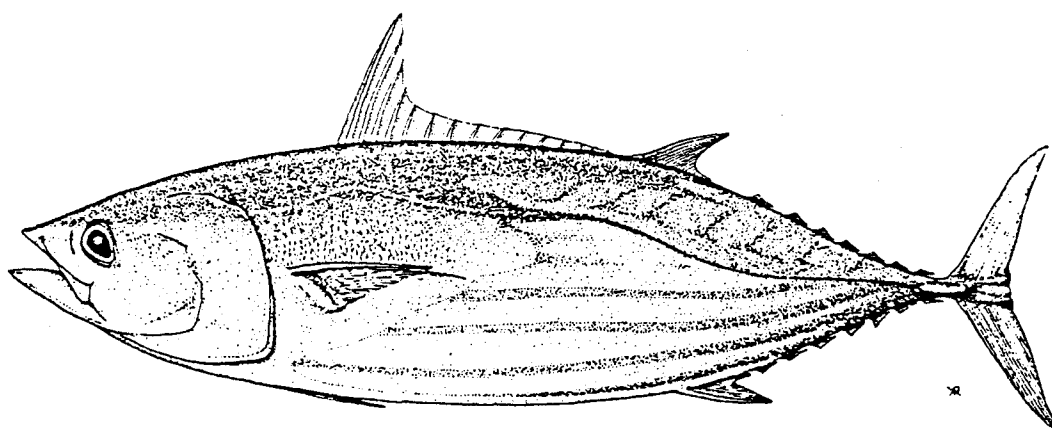


**FIFTH STANDING COMMITTEE ON TUNA AND BILLFISH**

18-19 June 1992  
Honolulu, Hawaii

**WORKING PAPER 9****TBAP WORK PLAN 1992-93**

Tuna and Billfish Assessment Programme  
South Pacific Commission  
June 1992

## TBAP WORK PLAN 1992-93

### INTRODUCTION

At the Fourth Standing Committee on Tuna and Billfish meeting (Port Vila, 17-19 June 1991), it was recommended that "In order to facilitate the role of SCTB in providing technical review of the work of the Tuna and Billfish Assessment Programme, ... the TBAP prepare and distribute to Standing Committee on Tuna and Billfish members prior to each meeting:

- A detailed description of any proposed new activities
- A projected work plan for the year"

The specification of a definitive work plan, including descriptions of proposed new activities, has been hindered to some extent by uncertainties with regard to the Lomé IV project (WP.8). While there is obviously strong regional and EC support for the project, the final prioritization of all Lomé IV projects will not take place until a meeting of ACP/EC officials, beginning on 24 June, takes place in Suva. It is therefore clear that the original time frame envisaged for the project, i.e. beginning on 1 October 1992 (immediately upon completion of the RTTP on 30 September 1992), will not be met. As a contingency plan, the TBAP is seeking a one year extension of the RTTP that would essentially cover the first year of activities planned under the new Lomé IV project. It is on the assumption that this extension is approved and the funding in place by 1 October 1992 that the following work plan for TBAP year 12 (1 October 1992 - 30 September 1993) has been constructed.

### WORK PLAN 1992-93

Although the Draft Strategic Plan, as approved by the 23rd Regional Technical Meeting on Fisheries, was not subsequently approved by CRGA and the South Pacific Conference, it still provides a useful framework for the development of this work plan. Therefore, the various activities have been organised under the four key projects as detailed in the Draft Strategic Plan: Statistics and Monitoring; Biological Research; Stock Assessment and Modelling; Reporting and Liaison. Because it involves substantial input from each of the other projects, the Albacore Research Project is discussed separately. TBAP involvement, on a consultancy basis, in the Philippines Tuna Research Project, is also described in a separate section.

#### 1. Statistics and Monitoring Project

##### *Activity 1.1      Regional Tuna Fisheries Databases (Funding: TBAP core)*

Maintenance of the daily catch and effort logbook database, the Standing Committee database and the SPAR database will continue. The daily logbook database contains data provided by SPC member countries, covering the activities of either distant-water fishing nations or domestic fleets. The daily logbook database is used for research and monitoring purposes. Monitoring of the fisheries is accomplished through quarterly publication of the SPC Regional Tuna Bulletin. Data summaries are provided to member countries on a quarterly basis. For several member countries, the processed data are returned on diskettes for incorporation into databases which are maintained on computers within each country. Data management support for the Standing Committee on Tuna and Billfish and the South Pacific Albacore Research group will continue through maintenance of the Standing Committee database and the SPAR database.

*Activity 1.2                      Compilation of Historical (Pre-Treaty) American Purse Seine Data*  
\*\*\* New Activity \*\*\*    (Funding: USAID)

Historical data covering American purse seiners, primarily for the period 1983-1988, will be compiled and processed with the assistance of the Inter-American Tropical Tuna Commission. These data will substantially improve the coverage of the American fleet during this period.

