iotc ctoi Indian Ocean Tuna Commission
Commission des Thons de l'Océan Indien

Report of the First Session of the IOTC Permanent Working Party on Data Collection and Statistics

Victoria, Seychelles 28 August–1 September 1999

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EXECUTIVE SUMMARY

The First Session of the Permanent Working Party on Data Collection and Statistics was attended by 20 participants from 11 contracting and collaborating parties, met for five days in Victoria, Seychelles.

After examining papers dealing with the data collection systems and statistics of the countries represented, as well as a report from the Secretariat on the status of the databases held by the Commission, the participants noted the deplorable lack of completeness and timeliness of statistics available to the Commission and debated what steps might be taken to improve this situation.

In view of the total or partial lack of reporting of longline catches from a number of important fleets, notably by Indonesia, Taiwan Province of China and various Flag of Convenience countries, the Working Party recommended that the missing data be estimated from the following parameters:

- The basic **frame** would be an exhaustive list of longliners fishing in the Indian Ocean constituted from the **Vessel Register**[1], complemented by the **Landings database**[2] and port authority records of vessel visits;

- An **activity coefficient** would be obtained from the proposed **Landings database**, from information on licenses and from various vessel monitoring systems being implemented in the Indian Ocean;

- **Catch** information would be obtained from **port sampling** schemes to be instituted in selected tuna landing harbours[3].

The Working Party recommended, furthermore, that these activities should be extended to all Indian Ocean countries with major tuna fisheries or landing centres, *whether or not they were contracting parties* and that missions of the Secretariat should be undertaken to initiate or reinforce data collection and collation in those countries where this was needed.

The Working Party also recommended that:

1. Minor modifications should be made to the mandatory data standards for IOTC Members to include reporting of sample sizes for size-frequency data.

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[1] The Recommendation concerning registration and exchange of information on vessels, including flag of convenience vessels, fishing for tropical tunas in the iotc area of competence adopted by the Third Session of IOTC calls on contracting and collaborating parties to provide identifiers and characteristics for all tuna fishing vessels licensed by them.

[2] The focus of the transhipment database should be changed from collecting data on transhipment tonnage to a listing of landings from individual foreign flag vessels, whether licensed or not. This database could be called a Landings database and would be used to assess the level of vessel activity for non-reported fishing, as well as complementing the vessel registry.

[3] Port sampling would provide much-needed size-frequency data as a by-product.

2. Contracting and collaborating parties should be reminded of their obligations with respect to the timeliness and completeness of the data to be provided and should be reminded of the obligation to nominate contact points.

3. Contracting Parties should be encouraged to use diplomatic channels to induce all parties fishing for tuna and tuna-like species in the Indian Ocean to report catch and effort data.

4. In relation to data reporting, Contracting and Collaborating Parties should:

    a. When reporting catches for vessels operating under foreign flag, inform the Secretariat on the flags concerned in order to avoid double reporting if the flag country also submits statistics.

    b. In addition to providing vessel registry and landings database information, attempt to provide data on tuna fishing vessels passing through their ports.

    c. Make an effort to provide the Lloyd's registration number for vessels flying their flag and for foreign vessels licensed to operate in their waters in order to permit the tracking of vessels changing name and flag. In addition, countries were requested to try to obtain information on the identity and characteristics of all tuna fishing vessels landing or transhipping in their ports.

    d. Endeavour to provide Fishing Craft data to IOTC under LOA as primary aggregate rather than in tonnage.

    e. Whenever possible, use the 3-Alpha codes for country and species for all data submissions to IOTC[4].

    f. Adopt a common reporting format and standards for VMS reporting; it was suggested that the format adopted by the EU would be technically adequate and could become a *de facto* standard.

    g. Not collect value statistics routinely for submission to IOTC; these statistics should be assessed as and when needed by the Secretariat through specific studies.

5. The Secretariat should:

    a. Place a catalogue of data holdings on the IOTC Web site, together with an indication of any restrictions there might be on their release to third parties.

    b. Compile a database of basic length-weight measurements for calculation of functions to convert between the two variables.

6. The IOTC statistical area should, in view of the presence of tuna catches in FAO Area 58, as specified in the Agreement, extend over the whole distribution range of the tunas under its remit and:

    a. All catch data should be reviewed to ensure that the correct allocations for Area 58 catches have been effected;

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[4] The Secretariat will place a listing of these codes on its Web site at http://www.seychelles.net/iotc

b. The eastern/western Indian Ocean division should be maintained for ease of comparison of trends which are significantly different between these two areas;

c. The two areas should be called Eastern and Western Indian Ocean in order to avoid confusion which might arise from misuse of the FAO Areas 51 and 57 names.

7. The Scientific Committee should consider options to mitigate the low level of attendance to Working Party activities from scientists from Member countries and, in particular, from Indian Ocean coastal countries.

The Working Party reviewed its functional relations with other subsidiary bodies of IOTC and recommended that:

1. Each species Working Party should include in its agenda a review of the data status and statistical systems in use for the species falling within its mandate.

2. The Working Party on Data Collection and Statistics should, as from 2000, meet immediately prior to the Scientific Committee to review and complement the statistical reports of the other Working Parties and advise the Scientific Committee and Secretariat of steps which might improve data collection and statistical reporting.

Ms. Rose-Marie Bargain was elected Chairperson of the Working Party for the biennium.

1. OPENING OF THE MEETING, ELECTION OF THE CHAIRPERSON AND ADOPTION OF THE AGENDA

The First Meeting of the Working Party on Data Collection and Statistics (WPDCS) opened on August 28th, 1999 in Mahé, Seychelles. Its Terms of Reference are listed in Appendix I. The participants (listed in Appendix II) elected Mr David Ardill from the IOTC Secretariat as Chairman for the Meeting. The Agenda adopted is listed in Appendix III and the list of documents is reproduced in Appendix IV of this report.

2. REVIEW OF DATA COLLECTION AND NATIONAL FISHERIES

Australia {Document WPDCS-99-15}

Information on Australian tuna fisheries in the Indian Ocean and data collection practices are summarised briefly. Annual catch data for tuna and tuna-like species in regions of the Australian Fishing Zone included in FAO Statistical Area 57 are presented.

In recent years, Australian fisheries for tuna and tuna-like fishes in FAO Statistical Area 57 have diversified from a catch that was predominantly southern bluefin tuna, due to the development of a pelagic longline fishery that targets swordfish and, in some cases, bigeye tuna. In 1998, combined catches of large pelagic species from all gear types in regions of the AFZ within FAO Statistical Area 57 included 4,194 t of southern bluefin tuna, 319 t of broadbill swordfish, 26 t of yellowfin, 18 t of bigeye and 25 t of albacore.

The principal form of data collection for tuna and tuna-like species is through logbooks. For the southern bluefin tuna fishery, these data are validated, in association with the need for strict quota controls, through landing records. Similar levels of validation have not been achieved for other Australian pelagic fisheries. Most catch data on tuna and tuna-like species are maintained in a database at the Australian Fisheries Management Authority.

British Indian Ocean Territory (Chagos Archipelago) {Document WPDCS-99-3}

The data collection systems for the British Indian Ocean Territory (BIOT) Fisheries Conservation and Management Zone (FCMZ) were described. The primary data collection system in place is a logbook programme for all purse seine, longline and support vessels. These data are crosschecked against vessel activity reporting made by radio, fax and telex whilst fishing. Data verification is carried out through a monitoring, control and surveillance programme conducted by a Senior Fisheries Protection Officer on board a Fisheries Patrol Vessel in the zone and through an observer programme which collects detailed data on the longline and purse seine fisheries, during the main period of activity in the BIOT FCMZ, (November - February).

The objectives of the observer programme, problems encountered during the development of the system and the mechanisms used to avoid these problems were described.

Details of the vessel registry held by the BIOT Authorities were described. Due to the nature of BIOT, there are no facilities for unloading of catch (and therefore for port sampling) or for transhipment. Transhipment at sea is permitted through a licensing system described, although no transhipment has yet occurred. Length frequency, length-weight and sex and maturity data for all target and by-catch species for both longline and purse seine fisheries are collected as part of the annual observer programme.

All the data from the BIOT FCMZ is stored in an integrated Fisheries Information Management System (FIMS) based on a relational SQL database model implemented in MS Access 97. This

database contains all the information on the fishery from the vessel and licence details through to logbook data and market price information.

Discussion

Supply vessels are also required to register with BIOT authorities. These vessels must complete a logbook form, listing daily positions and activities such as deployments of Fish Aggregating Devices (FADs).

A limited number of observers (2-3) operate during the fishing season. Usually, two observers work simultaneously on a boat. This arrangement is considered more effective in collecting the comprehensive information required. The observers board the boat only in waters under the jurisdiction of BIOT. The observer time is divided equally between purse seine and longline operations. Equal coverage is also given to each of the major flag vessels (e.g., Japanese and Taiwanese longline vessels would each have 25 % of the observer coverage).

