

SOUTH PACIFIC COMMISSION

MEETING OF COASTAL STATES AND DISTANT-WATER FISHING NATIONS  
(Noumea, New Caledonia, 18 - 22 June 1984)

THE TUNA PROGRAMME FISHERIES STATISTICAL SYSTEM

(Paper Prepared by the Secretariat)

The development of a regional statistical programme is No.1 of the 13 priority items of the Tuna and Billfish Assessment Programme. A comprehensive system of data handling, computerised processing and dissemination of information to the countries and territories of the South Pacific Commission has been designed and implemented by Programme staff. All data received is routinely processed and appropriate summaries and graphical presentations forwarded in a timely manner to the relevant countries. Additionally, the statistical programme provides a great deal of the basic information used by the Tuna Programme for resource assessments.

Functions of the Statistical System

The statistical system has two primary functions:

1. The entry onto computer and processing of raw data and the provision of summaries, specified tabulations and graphical displays of the data for countries or agencies as specified by the country supplying the data. This is largely a service function for countries of the region but in providing this service it also assures the Tuna Programme of access to a vast amount of detail essential to the understanding of the dynamics of the tuna fisheries of the region and for the compilation of a regional data base (see 2 below).
2. The compilation of a regional data base from which analyses of the status of the stocks can be carried out. These data are an essential component of the total fishery and biological data set used by the Tuna Programme for assessment and evaluation of the regional resources and of the effects of the numerous fisheries on the underlying stocks on each other.

Sources of Data

Data on tuna and billfish fisheries compiled by the statistical system are from two main sources:

1. Provided as raw data (log sheets or catch reports) from fishing vessels registered in South Pacific Commission countries or from foreign fishing vessels which submit effort and catch details as part of agreements for access to the waters of coastal states of the region.
2. As processed, and to varying degrees aggregated, data from local and distant-water fishing nations and other international or intergovernmental organisations.

### Operational Phases of the Statistical System

The operation of the statistical programme is done in five major phases:

1. Data receipt and registration: All data received are carefully registered and acknowledgement of the quantity and type of data received (e.g. the number of log sheets from each type of fishing vessel) promptly sent to the source of the data.
2. Data entry and verification: This involves the preparation, including coding where necessary, and entry of all appropriate data from the log sheets or other sources, onto computer disc, making use of extensive error-checking capabilities created within the data entry system. All data are punched twice and verified before final acceptance into files.
3. Processing the data: To ensure ready access, all data are translated into standardised files for each gear type. Summaries of all files are transferred to the consolidated regional one degree square data base. Subsets of the data in numerous forms are used for analytical purposes as requested by countries or as required by Tuna Programme staff for stock assessments.
4. The provision of information to countries: The dissemination of summaries of data relating to individual countries is regulated in strict accordance with the confidentiality requirements of the country or agency supplying the data. Only the country or agency supplying the data, or other countries or agencies so designated in writing by the source of the data, will receive summaries. As a service to the countries and territories for which the Commission works the Tuna Programme offers the following alternative presentations of the data, or summaries thereof, to the country supplying raw data:
  - (a) Total effort and catch by month and/or year. Tables include a breakdown by species and average size information where available.
  - (b) Total effort and catch by vessel size class by either agreement period or by year. Data breakdown by species and size is provided where available.
  - (c) Total effort and catch by zone or area within a country, e.g. province or region, by either agreement period or year. Species and size breakdowns are provided where possible.
  - (d) Graphical presentation of statistics given in (a), (b) or (c) above or of combinations of these statistics. For example, plots of total effort by month, total catch by month, catch per unit effort by month, average weight of each species by month; or histograms of total catch per vessel size class, total catch by region within country, catch per unit effort by vessel size class.
  - (e) Maps showing daily vessel positions for each type of vessel for the time period chosen, e.g. day, month, quarter or year.

