported hooks) by year and quarter.

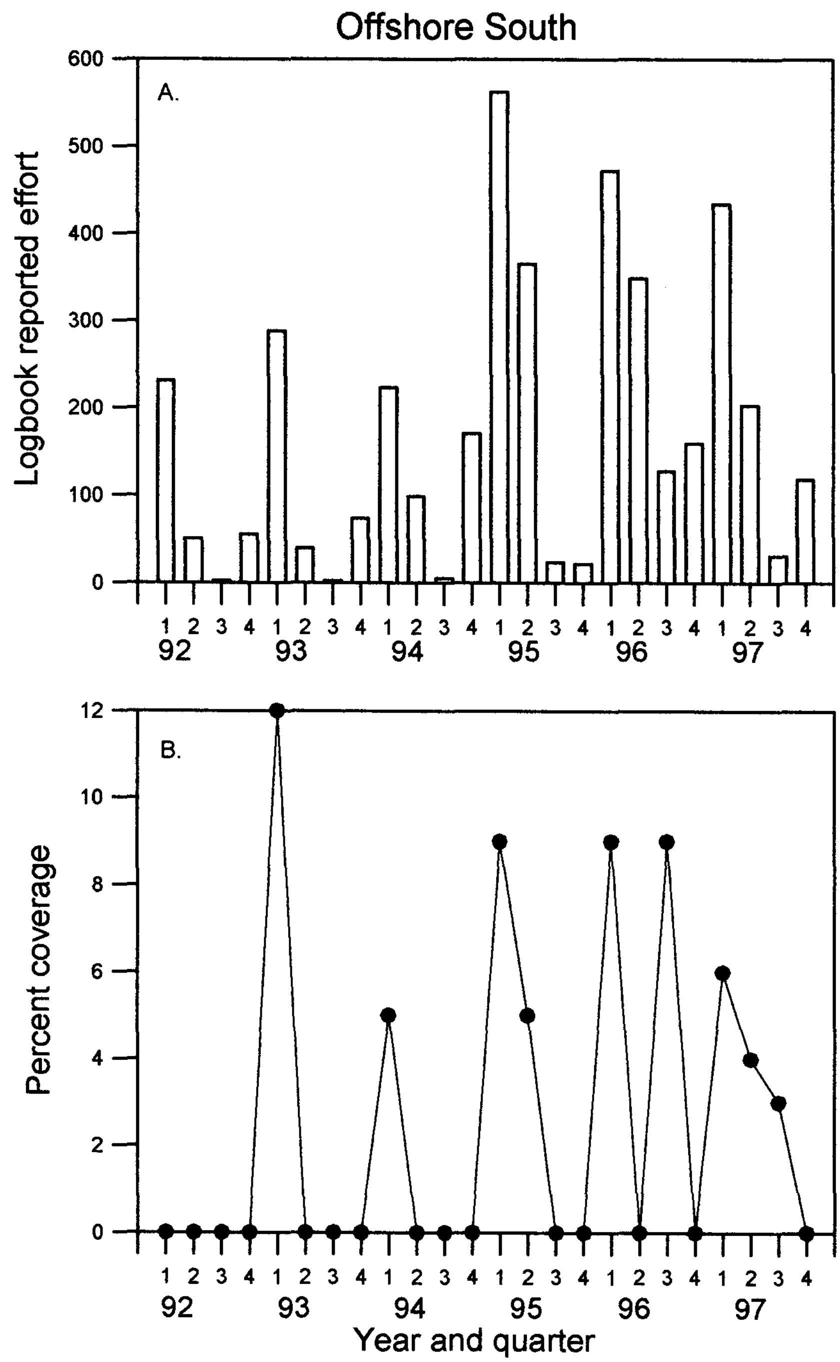


Figure 7. A) Effort (number of hooks H 10^3) reported in logbook for Offshore South area by year (1992-1997) and calendar quarter. B) Percent coverage (observed hooks/ logbook reported hooks) by year and quarter.