All fishing gear has to be marked visibly with the radio call sign of the vessel. BIOT authorities can confiscate gear found in the EEZ with no such labels.

Due to the limited facilities available, observers can only stay on board longline vessels for a period of between three and seven days. Length measurements are taken of target species are in both longline and purse seine operations, with 100 % coverage in the case of longlines. On purse seiners, target species are measured below decks (from the conveyor belt), while discard and by-catch species are measured on deck, prior to being discarded. The observers are instructed to measure as many fish as possible and to take some fish from every brail. When measuring large fish from the conveyor belt, the observer is supposed to measure one of every ten fish. Observers also described the gear configuration as well as the pattern of search and fishing. They record data on discards, even when the fish caught on longlines are not taken aboard (large sharks in particular, are often cut loose when alive). Often, upon request, all fish to be discarded are brought on deck to be measured prior to discarding.

At the beginning of the observer programme, there were some problems in taxonomically identifying non-target species and discriminating between small bigeye and yellowfin. These problems have been substantially reduced by training observers better and supplying them with identification guides, but identification of small bigeye tuna might still be uncertain.

No association was recorded of tuna with marine mammals, other than occasional whale-associated sets in purse-seine operations. In longline fisheries, there are no reports of large-scale predation by marine mammals as is common in other areas of the Indian Ocean. Current information does not allow an assessment of the survival rate of longline caught fish discarded alive, although it is probably high for sharks.

China, People's Republic of (PRC)

Documents WPDCS/99/02 presented the status of the data collection system and tuna statistics in the PRC.

The area of operation of the fleet is primarily the eastern Indian Ocean, unloading in Phuket, Singapore and Penang, where the fleet unloaded 377 t in 1997 and 720 t in 1998. The growing number of vessels in this fishery is the result of a shift in operations from the Pacific Ocean. The gear employed corresponds to a deep longline, with short lines (mainline length between 24 and 28 km) comprising 800 hooks on average and 8 to 10 hooks per basket

There is no port sampling by PRC authorities, and no size frequency information is available yet from this fleet. An observer programme has begun recently. These observers, of which there are currently

ten, are fishermen with the required educational qualifications who have followed a training course. They take logbook records and size-frequency measurements. Data obtained are collated by a dedicated working group that compiles the final data sent to IOTC.

France {Document WPDCS/99/09}

Paper WPDCS/99/09 give an extensive description of the statistical procedures used by EU in order to collect and process data from their purse seine fleet in the Indian Ocean. This fleet is mainly from France and Spain and, more recently, an Italian boat; statistical coverage is also extended to flag of convenience vessels belonging to European fishing companies (Not Elsewhere Identified – NEI). This activity has been routinely carried out in close co-operation with Seychelles and Madagascar since the beginning of this fishery. The coverage of fleet activities is quite complete since 1981 and data are presented for the three components: France, Spain and NEI.

The statistics are based on the analysis of logbooks in relation with unloading, associated with an extensive sampling programme of the catch (more than 1,000 samples per year) in order to obtain the best possible estimate of size frequencies of the main species (yellowfin, skipjack, bigeye and albacore) as well as of the effective species composition of the catch. The estimation procedure is based on stratification on the type of schools fished: free swimming or associated to logs or FADs.

In order to improve the quality of the sampling scheme, a specific study – ET: Analysis of the multispecific sampling scheme of tropical tunas – was conducted through European Union DG 14 funding. The results of this study, which were presented at the 7th Expert Consultation (Seychelles, 1998), permitted the definition of new improved standards and common (Atlantic and Indian Ocean) procedures for collecting and processing statistics. New sampling strata were defined according to the variability of size and species composition and a strategy was designed in order to sample simultaneously and efficiently both size and species composition. This new system has been progressively applied to the European purse-seine fleets since April 1998 (Seychelles, Madagascar and Kenya), and is expected to be fully operational in 2000; it can be easily generalised to other fleets and harbours.

Data collection, sampling methodology and processing procedures used in order to obtain the final estimates are described in detail for both the original and the new sampling schemes. For this meeting, estimates for the European fishery have been made using the original system for the 1981-1990 period and the new processing procedure (but still based on the previous sampling scheme) from 1991 to 1998.

Discussion

The Working Party commended the attention that had been given to those statistics, but noted that temporal and spatial resolution of the data obtained under the new system has been reduced.

Réunion (France) {Document WPDCS-99-11}

For the last seven years, the Réunion Fishery has experienced rapid growth and development in all segments (artisanal, Antarctic deep sea and longline fisheries). The artisanal segment has shown a rapid extension, thanks to the development of FAD-associated techniques. In Réunion Island coastal waters (up to 15 miles), there are now more than 30 anchored FADs that local fishermen exploit for artisanal sale on the local market with troll and drifting hand lines from small fishing units.

The most rapid of these developments is in the longlining sector, which began six years ago. The longline fishery has overtaken the artisanal fishery since 1996, with more than 2,300 t caught in 1997 and about 3,000 t in 1998. This fishery mainly targets swordfish, between the equator and 30° S.

The responsibility for collecting data on Réunion fisheries for reporting to IOTC and FAO lies with the local fisheries office 'Direction Départementale des Affaires Maritimes' (DDAM). Moreover, since 1993, IFREMER has been collecting and compiling scientific and technical information on longline fisheries operating in the French EEZ and international waters. Data are collected from voluntary logbooks, regular at-sea and landing sampling as well as on-board scientist observers. This data collection system is designed to provide information on swordfish biology and size composition, tuna and tuna-like catches and by-catch, fishing effort and predation of marine mammals on catches. All these actions arise from the "*Programme Palangre Réunion*" (PPR), the new IFREMER programme which is financed by the European Union and by Réunion local Councils. One of the aims of this programme is to contribute to the management and conservation of the species caught by SWIO fisheries.

This paper presents the characteristics of this new longline fishery and describes the different data collection procedures on the domestic fleet set up by DDAM and IFREMER. The first results (conversions between measurements) and the guidelines of the IFREMER programme are presented.

In order to return information back to professionals and decision makers, IFREMER has designed an "interactive atlas", available on CD-Rom, which permit the extraction of different time strata, effort, CPUE and catch data so as to create specific maps with a one degree square resolution. Other layers of information such as environmental data will soon be integrated.

Discussion

After the introduction of the document, there was a demonstration of this atlas. The Working Party noted that this is a good example of offering a product to fishers in return for good logbook returns, a practice which can improve cooperation significantly.

India {Document WPDCS-99-16}

The current annual production of tuna and tuna-like species from India is of the order of 96 thousand tonnes consisting of 45 % tunas, 4 % billfishes and 51 % seerfishes. The catches are landed mainly by the coastal operating multipurpose mechanized and non-mechanized fishing craft. The oceanic fishery consists of a limited number of tuna longliners operating under joint venture and leasing schemes.

The paper gives an update of the Indian tuna fishery and its trends in recent years. The fishing craft statistics (1998) and species-wise production data (1989-98) are presented. The salient features of the sampling design adopted for collection of catch statistics, which is based on a stratified multi-stage random sampling technique, are discussed. Some of the recent developments taking place in the fishery, in terms of technological upgrading and fishing practices are also indicated in the paper.

Japan {Document WPDCS-99-10}

The data collection system and fisheries statistics of Japanese tuna fisheries are summarized. Japanese fisheries currently operate longline and purse seine fisheries in the Indian Ocean. The longline fishery in this ocean started operating after 1952 when limitations were removed on operational areas. The commercial purse seine fleet commenced fishing in the Indian Ocean in 1991 after several years of experimental fishing. In recent years, about 250 longline vessel and three purse seine vessels have operated. The preliminary longline catch for each species in 1997 was 4,543 t for southern bluefin, 2,799 t for albacore, 16,756 t for bigeye and 13,248 t for yellowfin. Purse seine catch in 1998 (preliminary) was 5,748 t, 1,949 t and 915 t for skipjack, yellowfin and bigeye, respectively.

Catch and effort data are collected by logbook in both fisheries. About 90 % of longline logbooks are submitted and sampled values are raised to the real catch amount. Since the submission rate of purse seine logbook is 100 %, nominal total catch and stratified catch and effort statistics are estimated by summing up logbook data.

Size and other biological data of tunas and billfishes caught by the Japanese tuna fisheries are obtained from port sampling, on-board measurement by fishing, training and research vessels and from observer programmes. Recently coverage of size measurement in the total catch has not been high, except for that on southern bluefin tuna, for which length have had to be measured in recent years by fishermen or RTMP observers (about 100 % coverage since 1995). Although purse seine vessels also conduct onboard measurement, the data reliability is not considered high. Port sampling is conducted on one vessel (*R/V Nippon Maru*).