- (f) Maps showing the relative density of effort, catch or catch per unit effort by one, two or five degree squares by 10-day period, month, two-month, quarter or year. The statistics displayed may represent the total or a subset of the data on the basis of vessel nationality and/or vessel size class. Relative density is shown by circles of different sizes centred on the geographical square which it represents. Four different density ranks are specified.
- (g) Full listing by one degree square of effort and catch data by 10-day period, or month, or quarter, or year, for each vessel type. Statistics given are total effort, catch by species and average size.
- (g) Per vessel per trip summary statistics. Vessel identification, trip commencement and completion date, total effort and total catch by species are given for each trip. Listings are sorted by vessel name or other vessel identification field as required.

In addition the Programme will provide a summary of the regional data base for routine distribution. It was agreed in principle at the Commission's Fourteenth Regional Technical Meeting on Fisheries that aggregate data by one degree square by month would be routinely published. All necessary computer software and data processing have been completed for this purpose but the publication of summaries has been postponed in order to accumulate sufficient data to ensure that individual confidentiality requirements were not threatened.

5. The provision of a statistical data base Tuna Programme scientists can use in pursuing the other objectives of the Tuna and Billfish Assessment Programme.

#### Requirements for Improvement to the Statistical System and Data Base

When considering the adequacy, or otherwise, of any data system it is necessary to align the information available with the purpose for which it has been accumulated. As mentioned above, the South Pacific Commission fisheries statistical system operates for two primary purposes; firstly to accumulate and summarise data on the fisheries operating in the waters of individual coastal states of the region as a service function; and secondly, to accumulate data necessary for the assessment of the total tuna and billfish resources of the region and for the evaluation of the impact of the numerous fisheries on these resources and on each other. Evaluation of the adequacy of the former function can only be done by the users of the service (SPC countries and territories). Evaluation of inadequacies in the data system as a basis for resource assessment and evaluation can be done by the researchers using the data, primarily the scientists of the Tuna and Billfish Assessment Programme.

There is, for the scientists involved in regional resource assessments, no doubt that the major inadequacy in the total statistical system is the lack of comprehensive statistical coverage of the fisheries operating over the total area of distribution of the common resources. For assessment of resources within the area of the South Pacific Commission most acute is the problem caused by gaps in the data base for fisheries within this area.

Data for accurate stock assessment for individual countries and particularly for investigation of interaction between fisheries, must be by gear type and for small time and area units. The degree of definition required varies between gear types. The utility of the data base available to Tuna Programme scientists has been evaluated taking account of these known variables. The major gaps in the present data base available for evaluating the effects of fishing within the region are as follows (numbers 1 to 4 are in the order of the magnitude of catches involved which are taken within the area of the South Pacific Commission):

1. Purse-seine data for fleets of some nationalities are not available for any part of the region while for other nationalities there are gaps, particularly in the high seas areas, in the information that is available.
2. Pole-and-line data for some fleets is incomplete since about 1980, particularly in high seas areas.
3. Longline data is not available in sufficient detail for some fleets, again particularly in the high seas areas.
4. Very few data are available on subsistence and artisanal tuna catches from within the region.
5. Size frequency information presently available from most fisheries is inadequate.

The prospects for overcoming problems 1-3 above are largely dependent upon increasing the input of data from distant-water fishing nations, either directly to the Tuna Programme in the common interests of co-operative research, or through coastal states as a condition of access to the regional resources.

Even though catches by subsistence and artisanal fisheries represent a small fraction of total tuna catches within the region, statistics on them are of vital importance to the people of the region and hence to the future activities of the Tuna Programme. Without better indices of effort and catches it is impossible to evaluate interaction between these and larger fisheries (a priority for the Programme). The Statistical Training Course scheduled for September 1984 will provide an ideal medium to increase awareness of the problem by the region's fisheries staff and to identify the best approaches to solving it.

Points 1 to 5 above relate to data which is generated from fishing activities within the area of the South Pacific Commission and which are therefore of primary importance to the countries and territories of the Commission. Because of the migratory nature of the tuna and billfish species being exploited within the Commission region it is, however, necessary to have access to information preferably for the total area of distribution of the resources which spend part of their time in this region. In addition to access to effort and catch data for adjacent fisheries, access to other research information or analytical results generated in other areas is also required.

---