U.S. National Report to ICCAT, 2001

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1. NATIONAL FISHERIES INFORMATION

Total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 2000 was 24,202 MT, a decrease of about 13% from 27,770 MT in 1999. Estimated swordfish catch (including estimated dead discards) decreased 83 MT to 3,481 MT, and provisional landings from the U.S. fishery for yellowfin in the Gulf of Mexico decreased in 2000 to 2,214 from 2,899 in 1999. The estimated 2000 Gulf of Mexico landings of yellowfin tuna accounted for about 31% of the estimated total U.S. yellowfin landings in 2000. U.S. vessels fishing in the northwest Atlantic landed an estimated 1,212 MT of bluefin, a decrease of 2 MT compared to 1999. Provisional skipjack landings decreased by 108 MT to 44MT from 1999 to 2000, estimated bigeye landings decreased by 688 MT compared to 1999 to an estimated 574 MT in 2000, and estimated albacore landings increased from 1999 to 2000 by 90 MT to 407 MT.

2. STATISTICS AND RESEARCH

In addition to monitoring landings and size of swordfish, bluefin tuna, yellowfin tuna, billfish, and other large pelagic species through continued port and tournament sampling, logbook and dealer reporting procedures, and scientific observer sampling of the U.S. fleet, major research activities in 2000 and 2001 focused on several items. Research on development of methodologies to determine the genetic discreteness of large pelagic fishes in the Atlantic was continued as were larval surveys for bluefin tuna and other large pelagics in the Gulf of Mexico. Research on development of robust estimation techniques for population analyses and on approaches for characterization of uncertainty in assessments and methods for translating that uncertainty into risk levels associated with alternative management approaches was further conducted. U.S. scientists also continued to coordinate efforts for the ICCAT Enhanced Research Program for Billfish and for the Bluefin Year Program. Participants in the Southeast Fisheries Science Center's Cooperative Tagging Center (CTC) and the Billfish Foundation tagging program tagged and released 9,149 billfishes (swordfish, marlins, sailfish, and spearfish) and 850 tunas in 2000. This represents an increase of 7% from 1999 levels for billfish, and a 13% decrease for tunas. Electronic tagging studies of bluefin tuna and of marlins were substantially enhanced. Cooperative research was conducted with scientists from other nations on development of assessment methodologies, on biological investigations and on development of indices of abundance for species of concern to ICCAT.

2.1 Fisheries Statistics

2.1.1 Tropical Tuna Fishery Statistics

Yellowfin Tuna. Yellowfin is the principal species of tropical tuna landed by U.S. fisheries in the western North Atlantic. Total estimated landings decreased to 7,051 MT in 2000, from the 1999 landings estimate of 7,569 MT (Appendix Table 2.1-YFT). The 2000 estimate is considered provisional and may change owing to incorporation of late reports of commercial catches as they become available and to possible revisions in estimates of rod & reel catches made by recreational anglers. A high proportion of the landings were due to estimated rod & reel catches of recreational anglers in the NW Atlantic (3,809 MT). Estimates of U.S. recreational harvests for tuna and tuna-like species continue to be reviewed and this may result in the need to report additional revisions to the available estimates in the future. Nominal catch rate information from logbook reports (longline catch per 1000 hooks) for yellowfin by general fishing areas is shown in Appendix Figure 2.1-YFT.

Skipjack Tuna. Skipjack tuna also are caught by U.S. vessels in the western North Atlantic. Total reported skipjack landings (preliminary) decreased from 152 MT in 1999 to 44 MT in 2000 (Appendix Table 2.1-SKJ). The largest decrease in catch was off the U.S. east coast (NW Atlantic) between Cape Hatteras and Long Island. Estimates of recreational harvests of skipjack continue to be reviewed and could be revised again in the future. Appendix Figure 2.1-SKJ presents nominal catch rate information (longline catch per 1,000 hooks) based on fishing logbook reports.

Bigeye Tuna. The other large tropical tuna reported in catches by U.S. vessels in the western North Atlantic is bigeye tuna. The majority of U.S. landings of this species comes from longline vessels fishing off the east coast of the U.S. in the area from Cape Hatteras, North Carolina to Massachusetts. These landings accounted for 58% of the U.S. bigeye catch in 2000. Total reported catches and landings (preliminary) for 2000 decreased by 55% from 1262 MT in 1999 to 574 MT. Note that like yellowfin, the estimates of rod & reel catch are considered provisional and may be revised based on results of a future review of recreational harvest estimates. Appendix Figure 2.1-BET presents nominal catch rate information (longline catch per 1,000 hooks) based on fishing logbook reports.

2.1.2 Temperate Tuna Fishery Statistics

Bluefin Tuna. The U.S. bluefin fishery continues to be regulated by quotas, seasons, gear restrictions, limits on catches per trip, and size limits. To varying degrees, these regulations are designed to restrict total U.S. landings and to conform to ICCAT recommendations. U.S. vessels fishing in the northwest Atlantic (including the Gulf of Mexico) in 2000 landed an estimated 1,212 MT of bluefin tuna (see Table 2.2-BFT). Those estimated landings represent a decrease of 2 MT from the 1999 landings. The 2000 landings by gear were: 275 MT by purse seine, 184 MT by harpoon, 3 MT by handline, 66 MT by longline (of which 43 MT were from the Gulf of Mexico), 683 MT by rod and reel (of which, 50 MT was the preliminary estimate for bluefin less than 145cm SFL from off the northeastern U.S.), and less than 1 MT was taken by other gears.

In response to 1992 regulations limiting the allowable catch of small fish by U.S. fishermen, in conformity with ICCAT agreements, enhanced monitoring of the rod and reel fishery was implemented in 1993 for the purpose of providing near real-time advice on catch levels by this fishery. This monitoring activity has continued and has included estimation of catches by finer size categories than reported above. The preliminary estimates for the 1999 rod and reel fishery off the northeastern U.S. (including the North Carolina winter fishery) for landings in several size categories were 1,028 fish <115 cm (of which 76 fish, less than 0.4 MT, were <66 cm), 742 fish 115-144 cm and 741 fish 145-177 cm (an estimated 17, 33, and 53 MT, respectively). Note that additional rod and reel landings of bluefin >177 cm SFL, monitored through a sales reporting system, are included in Table 2.2-BFT.

In 1996, a program was instituted to monitor the catch, catch rates, and landings from the bluefin fishery that developed off the coast of North Carolina. This component of the 2000 rod and reel fishery landings (included in the totals reported above) was estimated to be about 6 MT of fish <145cm, about 27 MT of fish 145-177cm, and about 23 MT of fish >177 cm. Unlike January and February of 1998, when catches mainly occurred off southern North Carolina, catches occurred throughout the North Carolina fishery area in 2000.

Logbook tallies of dead discarded bluefin for year 2000, amount to 67 MT. Other estimates of this tonnage based on observer data are provided in Appendix Table 2.2a.BFT. As indicated in our year 2000 National report, the United States sought scientific review of the methods applied for estimating dead discarded catch of bluefin in 2001. This review took place in a 2-stage fashion. In the first stage of the review, three independent scientists contracted through the University of Miami's Center for Independent Experts (CIE) were asked to comment on the approaches used to estimate marine turtle and other species bycatches (the methods used for turtles and bluefin tuna were the same) as part of a broader review of marine turtle stock assessment. None of these reviewers provided recommendations for improvement in the bycatch estimation methods applied. Because this review was judged to be too broad for detailed comments and recommendations for improvements on the methodological approach, a second, and more focused review was sought from an additional 2 independent scientists, again through the CIE. These review comments were received in mid-September, 2001, and as such, have not yet been implemented into estimation of bluefin (and other species) dead discarded catch. A number of recommendations for evaluation of the sensitivity of the estimates to alternative assumptions and for further modeling approach were made and executive summaries of these reviews are provided in the Appendix. A reviewer recommended continuation of the use of logbook tallies for monitoring U.S. compliance with the negotiated dead discard allowance for the west Atlantic bluefin tuna recovery plan until the technical recommendations for improvements in the statistical methods for estimating discards were incorporated.

Albacore. Albacore are landed by U.S. vessels; however, historically, albacore has not been a main focus of the U.S. commercial tuna fisheries operating in the North Atlantic. Reported commercial catches were relatively low prior to 1986; however, these catches increased substantially and have remained at higher levels throughout the 1990s, with nearly all of the production coming from the northeastern U.S. coast. Caribbean landings increased in 1995 to make up over 14% of the total, but U.S. landings from the Caribbean have remained below 4% of the total each year during 1996-2000. Nominal catch rate information from U.S. longline logbook reports are shown in Appendix Figure 2.2-ALB. Estimated total catches of albacore were 407 MT in 2000, an increase of 90 MT from 1999 which was primarily due to an increase in estimated rod and reel catches from 90 MT in 1999 to 251 MT in 2000 (Appendix Table 2.2-ALB).

2.1.3 Swordfish Fishery Statistics

For 2000 the provisional estimate of U.S. vessel landings and dead discards of swordfish was 3,497 MT (Appendix Table 2.3-SWO). This estimate is 2% lower than the estimate of 3,585 MT for 1999. The provisional landings, excluding discard estimates, by ICCAT area for 2000 (compared to 1999) were: 503 MT (539 MT) from the Gulf of Mexico (Area 91); 1278 MT (1490MT) from the northwest Atlantic (Area 92); 330 MT (252 MT) from the Caribbean Sea (Area 93); and 752 MT (605 MT) from the North Central Atlantic (Area 94A), and 142 MT (179 MT) from the SW Atlantic (Area 96).

U.S. swordfish landings are monitored in-season from reports submitted by dealers, vessel owners and captains, NMFS port agents, and mandatory daily logbook reports submitted by U.S. vessels permitted to fish for swordfish. This fishery is also being monitored via a scientific observer sampling program, instituted in 1992. Approximately 5% of the longline fleet-wide fishing effort is randomly selected for observation during the fishing year. The observer sampling data, in combination with logbook reported effort levels, support estimates of approximately 36,902 fish discarded dead in 2000, representing an estimated 492 MT of swordfish. This reflects a decrease of 7 MT in estimated discarded swordfish from the 1999 level.

Total weight of swordfish sampled for sizing U.S. landings by longline, harpoon, otter trawl, and handline was 2940 MT, 0.6 MT, 9 MT, and 4 MT in 2000. The weight of sampled swordfish landings in 2000 were 99%, 100%, 85%, and 44% of the U.S. total reported annual landings of swordfish for longline, harpoon, otter trawl, and handline. Again, incorporation of late reports into the estimated 2000 landings figure will likely result in changes in the sampled fraction of the catch. Recent estimates of rod and reel landings of swordfish based on statistical surveys of recreational anglers, range from about 5-21 MT per year for the period 1996-2000.

2.1.4 Marlins and Sailfish Fishery Statistics

Blue marlin, white marlin, and sailfish are landed by U.S recreational rod and reel fishermen and are a by-catch of the U.S. commercial tuna and swordfish longline fisheries. The U.S. Fisheries Management Plan for Atlantic Billfishes was implemented in October, 1988. The Plan allows billfish that are caught by recreational gear (rod and reel) to be landed only if the fish is larger than the minimum size specified for each species covered by the Plan. Recreational landings of each billfish species are estimated using: (a) the SEFSC Recreational Billfish Survey which provides the number of billfish caught during tournaments held along the southeastern U.S. coast (south of 35^0 N latitude), in the Gulf of Mexico, and U.S. Caribbean Sea regions (i.e., U.S. Virgin Islands and Puerto Rico); and (b) the Large Pelagics Recreational Survey conducted by the National Marine Fisheries Service which provides estimates of recreational billfish harvest from waters along the northeastern U.S. (north of 35^o N latitude). Estimates of landed recreational catch of these species by non-tournament fishers are not well estimated and for this reason, the landings reported for recreational rod and reel fishers are thought to be conservative. It is not yet known to what degree or for which species estimates of rod and reel landed catch should be adjusted to account for this feature, although studies are underway which could help to resolve this question.

In addition to restrictions on U.S. recreational harvest, the Management Plan also imposed regulations on commercial fisheries by prohibiting retention and sale of the three species at U.S. ports. For this reason, no U.S. commercial landings were reported for any of the three Atlantic species. However, estimates of by-catch mortality in the U.S. longline fleet are made using the data from mandatory pelagic logbooks and scientific observer data collected on this fleet. The procedure for estimating the historical by-catch of blue marlin, white marlin, and sailfish was detailed in SCRS/96/97-Revised. This procedure was implemented for estimating by-catch mortalities from the U.S. longline fleet. Revisions to historical landings of billfish previously reported to ICCAT were based on review of the estimates conducted at the 1996 ICCAT Billfish Workshop held in Miami.