*Activity 1.3                      Transshipment Database* (Funding: TBAP core)

Transshipment data for 1992, including the amounts unloaded by species per vessel, will be forwarded to SPC on a monthly basis from Koror, Majuro, Pohnpei and Yap. Attempts will be made to obtain transshipment data from Guam, Lami, Levuka, Noumea, Papeete and Tinian. Unloading data covering American purse seiners, which unload at Pago Pago, Tinian or on the high seas, are regularly forwarded to SPC. These data will be used to monitor transshipment activity in the region, analyse the quality of the logbook data and to estimate annual catches for some of the fleets.

*Activity 1.4                      Regional Tuna Bulletin* (Funding: TBAP core)

The Regional Tuna Bulletin, which contains monthly summaries of daily logbook data and other information, will continue to be published on a quarterly basis.

*Activity 1.5                      National Fisheries Statistics Systems* (Funding: TBAP core)

Data management systems installed on computers in 13 member countries will continue to be supported by in-country visits of SPC staff when required. Currently, visits to the Federated States of Micronesia and Papua New Guinea have been planned for the next reporting period. New systems may be installed in French Polynesia and Vanuatu.

*Activity 1.6                      Statistics Support for Other SPC Fisheries Projects* (Funding: users)

Statistics support for other SPC fisheries projects, notably the Regional Tuna Tagging Project and the Albacore Tagging Project, will continue.

*Activity 1.7                      Port Sampling*    \*\*\* New Activity \*\*\*    (Funding: Lomé IV)

During 1991, port sampling programmes to collect biological data from landings by longliners were initiated in the Federated States of Micronesia, Fiji, French Polynesia, Marshall Islands, New Caledonia and Palau. The sampling data are forwarded to SPC on a quarterly basis, where they are then processed. During the next reporting period, visits by SPC staff to each of the sampling locations will be made in order to monitor the progress of the sampling programmes and to standardise data collection procedures. An attempt may be made to assess the feasibility of sampling non-American vessels transshipping on Tinian and longliners transshipping on Guam.

*Activity 1.8                      Observers*    \*\*\* New Activity \*\*\*    (Funding: Lomé IV)

Processing of data collected by observers aboard American purse seiners and observer training will continue as in the past as a service to the FFA. In addition, discussions will be held with several member countries regarding the deployment of SPC-funded scientific observers on foreign vessels operating in their EEZ's, with a view to beginning observer placement in the coming year. The principal function of these observers would be to collect scientific data and samples in support of TBAP research activities. We will liaise with FFA and countries already running their own national observer programmes to ensure consistency of data collected and methods used.

## 2. Biological Research Project

The new Biological Research Project will undertake most of the field-based and laboratory-based research of the TBAP. The activities of the project will be funded from the new Lomé IV project, with some TBAP core support, and will consist of (over the 5-year Lomé IV funding period) of field, laboratory and training components. During 1992-93, only laboratory- or desk-based research will be initiated, mainly in working up the large amount of biological data and samples collected during the course of the RTTP.

### *Activity 2.1      By-catch and Discards in Western Pacific Tuna Fisheries* (Funding: TBAP core)

This activity, which commenced during 1991-92 following a recommendation of the SCTB 4, will continue in 1992-93. The objective of the study is to review by-catch and discard practices of the industrial tuna fisheries operating in the western Pacific, using logsheet data provided to SPC member countries, observer data, and published and unpublished reports. This work will be completed during 1992-93 and published as a TBAP Technical Report.

### *Activity 2.2      Analysis Yellowfin and Bigeye Tuna Otoliths    \*\*\* New Activity \*\*\** (Funding: Lomé IV)

A large number of otoliths of yellowfin and bigeye tuna (currently 648 yellowfin and 38 bigeye otoliths) have been collected from throughout the western tropical Pacific during the course of the RTTP. This material, along with tag return data, will be used for the analysis of age and growth of these two species.

The objectives of this activity will be to (i) determine the periodicity of ring formation (and its variability) on otoliths of tagged tuna injected with oxytetracycline (OTC) and (ii) depending on the results of (i), develop a length-age data set for the existing otolith collection. The I-ATTC, because of their interest in this topic, have volunteered their services for the analysis of the OTC otoliths, and 11 samples have already been sent.

The reading of the entire otolith set (or a length-stratified subset) will be contracted to an organisation with the necessary facilities. The National Fish Aging Facility based at the Queenscliff (Vic., Australia) Marine Science Laboratories is a possibility, among others. Approaches have been made to several institutions, and arrangements will be finalized on completion of the OTC analyses by the I-ATTC.