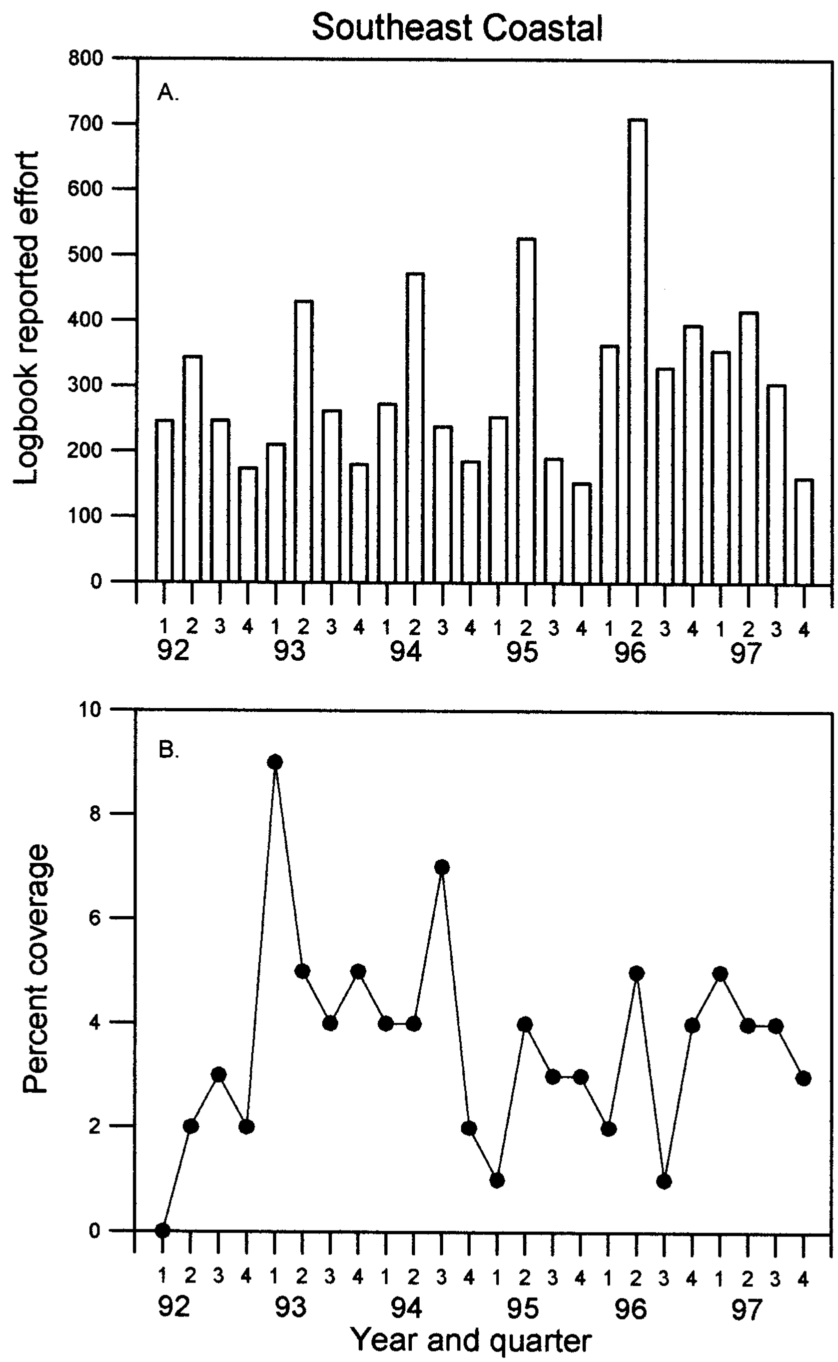


Figure 8. A) Effort (number of hooks H 10^3) reported in logbook for Southeast Coastal area by year (1992-1997) and calendar quarter. B) Percent coverage (observed hooks/logbook reported hooks) by year and quarter.