The preliminary estimates of 2000 U.S. recreational catches for these billfish species, combining the geographical areas of the Gulf of Mexico (Area 91), the northwestern Atlantic Ocean west of the 60^o W longitude (Area 92), and the Caribbean Sea (Area 93) are: 24.1 MT for blue marlin, 0.2 MT for white marlin, and 2.0 MT for sailfish. The estimates for 1999 were 36.9 MT, 1.6 MT, and 0.7 MT, respectively, for the three species. The estimates of the U.S. recreational catch (landings) do not include any estimates of mortality of released (or tagged and released) fish. Additionally, these landings include survey estimates of non-tournament billfish mortality and survey estimates from tournaments, but do not constitute a census of all tournaments. Because some components of the charter boat and non-tournament recreational fishery are not surveyed, the recreational catches are considered minimum estimates. Therefore, the rod and reel landings presented in Appendix Table 2.4-BIL include a '?' to represent the unknown quantities of recreational catch of billfish not recorded.

Estimates of the billfish by-catch discarded dead in the U.S. commercial longline and other commercial fisheries for 2000 were 59.6 MT for blue marlin, 40.8 MT for white marlin, and 45.2 MT for sailfish**.** The estimated 1999 U.S. discarded dead bycatch was 82.0 MT, 56.7 MT, and 71.6 MT, respectively for the three species. The catches and landings (MT) by species, area, and gear, for 1998-2000 are presented in Appendix Table 2.4-BIL.

Information from a statistical survey (Marine Recreational Fishery Statistics Survey, MRFSS) of the US recreational harvesting sector conducted over the US northeast and southeast coasts, continues to be under evaluation for its application to estimating billfish catches by recreational fishers. Preliminary results for marlins were presented at the 2000 SCRS meeting in SCRS/00/52. Although billfish are considered “rare event” species in this survey and accordingly the estimates may suffer from bias and imprecision, they do provide a possible basis for evaluating the potential degree of conservatism in the values reported in Appendix Table 2.4 BIL for recreational (rod and reel) harvest. These estimates were predictably higher than the previous RBS estimate due to more complete coverage of the recreational fishery for billfish by the MRFSS. For sailfish, the MRFSS based estimates of tonnage landed are considerably higher than counted through the RBS, expectedly so since the tournaments monitored by the RBS are known to represent only a fraction of the recreational fleet that catches sailfish. That the rare event nature of sailfish catch compared to other species catches could lead to some bias in estimates cannot be ruled out. However, for the purposes of assessment of sailfish, it is recommended that sensitivity of the assessment to use of the MRFSS-based estimates of sailfish harvested be evaluated. Appendix Table 2.4 SAI provides a time-series of estimates of fish landed and released from this statistical survey.

2.1.5 Mackerels Fishery Statistics

Significant catches of king and Spanish mackerels by U.S. fishermen have occurred since the 1850's for Spanish mackerel and since the 1880's for king mackerel. The major gears currently exploiting these species are handlines and gillnets. Purse seines were also used to harvest king mackerel during the 1980's. Gillnets have historically been the main commercial gear for Spanish mackerel however in recent years, recreational removals have become an important component in total catches for both species. The majority of king mackerel catches are taken off North Carolina and Florida and it is believed that a major production area off Louisiana, is recovering. The primary Spanish mackerel catch areas include the Chesapeake Bay and Florida. Current fisheries are co-managed under the Coastal Migratory Pelagic Resources FMP enacted in 1983 and regulations adopted by the South Atlantic and Gulf of Mexico Fishery Management Council and implemenented by NMFS. Annual catches are monitored closely by NMFS and within season management measures include commercial trip limits, size limits, seasonal and area quotas, and recreational per person daily bag limits. Because these species occur in both federal and state territorial zones of U.S. successful management has required participation by both federal and state management agencies. At present, none of the king or Spanish mackerel stocks are any longer considered overfished.

Annual yields of king mackerel have ranged from 4,365 MT to 8,772 MT between 1983 and 2000 with an average production of about 7,000 MT since 1995. Annual catches of Spanish mackerel have ranged from 2,784 MT to 5,957 MT from 1983 to 2000 with the average catch of about 4,500 MT since 1995. Harvest of both species has stabilized in recent years although large fluctuations in estimates of recreational catches in some years have occurred and overages in commercial landings and recreational quotas can occur. The stabilization in yields is thought to be the direct impact of regulations which have been implemented in an effort to sustain future production. The primary management factors contributing to fluctuations in annual recreational harvests include difficulties of enforcement of differential bag limits imposed in individual states, large inter-annual variances in recreational harvest estimates, and regulations that permit the sale of king mackerel from recreational charter boats after the closure of commercial fisheries. Critical research concerns regarding mackerels are sampling concerns related to adequate coverage of the age structure of the stocks and increasing the precision associated with the mackerel assessment abundance indices.

2.1.6 Shark Fishery Statistics

The U.S. Atlantic shark fishery is primarily a southeastern fishery extending from Virginia to Texas, although sharks are also landed in the states north of Virginia. In view of the ICCAT request for total harvest estimates of certain pelagic sharks in anticipation of possible assessments, catches and landings of Atlantic pelagic sharks across the range of US fleets which harvest them were compiled in SCRS/01/60. Commercial landings of pelagic sharks steadily increased from the early 1980's and peaked in 1995 and 1996 (Appendix Table 2.6a-SHK). Recreational landings in numbers estimated from the MRFSS survey during 1981-2000 fluctuated from a minimum of about 5,600 fish in 1994 to a maximum of 93,000 fish in 1985 (Appendix Table 2.6a-SHK). Pelagic longline dead discards also fluctuated between 1987 and 2000, with a minimum of about 3,500 fish in 1999 and a maximum of about 30,500 fish in 1993. Total catches ranged from about 12,500 fish in 1981 (no commercial landings or discard estimates were available for that year) to about 95,000 fish in 1985, as a result of the peak in recreational landings that year.

Blue shark commercial landings were generally low (Appendix Table 2.6b-SHK). Recreational landings in numbers ranged from about 500 fish in 1994 and 1995 to over 20,000 fish in 1987. Pelagic longline discards reached 29,000 fish in 1993, but otherwise oscillated between a minimum of about 3,000 fish in 1999 to a maximum of about 19,000 fish in 1996 (Appendix Table 2.6b-SHK). The trends in recreational landings and dead discards were very similar from 1992 to 1997 (Fig. 1b). Total catches ranged from 0 fish in 1982 (a year in which no commercial or recreational landings were reported) to about 43,500 fish in 1993, the year in which dead discard estimates peaked (Appendix Table 2.6b-SHK).

Shortfin mako commercial landings never exceeded 5,000 fish according to available data (Appendix Table 2.6c-SHK). Note that commercial landings from 1995 to 2000 in the quota monitoring and general canvass program data are also assigned to an unclassified "mako" category, in addition to the "shortfin mako" category considered here. Adding these landings of unclassified makos, which are likely to be shortfin makos, would increase commercial landings for this species, but would not affect significantly total catches. Most of the landings were attributable to the recreational fishery, whose landings in numbers peaked in 1985 (as for blue shark) to about 80,000 fish, and ranged from less than 1,500 fish to over 31,000 fish in the remaining years. Pelagic longline discards of shortfin makos were negligible. Total catches ranged from less than 4,000 fish in 1999 to almost 82,000 fish in 1985, when recreational catches peaked (Appendix Table 2.6c-SHK).

2.2. Research Activities

Research continued on genetic discreteness of large pelagic fishes in the Atlantic, larval surveys for bluefin tuna and other large pelagics in the Gulf of Mexico, new methods for estimating and indexing abundance, robust estimation techniques for sequential population analyses, and estimating discards based on direct observations by scientific fishery observers. Research was also conducted on approaches for characterization of uncertainty in assessments and methods for translating that uncertainty into risk levels associated with alternative approaches. U.S. scientists also continued to coordinate efforts for the

ICCAT Enhanced Research Program for Billfish and for the Bluefin Year Program.

Collaborative research with scientists from ICCAT member nations and cooperating parties continues. In early 2000, the SEFSC hosted a Brazilian scientist for several months and in 2001, a Spanish scientist was also hosted for several months. The intent of this collaboration is to improve our capacity to collaborate on stock assessment research with Brazil, Spain, and other countries. Collaboration with U.K, French, Spanish, and other European Community scientists on topics of evaluation of fishery management-assessment feedback approaches to ICCAT species continues. One collaborative document (SCRS/01/44) was prepared on the effect of time-correlated uncertainty on the management of yellowfin tuna stocks, while another (SCRS/01/39) was prepared on time trends in abundance and catchability of yellowfin tuna and their relationship to the North Atlantic Oscillation index. A scientist at the University of Miami's Cooperative Unit for Fisheries Education and Research under sponsorship by the SEFSC, has conducted training under the COPEMED banner to provide tools to North African scientists so that they can increase their participation in the ICCAT assessment process of Mediterranean bluefin and swordfish. Another SEFSC scientist taught statistical methods for evaluating relative abundance patterns to a group of 21 Spanish scientists at the Instituto Tecnologico Pesquero and Alimentario (AZTI), in November 2000. An SEFSC scientist also was hosted by the Instituto Espanol de Oceanographia (IEO), in June 2001, for collaboration on methods to standardize the Spanish Baitboat CPUE series for eastern Atlantic juvenile bluefin tuna. The products of this collaborative research and training is expected to enhance stock assessment analysis capabilities in the U.S. and other ICCAT member nations. Cooperative research by the U.S. NMFS and the INP in Mexico was continued, resulting in further joint analyses of longline observer program data from the Gulf of Mexico fisheries of both countries.

Several documents dealing with methodological approaches to stock assessment and dealing with environmental influences on tuna and tuna-like fisheries were prepared. SCRS/01/43 provided a Bayesian approach to standardizing catch rate time series, and SCRS/01/32 discussed the correlation (or lack thereof) of the North Atlantic Oscillation Index with west Atlantic bluefin tuna year class strength. Other research on these and additional areas are identified in the following sections.

2.2.1 Bluefin Tuna Research

As part of its commitment to the Bluefin Program, research supported by the U.S. has concentrated on ichthyoplankton sampling, reproductive biology, methods to evaluate hypotheses about movement patterns, spawning area fidelity and stock structure investigations. A BYP planning meeting was hosted at the SEFSC in May, 2001, to review activities of eastern and western researchers relative to further study of bluefin reproductive biology in the central North Atlantic and in the Mediterranean. The results of the initial survey of the Central North Atlantic study area are provided in SCRS/01/31 (rev). Samples collected and available for collaborative research, in support of the BYP research plans are presented in Appendix Tables BYP-1 to BYP-4.

Ichthyoplankton surveys in the Gulf of Mexico during the bluefin spawning season were continued in 2000 and 2001. Data resulting from these surveys which began in 1977 are used to develop a fishery-independent abundance index of spawning west Atlantic bluefin tuna. This index has continued to provide one measure of bluefin abundance that is used in SCRS assessments of the status of the resource.

Studies related to genetic evaluations of the number of fishery management units of Atlantic bluefin are being conducted at several laboratories in the United States. The National Oceanographic and

Atmospheric Administration laboratory in Charleston, S. C. is acting as a sample archive center and has tissues from all bluefin collected for stock structure research by the National Marine Fisheries Service since 1996 and some or all samples collected by researchers from various institutions including the University of South Carolina, the Virginia Institute of Marine Science, the University of Maryland and the Massachusetts Department of Marine Fisheries.

SCRS/01/54 further addressed the issue of panmixia in bluefin tuna, by examining both mitochondrial DNA control region nucleotide sequences and nuclear gene ldhA allele frequencies in replicate samples of northern bluefin tuna from the Mediterranean Sea and the northwestern Atlantic Ocean.Analyses of both types of data revealed no significant differences between samples from the two regions. The authors noted that failure to find genetic evidence for population substructure does not constitute evidence for a single panmictic population. It is possible that multiple subpopulations do exist, and that genetic differentiation at the loci analyzed in this study has not occurred because of large population sizes and/or low levels of reproductively successful migration between the sub-populations.

Researchers from the Virginia Institute of Marine Science and Texas A & M University have developed seven tetra-nucleootide markers and at least fifteen di- and tri-nucleotide markers for Atlantic bluefin. These are in addition to three single-copy nuclear DNA markers for bluefin developed by these investigators several years ago. This suite of markers potentially provides a more powerful tool for determining whether genetic differences indicative of reproductive isolation exist in Atlantic bluefin.

Scientists from the Texas A&M University, University of Maryland and the National Marine Fisheries Service continued research on the feasibility of using otolith microconstituents to distinguish bluefin stocks. Building on prior years work, in SCRS/01/113, otolith chemistry of Atlantic bluefin tuna (*Thunnus thynnus*) was measured to determine the feasibility of the approach for discriminating juveniles (age-0 and age-1) from eastern and western nurseries. Findings suggest that otolith chemistry of juvenile *T. thynnus* from different nurseries and sub-nurseries are distinct and elemental signatures show some degree of temporal persistence, indicating the technique has considerable potential for use in future assessments of population connectivity and stock structure. The results of this research were further discussed and reported upon at the ICCAT intersessional on bluefin tuna mixing.

Research on bluefin tuna movement patterns using electronic tags and on the associated methodology was continued in 2000 and 2001. Tagging activities continued off North Carolina (scientists from Stanford University, Monterey Bay Aquarium and N.M.F.S.) and off northeast North America (by scientists from (1) New England Aquarium, Massachusetts Division of Marine Fisheries. and D.F.O. from Canada and (2) Stanford University and the Monterey Bay Aquarium). Additionally researchers from Stanford University and the Monterey Bay Aquarium continued studying the feasibility of tagging bluefin tuna in the Gulf of Mexico, successfully releasing 4 bluefin with electronic tags in 1999, about 10 fish in 2000, and 5 fish in 2001.

