

## COLLECTION OF TASK I, II AND BIOLOGICAL DATA FOR UNITED STATES ATLANTIC OCEAN FISHERIES

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## SUMMARY

Sampling and data processing procedures used in the collection of total catch (Task I), sample catch and effort (Task II) and size frequency (biological data) fishery statistics are reviewed. Three major fishing operations are covered, 1) U.S. distant-water fishery, 2) U.S. coastal fisheries and 3) foreign fishery imports. Results indicate that: 1) sampling procedures are adequate for the U.S. distant water fishery and foreign fishery imports, 2) the precision of Task I and Task II statistics for the U.S. coastal fisheries could be improved by the adoption of a voluntary logbook system and 3) length-frequency sampling of skipjack, yellowfin and bigeye tunas from U.S. coastal fisheries should be increased as more of these fish are caught.

## RESUME

Les procédures d'échantillonnage et de traitement de données utilisées pour la collecte de statistiques sur la prise globale (Tâche I), l'échantillonnage de prise et effort (Tâche II) et les fréquences de taille (données biologiques) ont fait l'objet d'un examen. Trois pêcheries importantes sont couvertes: 1) la pêche lointaine des Etats-Unis, 2) la pêche côtière des Etats-Unis et 3) les importations de pêcheries étrangères. Les résultats indiquent que: 1) les procédures d'échantillonnage sont adéquates pour la pêche lointaine et les importations étrangères, 2) la précision des statistiques de la Tâche I et de la Tâche II des pêcheries côtières des Etats-Unis pourrait être améliorée en mettant sur pied un système de livre de bord volontaire et 3) l'échantillonnage de fréquence de taille du listao, de l'albacore et du thon obèse provenant des pêcheries côtières des Etats-Unis devrait être accru, au fur et à mesure de l'accroissement des prises de ces poissons.

## RESUMEN

Se examinan los procedimientos de muestreo y proceso de datos en la recopilación de estadísticas de la captura total (Tarea I), muestreo de captura y esfuerzo (Tarea II) y frecuencia de talla (datos biológicos). Abarca tres operaciones principales, 1) pesquería estadounidense en aguas distantes, 2) pesquerías costeras de EE.UU., y 3) importaciones de pesquerías extranjeras. Los resultados indican que: 1), los procedimientos de muestreo son adecuados para las pesquerías distantes de Estados Unidos e importaciones del extranjero; 2), la precisión de las estadísticas de las Tareas I y II para las pesquerías costeras podría mejorarse mediante la adopción de un sistema voluntario de cuadernos de pesca y 3) debería incrementarse el muestreo de frecuencias de talla de listado, rabil y patudo de las pesquerías costeras de EE.UU. ya que se han aumentado las capturas de estas especies.

DATA COLLECTION METHODS

INTRODUCTION

Fishery statistics gathered by the United States (U.S.) and submitted annually to the International Commission for the Conservation of Atlantic Tunas (ICCAT) include total catch and total effort (Task I), sample catch and effort (Task II) and size frequency (Biological data). These statistics are collected from three major fishing operations; 1) U.S. distant-water fishery, 2) U.S. coastal fisheries and 3) foreign fishery imports. This paper summarizes the methods used to collect and process these data before submission to ICCAT.

Task I, Task II and biological data for the U.S. distant-water fishery have been routinely collected, through a National Marine Fisheries Service (NMFS) contract, since 1967. The fishery has been mainly a distant water large purse seine (greater than 400 tons carrying capacity) fishery operating off Africa. Catches are primarily yellowfin, skipjack and bigeye tuna. Incidental catches of albacore, little tunny, blackfin and frigate mackerels are also made.