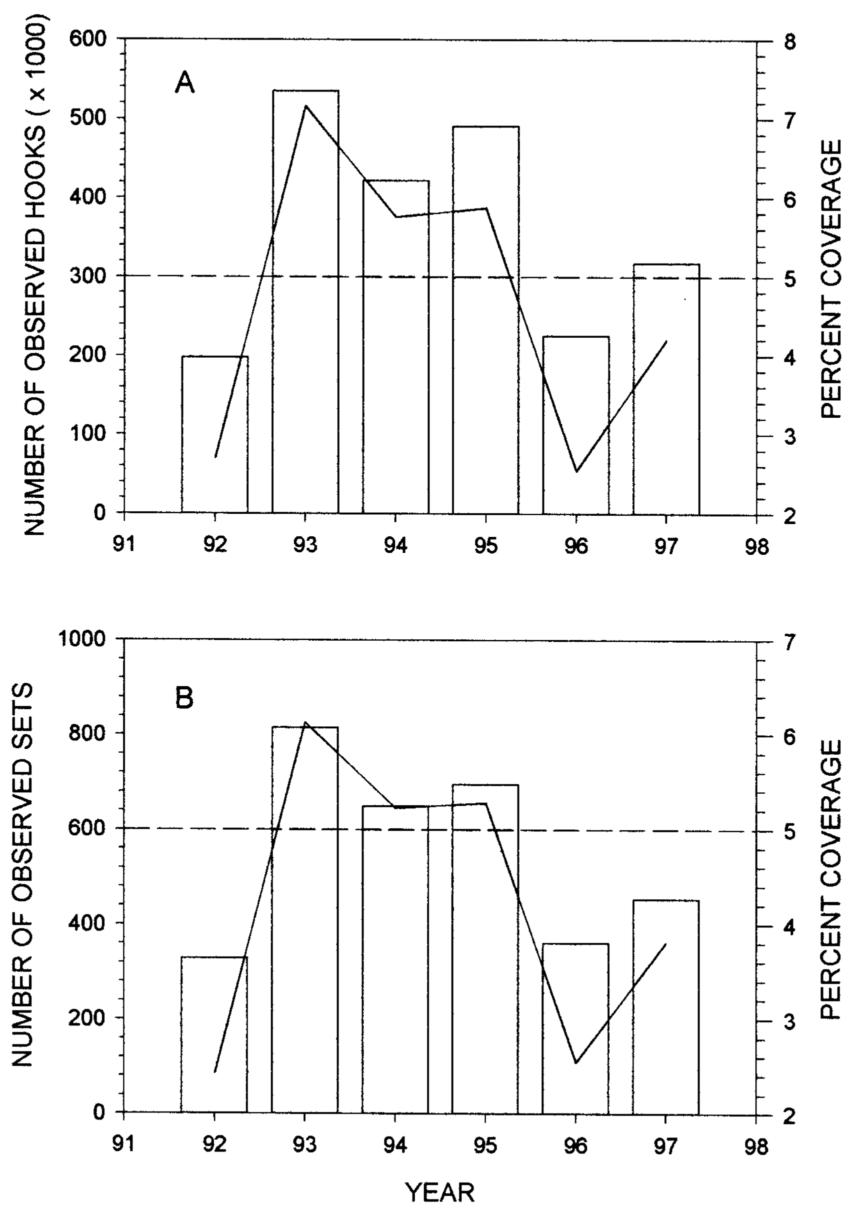
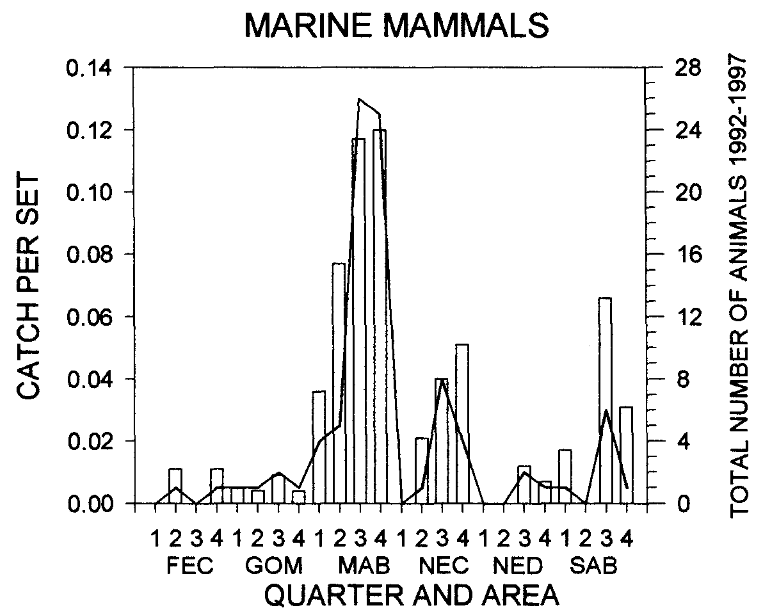


Figure 9. The number of A) observed hooks and B) observed sets (line) on board U.S. pelagic longline vessels operating in the Atlantic since 1992. Also indicated are the realized (1992-1997) percent coverage (observed hooks (sets)/logbook-reported hooks (sets) - bars). A 5% coverage, indicated by the dashed reference line, was agreed upon at the 1996 ICCAT Commission meeting (San Sebastian, Spain) for observer sampling of pelagic longline vessels operating in the Atlantic.