Discussion

It was noted that the acquisition of size-frequency data from Japanese longline operations is based on an opportunistic sampling strategy. Requests for such data from the Japanese authorities are channelled through the fishermen's association. During fishing operations, fishermen take size measurements (with no minimum number of fish to measure) and provide the data to the authorities. However, there has been a decreasing trend in the return of size data in recent years and this was mentioned as one of the reasons for the very low sample sizes seen in the Japanese longline size data. It was also noted that fishermen routinely obtain the weight of each fish caught, as they used these data to estimate the total weight of a set. This could become a very valuable source of additional information. The Working Party suggested that the possibility be explored of recuperating this information, at least from some longliners. For purse seine operations, there is no shore sampling, but size data are taken on board both commercial and research vessels. Some information is now available from the AFDEC port sampling in Phuket.

The Working Party noted that it would be a useful exercise to compare size data held by Japan with those from the same fleet and time-area strata obtained through the BIOT observer programme.

There are differences in the interpretation of purse seine set types between Japanese and EU scientists. The Japanese classification assumes shark and boat-associated schools have a free-school species and size composition. EU studies concluded that this is so for whale-shark schools, but have shown that boat-associated schools have a log type composition. Some species of sharks are associated with schools with a typical free-swimming structure. This may come from a difference in techniques as, in the Japanese fishery, a boat typically cuts off a free school and holds it until a purse seiner arrives. The school is therefore associated with the boat for a short time.

Malaysia

Transhipment of Chinese and Taiwanese longline vessels in Malaysia are recorded. There were approximately 600 - 700 landings by Taiwanese vessels in 1996 and 1997 and over a 100 landings by Chinese vessels. These are small ice boats landing about 15 to 25 t per trip.

Mauritius {Document WPDCS-99-14}

The Albion Fisheries Research Centre (AFRC) has been conducting research on tunas since 1985. In 1987, computerised data entry and processing for logbooks based in the ORSTOM Atlantic system has been operating to cover Mauritian purse seiners and licensed longliners. The purse seine catch is verified from landing data and shore sampling for size-frequency and species composition.

Discussion

Only one Mauritian purse seine vessel is now operational at this time, and unloaded 4,435 t in 1997. On the other hand, after a period of low activity, Mauritius has again become a major transhipment point for Asian longline fleets. About 27,000 t of tuna were transhipped in Mauritius during 1998 from close to 300 longline vessels of Taiwanese, Korean and Japanese origin, with albacore comprising 75 % of the catches. Data are collected on transhipments from vessel agents; it is

anticipated that regular sampling of foreign fleet catches will be implemented in the near future. There is no data on non-licensed vessels, although harbour authorities might have partial data records.

The licensing scheme for foreign fleets was started in 1995. Eighty-seven vessels were licensed in 1998. Information on these vessels exists in a vessel registry database which has been provided to IOTC. The sampling scheme for purse seine catch is similar to that used in the Atlantic but differs slightly from the model used for sampling the EU Indian Ocean fleet.

No system produces tuna-specific data for artisanal fisheries.

Seychelles {Document WPDCS-99-13}

Japanese industrial longlining has taken place in Seychelles waters since 1950, with the entry of Taiwanese vessels in 1954, Korean vessels in 1960, EU vessels in 1993 and now Indonesian vessels. Although there is a request for logbook data from the licensing scheme covering foreign longline vessels operating in the Seychelles EEZ, these are obtained from only 26-27 % of the licensed vessels. Currently, about 300 licences, most of which are of short duration, are issued yearly.

Asian longline vessels use deep longlines with 17-20 hooks per basket, primarily targeting bigeye tuna, while EU longliners target swordfish. A domestic longline fishery has developed, targeting swordfish and bigeye tuna. A significant amount of predation attributed to false killer whales occurs in this fishery.

Purse seining started in 1983, and there are currently about 50 vessels active. Logbook reports are provided by all purse seiners, with close to 100 % returns. Logbook data are corrected for species composition and weight estimation errors by port sampling, which also provides size-frequency data.

Data processing is conducted using a variety of software packages developed by IPTP, IRD and the SFA (for the vessel registry).

Discussion

The Working Party noted the significant effort that a small country such as Seychelles has devoted to compile good statistics. The significant level of collaboration existing between scientists from Seychelles and Réunion was also noted.

South Africa {Document WPDCS-99-12}

South Africa has been fishing tuna since the early 1960s. Initially this was a longline fishery, but it later developed into an albacore-directed pole fishery, predominantly in the Atlantic Ocean. Japanese and Taiwan Province of China longliners have been fishing in the South African EEZ for approximately 40 years primarily in the Indian Ocean. An experimental tuna longline fishery has recently started operating, with large catches of swordfish, yellowfin and bigeye tuna.

Data collection for the tuna fisheries, both foreign and domestic, is based on logbook data. However, export figures are used to estimate the total catch in the pole fishery. Observer and port sampling schemes are at present being implemented to supplement the logbook data.

Discussion

Logbook data are collected for the foreign longline fleet but the information requested only covers the portion of the trip that takes place inside the South African Exclusive Economic Exclusive Zone (EEZ). A fishing vessel registry records information compiled at a level of detail following the FAO recommendations for vessel monitoring.

Observers take biological samples, by-catch and discards as well as data relevant to the monitoring of the fishing activities of the domestic fleet, with coverage of 25 % of the active domestic longliners. It is anticipated that port sampling will be expanded in the future and that the observer programme will be expanded to cover licensed foreign vessels. Data obtained from the observer programme have not been yet analysed, but it is anticipated that this will soon be done.

Transhipment takes place primarily at Cape Town and Durban, with some transhipment observed at sea.

It was confirmed that logbook data are available for Spanish longline vessels that operate south of Madagascar and unload in Durban.

The problem of predation in longline-caught fish, primarily by killer whales, is very important, reaching 70 % predation rate on individual trips.

Spain {Documents WPDCS-99-07 and -08}

The two documents discuss the statistics of the Spanish and the NEI purse seine fleets. It was noted that there are no differences between the modes of operation of these fleets.

A significant decrease in the average size in the catches of both log-associated and free-swimming tuna was noted in the data reported. It was mentioned that this might be due to an increase in the catches of large fish (about 60 kg) in the BIOT zone between 1992 and 1994.

Thailand {Documents WPDCS-99-04, -05 and -06}

The characteristics of data collection and statistics in Thailand are described in document WPDCS/99/04. One statistical system is run by the Department of Fisheries (DOF) to estimate the catch of small tunas and one by the Andaman Sea Fisheries Development Centre (AFDEC), sampling both small tunas and the foreign purse seine and longline fleets landing in Phuket.

Discussion

The Working Party noted that the estimation procedure used by DOF and listed in the document does not include a component for the level of activity of the vessels at the sampling point. This omission would lead to incorrect results in the final analyses. The Working Party recommended incorporating such a component in the calculation if that is not done at present.

One hundred fish are measuring for each longline vessel sampled and some information is obtained regarding the areas fished during the trip, but obtaining logbook information has proven to be difficult. The vessels bring back sharks and billfish and the Working Party noted that it might be possible to assess the level of by-catch in this fishery.

Document WPDCS/99/05 analyses tuna landings in Phuket between 1993 and 1996. Longliners, purse seiners and pole-and-line vessels operated by Japanese, Taiwanese, Russian (formerly USSR) and French vessels have been landing catch in Phuket since 1973. A Japanese purse seine fleet of ten purse seiners moved to the Eastern Indian Ocean in 1991 and landed in Phuket as from 1993. This fleet is now reduced to three vessels. In 1998, tuna landings doubled to 34,032 t, possibly because of the movement of the EU fleet to the Eastern Indian Ocean (possibly as a result of the El Niño event).

Port sampling for catch, effort, length and weight has been affected by the staff of AFDEC since 1993. Both purse seine and longline fleets operate mainly to the East of Sumatra. The species composition of purse seine and longline landings is displayed.

Discussion

In the ensuing discussion, it was noted that no information was available on the length of the fishing trips of longline vessels. Data on species composition is available from the tuna cannery where bigeye and yellowfin tuna are separated.

Document WPDCS/99/06 covers the development of neritic tuna fisheries in the Andaman Sea. Descriptions are given of the gears used, fishing grounds, catches and species composition. The total catch now stands at 22 thousand tonnes.

Discussion

In the review of the statistics of small tunas (WPRCS/99/06), it was noted that between 1985 and 1993 there was a big discontinuity in the catch statistics. This corresponds to the period where ASFDEC data were used (the rest of the table lists DOF data). It was recommended to further investigate these discrepancies, but it was noted that perhaps DOF is in a better position than AFDEC, due to coverage of the sampling programme, to estimate the total catch, with the AFDEC data being used to estimate species composition.

The Working Party noted that kawakawa and longtail tuna are becoming important species in the Indian Ocean. Currently, longtail tuna commands a higher price than kawakawa. Most of the fish caught in Thailand go for canning. The resulting product is distributed in the domestic and regional markets.

The size-distribution caught by gillnets is not very different from that obtained from other gears. Gillnets do not exceed six km in total length.