SCRS/01/57 reported upon the results obtained from tagging of Atlantic bluefin tuna with implantable archival and pop-up satellite archival tags, which were further discussed during the ICCAT intersessional meeting on Bluefin Tuna Mixing. A summary of pop-up satellite tagging of giant bluefin tuna in the joint US-Canadian program in the Gulf of Maine and Canadian Atlantic was reported by Lutcavage et al. (SCRS/00/95) and updated in a Canadian document SCRS/01/53. These results were used to plan a long line research cruise to the central north Atlantic that took place from 26 June to 19 July, 2001 (SCRS/01/31). The results of this research was further discussed and reported upon during the ICCAT intersessional meeting on Bluefin Tuna Mixing.

SCRS/01/51 examined the implications of adopting the one-stock hypothesis for VPA assessments of Atlantic bluefin. The one-stock VPA gave a very similar picture to the combined results of the separate eastern and western VPA's because the catches from the East stock are much larger. The document concludes that a one-stock analysis may be useful as a reference of total population size, but is risky as a basis for setting management policies as severe overfishing of the less abundant stock may go undetected. SCRS/01/52 discusses aspects of earlier analyses of bluefin tuna mixing. It is suggested that a key matter of concern is the different growth curves used at present for West and East, which cause mixing analyses to be internally inconsistent in treating some fish of rather different lengths as having the same age. The document suggests a possible solution to this is to move towards length-based assessments, which it also notes may provide a more reliable basis for modeling the catches of larger fish than the present assumption of temporally invariant F10+/F9 ratios.

SCRS/01/56 pointed out that the substantial life history differences between Eastern and Western populations favor the idea that Atlantic bluefin tuna is not a true metapopulation and that the overlap model probably has more credence than the diffusion model. However, alternate or anomalous migration pathways within populations *(i.e.* contingent structure) of bluefin tuna will not be accommodated easily into models until we learn more about them and their causes. Otolith microconstituent studies are proposed as perhaps the most effective means of doing this.

SCRS/01/55 points out that the life history and tagging data support the idea that at least two biotypes exist for Atlantic bluefin tuna, but that none of the data so far available are sufficient to rule out any of the mixing-related hypotheses (other than the hypothesis that movement across the 45ºW line is negligible). Inasmuch as the management advice may differ under different mixing scenarios, the authors advocate a Bayesian decision-analysis whereby the potential consequences of alternative management actions are evaluated under several plausible model scenarios keeping in mind the weight of evidence in support of each model.

2.2.2 Swordfish Research

Data from observer samples were compared against self-reported information in from the U.S. large pelagic mandatory logbook reporting system and estimates of discard mortality of swordfish, billfish, sharks and other species from the U.S. fleet were developed from that analysis for the 2001 SCRS.

Fisher reported and observed swordfish catch, size and catch rate patterns through 2000 were examined in support of monitoring the recovery of north Atlantic swordfish. U.S. catch rates patterns from the pelagic longline fleet were described in SCRS/01/109.

2.2.3 Yellowfin Tuna Research

Several collaborative studies were conducted by U.S. scientists in cooperation with scientists from other countries (see General Research Activities discussion). Cooperative research by the U.S. NMFS and the INP in Mexico will continue. Cooperative research plans include further development of abundance indices for sharks and other tunas, as well as the refinement of the yellowfin tuna indices as additional data becomes available.

Cooperative research on yellowfin tuna abundance indices, catch at age, and life-history studies is also continuing with Venezuelan scientists.

2.2.4 Albacore Research

The cooperative research initiated by the U.S. NMFS and the IEO of Spain in 1993 was continued at the NMFS in Miami during the spring of 2001. A U.S. scientist also provided training to Spanish IEO and other ICCAT country scientists in mid-2001. In 1999 the effort was extended to analyze the catch per unit of effort data for the Spanish troll and baitboat fisheries using the general linear modeling approach. Further training sessions on this topic also took place in late 2000 and was extended to standardization of eastern Atlantic bluefin tuna catch rate time series in early 2001.

2.2.5 Mackerels and Small Tunas Research

U.S. small tuna research is directed mainly on king and Spanish mackerel stocks as the amount landed of other small tunas such as cero makerels by U.S. fishermen is very low. The focus of research is collection of primary fishery catch statistics, and biostatistical sample data, fishery age samples, and abundance indices. Because assessment and management are by necessity by geographical units, continued research on migration of king mackerel in particular is important.

2.2.6 Shark Research

Pelagic shark research continued to be conducted in support of the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks, and ICCAT. Landings of sharks by US longline fishermen holding permits to land and sell swordfish caught in the Atlantic and dead discards of sharks in the US longline fleet targeting tunas and tuna-like species are monitored and reported to ICCAT. A document (SCRS/01/60) on U.S. catches and catch rates of pelagic sharks from the northwestern Atlantic, Gulf of Mexico, and Caribbean was presented at the ICCAT Data Preparatory Meeting for Atlantic Shark Stock Assessment held in Darmouth, Canada, September 11-14, 2001. Six other working documents on various aspects of shark stock assessment (SCRS/01/61 on Use of a generalized stage-based, age-, sex-structured model for shark stock assessment), , abundance indexing (SCRS/01/62 on Pelagic shark abundance indices based on fishery-dependent and fishery-independent data from the western north Atlantic), life history (SCRS/01/66 on Preliminary investigations into the age and growth of the thresher shark, mako shark and white shark in the Western North Atlantic Ocean**;** SCRS/01/63 on Age and growth of the blue shark, Prionace glauca, in the north Atlantic ocean; SCRS/01/65 on Validated age and growth of the porbeagle shark, *Lamna nasus*, in the western north Atlantic ocean), and movement patterns identified through tagging data (SCRS/01/64 on Tag and recapture data for three pelagic shark species, blue shark (*Prionace glauca*), shortfin mako (*Isurus oxyrinchus*), and porbeagle (*Lamna nasus*) in the north Atlantic ocean) were presented to the workshop. Work on standardization of catch rates for pelagic sharks in the Gulf of Mexico longline fishery based on observer programs from Mexico and the US also continued in 2001.

2.2.7 Billfish Research

Sampling of recreational billfish tournaments continued in 2000 along the U.S. east coast, Gulf of Mexico, Bahamas, and U.S. territories in the Caribbean. A total of 174 billfish tournaments were sampled in 2000, compared to 161 tournaments in 1999. This represented 146,655 hours of fishing effort, an increase of about 27,943 hours from the 1999 level. In 2000, sampling accounted for 144 billfish boated (120 blue marlin, 8 white marlin, 16 sailfish, and 0 spearfish) and 4,598 released. In comparison, in 1999, there were 243 billfish boated (177 blue marlin, 36 white marlin, 30 sailfish, and 0 spearfish) and 5,024 released.. Morphometric measurements of billfish landings were taken in conjunction with the ICCAT Enhanced Research Program for Billfish (ERPB).

A number of working papers on various aspects of marlin research were submitted to ICCAT for consideration at its 2001 scientific meetings. These are briefly summarized below. Document SCRS/01/104 examined time-area closure potentials for furthering the recovery program for Atlantic marlins. Atlantic blue and white marlins are currently overfished primarily as a result of bycatch in pelagic long lines directed at other species. One possible management measure to reduce fishing mortality on these species would be to restrict fishing effort in times and places with exceptionally high marlin catch per unit effort (CPUE). The International Commission for the Conservation of Atlantic Tunas (ICCAT) maintains a database of catch and catch-effort statistics of participating nations. These data were analyzed to determine whether or not the distribution of CPUE is sufficiently heterogeneous in time and space that such measures might provide meaningful management alternatives. The resulting distributions of catch rates were also contrasted with monthly average sea surface temperatures to examine the possible association between temperature and CPUE. The results show spatiotemporal heterogeneity in catch rates that may be partly explained by seasonal changes in sea surface temperatures. The time-area concentrations of high CPUE differ between the species. This observed heterogeneity might be exploited to develop alternatives for reducing fishing mortality for future management of the fisheries, but additional research is needed to refine the spatial scale of the analysis, and to more fully understand the factors contributing to the observed distribution.

SCRS/01/108 examined the expected change in mean size of marlins over a range of fishing mortality rate scenarios given current information about fishery selectivity and life history characteristics for these species. Mean size of fish in the catch often declines noticeably with increasing fishing mortality, and this trend is regarded as an indicator of excessive fishing mortality. The results indicated that blue marlin should not be expected to exhibit strong trends in mean length with respect to fishing mortality within the range of fishing mortality estimated in the most recent stock assessment, and that the trends in the observed size composition are consistent with the findings of the stock assessment.

SCRS/01/105 examined, through simulation, methods of integration of habitat preference information with fisheries catch-rate data to develop standardized indices of abundance for use in stock assessments. These results suggest that the habitat standardization of cpue time series is potentially useful if there is accurate knowledge of the distribution of the population, the distribution of the gear with respect to the population, and factors that may affect the fish's propensity to take bait. Absent certain knowledge of these factors, the GLM seems a much more robust method for standardizing catch rate data.

In support of the sailfish assessment conducted at the 2001 SCRS BIL species group meeting, document SCRS/01/106 developed indices of abundance of sailfish from the United States recreational billfish tournament fishery for the period 1973-2000. The index of weight (kg) per 100 hours fishing was estimated from numbers of sailfish caught and reported in the logbooks submitted by recreational tournament coordinators and NMFS observers under the Recreational Billfish Survey Program as well as available size information. Document SCRS/01/107 also provided indices of abundance of sailfish from the United States pelagic longline fishery in the Atlantic for the period 1986-2000. The index of weight (kg) per number of hooks (thousand) was estimated from numbers of sailfish caught and reported in the logbooks submitted by commercial fisherman, and from mean annual weight estimated by scientific observers aboard longline vessels since 1992. Document SCRS/01/111 evaluated the genetic basis of stock structure of Atlantic sailfish (*Istiophorus platypterus*) using analyses of the mitochondrial control region and four nuclear microsatellite loci. While considerable variation was revealed, almost all of the variation was present in individual samples. The null hypothesis that samples were drawn from a common gene pool could not be rejected when each sample location was considered separately, or when collections were combined into eastern and western Atlantic samples.

The NMFS SEFSC again played a substantial role in the ICCAT Enhanced Research Program for Billfish in 2000, with SEFSC scientists acting as general coordinator and coordinator for the western Atlantic Ocean. Major accomplishments in 2000 are documented in SCRS/01/103.

A successful pilot study assessing popup satellite tag technology for estimating post-release survival of blue marlin from recreational vessels off Bermuda (SCRS/99/71) was reported to the 1999 SCRS (SCRS/99/97). This collaborative research effort, between the Virginia Institute of Marine Science, the Bermuda Division of Fisheries, and the National Marine Fisheries Service was continued in 2000 on longline vessels. In response to the 2000 ICCAT recommendation for increased research into the habitat preferences of Atlantic marlins, electronic tagging studies for marlins has been substantially increased in year 2001. In 2001, further investigations of biological habitat requirements of blue and white marlins are being facilitated through cooperative research with the US pelagic longline vessels and with the US for-hire fleets operating in areas of high concentrations of billfish. This research is critical for evaluation of essential fish habitat since for pelagic species in general, and for marlins in particular the information base is almost non-existent. A target deployment of 25-50 satellite archival pop-up tags is planned for 2001-2002.

2.2.8 Tagging

Participants in the Southeast Fisheries Science Center's Cooperative Tagging Center (CTC) and the Billfish Foundation Tagging Program (TBF) tagged and released 9,149 billfishes (including swordfish) and 850 tunas in 2000. This represents an increase of about 7% from 1999 levels for billfish and a decrease of 13% for tunas. A number of electronic tagging studies involving bluefin tuna and billfish were also carried out in 2000 and 2001. These are discussed in the bluefin and billfish research sections above.

There were 151 billfish recaptures from the CTC and TBF reported in 2000, representing a decrease of 49% from 1999. Among the 2000 CTC billfish recaptures there were 55 blue marlin, 12 white marlin, 65 sailfish, and 12 swordfish. For the CTC and TBF, a total of 37 tunas were recorded recaptured in 2000; these were 27 bluefin and 10 yellowfin tuna. These recaptures represent a 62% decrease with repsect to 1999. The ICCAT Enhanced Research Program for Billfish in the western Atlantic Ocean has continued to assistance in reporting tag recaptures to improve the quantity and quality of tag recapture reports, particularly from Venezuela, Barbados and Grenada.