Task I, Task II and biological data are collected for various coastal fisheries that operate within 100 miles of the U.S. east coast or U.S. Gulf coast. Task I data have been collected since 1950. Task II and biological data have been collected since 1979. These coastal fisheries (commercial and recreational) use handlines, harpoons, purse seines, traps, gillnets, trolls, trawls, longlines, haul seines, and rod and reel gears. The catches include bluefin, yellowfin, albacore, bigeye, skipjack, swordfish, bonito, little tunny, king mackerel, spanish mackerel, blackfin, sailfish and marlins. Biological data are collected primarily from bluefin, blue marlin, white marlin, sailfish and swordfish catches but occasionally samples of yellowfin and skipjack are taken.

Biological data from foreign fishery imports of Atlantic tuna catches have been sampled by NMFS personnel in Puerto Rico since 1974. Landings are from baitboat, purse seine and longline catches. Primary emphasis is given to yellowfin, skipjack and bigeye tuna catches but occasionally catches of albacore, blackfin, little tunny and frigate mackerel are also sampled. No Task I or Task II data are collected, although, data on total imports are available.

Task I Data

Task I data have been collected by the NMFS for the U.S. distant-water fishery since 1967. Catch data are tabulated annually, in short tons (round weight), from cannery landing receipts. The data are reported by catch areas (i.e. eastern Atlantic, western Atlantic, etc.). Effort in number of vessels is also tabulated from these receipts. Coverage is 100%.

Task I data from commercial U.S. coastal fisheries are collected by various state agencies from landing receipts and provided to the NMFS. Catch data (in pounds round weight) have been collected since 1950 and effort data (in number of vessels) since 1967.

Task I data from recreational U.S. local fisheries are estimated through sampling of selected landing ports. Average weekly catch-per-unit effort, number of trips and sampling efficiency are estimated through an "intercept" survey in which vessel captains are interviewed to determine the number of hours fished and the catch for each sampled trip. Total catches are then calculated using,

$$WC = n * \frac{CPUE}{sf} * sc$$

CPUE = weekly average catch-per-unit effort

n = number of trips

sf = sampling efficiency

WC = total weekly catch

sc = sampling coverage factor. An extrapolation to 7 days from the normal 5 or 3 day sampling routine each week

Estimates of total effort are not made.

Data on imports of foreign caught tunas are collected by the NMFS. Occasionally, catch data by catcher vessel are available. This often occurs for Tema-based baitboat imports.

Task II Data

Task II data have been collected since 1967 for the U.S. distant-water fishery. Estimated catches by species, location of catch and date are recorded by fishermen in logbooks. The logbook information is transcribed by biologists at the port of landing, usually Puerto Rico. To keep individual operations of companies or vessels confidential, catch (in short tons) and fishing effort (in days fishing) are summarized by one-degree square and month. Coverage is usually 100%.

Task II data for commercial U.S. coastal fisheries are not collected since the fisheries have been relatively small. The recreational U.S. coastal fisheries, on the other hand, can be potentially large, even though catches remain relatively low, because of the increasing number of participants. Therefore, Task II data are being collected at tournaments and through intercept surveys to monitor the situation. Catches are measured in numbers of fish and effort in trips or hours fished ( see Task I section above for details). Coverage varies by area but is generally less than 80%.

#### Biological Data

Length-frequency samples for the U.S. distant-water fishery are collected using a two stage procedure (Hennemuth, 1957, Sakagawa et al, 1976). In stage I, wells are drawn randomly from each vessel and in stage II random samples are taken from each species in the catch of the selected well.

Fish are measured with calipers for fork length (anterior end of snout to fork of tail) at the unloading ports. Measurements are rounded to the nearest centimeter. Information on the area of catch (usually 1-degree square), month and day of catch, total catch (by species) in the well, water temperature, and type of set are collected whenever possible. The species composition of the catches in the well is also noted by counting the number of each other species encountered while drawing the required sample for the target species.