3. PROGRESS REPORT OF THE SECRETARIAT

Description of General Trends in Indian Ocean Tuna Fisheries

An update on the current trends in the Indian Ocean Tuna Fisheries was presented by the Secretariat. The total catch of tuna and tuna-like species in the Indian Ocean was estimated in 1996 to be close to 1,200,000 t. About 90 % of the total catch is constituted of tuna species and 10 % are seerfish and billfish. The total catch is split roughly equally between artisanal and industrial fisheries.

The 1996 reported catches show a large increase from countries aggregated as NEI. This is due to a change in the reporting practices from previous years, when EU owned purse seine vessels flying flags of convenience were reported under the individual flag countries. This increase does not therefore reflect a loss of data quality.

Discussion

The issues and problems of purse seine vessels recorded as NEI were briefly discussed. A justification from this aggregate arises as confidentiality could be compromised where very few vessels operate under any given flag; it may then be possible to identify the catch and fishing strategies for an individual vessel unless vessels under several flags are grouped together.

It was also noted that double counting might occur where catches are reported both by the flag state and as NEI by the country of origin of the operator. The Working Party concluded that it is necessary to communicate the catches of the NEI purse seiners by flag, (or, at a minimum, to indicate the flags and number of vessels per country included in the NEI category) to avoid double reporting in cases where the flag country may also be reporting.

A related problem arises when calculating contributions to IOTC. In the current situation, the catch of an Italian-flag vessel listed under NEI will have to be incorporated into the total EU catches. It was suggested that the information for these vessels should be reported by the nation of residence of the vessel owner, with the understanding that the Secretariat would report aggregated data under the NEI category.

Artisanal fisheries dominate the catch of seerfish. Reporting of these catches is not always thought to be reliable.

It was noted that in the last ten years the estimated catch of billfish (including swordfish) has doubled. The catches are divided approximately equally between the artisanal and industrial fisheries. Sri Lankan, Indonesian and Pakistani domestic fisheries and the Taiwanese longline fleet are major contributors to the billfish catch and it was noted that these catch figures have not yet been submitted to the IOTC Secretariat. The increase in the recorded catch of billfish might in part be due to improvement in reporting for these species and to increased retention for sale of species, which were previously discarded. Non-target species are sometimes not recorded on the logbooks as they are regarded as belonging to the crew who sell this fish separately on return to port.

Progress in the data related work of the Secretariat

Design and implementation of the databases

The relational database model implemented at IOTC for storage and analysis of data was described. The database contains tables for catch, effort, fishing craft statistics, size frequency and transhipment data. Proposed modifications to the model for size frequency data, based upon data submissions already received, were described.

Due to the rapidly increasing size of the database, tests have been carried out using MS SQL Server 7.0 to verify that porting of the database from MS Access to MS SQL Server was possible. These tests were very successful and, if required, the database can be ported with little effort.

The data tracking system implemented by the Secretariat to track the flow of data from reporting countries was described. The system consists of four components:

- Data request status table
- Data liaison officers table
- Data correspondence table
- Data revision table.

The first three components allow the data manager to track the status of data submission to IOTC. The fourth allows tracking of any changes that have been made to the database.

The draft vessel registry database structure was described. Provision of data for the vessel registry will be mandatory for all foreign flag vessels and all domestic vessels over 24m in length. This database is currently empty and will be documented once a final design has been approved. Discussion on this issue was deferred to later in the meeting.

Compilation and processing of the data received

The appointment of a Data Manager, to be primary responsible for the handling of the data, was approved by the Third Session of IOTC. Mr Miguel Herrera, currently in charge of the Spanish Fisheries Office in Seychelles, will fill this post in October 1999. The post of Data Analyst/Programmer, also approved by the Third IOTC Session, will be filled by Mr Marco Garcia, who has a great deal of experience of tuna databases from his work at the Inter-American Tropical Tuna Commission (IATTC). He is expected to join the Secretariat in October 1999.

Table 1. *Reporting by flag country*

	VR	NC	CE	SF
AUSTRALIA		Y		
BAHRAIN				
BANGLADESH				
CHINA	P	Y	Y	
CHINA (TAIWAN)				
COMOROS				
DJIBOUTI				
EGYPT				
ERITREA				
FRANCE	P	Y	Y	Y
HONDURAS				
INDIA		Y		
INDONESIA				
IRAN I R		P	P	
JAPAN	P	Y	Y	Y
KENYA				
KOREA REP				
KUWAIT				
MADAGASCAR				
MALAYSIA				
MALDIVES				
MAURITIUS				
MOZAMBIQUE				
NEI	P	P	P	P
OMAN				
PAKISTAN				
QATAR				
SAUDI ARABIA				
SEYCHELLES	P	P	P	
SOUTH AFRICA				
SPAIN	P	Y	Y	Y
SRI LANKA	P	P	P	
SUDAN				
TANZANIA				
THAILAND				
UNTD ARAB EM				
YEMEN AR RP				

N.B.: IOTC Contracting Parties are highlighted.

The first requests for data submission were sent out in March 1999 to representatives of about forty countries, with reminders if necessary in June and July. Seven categories of data were requested for 1997 and 1998. Five of these conformed to the regular IOTC format. The sixth was for bycatch and discard data and the seventh was for information on tuna fishing vessel identity and specifications. Data received on vessels were used to develop the model for the draft vessel registry structure and to constitute a historical record of vessels that have fished in the Indian Ocean.

An overview was presented of the data submissions by country and category (*Table 1*). The Working Party noted the deplorable lack of timeliness, completeness and quality in the submission of data from both contracting and non-contracting parties. Data from countries with purse seine fisheries and from one longline fishing country were almost complete and generally of high quality but were submitted one year late with respect to mandatory requirements. Several major longline fisheries and most countries where artisanal fisheries dominate the catches have not provided data or have provided partial figures, which do not meet the mandatory resolution. Very little data has been returned so far for 1998 for both industrial and artisanal fisheries.

Dissemination of data by the Secretariat

One of the roles of the Secretariat is to disseminate public domain information. The most effective mechanism has been through the IOTC website (http://www.seychelles.net/iotc).

Publications can be downloaded as Adobe PDF files, which is a very efficient way of providing documents over the web. Datasets of the nominal catches are available for downloading and can be queried using the FishstatPlus software produced by FAO. This software was demonstrated for the

Working Party, as there seems to be little awareness of its existence or potentiality as a data query and analysis package.

GIS query and display software for the dissemination of catch and effort and size-frequency databases are being developed by IOTC and prototypes were demonstrated to the participants.

Environmental datasets in the public domain have been obtained by the Secretariat and are available for scientists working on the region. These include mean surface wind fields, sea surface temperature and the TOGA databases. An annotated bibliography of tuna and tuna-like species in the Indian Ocean has been prepared from the Aquatic Sciences and Fisheries Abstracts and other FAO databases. This will be published on the IOTC website, where interested parties will be able to download a summary of the database or individual reports.

The Working Party recommended that a catalogue of data holdings of the Secretariat should be placed on the IOTC Web site, together with an indication of any restrictions there might be on their release to third parties.

4. REVIEW OF MANDATORY DATA STANDARDS

Following the instructions of the Third Session of the Commission, the Working Party reviewed the mandatory data standards for IOTC Members as listed in Appendix V of the Session Report. The data requirements were found to be adequate and in line with statistical requirements of similar regional fishery bodies. Minor modifications are recommended:

In the Section under the heading "Size Data" to modify the first sentence to read (italics indicate suggested changes):

Considering that size data are of key importance for most tuna stock assessment, size data, *including the total number of fish actually measured*, should be routinely submitted to IOTC on a 5-degree grid area and month basis, by gear and fishing mode (e.g. free/log schools for the purse seiners).

5. PROBLEM AREAS IN THE DATA SITUATION AND POSSIBLE IMPROVEMENTS

General Considerations

The Working Party emphasised the fact that a number of international instruments including UNCLOS[5], the UNIA[6] and the Code of Conduct for Responsible Fishing place an obligation on both contracting and non-contracting parties to IOTC to provide data on their catches of straddling and highly migratory stocks and to collaborate in their management.