2.2.9 Fishery Observer Deployments

Domestic Longline Observer Coverage. In response to ICCAT recommendations, randomized observer sampling of the U.S. large pelagic long line fleet was continued into 2000. Representative scientific observer sampling of this fleet has been underway since 1992. The data collected through this program have been used to quantify the composition, disposition, and quantity of the total catch (both retained and discarded at sea) by this fleet which fishes in waters of the northwest Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Selection of the vessels is based on a random, 5% sampling of the number of sets reported by the longline fleet. A total of 4,491 sets (2,981,073 hooks) were recorded observed by personnel from the SEFSC and NEFSC programs from May of 1992 to December of 2000. Observers recorded over 111,500 fish (primarily swordfish, tunas, and sharks), marine mammals, turtles, and seabirds during this time period. Observer coverage successfully recorded effort from 329 observed sets during 1992, 817 during 1993, 648 during 1994, 699 during 1995, 361 during 1996, 455 during 1997, 287 during 1998, 430 during 1999, and 465 during 2000, corresponding to nominal sampling fractions of about 2.5%, 6%, 5.2%, 5.2%, 2.5%, 3.1%, 2.9% , 4% , and about 4.2%. Increased sampling in year 2001 is expected to increase the sampling fraction to about 8%.

In 2001, an experimental program was initiated in cooperation with the U.S. pelagic long line fleet with a history of fishing for swordfish on the Grand Banks fishing grounds, to develop gear modifications that might prove useful in reducing the rate of interaction and limit severity of injury to marine turtles incidentally captured by the gear while at the same time minimizing loss of targeted catch. The gear modifications being tested include the type of bait used, the type of hooks used, as well as the positioning of gangions relative to surface floats. Other gear modifications may be tested in the future. It is viewed that these technologies could be of application in other long line fleets. In this experiment, there is 100% observer coverage of the U.S. vessels is underway. The experiments undertaken are being coordinated and are, to some degree, based on provisional results obtained from experiments conducted on Azorean long line vessels operating in the northeastern Atlantic as described in SCRS/01/110.

Southeast U.S. Shark Drift Gillnet Fishery Observer Coverage. The SEFSC Pelagic Observer Program at the Panama City Laboratory observed 123 sets of the shark drift gillnet fishery during 1999-2000. Effort took place in waters off of south Georgia, as well as central and south Florida.

Foreign Fishery Observers. There was no foreign fishing activity in the U.S. Exclusive Economic Zone (EEZ) off the east coast during 2000.

3. U.S. Implementation of ICCAT Conservation and Management Measures

3.1 Catch Limits and Minimum Sizes

3.1.1. Rebuilding Program for West Atlantic Bluefin Tuna (Rec 98-7)

The twenty year rebuilding program for west Atlantic bluefin tuna established an annual landings quota for the United States of 1387 mt. This quota is applied to the 2000 fishing year of June 1, 2000 - May 31, 2001. During the 1999 calendar year, there was an underharvest of 292 mt. During the 1999 fishing year, there was an underharvest of 228 mt, which has been carried over to adjust the 2000 fishing year quota. Landings and discard estimates for the 2000 fishing year are not yet available, therefore, calendar year estimates are provided in the U.S. compliance tables. (See Appendix, page 2).

3.1.2 Recommendation Regarding Atlantic Billfishes (Rec 98-10)

This extends the requirements of Rec 97-9 to apply in the year 2000 (i.e. a 25% reduction in landings from the 1996 baseline). The billfish fishery is managed on a fishing year basis (June 1 - May 31) in the United States. However, landings estimates for the 2000 fishing year are not yet available. During the 2000 calendar year, the United States landed an estimated 0.2 mt of white marlin and 24 mt of blue marlin. (See Appendix, page 4)

3.1.3 Recommendation to Establish a Plan to Rebuild Blue Marlin and White Marlin Populations (2000)

Phase I requires that countries capturing marlins commercially reduce white marlin landings from pelagic longline and purse seine fisheries by 67 percent and blue marlin landings by 50 percent from 1999 levels; the United States has prohibited all commercial retention of billfish since 1988. For its part of the rebuilding program, the United States agreed to maintain regulations that prohibit all landings of marlins by U.S. pelagic longline fishermen, and to continue monitoring billfish tournaments through scientific observer coverage of at least 5 percent initially, with an objective of 10 percent coverage by 2002. The United States now exceeds these observer requirements. The United States also agreed to limit annual landings by U.S. recreational fishermen to 250 Atlantic blue and white marlin, combined, for 2001 and 2002. Catch and release rates are estimated to be very high (90-95%) based on tournament data, and minimum sizes have been established at 168 cm (66 inches) for white marlin and 251 cm (99 inches) for blue marlin. The United States is monitoring recreational landings to evaluate compliance with the catch limit for the 2001 fishing year.

3.1.4 Recommendation to Establish a Rebuilding Program for North Atlantic Swordfish (Rec 99-7)

This recommendation establishes an annual landings quota of 2951 mt ww for the United States. The discard allowance for 2000 is 320 mt ww. The landings quota and discard allowance are applied to a fishing year of June 1 - May 31. Landings and discard estimates for the 2000 fishing year are not yet available, therefore, 2000 calendar year estimates are provided in the U.S. compliance tables. (See Appendix, page 4). During the 1999 fishing year, there was an underharvest of 731 mt ww. This underharvest has been added to the landings quota for the 2001 fishing year, therefore, the 2000 landings quota has not been adjusted. The United States has a minimum size of 33 lb (15 kg) dressed weight, which is designed to correspond to 119 cm, with zero tolerance. Information on compliance with the minimum size is provided in the U.S. compliance tables. (See Appendix, page 4).

3.1.5 Recommendation Concerning Swordfish Catches by the Tuna Longline Fishery (2000)

The United States is in the process of rulemaking to establish a 400 mt reserve from the 2001 fishing year quota for North Atlantic swordfish; this will be applied to Japan's discards during 2001 in order to account for that mortality in the total allowable catch.

3.1.5 Recommendation on South Atlantic Swordfish (2000)

The United States informed ICCAT of its intention to stay within its prior annual catch limit of 384 mt ww (289 mt dw).

3.1.6 Recommendation on Revision and Sharing of the Southern Albacore Catch Limit (2000)

The United States is subject to a catch limit of 100 mt in 2001, but does not have a directed fishery for southern albacore. Landings in 2000 were less than 1 mt.

3.1.7 Recommendation on North Atlantic Albacore Catch Limits (2000)

The United States was allocated a landings quota of 607 mt ww for the 2001 fishing year, which is a level consistent with average landings for the United States over the past ten years. This recommendation applies for one year only. Given the minor share of U.S. mortality in this fishery (< 2%), and given that the ICCAT recommendation provides for the adjustment of next year's catch level in the case of overharvest or underharvest, no new regulations have been proposed for this fishery in the United States. The recommendation provides that overages/underages of this annual catch limit should be deducted from or added to the catch limit established for the year 2002 and/or 2003. Once ICCAT establishes a catch limit for 2002 and 2003 (as expected at the November 2001 meeting), the United States may need to undertake rulemaking to adjust as necessary for any overharvest or underharvest during 2001.

3.1.8 Recommendation on Bigeye Tuna Conservation Measures (2000)

No catch limits apply to the United States, since 1999 catch was less than 2100 mt. The United States has implemented a higher minimum size than that required by ICCAT, which provides additional protection for juvenile bigeye. This minimum size of 27 inches (approximately 6.8 kg) applies to all U.S. fisheries landing bigeye tuna, both commercial and recreational.

3.2 Closed Seasons

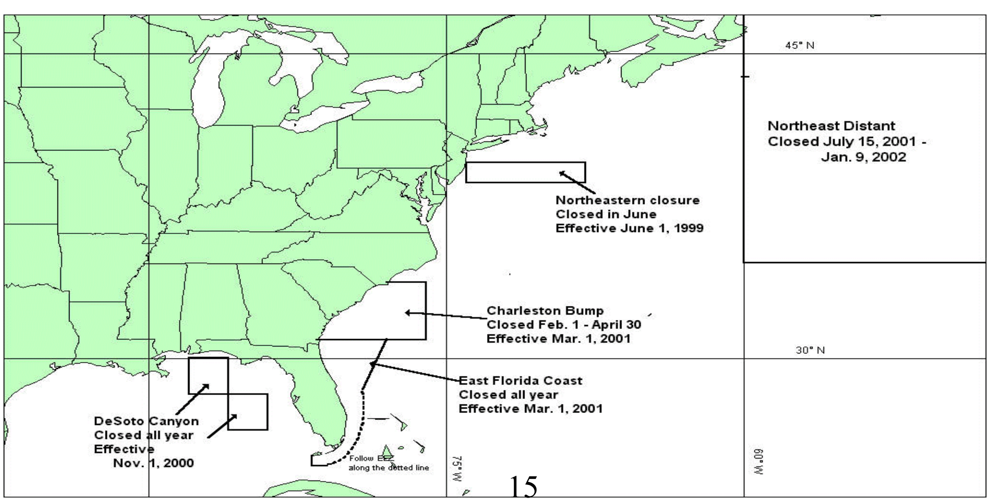
3.2.1 Recommendation on the Establishment of a Closed Area/Season for the Use of Fish-Aggregation Devices (Rec 99-3)

No U.S. action is necessary. The United States does not have any surface fleets fishing in the area covered by this recommendation.

3.2.3. Domestic Time/Area Closures for ICCAT Species

At present, the Atlantic pelagic longline fishery of the United States is subject to several discrete time/area closures that are designed to reduce bycatch in the pelagic longline fishery by prohibiting pelagic longline fishing for ICCAT species in those areas during specified times. These closures affect offshore fishing areas up to 200 nautical miles (nm) from shore (see Figure 1). Those closures are as follows: (1) Florida East Coast: 50,720 nm^2 year-round; (2) Charleston Bump: 49,090 nm^2 from February through April each year; (3) DeSoto Canyon: 32,860 nm^2 year-round; and (4) the Northeastern United States: 21,600 nm^2 during the month of June each year. 50 CFR 635.21(c)(2).

In addition, NMFS implemented a fifth closed area pursuant to a June 14, 2001, Biological Opinion (BiOp) (NMFS, 2001a) resulting from formal consultation under the Endangered Species Act (ESA). The BiOp concluded that the HMS pelagic longline fishery is likely to jeopardize the continued existence of leatherback and loggerhead sea turtles. Closure of the Northeast Distant Statistical Sampling area (NED) was identified as part of a Reasonable and Prudent Alternative (RPA) that will allow the Atlantic pelagic longline fishery to continue operating. The emergency regulation implementing the RPA closes approximately 2,631,000 nm^2 on the high seas to U.S. fishing vessels (66 FR 36711; July 13, 2001).



3.3 Ban on Imports

3.3.1 Recommendation Regarding Equatorial Guinea Pursuant to the 1996 Recommendation Regarding Compliance in the Bluefin Tuna and North Atlantic Swordfish Fisheries (Rec 99-9); Recommendation Concerning Import of Bluefin Tuna and its Products from Panama (Rec 99-10); Recommendation Regarding Belize and Honduras Pursuant to the Swordfish Action Plan (Rec 99-12)

These measures took effect in the United States in December 2000.

3.3.2 Trade Restrictive Recommendations adopted in 2000

In 2000, ICCAT recommended bigeye tuna trade restrictions against Belize, Cambodia, Honduras, Equatorial Guinea, and St. Vincent and the Grenadines pursuant to its 1998 unregulated and unreported catches resolution. The United States is developing regulations to implement these measures. A 2000 ICCAT recommendation indicates that an import prohibition against Honduras should take effect on Jan. 1, 2002, unless ICCAT decides at its 2001 meeting that this measure would be unnecessary based on documentary evidence. The United States will address this issue after the 2001 ICCAT meeting, if necessary.

3.4 Observer Programs

The U.S. observer program currently meets two main objectives: monitoring of interactions between fishing gear and protected species (marine mammals, sea turtles, and to a lesser degree, sea birds), and monitoring of fishing effort and catch (estimation of total landings of target species and/or bycatch of non-target or prohibited species). An overview of observer programs in the United States can be found at our website at: http://www.st.nmfs.gov/st1/nop/. Click on the bullets under "About US" for info about both the National Observer Program, which is a coordinating office for NMFS observer programs in our headquarters outside of Washington, DC, and the Regional Programs. Section 2.2.9 describes observer activities on U.S. vessels involved in ICCAT fisheries.

3.5 Vessel Monitoring

3.5.1 Recommendation Concerning a Vessel Monitoring System Pilot Program (Rec 97-12)

The United States adopted fleet-wide VMS requirements in the Atlantic pelagic longline fishery in May 1999, but was subsequently sued by an industry group. By order dated September 25, 2000, the U.S. District Court for the District of Columbia prevented any immediate implementation of VMS in the Atlantic pelagic longline fishery, and instructed the National Marine Fisheries Service (NMFS) to "undertake further consideration of the scope of the [VMS] requirements in light of any attendant relevant conservation benefits." Pursuant to that order, NMFS has taken the following actions.

On January 10, 2001, NMFS published a request for comments on options for implementing VMS requirements in the Atlantic HMS pelagic longline fishery (66 FR 1907). The agency received and considered seven comments from vessel owners and their fishing organization, environmental advocacy groups, a fishery management council member, and a VMS distributor. NMFS also examined monitoring and enforcement in the fishery, the limits of conventional methods, and the applications of VMS. NMFS conducted an analysis of HMS pelagic longline vessels to determine whether the VMS requirement could be restricted to a subset of HMS pelagic longline vessels. This information has been submitted to the court, and NMFS is awaiting further direction regarding its ability to implement a VMS program.

3.6 Inspection Schemes and Activities.

The United States has nothing to report at this time.