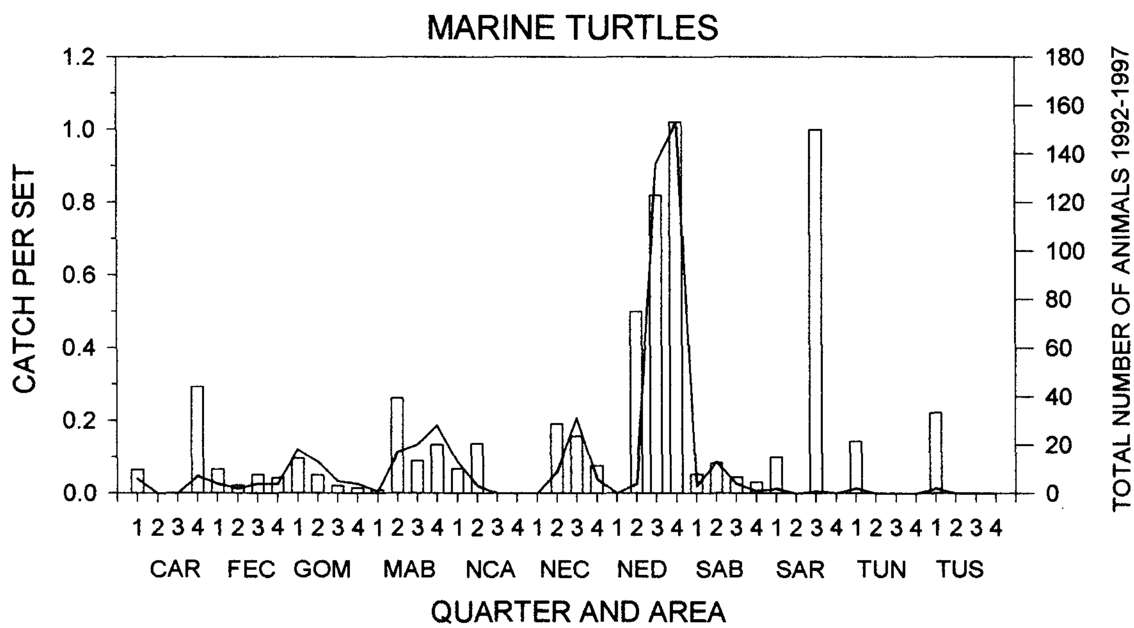


Figure 10. A) Catch per set (bar) of marine mammals in observed sets of the U.S. Atlantic pelagic longline fishery during 1992-1997 and total number of marine mammals (line) taken for all years by quarter and area (no observed catches were made in CAR, NCA, SAR, TUN, AND TUS). B) Catch per set (bar) of marine turtles in observed sets of the U.S. Atlantic pelagic longline fishery during 1992-1997 and total number of turtles (line) taken for all years by quarter and area. Note that the catch per set for SAR (third quarter) represents one set and one turtle.