Two particular issues of concern were highlighted. The first is the timeliness of the data submissions. According to the resolution passed at the Third Session of IOTC, data for industrial surface fisheries for the previous year should be submitted by 30th June each year. For industrial longline fisheries, provisional data for the previous year should be submitted by the 30th June and final data by the 31st December. This is not being achieved and is a matter for serious concern. Secondly, many of the datasets submitted were partial. For example, nominal catches that are required as the basis for stock

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5 United Nations Convention on the Law of the Sea

6 Agreement for the Implementation of UNCLOS Relating to the Management of Straddling Fish Stocks and Highly Migratory Fish Stocks

assessment are not complete. Late submission of data jeopardises the work of the species-related working parties. Therefore, the Working Party recommended that Members and collaborating

Table 2. *Proportion of reported and estimated nominal catches in 1997*

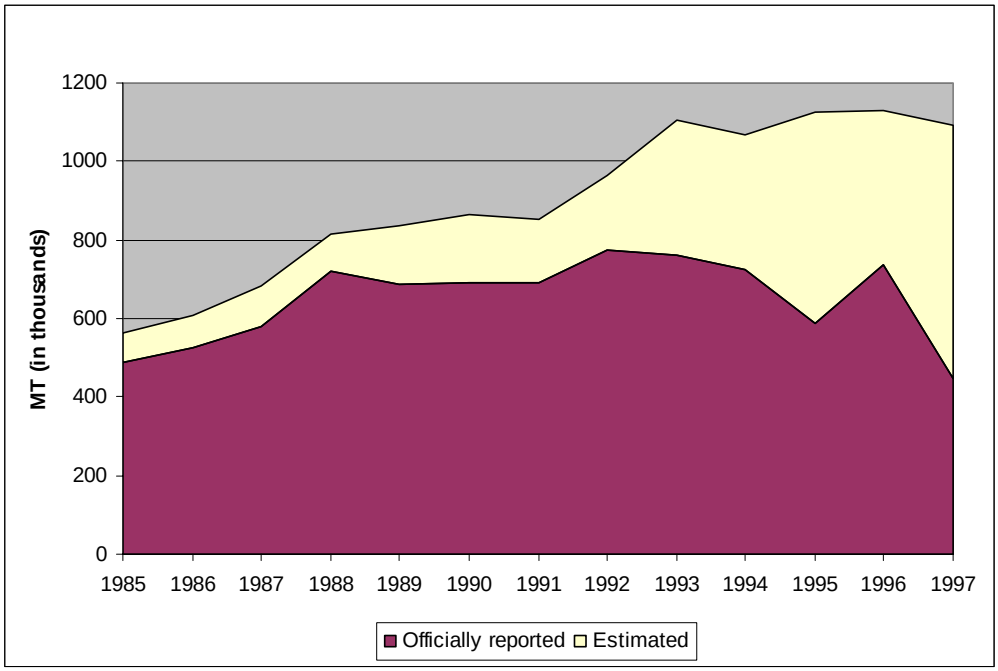
	Reported	Estimated	Total	Percent[7]	Notes
SPAIN	135,058		135,058		
INDONESIA		113,850	113,850	51.37%	Highly aggregated species
CHINA (TAIWAN)		112,340	112,340	61.64%	
INDIA	95,988		95,988		
MALDIVES		89,721	89,721	69.84%	
NEI	74,720		74,720		Purse seine reported; longline estimated
FRANCE	73,182		73,182		
SRI LANKA		58,408	58,408	75.18%	
JAPAN	55,477		55,477		
IRAN I R		53,851	53,851	80.10%	
THAILAND		47,250	47,250	84.42%	
PAKISTAN		36,361	36,361		
OMAN		32,955	32,955	90.76%	
KOREA REP		18,054	18,054	92.41%	No size data
UNTD ARAB EM		16,399	16,399	93.91%	
MALAYSIA		10,079	10,079	94.83%	
MADAGASCAR		10,000	10,000	95.74%	No current statistical system
EGYPT		9,258	9,258	96.59%	
YEMEN AR RP		8,670	8,670	97.38%	No current statistical system
COMOROS		8,030	8,030	98.12%	
SAUDI ARABIA		6,972	6,972	98.76%	
AUSTRALIA	6,096		6,096		
SEYCHELLES	4,869	515	5,384	98.80%	
MAURITIUS		5,249	5,249	99.28%	
MOZAMBIQUE		4,126	4,126	99.66%	No current statistical system
CHINA	2,702		2,702		
TANZANIA		2,300	2,300	99.87%	
QATAR		411	411	99.91%	
KUWAIT		279	279	99.93%	
KENYA		236	236	99.95%	
ERITREA		203	203	99.97%	
BAHRAIN		159	159	99.99%	
DJIBOUTI		75	75		
BANGLADESH		50	50		
SOUTH AFRICA		14	14	100.00%	
SUDAN					
Total	448,092	645,815	1,093,907	100.00%	

N.B. IOTC Contracting Parties are highlighted.

countries be reminded of their obligations with respect to the timeliness and completeness of the data to be provided.

[7] Percent of total catch that would be considered reported if the data for that country is reported.

Figure 1. *Proportion of reported and estimated nominal catch*



Nominal catch (NC) data

The core data required is the nominal catches by country. The level of official reporting of catches is unacceptably low, with the catch reported being only 41 % of the total catch and with most data

submissions one year or more late. This indicates a downward trend in the level of reporting relative to the 1980s. However, it was noted that, prior to 1993, IPTP only listed reported catches. Since then, countries participating in IPTP have agreed that the missing proportion of the catch should be estimated, based on the best available data, with a fully detailed audit trail being available for all data estimates. At the time, attempts were made to reconstruct the historical time-series, but this proved unfeasible for earlier years. It is possible, therefore, that the level of reporting in the earlier years may actually have been over-estimated.

It should be noted, however, that a dramatic improvement could be achieved if the data missing from some of the major fishing fleets can be obtained. The case-by-case summary presented in Table 2 and further discussed below illustrated this fact.

Indonesia is one of the major tuna fishing nations in the Indian Ocean but there are severe problems in the collection of fisheries statistics and no data are reported officially to IOTC. The most accurate catch figures come from state run purchasing companies. Problems occur both in the data aggregation process from the district to the province and national levels, where data are aggregated by commercial grades of tuna, rather than by species, area and time. It was also noted that some 800 vessels from Taiwan Province of China might have changed their flag to Indonesia over the past few years. The Secretariat has hired a consultant with field experience in Indonesia to identify the current situation and expects his report in the next few days.

Data from Taiwan Province of China are also not currently available. Upon instructions from the China, no direct contact has been established with or data requested from Taiwan Province of China. Current instructions also establish that the Secretariat should not accept any data coming directly from Taiwan Province of China. PRC has submitted data for their fleet but has indicated that they have not to date been able to obtain data from Taiwan Province of China.

The artisanal skipjack fishery in the Maldives has previously been reported well to IPTP. Maldives has not joined IOTC and has not reported catches to IOTC for 1997 or 1998. Maldivian authorities have indicated that published data could be made available to IOTC, but no reply to requests for such data has been received by the Secretariat.

Several countries have submitted partial datasets that differ greatly from the estimates submitted to FAO. Further clarification will be sought from these countries before entering the official statistics.

The Working Party noted with grave concern the case of IOTC member countries (such as Eritrea, Korea, Madagascar and Pakistan) that have not replied to any of the attempts at contacting the relevant officials and have submitted no data.

Catch-and-Effort (CE) and Size-Frequency (SF) Data

Good catch, effort and size frequency data are available for most of the purse seine fleets. Longline data are more difficult to obtain, with most of the size sampling being carried out by fishers themselves during operations. The Secretariat has no size-frequency data for the Korean longline fleet (historical or current) for which apparently no data have been collected. For the Taiwanese fleet, size-frequency data have not been submitted since 1989.

A complete revision of Japanese longline size-frequency data has recently been provided to IOTC. This dataset covers all target species in the Indian Ocean since 1952.

It was noted that the length-weight measurements taken by observers in the BIOT programme constitute one of the few datasets available in the Indian Ocean. The Working Party recommended that the Secretariat compile a database of basic length-weight measurements for calculation of functions to convert between the two variables.

Fishing Craft (FC) Data

Returns have been uneven for this type of data. It was noted that the creation of the vessel registry would supersede this information to some extent. However, there is a need for this type of data where a comprehensive vessel registry database cannot be compiled. The Working Party also noted that artisanal fishing craft statistics would still be needed, as the vessel registry will not cover these.

As reported to the latest meeting of the Coordinating Working Party on Fisheries Statistics (CWP), the FAO vessel statistics have changed focus from GRT to LOA as an aggregating variable. This is because the differences between the various tonnage measurements cause problems in reporting of statistics. The Working Party recommended that in future countries should attempt to provide FC data to IOTC under this primary aggregate rather than in tonnage.

Transhipment (TS) data

This database had previously been identified as a way to assist in the identification of possible double reporting and as a secondary source of catches for non-reporting countries. Only Mauritius has returned transhipment data to date. Several problems of a logistic nature were highlighted on the monitoring of transhipments. It was also noted that these data are often incomplete or inaccurate as they are mostly generated from declarations for customs or tax purposes.

The Working Party recommended that the focus of this database should be changed from collecting data on transhipment tonnage to the actual listing of landings from individual foreign flag vessels. This database could be called a **Landings database** and would be used to assess the level of vessel activity for non-reported fishing.

Vessel Registry (VR) database

The initiative to constitute a vessel registry originates in a resolution from the Third Session of the IOTC that calls on all Member countries to submit identifiers and characteristics for vessels over 24 m LOA on a mandatory basis (voluntary for vessels under 24 m), and for all licensed foreign vessels irrespective of their length.

The original intention of the vessel registry was to constitute an inventory of all flag of convenience vessels. There is a large fleet of vessels, often flagged or owned from Taiwan Province of China, where, given the current situation, statistics are not going to be readily available. The vessel registry could be of help in identifying the total number of vessels active in the Indian Ocean, a statistic that is required to estimate the total catch of this portion of the fleet.