3.7 Measures to Prohibit IUU Fishing

The United States is committed to full participation in ICCAT's efforts to prohibit Illegal, Unregulated and Unreported (IUU) fishing in the Convention Area. The United States government is actively developing a national plan of action (NPOA) to combat IUU, consistent with the International Plan of Action that was recently adopted by the FAO. Possible regulatory or legislative actions will be considered in the context of NPOA development.

3.8 Other Recommendations

3.8.1 Resolution on Improving Recreational Fishery Statistics (Rec 99-13)

Recreational landings are estimated through a combination of tournament surveys (the Recreational Billfish Survey), the Large Pelagic Survey (LPS), the Marine Recreational Fishing Statistics Survey (MRFSS), and state landings data. Final regulations adopted in 1999 require selected HMS charter/headboat vessels that do not already do so to complete a logbook; implementation of this requirement is underway. In 1999, NMFS mandated the registration of all recreational tournaments for Atlantic highly migratory species. All tournaments are now required to submit landing reports, if selected. Currently, 100% of billfish tournaments are selected for reporting. NMFS has also published an advance notice of proposed rulemaking to request public comment on options to further improve the monitoring of recreationally landed billfish and swordfish [65 FR 48671], and is considering management options at this time.

3.8.2 *Recommendation Concerning Registration and Exchange of Information on Vessels Fishing for Tunas and Tuna-Like Species in the Convention Area (2000)*.

The United States has submitted the list of vessels required pursuant to this recommendation to the Secretariat.

3.8.3 U.S. Swordfish Certificate of Eligibility Program

A summary of data collected through this program in 2001 is provided in the Appendix, page 7.

3.8.4 U.S. Enforcement Actions

A summary of actions taken in ICCAT fisheries is provided in the Appendix, page 5.

Recent U.S. management actions for Atlantic highly migratory species can be found online at: http://www.nmfs.noaa.gov/sfa/hmspg.html

Federal Register notices containing the full text of proposed and final regulations can be found at: http://www.access.gpo.gov/su_docs/aces/aces140.html.

Appendix. Provide catch statistics submitted to the SCRS for the current reporting year and any revisions for previous years data.

Panel 1 - bigeye, yellowfin and skipjack tunas (Calendar year 2000)

Species/Region	Catch Limit	Catches	Estimated catch over/ under catch limit	Estimated Catch over 15% tolerance of fish below 3.2kg
Bigeye	N/A	574 mt	N/A	0 mt
Yellowfin	N/A	7051 mt	N/A	0 mt
Skipjack	N/A	44 mt	N/A	N/A

In case of over-harvest, explain how the over-harvest occurred and the actions taken, or to be taken, to prevent further over-harvest:
No overharvests occurred in 2000.

In case of harvest in excess of specified minimum size, explain domestic measures implemented to avoid further overharvest, the monitoring of compliance with domestic measures, and any other actions to be taken to prevent over-harvest:
No overharvests occurred in 2000.

Other comments:

There were no catch limits in place for bigeye, yellowfin or skipjack during 2000.

The United States has implemented a minimum size for bigeye and yellowfin that corresponds to 6.4 kg (a higher minimum size than the 3.2 kg adopted by ICCAT). There is zero tolerance for fish less than 6.4 kg in both the commercial and recreational U.S. fisheries.

Panel 2 - North Atlantic bluefin tuna and albacore (Calendar year 2000)

Species/Region	Catch limit	Catch	Estimated Catch over/under catch limit	Catch of Age 0	Estimated catch over 15% tolerance of fish below 6.4kg	Estimated catch over 8% tolerance of fish below 30kg or 115cm
Western BFT	1387 mt, including 111 mt of BFT <115 cm	1212 mt landed, including 34.6 mt of BFT <115 cm	175 mt under	0 mt	0 mt	0
Eastern BFT	N/A	0 mt	N/A	0 mt	0 mt	N/A
N. Albacore	N/A	406 mt landed	N/A	0 mt	0 mt	N/A

In case of over-harvest, explain how the over-harvest occurred and the actions taken, or to be taken, to prevent further over-harvest:
No overharvests occurred in 2000.

In case of harvest in excess of specified minimum size, explain domestic measures implemented to avoid further over-harvest, the monitoring of compliance with domestic measures, and any other actions to be taken to prevent over-harvest:
No overharvests occurred in 2000.

Other comments:
The above figures represent landings and discards for the calendar year. While the United States is managing its fisheries on a fishing year (June through May) schedule, these estimates are not yet available, so calendar year figures are presented here. During the 1999 fishing year, there was an underharvest of 228 mt, which has been carried over to adjust the 2000 fishing year quota to 1615 mt. Landings estimates from the 2000 fishing year will be provided at the 2002 annual meeting.

The United States has zero tolerance for landings of bluefin less than 6.4 kg. There were 34.6 mt of bluefin tuna less than 115 cm landed during 2000, accounting for 2.5 % of the landings quota of 1387 mt. An estimated 67 mt of bluefin were discarded dead during the 2000 calendar year.

Panel 3 - South Atlantic albacore (Calendar year 2000)

Species/Region	Catch limit	Catches	Estimated catch over/ under catch limit
S. Albacore	4.9 mt	0.9 mt	0 mt

In case of over-harvest, explain how the over-harvest occurred and the actions taken, or to be taken, to prevent further over-harvest:
No overharvest occurred in 2000.

In case of harvest in excess of specified minimum size, explain domestic measures implemented to avoid further over-harvest, the monitoring of compliance with domestic measures, and any other actions to be taken to prevent over-harvest:
N/A

Other comments: The U.S. quota for 1999 is 4% of its total swordfish catch in the South Atlantic.

Panel 4 - Swordfish and Marlins (Calendar year 2000)

Species/Region	Catch limit (Swordfish)	Catches of Swordfish	Estimated SWO catch over / under catch limit	Estimated SWO catch less than 119 cm
N. Atlantic swordfish	2951 mt ww (landings); 320 mt ww (dead discards)	2864.3 mt ww (landings); 488.9 mt ww (dead discards)	87 mt ww underharvest; 168 mt ww over the dead discard allowance	9.4 mt ww
S. Atlantic swordfish	384 mt ww	51 mt ww landed	333 mt ww underharvest	0 mt

Species/Region	Landings Target (25% reduction from 1996 landings)	Landings (BIL)	Estimated landings of marlins in excess of target
Atlantic white marlin	2.5 mt	0.2 mt ww landed	---
Atlantic blue marlin	26 mt	24 mt ww landed	---

In case of over-harvest, explain how the over-harvest occurred and the actions taken, or to be taken, to prevent further over-harvest: Dead discards of swordfish totaled 489 mt during the 2000 calendar year. Extensive time/area closures, designed to minimize interactions with undersized swordfish, were implemented in August 2000. (See page 16 of the U.S. National Report). These new management measures are expected to result in a decline in swordfish dead discards in the 2000 fishing year and beyond. If fishing year estimates indicate an overharvest of landings quota and/or dead discard allowance, this overharvest will be deducted from the 2002 landings quota.

In case of harvest in excess of specified minimum size, explain domestic measures implemented to avoid further over-harvest, the monitoring of compliance with domestic measures, and any other actions to be taken to prevent over-harvest: During 2000, weighout slips showed 9.4 mt ww of swordfish < 33 lb dw (which corresponds roughly to 119 cm). This corresponds to approximately 0.3 % of the U.S. quota for the North Atlantic. Time/area closures should minimize interactions with small swordfish.

Other comments: The above figures represent landings and discards for the calendar year. While the United States is managing its fisheries on a fishing year (June through May) schedule, these estimates are not yet available, so calendar year figures for 2000 are presented here. The 1999 underharvest of 731 mt ww will be added to the 2001 U.S. quota for North Atlantic swordfish; therefore, the 2000 landings quota has not been adjusted. 400 mt ww of the 2001 fishing year quota will be set aside for Japan.

NOAA ENFORCEMENT ACTIONS TAKEN ON ICCAT SPECIES IN THE UNITED STATES (September 1, 2000 - August 31, 2001)

During the reporting period, enforcement efforts consisted of dockside monitoring of offloads at major landing facilities in conjunction with dealer record checks, as well as at-sea boardings. Enforcement officials detected the following violations within the U.S. Fleet:

Prohibition	Number of Cases	Disposition/Status
Undersized Tuna	1	Settlement Paid
Undersized Billfish	1	Open investigation
Possession of Tuna w/o tail & fin	1	Open investigation
	1	Sent to General Counsel (GC)
Commercially possess Billfish w/o Certificate of Eligibility (CoE)	1	Open investigation
Illegal sale of Billfish	1	Open investigation
Possess Tuna w/o vessel permit	1	Open investigation
Possess Tuna w/o dealer permit	1	Open investigation
Purchase of HMS from un-permitted vessel	1	Open investigation
Illegal use of live bait	19	Open investigations
Impeding an investigation	1	Written warning
Tuna and/or Swordfish caught with gillnet	1	Sent to GC
Illegally possess HMS w/o vessel permit	2	Open investigations
	2	Written warnings
	1	Sent to GC
	1	Satisfactorily settled

HMS not in specified form	1	Open investigation
No HMS dealer permit	4	Open investigations
	1	Written warning
Pelagic Longline in closed area	3	Open investigations
Illegal sale of HMS to non-permitted dealer	1	Open investigation
Improper records/logs	4	Written warnings
	3	Closed - lack of OLE resources
Exceed Bluefin Tuna catch limit	1	Open investigation
Import/Export Bluefin Tuna w/o dealer permit	1	Open investigation
Anglers fail to report Bluefin Tuna catch	3	Open investigations
Fish for Bluefin Tuna with illegal gear	1	Open investigation
	1	Sent to GC
Swordfish in improper form	1	Settlement paid
Illegal sale/purchase of Swordfish	1	Open investigation
Unspecified HMS prohibitions	3	Open investigations
	2	Transferred to another Division or Agency

Swordfish Imports into the United States (metric tons, whole weight)
Data Summarized from Certificates of Eligibility from January 1, 2000 - Dec 31, 2000

Flag of HarvestingVessel	Atlantic Ocean	Pacific Ocean	Indian Ocean	Not Provided	TOTAL
Australia	0	294	36	25	355
Barbados	7	0	0	0	7
Brazil	1716	2	0	0	1718
Canada	321	0	0	0	321
Chile	0	1028	0	0	1028
Costa Rica	0	426	0	0	426
Ecuador	0	308	0	1	308
El Salvador	0	51	0	0	51
Fiji Islands	0	66	0	0	66
Grenada	39	0	0	0	39
Indonesia	0	0	56	0	56
Japan	0	155	43	0	199
Mexico	0	380	0	0	380
Namibia	25	0	0	0	25
New Zealand	0	290	0	42	332
Panama	1	2	0	0	2
Peru	0	0	0	1	1
Phillipines	24	19	0	148	191
Samoa	0	3	0	0	3
Singapore	0	0	0	52	52
South Africa	714	0	0	13	730
St. Vincent	20	0	0	4	24
Taiwan	327	38	4332	0	4697
T & T	21	0	0	0	21
United States	3	0	0	0	3
Uruguay	251	0	0	0	251
Venezuela	15	0	0	10	25
Vietnam	0	45	0	0	45
Not Provided	0	0	2	3	5
TOTAL	**3483**	**3106**	**4472**	**300**	**11361**

Notes on Table of Swordfish Imports into the United States:

1. The Swordfish Import Monitoring Program data published in the 2000 U.S. National Report was incorrectly labeled as metric tons instead of in units of thousands of pounds. To convert to metric tons, those data must be multiplied by a conversion factor of 0.454.

2. Data from the Certificates of Eligibility, which was originally provided in terms of dressed weight, has been converted to whole weight using a conversion factor of 1.3333.

3. "Not Provided" indicates that information on either the ocean of origin or the flag of the harvesting vessel was not reported on the certificate of eligibility.

Appendix Table 2.1-YFT. Annual Landings (MT) of Yellowfin Tuna from 1997 to 2000

Area	Gear	1997	1998	1999	2000
NW Atlantic	Longline	838.9	464.9	581.3	734.45
	Rod and reel*	3560.9	2845.7	3818.2	3809.47
	Troll	218	177.5	0	0
	Gillnet	1.3	1.7	0.2	0.21
	Trawl	1.9	0.7	4.1	1.76
	Handline	34.3	0	192	235.7
	Trap	**	0.1	0.8	0.53
	Uncl	0	0	2.1	1.31
Gulf of Mexico	Longline	2571.3	1864.5	2736.6	2133
	Rod and reel*	7.7	80.9	149.4	52.26
	Handline	55.6	60.8	12.7	28.57
	Gillnet	0	0	**	0
Caribbean	Longline	135.4	58.6	24.4	11.77
	Troll	19.6	0	0	0
	Handline	.7	3.9	14.5	19.41
	Gillnet	**	0	0	0.09
	Trap	.1	0	0.1	0.28
NC Area 94a	Longline	6.1	4.6	0.2	2.11
SW Atlantic	Longline	221.9	55.3	32.4	19.76
All Gears		7673.7	5619.2	7569	7050.68

** $\leq$ 0.05 MT

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys

Appendix Table 2.1-SKJ. Landings (MT) of Skipjack Tuna from 1997 to 2000

Area	Gear	1997	1998	1999	2000
NW Atlantic	Longline	1.0	0.7	0.3	0
	Rod and reel*	42.0	49.5	63.6	13.12
	Troll	.6	0.4	0	0
	Gillnet	8.9	16.9	26.5	1.86
	Trawl	0	0.2	1.0	0.04
	Handline	.1	0	0.2	0.23
	Trap	0	0	17.5	0
Gulf of Mexico	Longline	1.3	0.6	0.4	0.23
	Rod and reel*	21.7	37.0	34.8	16.67
	Handline	0	0	0.4	0.65
	Uncl	0	0	0	0.04
Caribbean	Longline	1.2	0	1.3	1.62
	Gillnet	.2	0	0.4	0.59
	Handline	0	0	5.8	8.8
	Trap	**	0	0.1	0.28
	Trol	7.3	0	0	0
SW Atlantic	Longline	**	0	0	0
All Gears		84.3	105.3	152.3	44.13

** ≤ 0.05 MT

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys

Appendix Table 2.1-BET. Landings (MT) of Bigeye tuna by year for 1997-2000.