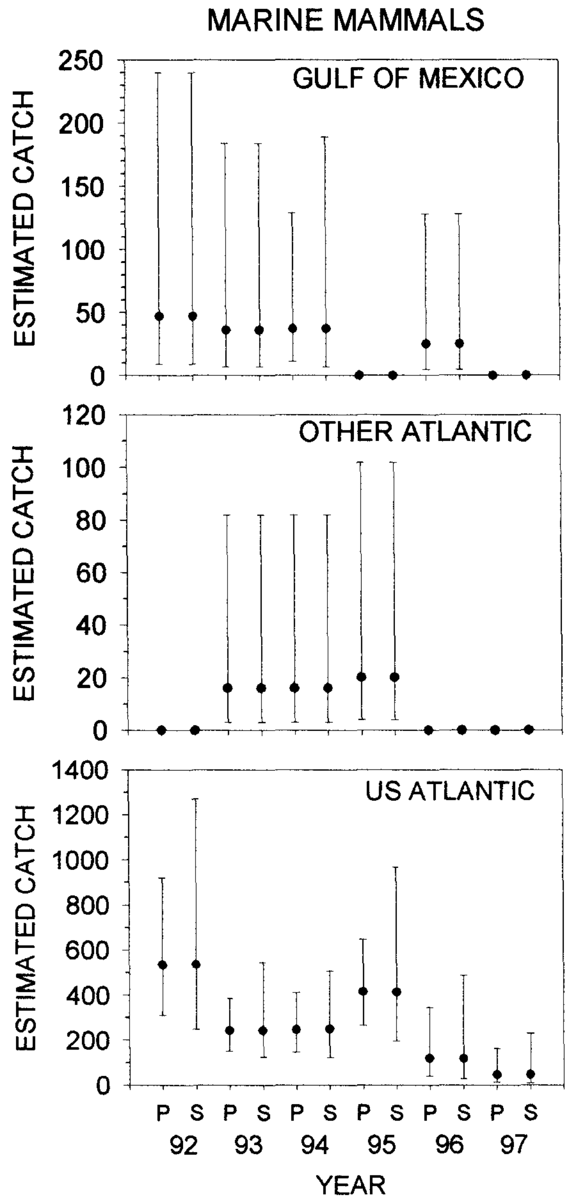


Figure 11. Comparison of stratified (S) and pooled (P) estimates of marine mammal bycatch by the U.S. pelagic longline fishery operating in the major Atlantic areas in 1992-1997. Considerable gains in precision (shown here as approximate 95% confidence ranges, error bars) can be seen about the central estimates in the pooling method. The point estimates are relatively insensitive to pooling, as is evident in the close proximity of the stratified and pooled point estimates. The stratified estimates represent the sum of independent estimates of different species groupings by large ocean regions (MAREA), as shown in Table 12, The pooled estimates are those shown in Table 13.

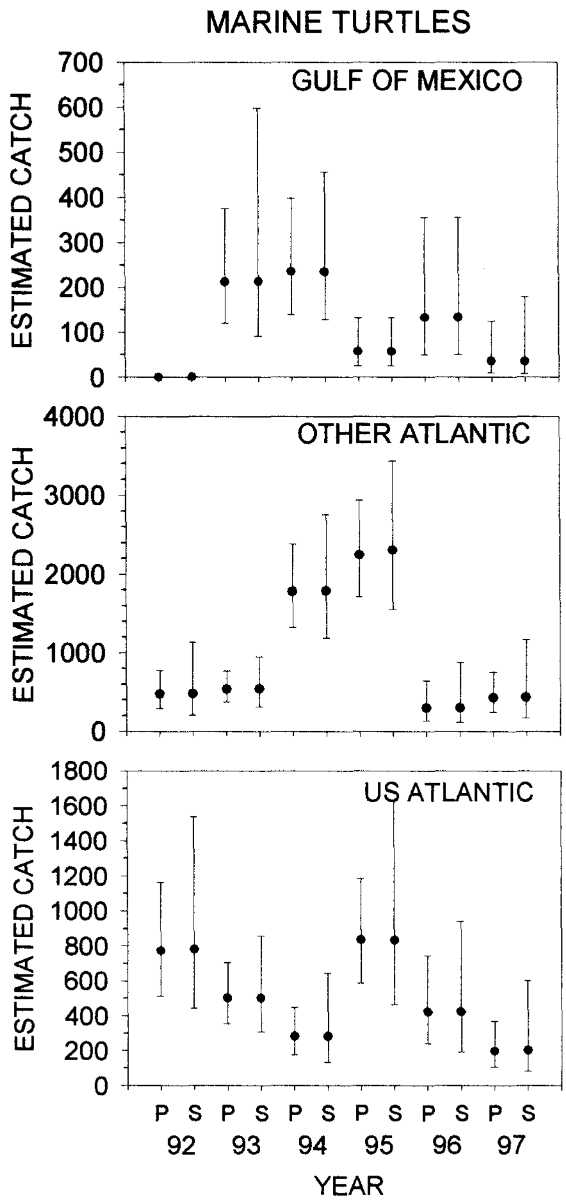


Figure 12. Comparison of stratified (S) and pooled (P) estimates of marine turtle bycatch by the U.S. pelagic longline fishery operating in the major Atlantic areas in 1992-1997. Considerable gains in precision (shown here as approximate 95% confidence ranges, error bars) can be seen about the central estimates in the pooling method. The point estimates are relatively insensitive to pooling, as is evident in the close proximity of the stratified and pooled point estimates. The stratified estimates represent the sum of independent estimates of different species groupings by large ocean regions (MAREA), as shown in Table 12. The pooled estimates are those shown in Table 13.