During the period 1967 to 1971 samples were drawn on an opportunistic basis and sample sizes varied from 10 to 300 fish. During the period 1972 to 1980, a goal of 6 skipjack and 12 yellowfin samples of fifty fish each from each NMFS area (Figure 1) and month was established to obtain a better sampling coverage. This goal was not met in each of the years so the sampling scheme was revised, in 1980, to the current sampling requirement of selecting, for each vessel, at least one sample (fifty fish) of each species from each NMFS area and month fished.

U.S. coastal fisheries catches are sampled for individual fish length or weight at unloading ports and canneries. Calipers (bluefin tuna) or tape measure (billfishes) are used to measure fork lengths (snout to fork of tail for bluefin tuna and lower jaw to fork for billfishes) to the nearest centimeter or weights are measured for each fish sampled to the nearest pound. As many fish as possible are sampled. Most of the samples are of bluefin tuna, blue marlin, white marlin and sailfish with occasional samples of swordfish, yellowfin and skipjack tunas.

Length-frequency samples from foreign fishery imports are taken from landings of transshipment vessels in Puerto Rico. First priority is given to sampling of imports from the Tema-based fleet. Of several holds containing fish on a transshipment vessel, one is selected at random. If the load is segregated by catcher vessel, then at least one sample of each species in the catch of each catcher vessel is taken. If not, then one sample of

each species in the catch in the entire load is drawn. Yellowfin and bigeye catches are frequently unloaded by size groups for pricing and processing purposes. In this case, a sample is taken from each size group. Sample sizes are 100 fish for yellowfin and bigeye tunas and 50 fish for skipjack tuna and other species.

Fish are measured for fork length with calipers. Measurements are rounded to the nearest centimeter. Information on the area of catch (usually ocean region i.e. eastern Atlantic), month of catch, total catch (by species) and gear are collected from bills of lading whenever possible. The species composition of the unloaded catches is also noted by counting the number of each species encountered while drawing fish for the length measurement. If required, fish are dissected to determine species, such as for distinguishing between yellowfin and bigeye tunas.

#### DATA PROCESSING

Other than conversion of catch tonnages from short tons to metric tons and summarization of Task I and task II data by ocean regions (i.e. eastern Atlantic, north western Atlantic, etc.), no major processing is done to prepare U.S. fishery statistics for submission to ICCAT. Task II and biological data are submitted on computer tapes and Task I data are submitted on ICCAT form 1-1. Five-degree and one-degree square summaries are provided for Task II data.

Samples of length frequencies are combined by ICCAT areas to produce summaries. These summaries are compiled by first expanding each sample to the total sampled catch, pooling the samples within an ICCAT area and then expanding the pooled samples to the total catch in the ICCAT area. Total catches in each ICCAT area are calculated from Task II data.

#### DISCUSSION

The current sampling of U.S. catches of Atlantic tunas and tuna-like fishes are considered adequate for the monitoring of U.S. fisheries. No improvements in the collection of Task I or task II data for the U.S. distant-water fishery are needed. Length-frequency samples for this fishery are representative of the sizes of tunas caught by the registered U.S. fleet during the fishing season (month) and in areas (ICCAT areas) that it operates. However, the sampling is not extensive enough to place much confidence in use of the data by one-degree or five-degree square summaries or to estimate the actual size distribution of fish on each vessel.

Task I and Task II data for U.S. Coastal fisheries could be enhanced by the adoption of a voluntary logbook system. This system would increase precision of the task I estimates of the recreational fisheries as well as provide a source of task II

data for the commercial fisheries. Length-frequency coverage of billfishes and bluefin tunas for the U.S. coastal fisheries are adequate. However, as increasing numbers of skipjack, yellowfin and bigeye tunas are caught, length-frequency coverage for these species should be increased.

The adequacy of length-frequency sampling of foreign imports have been evaluated and determined to be adequate for determining the length distribution of fish in the landings (Coan and Bartoo, 1984). However, because of sorting of fish at the port of origin, these landings can not be assumed to be representative of the actual catch length frequency or species composition.