Area	Gear	1997	1998	1999	2000
NW Atlantic	Longline	476.3	544.3	737.8	333.2
	Rod and reel*	333.5	228.0	316.1	34.4
	Troll	3.9	4.0	0.0	0.0
	Gillnet	**	0.4	0.2	0.0
	Handline	2.7	0.0	11.9	4.1
	Trawl	1.0	0.5	1.2	1.7
	Pound	0.0	0.0	0.0	0.0
	Uncl	0.5	0.0	0.9	0.0
Gulf of Mexico	Longline	33.9	25.6	54.6	44.5
	Rod and reel*	0.0	0.0	1.8	0.0
	Handline	**	0.1	0.2	0.1
Caribbean	Longline	50.0	48.5	23.2	13.7
	Handline	0.0	0.0	0.2	1.5
NC Area 94a	Longline	91.8	48.4	35.3	63.1
SW Atlantic	Longline	142.8	28.5	78.2	77.4
All Gears		1136.4	928.3	1261.6	573.6

** <= 0.05
* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys

Appendix Table 2.2a-BFT.

Estimates of BFT Longline Discard Estimates using several different methods					
Methodology	Mean Annual Metric Tonnes for the Period Indicated				
	1992-1997[1]	*1993-1997*[1]	*1994-1997*[1]	*1999*[1]	2000[1]
logbook tallies	67	72	82	30	67
no pooling	171	177	198	83	132
5 observations for pooling	197	206	233	134	143
30 observations for pooling	145	131	139	151	173

Notes: *logbook tallies* represents the methodology previously applied and assumes that logbook reports are an accurate indication of the levels of dead discarded BFT; *no pooling* makes use of the direct observations of dead discard rates, but assumes for strata for which no observations are available, that 0 dead discards occurred even though logbooks might indicate otherwise; *5 observations for pooling* makes use of the direct observations of dead discard rates and pools across years until at least 5 observations per area-quarter stratum is achieved for computing observed dead discard rates; *30 observations for pooling* makes use of the direct observations of dead discard rates and pools across years and for some cases, quarters, until at least 30 observations per area-quarter stratum is achieved.

[1] Calender year statistics

Appendix Table BYP 1. Genetic samples from the Mediterranean Sea, east Atlantic and west Atlantic (1) deposited in sample archive in Charleston, SC or (2) held at U. South Carolina (pers. comm. Bert Ely). Information is through mid September, 2001.

Mediterranean Sea

	1993	1994	1995	1996	1997	1998	1999	2000	2001		Total
< 39 cm	12	22				85	91				210
39-64 cm		33				16	14				63
65-88 cm		9					7				16
88-111 cm		2				1					3
> 111 cm						24					24
unknow n						1					1
Total-Med	12	66				127	112				317

East Atlantic

< 39 cm							1				1
39-64 cm							9				9
65-88 cm							1				1
88-111 cm							1				1
> 111 cm	1						163				164
unknow n											
Total-east	1						175				176

West Atlantic

< 39 cm											0
39-64 cm	2				15	85	1				103
65-88 cm	6			1	76	44	54	22			203
88-111 cm			1	1	307	127	94	62			592
> 111 cm	15	150	49	159	104	290	89	128	23		984
unknow n	1	3	25	86	58	11	1				185
Total-w est	24	153	75	247	560	557	239	212	23		2067

Appendix TableBYP- 2. Otolith samples from the west Atlantic deposited in the Charleston laboratory by size range.

	1996	1997	1998	1999	2000	2001	Total
< 39							0
39-64	0	10	35	1	0		46
65-88	1	70	34	53	22		180
89-111	0	285	124	92	60		561
112+	85	11	95	29	23		243
unknow n	2	23	7	1	0		33
Total	88	399	295	176	105		1063

Appendix Table BYP-3. Muscle samples useful reproductive research (frozen) deposited at the Charleston laboratory by region, year and 20 cm interval (0-19cm, ...).

East Atlantic

	1996	1997	1998	1999	2000	2001	total
20				1			
40							0
60							0
80							0
100				1			1
120				1			1
140				3			3
160				20			20
180				73			73
200				39			39
220				21			21
240				2			2
260				2			2
280				2			2
300							0
total-east				2164			2164

West Atlantic

	1996	1997	1998	1999	2000	2001	total
20							
40		8	4				12
60		3	21	1	9		34
80	1	19	1	1	47		69
100		18	1	2	25		46
120		1		4	11		16
140	1				66	2	69
160	12			1	6	4	23
180	49	6	16	6	5		82
200	12	9	8	24	8	1	62
220	22	8	5	10	10	2	57
240	6	3	1	9	3	5	27
260	3	3	4	1			11
280			4				4
300			2				2
total-w est	106	78	67	59	190	14	514

Appendix Table BYP-4. Muscle samples useful for reproductive research deposited at the Charleston laboratory tabulated by region, month and 20 cm interval (0-19cm, ...) through 2001.

East Atlantic

	1	2	3	4	5	6	7	8	9	10	11	12
20												
40												
60												
80												
100										1		
120										1		
140										3		
160										20		
180										73		
200										39		
220										21		
240										2		
260										2		
280										2		
300												
total-east										164		

West Atlantic

	1	2	3	4	5	6	7	8	9	10	11	12	
20													
40									8	8			16
60						2	7		8	34			51
80						5	51	9	4				69
100							23	7	13	6			49
120	4	1					7		2	6			20
140	19	46					2		2	2			71
160	4	6						4	10	8			32
180	19						2	11	54	30	16		132
200	13			3				8	30	22	18	6	100
220	7			4	2			3	24	38	16	4	98
240	1	1	1	7	2		1	5	18	8			44
260								4	12		2		18
280								1	6				7
300									4				4
total-west	67	54	1	14	4	7	93	52	195	162	52	10	711

Appendix Table 2.2b-BFT. Landings (MT) of Bluefin tuna for 1997 to 2000.					
Area	Gear	1997	1998	1999	2000
NW Atlantic	Longline	26.0	30.5	25.1	22.8
	Handline	17.4	29.2	15.5	3.2
	Purse Seine	249.7	248.6	247.9	275.2
	Harp	97.5	133.1	115.8	184.2
	* Rod and reel (>145 cm LJFL)	752.6	610.4	657.5	632.8
	* Rod and reel (<145 cm LJFL)	178.9	166.3	103.0	49.5
	Uncl	2.2	0.6	0.1	0.2
Gulf of Mexico	Longline	23.8	18.3	48.4	43.3
	* Rod and reel	0.0	0.0	0.4	0.9
	All Gears	1348.1	1237	1213.7	1212.1

* Rod and Reel catches and landings represent estimates of landings and dead discards when available based on harvesting sector.

Appendix Table 2.2-ALB. Landings (MT) of Albacore tuna for 1997 to 2000.					
Area	Gear	1997	1998	1999	2000
NW Atlantic	Longline	140.0	155.4	179.5	130.52
	Gillnet	42.8	40.1	27.0	0.78
	Handline	4.8	0	0.6	2.93
	Trawl	2.6	2.4	0.4	0.03
	Troll	1.6	5.8	0	0
	Rod and reel*	220.2	601.1	90.1	250.75
	Pound	1.3	0.9	0.4	0
	Uncl	0.2	0	0	0.12
Gulf of Mexico	Longline	16.9	3.9	3.8	4.13
	Rod and reel*	49.3	0	0	0
	Handline	0	0	**	0
Caribbean	Longline	16.1	17.8	8.3	9.24
	Trol	3.6	0	0	0
	Gillnet	**	0	0.2	0.13
	Trap	**	0	**	0.22
	Handline	0	0	3.8	5.01
NC Area 94a	Longline	11.4	1.6	1.5	2.6
SW Atlantic	Longline	4.7	1.4	1.4	0.89
	All Gears	515.5	830.4	317	407.35

** ≤ 0.05 MT

* Rod and Reel landings are estimates of landings and dead discards, when available.

Appendix Table 2.3-SWO. Catches and Landings (MT) of Swordfish for 1997 to 2000.

Area	Gear	1997	1998	1999	2000
NW Atlantic	* Longline	1262.2	1624.1	1872.3	1547.6
	Gillnet	0.4	36.3	0.0	0.0
	Handline	1.3	0.0	5.0	7.7
	Trawl	8.0	5.9	7.5	10.9
	Troll	0.4	0.7	0.0	0.0
	* unclassified	11.9	9.1	3.8	1.4
	Harpoon	0.7	1.5	0.0	0.6
	** Rod and Reel	10.9	4.7	21.3	15.6
	Trap	0.0	0.1	**	0.0
Gulf of Mexico	* Longline	759.9	633.1	579.6	631.7
	Handline	0.0	0.0	**	1.2
Caribbean	* Longline	688.9	516.0	260.5	331.9
	Trap	0.0	0.0	0.0	0.3
	Gillnet	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	0.0	0.0
NC Atlantic	* Longline	688.2	658.6	650.0	804.6
SW Atlantic	* Longline	417.9	170.1	185.2	143.8
	All Gears	3850.7	3660.2	3585.2	3497.1

* includes landings and estimated discards from scientific observer and logbook sampling programs.
** ≤ = 0.5 MT

Appendix Table 2.4-BIL. Landings (MT) and dead discards of Blue Marlin, White Marlin and Sailfish for 1998-2000.

		Blue Marlin			White Marlin			Sailfish		
Area	Gear	1998	1999	2000	1998	1999	2000	1998	1999	2000
NW Atlantic	* Longline	23.3	22.0	28.8	15.3	18.6	10.3	6.4	13.7	11.2
	* * Unclassified	0.6		0.1	0.7	0.1	0.0	0.1		0.0
	Rod and reel	34.1 +?	24.8 +?	13.75 +?	2.4 +?	1.5 +?	0.23 +?	0.1 +?	0.07 +?	1.75 +?
Gulf of Mexico	* Longline	18.5	55.2	29.6	11.8	31.5	29.9	17.0	57.4	33.9
	Rod and reel	4.5 +?	7.5 +?	4.7	0.2 +?	0.1 +?	0 +?	1.0 +?	0.6 +?	0.24 +?
Caribbean	* Longline	2.3	1.6	0.5	1.3	5.0	0.5	0.2	0.5	0.1
	Rod and reel	10.6 +?	4.6 +?	5.7	0.02 +?	0.0 +?	0.0	0.05 +?	0.0 +?	0.06 +?
	Other	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Unknown & NC Area 94a	* Longline	6.1	1.6	0.7	2.8	1.1	0.1	0.8	0.0	0.1
SW Atlantic	* Longline	1.6	1.7		0.9	0.5	0.0	2.7	0.0	0.1
	All Gears	101.6	119.0	83.7	35.4	58.3	41.0	28.3	72.3	47.3

* includes landings and estimated discards from scientific observer and logbook sampling programs.

Appendix Table 2.6-SAI. Alternative statistical survey based estimates of landed and released sailfish from the Gulf of Mexico and US Atlantic coasts coming (mainly) from the general MRFSS statistical survey of recreational fishing.

Year	Fish Landed	MT Landed	%Released
1981	23558	422.0	42%
1982	26792	471.0	23%
1983	44222	904.6	8%
1984	23746	452.4	32%
1985	16381	306.2	29%
1986	27759	420.5	45%
1987	24915	475.5	47%
1988	29648	480.5	57%
1989	10728	194.7	78%
1990	15285	312.9	56%
1991	25446	389.9	64%
1992	10876	184.4	85%
1993	11742	228.8	77%
1994	9768	160.6	84%
1995	16204	376.5	81%
1996	12295	199.4	84%
1997	17091	445.3	80%
1998	9383	231.6	89%
1999	8311	157.9	92%
2000	3312	62.9	95%

Appendix Table 2.6a-SHK. Estimates of U.S. commercial and recreational landings and dead discards for pelagic sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean.