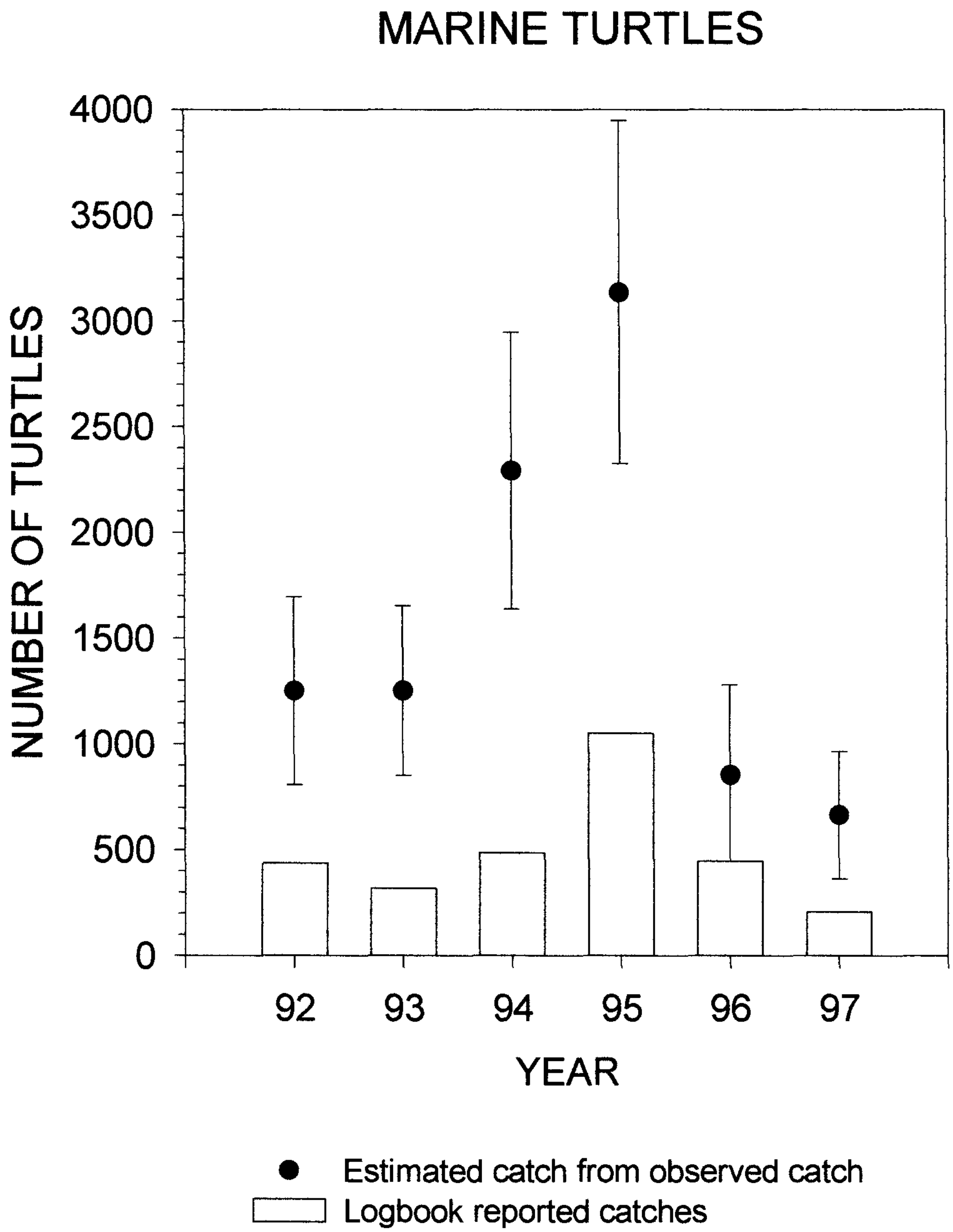


Figure 13. Comparison of annual (1992-1997) estimated marine turtle bycatch from observed sets in the U.S. Atlantic pelagic longline fishery, with 95% confidence intervals for all areas combined (Table 13), and the logbook-reported marine turtle bycatch.