LITERATURE CITED

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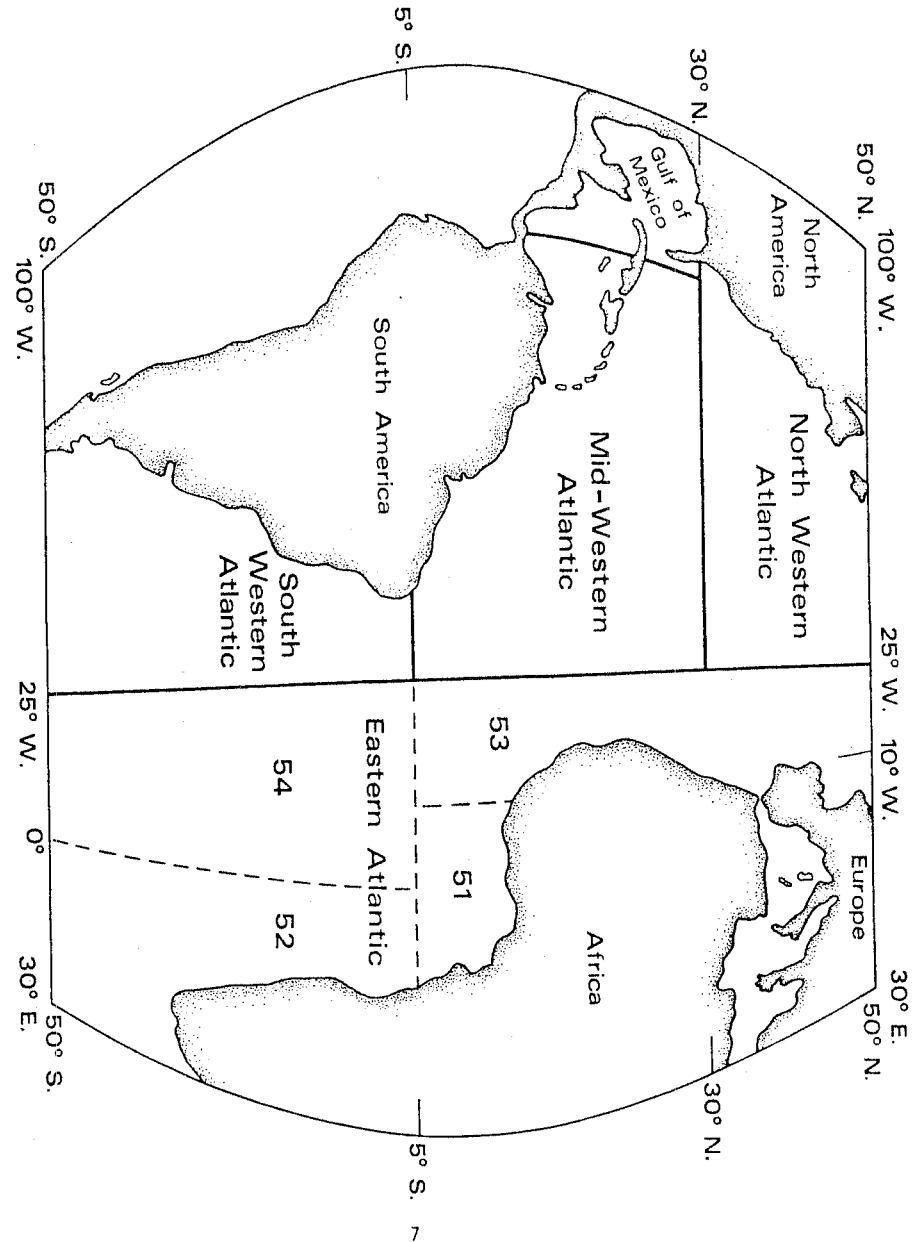


Figure 1: Regions of the Atlantic Ocean and NMFS areas (51, 52, 53, 54) used to collect and report U.S. Fisheries statistics.