Furthermore, at a recent inter-agency meeting of the regional fisheries bodies concerned with management of tunas, it was agreed that this information would be very useful in following the movement of fleets between the different areas, for example, in response to new regulatory measures. Information on vessels currently active in tuna fisheries in the areas of competence of the different tuna organisations will be exchanged between the organisations to attempt to track vessel movements between oceans.

The Secretariat presented a table in its report listing the progress in the compilation of information. A number of datasets have been obtained and substantial work will be required to validate this information prior to be incorporated in IOTC VR database.

A number of characteristics of the data requested concerning the vessel registry database were discussed in detail. The value of the Lloyd's registration number lies in that is a unique way of identifying vessels in spite of changing names and flag countries. However, two problems were noted: Asian longliners frequently are not registered with Lloyds and, in some cases, following some change in the characteristics of the vessel, owners re-registered the same vessel, changing the registration number. However, it was recommended that countries should make an effort to provide the Lloyd registration number for their vessels or for vessels licensed to operate in their waters.

The Working Party recommends that each country submits to IOTC on an annual basis a detailed list of the vessels and associated characteristics for those vessels licensed and active in each zone and, whenever possible, of tuna fishing vessels using their port facilities. It was noted that some countries might require assistance in the development of software for data-entry of this information. In this respect, technical staff from the Seychelles Fishing Authority demonstrated the use of FIMS, a computer programme to provide data entry and editing facilities for vessel registry information.

Proposed measures for improving the quality of the statistics

A number of specific proposals were presented by the Secretariat intended to improve the overall quality of the fisheries statistics.

Port sampling programmes

For fleets that are not reporting *directly* or that are providing only partial information, it was recognised that the only available option might be to establish port sampling programmes to supplement missing information.

One of the primary goals of such programmes will be to estimate the catch of the non-reporting fleets. To illustrate the approach, the following basic scheme for estimation was considered:

Total Catch = Number of vessels x Fishing Effort (Measure of Activity) x Catch per unit effort (or activity)

The starting point for estimating the catch for non-reporting fleets is to estimate how many vessels are active in the Indian Ocean. This figure could be provided by the vessel registry or the Fishing Craft (FC) databases, complemented by the Landings database to cover the case of vessels fishing without licenses.

A measure of the activity or fishing effort of these vessels can be obtained in a number of ways. Basic foreign flag landing statistics (e.g. number of landings over a period of time i.e. the new Landings database) for these vessels would provide such an estimate. This information can be obtained in some countries from port authorities as a record of the "Captain's List". In cases where such sources are not available or where reporting rates are low, port-sampling programmes could supply part of the missing estimate. Information from licensed vessels and VMS systems covering non-licensed vessels could also provide an activity index.

The third element of the scheme, catch-related statistics such as total catch and species composition per trip can be obtained through port sampling, observer programmes and logbook reports from licensed vessels. Other information vital to stock assessment activities, such as size-frequency data that is missing or inadequately sampled from many fisheries, can also be obtained through port sampling and observer programmes.

Whenever possible, existing sampling programmes that have proved successful should be expanded. Support from the Secretariat might be needed for this. The Secretariat should also monitor these programmes closely to ensure that the intended goals are achieved.

The location of possible sampling points was then discussed. It was noted that a very large proportion of the catch for the non-reporting fleets is transhipped at a few ports: Bali and Jakarta (Indonesia), Penang (Malaysia), Phuket (Thailand), Mauritius, Singapore and South Africa. In some of these ports there are already sampling programmes working. It was suggested that these ports be considered as potential sampling points and that priorities should be established based on a cost/benefit ratio.

The Working Party agreed that it is necessary for IOTC to engaged in such activities, <u>including those in non-member countries if they are necessary</u>. As IOTC has to establish budgetary provisions for these activities, it was agreed that a number of specific proposals would be prepared for the next meeting of the Scientific Committee. The Working Party requested that the Australian sampling programme be contacted as to whether they will collaborate in establishing a programme and provide estimated costs for sampling in Bali, Indonesia for both sampling and supervisory personnel. Scientists from Thailand, Mauritius, Malaysia and South Africa participating in the Working Party were also asked to provide assistance in the estimation of the costs of expanding existing sampling programmes or instituting new programmes in their countries.

Missions to countries in the region

The Working Party recognised the need for the staff of the Secretariat to carry out a number of missions to countries in the region that have not been reporting to IOTC. The objective of these missions would be to assess the availability of statistics and the sampling methodology, establish contact with the authorities of the country and clarify the role of IOTC, including its needs for statistics on tuna and tuna-like species.

Nomination of official data correspondents from each IOTC member country

At the Third Session of IOTC, it was agreed that Member countries would provide the names of contact points in each country. Few countries have complied with this recommendation. Therefore, the Working Party agreed that Member countries should be reminded of this obligation at the next Scientific Committee meeting.

Assistance to member and non-member countries in processing statistics

Several countries may have collected data but may lack the necessary resources to process the data to conform to the IOTC data requirements. In such cases, data could be provided to IOTC in raw form, subject to confidentiality issues, and IOTC will process the data for incorporation in its databases.

It was noted that IRD has already provided assistance to several IOTC member countries in data entry and analysis programmes for purse seine logbook and sampling schemes. IOTC and IRD plan to cooperate in a project to combine the capabilities of software produced by IPTP (WINTUNA) and IRD (AVDTH) to produce a single package that could provide data-entry and processing of statistics for longline, baitboat and purse seine data. The new software package will be made available to all countries upon request. The requirements for training and for flexibility in any regionally deployed system were noted.

For artisanal fisheries, statistical systems typically extend over the whole fishery situation and thus fall outside the IOTC mandate. Data may possibly be recorded using the FAO software package ARTFISH, but might have to be complemented by sampling schemes tailored for tuna and tuna-like species.

The Working Party recommended that the Secretariat continue with such activities.

Requesting data in two submissions

The Working Party discussed whether requesting data in two instalments might improve the timeliness of the submission of mission-critical data such as NC data. In general, the Working Party felt that this was not necessary and that a better course of action would be to emphasize the need for prompt delivery of such data when reminders are sent to those countries delaying submission.

Mailing lists for national statistical bulletins

The Working Party took note of the steps taken by the Secretariat to ensure its inclusion in mailing distribution lists for statistical bulletins generated by member and non-member countries. This will provide useful information for the generation of catch estimates where other information is not available.

Use of direct diplomatic channels to encourage participation

It was noted that, in the past, direct diplomatic contacts from Member countries have proved an effective way of encouraging participation in regional action, including providing data on fishing activities. The Working Party considered that it would be important that IOTC Members should initiate such contacts.

The use of standard codes in reporting

The heterogeneity of codes used by various agencies reporting to IOTC was noted. In certain cases, the codes are incorrect versions of the FAO 3-Alpha codes used by FAO and which have been adopted by CWP, which may lead to incorrect attribution of species and flags. The Working Party recommended that, whenever possible, a standard set of codes for country and species be adopted for all data submissions to IOTC. The 3-Alpha codes will be posted on the IOTC web site to facilitate their use. If it is inconvenient to use standard codes, full documentation of the codes used should accompany data submissions. The Working Party also recommends that countries be reminded to include any raising factors applied with their CE submissions.

6. ANY OTHER MATTERS

Statistics for neritic tuna

The paucity of data available for neritic tunas was noted with concerned by the Working Party, in particular considering the increasing importance of species such as kawakawa or longtail tunas in the total catch of tuna and tuna-like species in the Indian Ocean. Among the documents available to the Working Party, only one document from Thai scientists discusses neritic tunas.

It was noted that data for these species probably exist in most cases in fisheries administrations and research institutions. However, in many cases, scientists that have been directly involved with the collection of such statistics are reluctant to release the data to the public domain. Future meetings of a Working Party on neritic tunas might provide a forum for better exchange of information on these species, but personal contacts will be necessary to improve awareness of the role of IOTC. It was noted that provision of data is a mandatory requirement for IOTC Contracting Parties but that use for research leading to publication of data such as size-frequency sets which do not originate from formal statistical systems should be subject to the approval of the data owners.

The Working Party also noted the difficulties involved in the acquisition of good statistics in artisanal fisheries, which catch most neritic tunas. Assistance is often necessary to establish sampling programmes and train national staff. Experience of IPTP has shown that this can be done successfully when there is a long-term commitment from the national administrations.

Vessel Monitoring Systems (VMS)

The reporting requirements and standards adopted by the EU were discussed. The EU has mandated that vessels over 24 m LOA operating in the open seas and over 15 m in the Mediterranean as well as all vessels fishing in the high seas should have a VMS system installed. Vessels are required to report to their flag country the vessel identifier, position, track and speed every two hours, with the possibility of polling more frequently if necessary. They also have to report to monitoring stations in third countries in which vessels are authorized to operate through EU fishing agreements. The EU legislation specifies the data format, but does not impose any hardware system. There is a move to establish the EU format as a standard as it provides for the transmission of any type of data in addition to the base required by EU legislation. Currently, Portugal is the only EU country that requires catch and effort reporting in real time.