	Commercial					Recreational			Discards			Total	
Year	mt (ww) [1]	mt (dw) [2]	lb (dw) [3]	av. weight [4]	number [5]	number [6]	av. weight [7]	lb (dw)	number [8]	mt (ww) [8]	lb (dw) [9]	number	lb (dw)
1981						12,603	50.035	630,591				12,603	630,591
1982	45.41	23.17	51,077		1,354	20,015	50.996	1,020,685				21,369	1,071,762
1983	51.89	26.47	58,367		1,627	21,968	117.64	2,584,316				23,595	2,642,683
1984	49.12	25.06	55,250		1,538	23,295	67.489	1,572,156				24,833	1,627,406
1985	57.99	29.59	65,227		1,969	92,998	38.224	3,554,756				94,967	3,619,982
1986	68.50	34.95	77,049	66.850	2,385	42,572	65.631	2,794,043				44,957	2,871,091
1987	87.46	44.62	98,375	69.171	2,786	37,153	39.002	1,449,041	13,092	560.64	630,606	53,031	2,178,022
1988	129.48	66.06	145,639	68.958	3,915	32,993	41.271	1,361,654	13,655	468.74	527,237	50,563	2,034,530
1989	141.36	72.12	159,001	57.574	4,937	18,255	73.228	1,336,777	13,480	538.21	605,376	36,672	2,101,155
1990	102.744	52.42	115,566	67.221	3,274	11,630	41.246	479,691	13,955	795.97	895,300	28,859	1,490,557
1991	114.32	58.33	128,587	76.681	3,290	10,070	62.061	624,954	17,232	813.21	914,695	30,592	1,668,236
1992	139.81	71.33	157,258	73.737	4,111	16,304	39.219	639,427	8,939	298.31	335,538	29,354	1,132,222
1993	387.30	197.60	435,638	81.631	5,278	29,861	50.988	1,522,553	30,545	1,191.52	1,340,217	65,684	3,298,407
1994	513.46	261.97	577,535	82.713	6,688	5,638	68.280	384,963	13,410	637.71	717,294	25,736	1,679,791
1995	393.93	200.98	720,219	75.676	9,517	32,499	47.629	1,547,895	10,864	710.27	798,909	52,880	3,067,023
1996	402.03	205.12	760,364	81.934	9,280	21,573	33.697	726,945	22,153	949.22	1,067,682	53,006	2,554,992
1997	381.08	194.43	537,594	85.937	6,256	8,743	54.834	479,414	7,754	250.42	281,671	22,753	1,298,679
1998	267.07	136.26	505,275	74.007	6,827	11,762	35.977	423,161	6,002	280.09	315,044	24,591	1,243,480
1999	113.10	57.70	400,821	74.007	5,416	11,122	48.304	537,237	3,464	117.63	132,310	20,002	1,070,368
2000	191.15	97.53		74.007	0	12,847	16.749	215,174	7,495	216.13	243,102	20,342	458,277

[1] From weighout data sheets; [2] Wet weight to dry weight conversion ratio is 1.96; [3] 1982-1994 data are from weighout data sheets, 1995-1999 data are from the southeast quota monitoring program and southeast and northeast general canvass, data for 2000 were not yet available; [4] In pounds dressed weight from weighout data sheets, values for 1998-2000 are taken as the mean of 1986-1997 values; [5] 1982-1994 data are taken directly from weighout data sheets, 1995-2000 data obtained by dividing values in fourth column (lb dw) by those in fifth column (av. weight); [6] Almost all recreational landings are from the MRFSS survey; [7] In pounds dressed weight; [8] Pelagic dead discards are equal to the sum of dead discards for individual species (Tables 2-8) for 1987-1992, but not for the remaining years because there were unclassified thresher sharks reported in 1993-1995 (not included in Table 4) and other unclassified pelagic sharks in 1996-2000; [9] Wet weight to dry weight conversion ratio is 1.96.

Appendix Table 2.6b-SHK Estimates of commercial and recreational landings and dead discards for blue sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean.

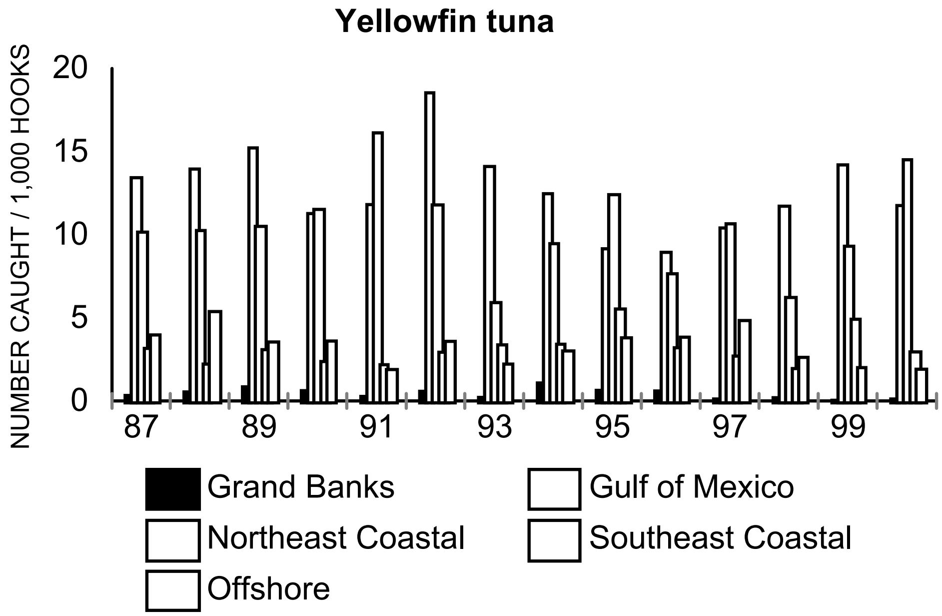
	Commercial					Recreational			Discards			Total	
Year	mt (ww) [1]	mt (dw) [2]	lb (dw) [3]	av. weight [4]	number [5]	number [6]	av. weight [7]	lb (dw)	number	mt (ww)	lb (dw) [8]	number	lb (dw)
1981						4,925	46.653	229,766				4,925	229,766
1982	0.00	0.00	0		0	0	46.653	-				0	0
1983	0.00	0.00	0		0	14,593	46.653	680,807				14,593	680,807
1984	0.00	0.00	0		0	2,579	46.653	120,318				2,579	120,318
1985	0.00	0.00	0		0	11,621	33.003	383,528				11,621	383,528
1986	0.40	0.20	450	148.500	6	18,898	66.182	1,250,707				18,904	1,251,157
1987	0.00	0.00	0	69.091	0	20,683	47.545	983,373	12,506	526.20	591,868	33,189	1,575,241
1988	0.10	0.05	112	69.091	4	12,235	32.62	399,106	12,934	421.16	473,719	25,173	872,937
1989	0.00	0.00	0	69.091	0	7,419	41.011	304,261	12,525	480.00	539,902	19,944	844,163
1990	0.25	0.13	286	69.091	6	1,745	56.134	97,954	13,141	741.33	833,845	14,892	932,084
1991	0.00	0.00	0	69.091	0	6,643	52.12	346,233	16,562	772.32	868,702	23,205	1,214,936
1992	0.47	0.24	529	67.769	14	5,853	41.191	241,091	7,043	184.39	207,401	12,910	449,021
1993	7.88	4.02	8,860	75.188	85	14,114	53.567	756,045	29,329	1,136.33	1,278,139	43,528	2,043,044
1994	7.82	3.99	8,796	79.960	105	507	46.653	23,653	11,986	572.24	643,653	12,598	676,103
1995	3.61	1.84	3,106	66.557	47	459	46.653	21,414	9,725	618.15	695,293	10,231	719,812
1996	5.40	2.76	17,920	70.819	253	11,224	34.07	382,402	18,996	710.69	799,381	30,473	1,199,703
1997	1.42	0.72	904	52.933	17	4,236	55.74	236,115	6,614	184.61	207,643	10,867	444,662
1998	2.87	1.46	706	69.091	10	6,085	46.653	283,884	5,295	195.25	219,616	11,390	504,206
1999	0.16	0.08	1,111	69.091	16	5,218	46.653	243,435	2,772	98.96	111,310	8,006	355,856
2000	0.61	0.31		69.091	0	6,779	46.653	316,261	6,298	137.19	154,311	13,077	470,571

[1] From weighout data sheets; [2] Wet weight to dry weight conversion ratio is 1.96; [3] 1982-1994 data are from weighout data sheets, 1995-1999 data are from the southeast quota monitoring program and southeast and northeast general canvass, data for 2000 were not yet available; [4] In pounds dressed weight from weighout data sheets, values for 1987-1991 and 1998-2000 are taken as the mean of 1986 and 1992-1997 values; [5] 1982-1994 data are taken directly from weighout data sheets, 1995-2000 data obtained by dividing values in fourth column (lb dw) by those in fifth column (av. weight); [6] Almost all recreational landings are from the MRFSS survey; [7] In pounds dressed weight, values for 1981-1984, 1994-1995, and 1998-2000 are taken as the mean of 1985-1993 and 1996-1997 values, for which n?5; [8] Wet weight to dry weight conversion ratio is 1.96.

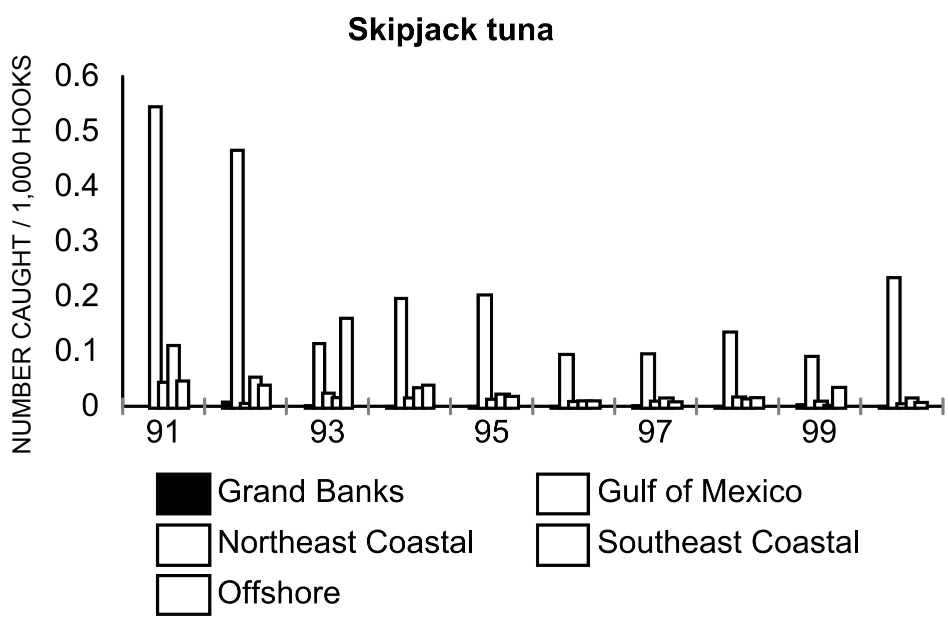
Appendix Table 2.6c-SHK. Estimates of commercial and recreational landings and dead discards for shortfin makos in the U.S. Atlantic, Gulf of Mexico, and Caribbean.

	Commercial					Recreational			Discards			Total	
Year	mt (ww) [1]	mt (dw) [2]	lb (dw) [3]	av. weight [4]	number [5]	number [6]	av. weight [7]	lb (dw)	number	mt (ww)	lb (dw) [8]	number	lb (dw)
1981						7,678	56.395	433,001				7,678	433,001
1982	42.12	21.49	47,376		1298	13,522	50.996	689,568				14,820	736,944
1983	6.78	3.46	7,626		225	7,375	52.450	386,815				7,600	394,441
1984	42.46	21.66	47,759		1436	15,474	67.531	1,044,975				16,910	1,092,734
1985	53.24	27.16	59,884		1877	79,912	41.487	3,315,309				81,789	3,375,193
1986	64.76	33.04	72,842	64.936	2,318	20,792	70.107	1,457,665				23,110	1,530,507
1987	77.84	39.71	87,554	65.771	2,592	14,809	35.069	519,337	217	8.72	9,808	17,618	616,699
1988	101.37	51.72	114,021	63.095	3,398	19,998	44.693	893,771	127	5.08	5,714	23,523	1,013,505
1989	124.56	63.55	140,105	55.771	4,608	8,367	90.117	754,009	249	9.01	10,134	13,224	904,248
1990	91.77	46.82	103,223	63.843	3,081	8,509	35.483	301,925	259	10.31	11,593	11,849	416,741
1991	104.87	53.51	117,957	75.502	3,085	3,422	69.020	236,186	245	11.16	12,553	6,752	366,697
1992	125.97	64.27	141,691	71.833	3,782	8,382	33.589	281,543	771	38.41	43,203	12,935	466,437
1993	281.09	143.41	316,164	77.355	4,044	15,034	49.883	749,941	562	24.03	27,029	19,640	1,093,134
1994	324.66	165.64	365,177	76.717	4,623	4,496	79.296	356,515	558	21.45	24,127	9,677	745,818
1995	288.83	147.36	237,736	71.209	3,339	31,042	51.227	1,590,189	446	28.44	31,989	34,827	1,859,914
1996	238.05	121.46	216,120	83.239	2,596	9,397	30.265	284,400	0	0.00	-	11,993	500,520
1997	245.46	125.23	224,362	84.574	2,653	3,025	60.839	184,038	0	0.00	-	5,678	408,400
1998	199.76	101.92	224,421	71.154	3,154	5,633	29.590	166,680	0	0.00	-	8,787	391,101
1999	90.05	45.94	170,860	71.154	2,401	1,383	52.450	72,538	0	0.00	-	3,784	243,398
2000	166.74	85.07		71.154	0	5,563	52.450	291,777	0	0.00		5,563	291,777