PREDICTED CV

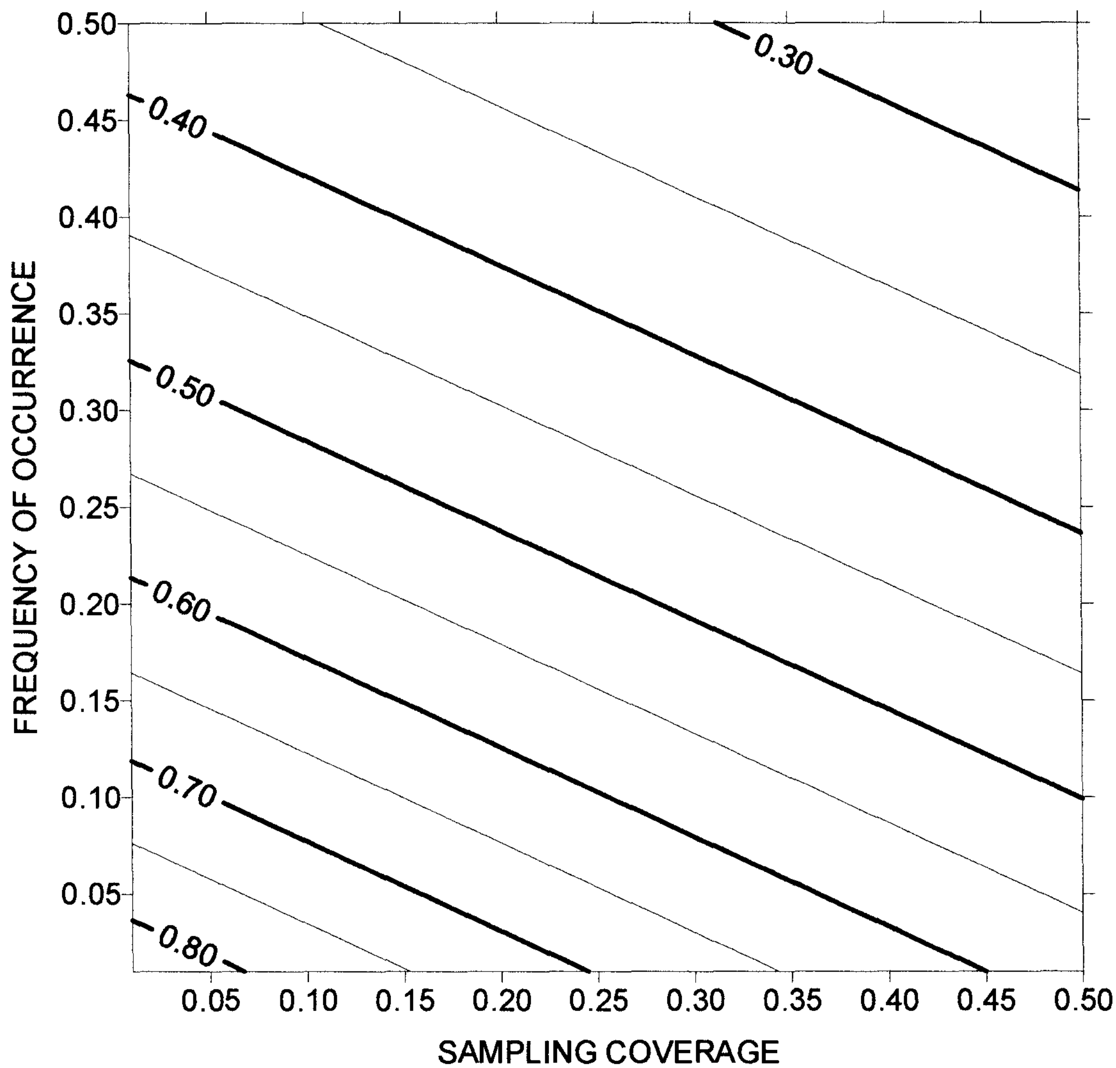


Figure 14. Model predicted coefficient of variation (CV) taking into account proportion of positive sets (frequency of occurrence) observed and the sampling coverage (observed sets/logbook-reported sets) in the US Atlantic longline observer data base. Estimates of precision less than about 40% for relatively rare event species (those which occur less than about 20% of the time) will likely be difficult to attain at the level of stratification used, unless sampling coverage is relatively large (more than 50%). See Table 16 for the estimated model parameters (with finite population correction).