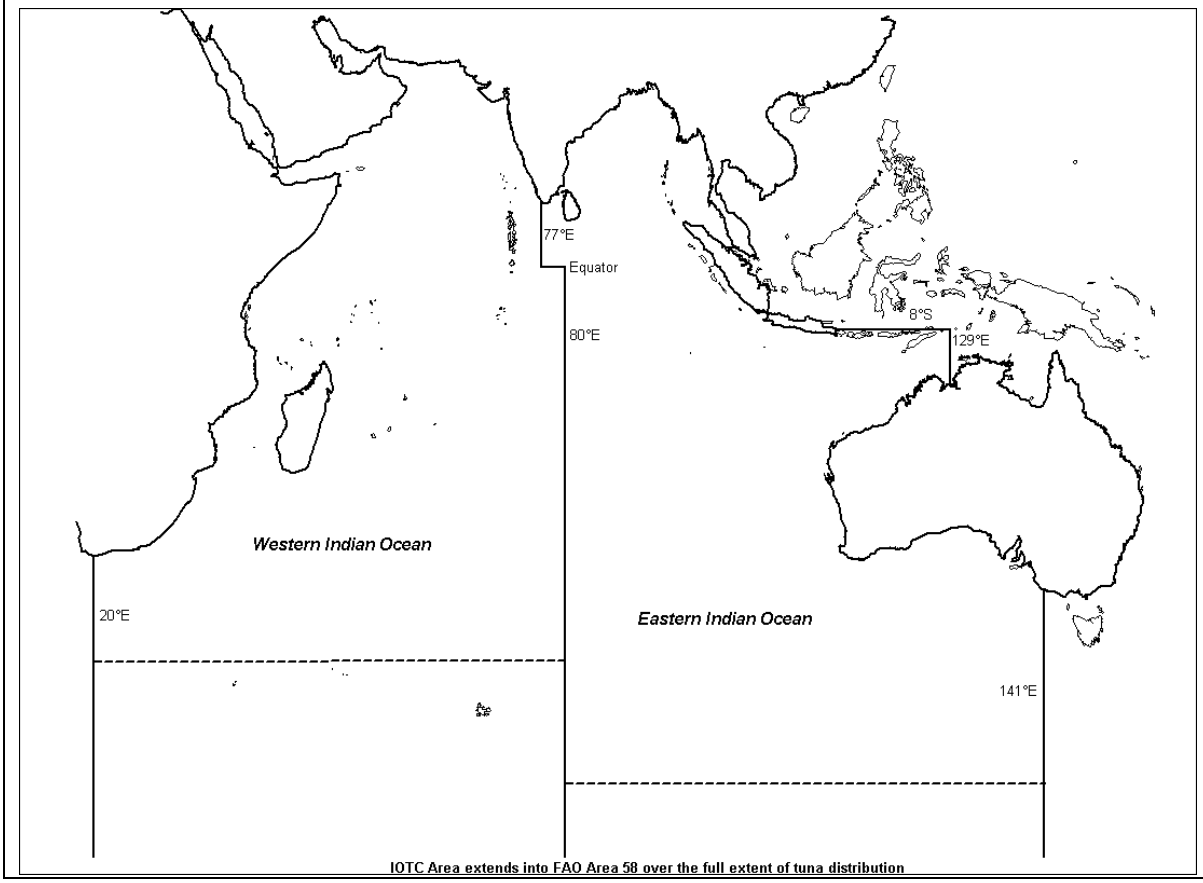
The South African policy with respect to VMS systems was discussed. Vessels are required to carry a VMS system to gain access to a South African port following an initial visit, irrespective of whether they intend to fish or not in the EEZ. The preferred system is based on INMARSAT C, which has the advantage of communications being inexpensive. Systems based on ARGOS do not meet the minimum regulation standards set by the EU, as daytime transmission does not function in the area; in addition, communications costs are higher.

The Secretariat noted that FAO has proposed a pilot experiment on the establishment of regional VMS system in the Indian Ocean. According to the project, a base station would be placed in IOTC headquarters, providing the necessary equipment and staff. The system would supply information to coastal countries on the activities of vessels within their EEZs.

In general, it was noted that there is a real need for standards regarding the method and format of reporting from VMS systems.

The Working Party noted that, although the information derived from VMS systems do not provide a replacement for the statistics required to monitor the status of resources, wide scale deployment of VMS on fishing vessels would provide valuable information on fishing effort and active zones. The

Figure 2. *Proposed IOTC statistical areas*



South African experience illustrates that the deployment of VMS systems could be a pre-requisite for access to port facilities, which would expand monitoring beyond the level of "compliant" fleets operating under licensed conditions.

Collection of value statistics

The Working Party discussed the feasibility of collecting value statistics related to fisheries. It was agreed that the statistics available are often partial and unreliable. Furthermore, there are difficulties in interpreting what those statistics really mean. The Working Party recognized that it would be very difficult to obtain value statistics that could be used for meaningful comparisons. It was suggested that, when required, a special project could be initiated to study the issue, possibly within the framework of FAO Academic Programme.

Status of IOTC Statistical areas

The Secretariat reviewed briefly the history and the characteristics of the statistical areas currently used for reporting NC data. Although these areas (currently named IOTC Areas 51 and 57) are based on the FAO areas 51 and 57, the actual boundaries have been changed and they no longer correspond exactly to the FAO areas. The reason for the changes, documented in the IOTC Data Summary, were to have the IOTC boundaries coincide with those of ICCAT in the West and SPC in the East, to facilitate the reporting from Australia in the eastern Indian Ocean and to better report on the longline fishery from Indonesia.It was noted that FAO Area 58, which includes a subset of the area of competence of IOTC as described in the IOTC Agreement is not covered in this arrangement and that some catches of temperate tunas occur in this area.

To simplify and better report the statistics, the Working Party agreed to extend the boundaries of both IOTC Areas 51 and 57 southwards into FAO Area 58. It was considered preferable to change the denomination of these two areas to "Eastern Indian Ocean" and "Western Indian Ocean" in order to reduce the danger of confusion. The changes are illustrated in the map in Figure 2.

It was also noted that, at the time of the previous changes in areas, no recalculation of the historical nominal catch data was done except for the allocation of the entire Indonesian longline catch to Area 57. The Secretariat will recalculate the catch history appropriately. If this proves unfeasible, it was agreed that the Secretariat would include a warning as a footnote to the appropriate tables in the Data Summary.

Participation in the Permanent Working Party on Data Collection and Statistics

The Working Party noted with disappointment the low level of attendance from scientists from Member countries and, in particular, from Indian Ocean coastal countries. It was noted that insufficient funding was often cited as the reason by scientists interested in participating in the Working Party but unable to attend. It was regrettable that scientists unable to attend did not send written contributions as had been requested by the Secretariat.

The Working Party recommended that the Scientific Committee consider options to mitigate this unfortunate situation.

FAO Advisory Committee on Fishery Research

The Secretariat informed the Working Party on the activities of this Advisory Committee which, among other responsibilities, is expected to recommend mechanisms for the reporting of status and trends in fisheries. Regional fishery bodies such as IOTC are expected to provide feedback to this initiative that will include the creation of an integrated database, among other characteristics, on catches, species identification and biological parameters.

In a similar spirit, the Working Party noted that it would be interesting for FAO to develop an integrated statistical database covering tuna fisheries worldwide at a finer scale of special and temporal resolution than the current nominal catch data.

7. TERMS OF REFERENCE FOR THE WORKING PARTY AND ARRANGEMENTS FOR FUTURE MEETINGS

The Working Party discussed the terms of reference for its future work. It was agreed that this should be a permanent Working Party dedicated to the task of reviewing the quality of the statistics available from tuna and tuna-like species and to review status of reporting. The Working Party should also identify measures that might be necessary to improve the quality of statistics.

The Working Party discussed whether it should be also assigned the task of producing a summary analysis of the existing data to be made available to the species-related WPs. It was agreed that the Secretariat would be in a better position to produce such analyses and that it should be assigned that responsibility.

An extensive discussion followed on the best arrangement for future meetings. The issues to be covered by future meetings of the WPDCS normally would require only one or two days of discussion. The Working Party felt that it would be difficult and expensive to convene such a short meeting.

A consensus was reached to request that the species-related WPs cover, as a permanent part of their agendas, the problems of statistics for the species for which they are mandated. The WPDCS would

then meet, prior to the Scientific Committee meeting, to discuss general issues concerning statistics and to receive the report on the more specific issues from the species-related WPs. This arrangement would become into effect in the year 2000. A concern was expressed that the persons responsible for statistical systems should be present at these meetings, as the Scientific Committee will be composed in general of senior government delegates.

It was also agreed that the election of a WPDCS Chairperson for a biennial period would be useful as the Chairperson could work closely with the Secretariat on data-related matters between sessions.