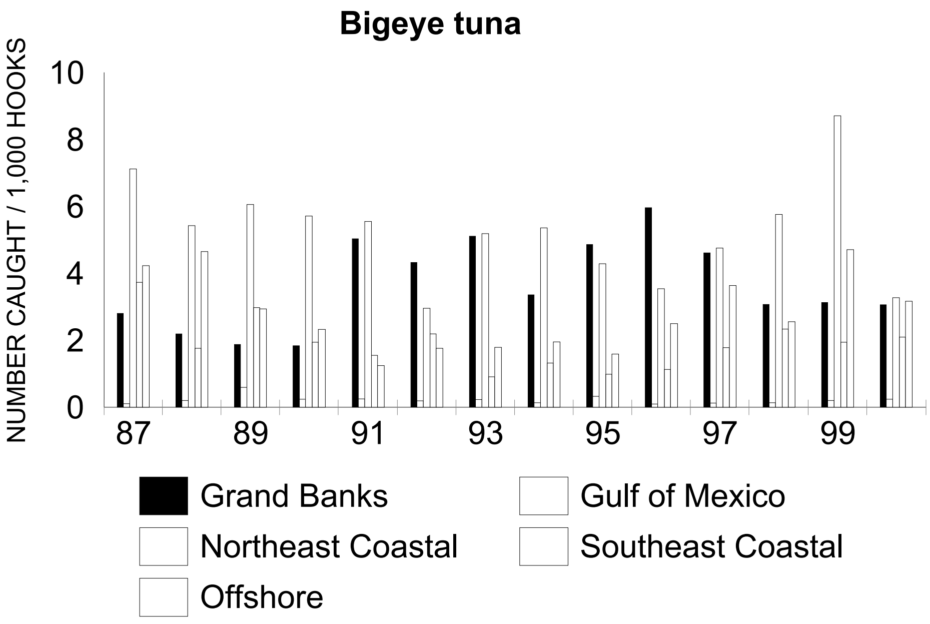
[1] From weighout data sheets; [2] Wet weight to dry weight conversion ratio is 1.96; [3] 1982-1994 data are from weighout data sheets, 1995-1999 data are from the southeast quota monitoring program and southeast and northeast general canvass, data for 2000 were not yet available; [4] In pounds dressed weight from weighout data sheets, values for 1998-2000 are taken as the mean of 1986-1997 values; [5] 1982-1994 data are taken directly from weighout data sheets, 1995-2000 data obtained by dividing values in fourth column (lb dw) by those in fifth column (av. weight); [6] Almost all recreational landings are from the MRFSS survey; [7] In pounds dressed weight, values for 1983 and 1999-2000 are taken as the mean of 1981-1982 and 1984-1998 values, for which n?5; [8] Wet weight to dry weight conversion ratio is 1.96.



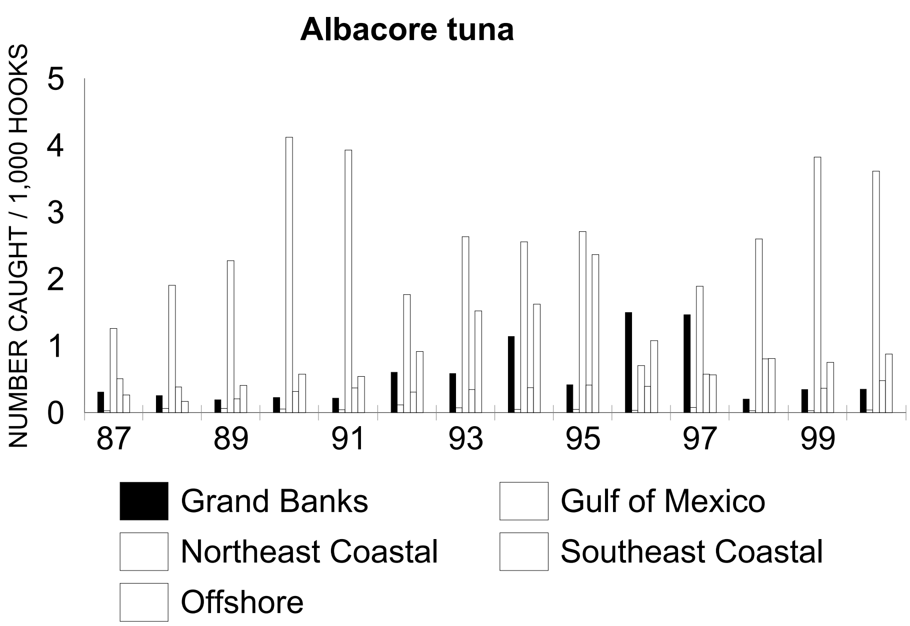
Appendix Figure 2.1-YFT. *Nominal catch rates for YFT in US Longline logbook reports.*



Appendix Figure 2.1-SKJ. *Nominal catch rates for SKJ in US Longline logbook reports*.



Appendix Figure 2.1-BET. *Nominal catch rates for BET in US Longline logbook reports.*



Appendix Figure 2.2 ALB. *Nominal catch rates for ALB in US Longline logbook reports*.

CIE Review 1.

CENTER FOR INDEPENDENT EXPERTS REVIEW
BY-CATCH IN U.S. ATLANTIC PELAGIC LONG-LINE FLEET

1. EXECUTIVE SUMMARY

1.1. Impetus and goals for the review

The consultant is required to provide a review of, and recommendations for, appropriate approaches to evaluate the precision and accuracy of methods and assumptions needed for estimation of dead discarded catches given current sampling levels for the range of species taken as by-catch in the US Atlantic pelagic long-line fishery. To review, and recommend, the most appropriate methodology for determining compliance with international re-building programme agreements' which incorporate rules regarding dead discarded catch.

1.2. Main conclusions and recommendations

ToR 1) determine if the methods applied to estimate dead discarded catch of bluefin tuna are appropriate given the available data

A two-stage approach to the estimation of bluefin tuna discarded dead is proposed in document SCRS/00/97. The method assumes a log-normal distribution of the positive by-catch rate observations. Estimates are constructed as a product of the proportion of occurrences of discarding and the average rate at which discarding occurs, given that discarding has occurred. The variance is a function of the variability of the non-zero dead discard rates as well as the number of discarding and non-discarding events.

Tests of normality are not presented in the document SCRS/00/97. Furthermore, there is no comment as to the validity of the assumption that the natural logarithm of the non-zero dead discard values is normally distributed. Estimators based on the $\Delta - distribution$ appear to have been used without verification of the underlying statistical assumptions.

ToR 2) recommend improvements in methods for estimating the level and associated precision in estimates of by-catch

The assumptions underlying the use of the Δ-lognormal method need to be tested before the estimates and their precision can be adopted. Alternative models might be developed (and tested) following an approach outlined in the main text of this report. The two-stage model may be further developed and tested based upon the ideas of conditionality and the explicit modelling of aggregation. Estimates of precision may be obtained through computer-intensive techniques such as bootstrapping.

ToR 3) recommend improvements in data collection that could lead to more accurate and precise estimates of by-catch

> Identification of particular factors (area fished, temporal effects, fleet effects) that result in a high level of by-catch may allow observer coverage to be weighted appropriately to monitor the influence of these factors, and optimise observer coverage. In turn, action could be taken to minimise the effect of these factors on by-catch, for example, through spatial or temporal closed area management, or restrictions on the use of gear.

ToR 4) comment on the appropriateness of utilizing these estimates for judging compliance with the recovery programme rules' established by ICCAT

> Document SCRS/00/142 notes that across years, comparisons within estimation methods (pooling or non-pooling) indicated that the level of discards in 1999 were no larger than, and were possibly lower than, the levels in previous years. Given the information available for this review, it is not possible to comment fully on the validity of this observation. However, the suggestions made in this report, which could refine the information on discards in space and time, may allow further management measures, such as the current closed areas in the northwest Atlantic, to be used to improve compliance with the recovery plan.

1.3. Interpretation of the findings with respect to conclusions and management advice

As noted in document SCRS/00/97, the approach described for the estimation of bluefin tuna dead discards improves upon previously available methodologies but there is still scope for improvement of the two-stage model proposed. A number of suggestions are to be found in the text of this report which could lead to improved estimates of bluefin tuna dead discards and their precision.

Executive summary

The overall objective of this review is to evaluate the methods used for the estimation of dead discarded bluefin tuna catches by the U.S. Atlantic pelagic longline fleet, and to recommend any changes to the methods that are found to be appropriate. The terms of reference of the review were to:

1. Determine if the methods applied to estimate dead discarded catch of bluefin tuna are appropriate given the available data;
2. Recommend improvements in methods for estimating the level and associated precision in estimates of bycatch;
3. Recommend improvements in data collection that could lead to more accurate and precise estimates of bycatch; and
4. Comment on the appropriateness of utilizing these estimates for judging compliance with the recovery program rules established by ICCAT.

The review concentrates on assessing a revised method for estimating dead discards. The method involves a statistical analysis of observer data collected over the period 1992–1999, and makes use of pooling observations across strata according to a set order where observations are deficient (< 30) in individual strata. Previous estimates were based on self-reported logbook tallies of dead discards.

Several areas of the revised method were identified as requiring additional work, including:

- Testing the appropriateness of the delta lognormal statistical model in relation to possible alternatives;
- Testing whether the inclusion of covariates in the analysis via a GLM might improve the predictive (estimation) power of the model;
- Possible use of bootstrap variance estimates;
- Possible joint analysis of logbook and observer data;
- Clarification of procedures used to estimate catch-at-length and total weight of dead discards.

The analysis as it is currently applied (30-observations-for-pooling) to the available data does not seem capable of providing reliable annual estimates of dead discards for stock assessment purposes, because pooling across years effectively removes much of the between-year variability. On the other hand, self reported logbook estimates appear to be negatively biased (but may better reflect year-to-year variability). Further research in the areas noted above may enable the estimation of dead discards to be improved. It is difficult to say whether such improvements, if they were achieved, would substantially alter the results of bluefin assessments. However, this would be fairly easy to test through sensitivity analysis.

Concerning improvements in data collection, it is suggested that estimates of dead discards would benefit by enhanced observer program coverage, and that an appropriate level of coverage to achieve a designated level of precision in the estimates of dead discards could be determined by a simulation analysis. For the logbook data, it was noted that the quality of logbook data is often enhanced by frequent personal communication between scientists and vessel operators, ideally by technical staff located in fishing ports. This aspect of the logbook program should be assessed and improved if found to be deficient.

Concerning the use of the various estimates to assess U.S. compliance with the rules of the ICCAT rebuilding program for West Atlantic bluefin tuna, it was noted that:

- Comparisons between an allocation and the current year's estimate should be made using the same method to calculate both variables;
- For the time being, the comparison of the current year's estimate with the allocation should continue to be made on the basis of logbook tallies;
- The 30-observations-for-pooling method should not be used for such comparisons because of its limited ability (at least on the basis of observer coverage achieved in 1999) to detect inter-annual variability in dead discards.

The following specific recommendations were made:

1. That consideration be given to carrying out the estimation of dead discards within a GLM framework in order to test the predictive value of a range of covariates and to more transparently assess the information content of the data.
2. That the appropriateness of the delta lognormal assumption be investigated by comparing the observed and predicted distributions of dead discard rates.
3. That alternative statistical models, such as the negative binomial and negative binomial with added zeros, also be assessed.
4. That comparative bootstrap variance estimates be obtained for areas where the observer coverage is sufficient.
5. That the self-reported logbook data be re-examined to ascertain whether it is possible to identify a subset of the data (e.g. certain vessels) that fully report dead or total discards.
6. That the distributions of dead discards for positive sets from the self-reported logbook data be compared to equivalent distributions from the observer data.
7. Dependent on the outcomes of the analyses suggested in recommendations 5 and 6, that consideration be given to designing a model to jointly analyze self-reported logbook data and observer data.
8. That the procedure for estimating catch-at-length be clarified, particularly the matching of time-area strata for the length-frequency data and dead discards estimates.
9. That consideration be given to increasing observer coverage of the U.S. Atlantic pelagic longline fleet so as to provide more reliable estimates of dead discards of bluefin tuna (and other estimates based on the observer data). Some guidance on the improvements in precision of estimates as a function of observer coverage rates could be obtained from simulation analysis.
10. That the operations of the logbook program be reviewed to ascertain the reliability of data and whether data quality might be improved by enhanced liaison between science and industry.
11. That the logbook tallies estimate of dead discards continue to be used to assess compliance with the ICCAT rebuilding program rules, at least until such time as a statistical analysis of the observer (and possibly logbook) data that better estimates dead discards in the current year relative to an historical average can be developed.