8. ELECTION OF THE CHAIRPERSON

Ms. Rose-Marie Bargain, Research Officer at the SFA, was elected to Chair the Working Party for the coming biennium.

APPENDIX I. TERMS OF REFERENCE OF THE IOTC WORKING PARTY ON DATA COLLECTION AND STATISTICS

Brief review of fisheries: The WP will conduct a brief review of the current situation of the fisheries for tuna and tuna-like species in the Indian Ocean. Scientists with intimate knowledge of these fisheries and invited to contribute by completing a short review according to the following outline:

a) Catches of tuna and tuna-like species in the last ten years, by gear and by month.

   i) Has the pattern of fishing changed significantly over the last ten years?

   ii) Have fishermen's practices changed (e.g. targeting practices) over the last ten years?

b) Description of recent changes in the gears employed.

   i) Have any significant technological changes (i.e. which might potentially affect fishing efficiency) occurred in the last ten years?

Review of data collection systems in the Indian Ocean: Scientists with direct involvement in the data collection systems for tuna and tuna-like species are invited to contribute with a description of the system currently in practice to monitor the activities of the relevant fisheries. It is strongly recommended that such a description be presented as a written document. In particular:

c) Describe how the nominal catches are estimated. Describe frame survey, sampling frequency, estimation of coverage and raising factors, etc.

d) Describe procedures for estimation of catch by time-area strata. Is there a logbook or an observer programme in place? Is there any port sampling done to correct for species composition? Please provide a description of the sampling frequency, coverage, and procedures to estimate raising factors. Describe adequately fishing effort units used, and describe, where applicable, any processing of the basic data (such as standardisation, various corrections, etc.)

e) Describe procedures used for sampling size-frequency data, including sampling strategies (e.g. simple stratified sampling, multi-stage stratified sampling, etc.)

f) Describe the availability of fishing craft statistics, transhipment data (where applicable) and data on the incidental catch of non-target, associated and dependent species (i.e. by-catch).

g) Give a brief description of the period of activity of the fleets and the different stages during which the above-mentioned data were collected.

Data handling system at the Secretariat. The Secretariat will present a detailed description of the data handling procedures applied to data submissions by Members and cooperating Parties, such as nominal catches, catch-and-effort data, biological data (size-frequency, etc.), fishing craft statistics and transhipment data. This will include the progress in implementation of new data handling software and a review of the Data Revisions carried out on submissions for specific fisheries. Following the Scientific Committee recommendation, the Secretariat will present a summary of the current deficiencies in the databases, as well as the basis for an integrated monitoring programme for comment by the WPDCS.

Recommended actions. On the basis of the reviews introduced under the first three items, the WP will identify problem areas in the data available and will suggest corrective actions to be taken. The WP will also recommend measures to improve the global efficiency of the data collection and handling systems, like development of cooperative efforts, transfer of technology, integrated sampling programmes, etc.

Establishment of a Vessel Registry for the Indian Ocean. In its Third Session, IOTC approved a resolution establishing the mandate to collect information on vessels fishing for tuna and tuna-like species in the Indian Ocean (see attachment). The Secretariat will report on the progress of this initiative.

APPENDIX II. LIST OF PARTICIPANTS

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APPENDIX III. AGENDA

1. Election of Chairperson and Arrangements for the Meeting

2. Review of National Fisheries and Statistical Systems

Participants to the WP are invited to describe tuna fisheries from the region and statistical systems in place to monitor them.

3. Progress Report of the IOTC Secretariat

The Secretariat will review its work on the compilation and processing of the information relevant to the fisheries for tunas and tuna-like species in the Indian Ocean. The Secretariat will also report on CWP and Inter-Agency meetings.

4. Review of Mandatory Data Standards

- Existing mandatory data standards.
- Mandatory standards for Vessel Registry (VR) data.

5. Problem Areas in the Data Situation and Possible Improvements

The WP is invited to identify problem areas affecting the timeliness and completeness of data submissions in the data collection and to discuss possible solutions.

6. Other matters

- Participation from Indian Ocean coastal countries in the Working Parties.
- Schedule of future meetings and functional relations with other Working Parties.

7. Adoption of Report

8. Election of Chairperson

APPENDIX IV. LIST OF DOCUMENTS

WPDCS-99-AG	Provisional Agenda
WPDCS-99-LP	List of Participants
WPDCS-99-INF01	Terms of Reference
WPDCS-99-01	Progress Report of the Secretariat
WPDCS-99-02	Chinese Tuna Fisheries in the Indian Ocean Between 1995 and 1999.
WPDCS-99-03	A Review of the Data Collection Systems in use in the British Indian Ocean Territory (BIOT) Fisheries Conservation and Management Zone (FCMZ) (Chagos Archipelago). *Pearce, John*
WPDCS-99-04	Data collection and Statistics in the Andaman Sea, Thailand. *Chantawong, Praulai and Sampan Panjarat*
WPDCS-99-05	Tuna Landings in Phuket, Thailand, from 1993 to 1998. *Chantawong, Praulai, Sampan Panjarat, Sichon Hoimuk, Wanlee Singtongyam and Durongrit Keawkaew*
WPDCS-99-06	Review on the Status of Small Tunas along the Andaman Sea Coast of Thailand. *Chantawong, Praulai*
WPDCS-99-07	Statistics of the Purse Seine Spanish Fleet in The Indian Ocean. *Pallares, P., A. Delgado de Molina and J. Ariz*
WPDCS-99-08	Statistics of the NEI Purse Seine Fleet in The Indian Ocean. *Pallares, P., A. Delgado de Molina and J. Ariz*
WPDCS-99-09	Evolution du système de collecte et de traitement des données de la pêche thonière des senneurs européens et assimiles de 1981 a 1998. *Pianet, Renaud.*

WPDCS-99-10	Data collection and statistics of Japanese tuna fisheries in the Indian Ocean. *Okamoto, Hiroaki and Naozumi Miyabe.*
WPDCS-99-11	The status of Réunion Island (France)-based tuna fisheries in the Indian Ocean. *René, François, François Poisson and David Guyomard.*
WPDCS-99-12	Background document (South Africa). *Kroese, Marcel*
WPDCS-99-13	Industrial and semi-industrial fisheries monitoring programme in Seychelles. *Bargain, Rose-Marie*
WPDCS-99-14	Tuna Data Collection and Processing in Mauritius. *Devanand Norungee and Munesh Munbodh*
WPDCS-99-15	Background Document (Australia). *Kalish, John, Carolyn Robins, Albert Caton and James Larcombe*
WPDCS-99-16	A Review of Tuna Fishery and the Data Collection System in India. *John, M.E.*

APPENDIX V. MANDATORY STATISTICAL STANDARDS FOR IOTC MEMBERS

CATCH AND EFFORT DATA

h) **Surface fisheries**: catch and effort data of the surface fisheries, catch weight and fishing days at least (purse seine, baitboat, troll, drift nets) should be provided to the IOTC by 1º grid area and month strata. Purse seine fishery data should be stratified by type of school. Those data should preferably be extrapolated to the national monthly catches of each gear. The raising factors used, corresponding to the logbook coverage, should be given routinely to the IOTC.

i) **Longline fisheries**: catch and effort data of the longline fisheries should be provided to the IOTC by 5º grid area and month strata, preferably in numbers and in weight. The fishing effort should be given in numbers of hooks. Those data should preferably be extrapolated to the national monthly catches. The raising factors used, corresponding to the logbook coverage, should be given routinely to the IOTC.

j) The catches, efforts and sizes of the **artisanal, small scale and sport fisheries** should also be submitted on a monthly basis, but using the best geographical areas used to collect and process those data.

SIZE DATA

Considering that size data are of key importance for most tuna stock assessment, length data should be routinely submitted to the IOTC on a 5º grid area and month basis, by gear and fishing mode (e.g. free/log schools for the purse seiners). Size data should be provided for all gears and for all species covered by the IOTC. Size data sampling should preferably be run under strict and well described random sampling schemes which are necessary to provide unbiased figures of the sizes taken. The exact recommended level of sampling could vary between species (as a function of various parameters), but the specific level of recommended sampling needs to be established by the working party on statistics. More detailed size data, for instance size by individual samples, should also be made available to the IOTC when requested by specific working groups, but under strict rules of confidentiality.

TIMELINESS OF DATA SUBMISSION TO THE IOTC

It is essential that all the fishery data be available in due time to allow the monitoring of stocks and analysis of the data. It is thus recommended that the following rules should be applied as standard obligation:

a) **Surface fleets and other fleets operating in coastal zone** must provide their fishery data at the earliest possible date **but no later than the 30th of June** each year (previous year data).

b) **Longline fleets operating in the high seas** must provide the **provisional** fishery data at the earliest date, but **no later than before June 30th** (for the previous year data). They must provide the **final estimate** of their fishery data **before December 30th each year** (for the previous year data).

The delays presently required to submit statistics could be reduced in the future because of the development of communication and data processing technologies, which should reduce the present data processing delays.