### *Activity 2.3      Assessment of Western Pacific Yellowfin Stock Structure by Analysis of Morphometric and Meristic Characters    \*\*\* New Activity \*\*\** (No additional funding required)

Morphometric and meristic data for yellowfin have been collected during the RTTP. To date, 932 samples, each consisting of 13 morphometric measurements and a gill-raker count, have been collected over a wide area of the western tropical Pacific. The objectives of the analysis will be (i) to assess and describe the geographic variation in the characters and (ii) based on the findings of (i), to test various hypotheses regarding statistically-distinguishable geographical groupings that may indicate some degree of spatial structuring of the stock. The analysis will be undertaken using well-known statistical techniques (multivariate regression, discriminant analysis, etc).

### *Activity 2.4      Analysis of Yellowfin Reproductive Condition    \*\*\* New Activity \*\*\** (No additional funding required)

Samples consisting of yellowfin gonad weight, gonad stage, total fish weight and length have also been collected during the RTTP. These data will be analysed with the objective of characterising variability in yellowfin reproductive condition (as indicated by gonad stage and GSI) by fish

size, season and location, for later incorporation into models of yellowfin population dynamics.

*Activity 2.5            Food and Feeding of Yellowfin    \*\*\* New Activity \*\*\*    (No new funding required)*

Data on the stomach contents of 1,400 yellowfin and bigeye collected during the RTTP will be analysed in terms of school association (eg. unassociated, log, Fish Aggregation Device, seamount, whale shark), area, time of day and other variables, in order to provide a better understanding of the role that the associations play in the life history of the tuna.

### 3. Assessment and Modelling Project

The objective of this project is to develop and apply tuna population dynamics models for the analysis of stock condition and fisheries interaction in support of national and regional fisheries management initiatives. The project will be largely funded from TBAP core sources, however some specific short-term contracts for specific analyses will be funded by the Lomé IV project.

*Activity 3.1            Assessment of Skipjack and Yellowfin Stocks in the Western Tropical Pacific Using Tagging Data    (No new funding required)*

This activity will continue and conclude the analyses of SSAP and RTTP tagging data reported in WP.3. The objectives of this work are to estimate skipjack and yellowfin population sizes, recruitment, natural mortality/emigration rates and fishing mortality rates, and to use this information to draw conclusions regarding the status of the stocks and their exploitation potential.

*Activity 3.2            Development and Application of Models of Skipjack and Yellowfin Movement    (Funding: FAO and Lomé IV)*

This activity is being undertaken in collaboration with Otter Research Ltd. of Canada, and has thus far been supported by funding associated with the FAO Expert Consultation on Interactions of Pacific Tuna Fisheries. The overall objective is to develop a population dynamics model that explicitly incorporates a generalized movement sub-model, and to use the model to investigate spatial interaction among tuna fisheries. During 1992-93, this activity will (i) undertake further development and testing of the movement model reported to the December 1991 meeting of the Expert Consultation; (ii) apply the model to RTTP and SSAP skipjack tagging data; and (iii) explore ways of modifying the model for application to yellowfin tagging data.

*Activity 3.3            Investigation of Interaction Between Surface and Longline Fisheries for Yellowfin    \*\*\* New activity \*\*\*    (Funding: Lomé IV)*

This issue has for some years been a concern for SPC member countries and its resolution was one of the major objectives of the RTTP. In this activity, an analysis of all available data (tagging, size composition, catch and effort, biological) will be undertaken in order to evaluate the effects of the various surface fisheries for yellowfin on the longline fishery. It is anticipated that the analysis will indicate future directions for research on this important issue, rather than result in definitive conclusions.

*Activity 3.4            Case Study of Fishery Interaction in a Pacific Island Country: Kiribati    \*\*\* New activity \*\*\*    (Funding: FAO)*

This activity was one that received strong support from Pacific Island countries at the recent Expert Consultation on Interactions of Pacific Tuna Fisheries. The objectives of the project are to: (i) quantify the overall levels of exploitation of skipjack and yellowfin tuna in the Kiribati

EEZ (primarily the Gilbert group); (ii) quantify the interaction between artisanal, domestic commercial and DWFN purse seine fleets operating within the Kiribati EEZ; and (iii) quantify the interaction between fisheries operating in the Kiribati EEZ and large-scale industrial tuna fisheries throughout the greater western tropical Pacific. The analyses to be undertaken will include the construction of abundance index models using catch and effort data and analyses of tagging data for both releases in the Kiribati EEZ and in the greater western tropical Pacific.

*Activity 3.5                      National Fisheries Assessments (Country Reports)* (Funding: Lomé IV, AIDAB and possibly countries)

Country reports are produced by the TBAP to inform member countries of the status of their tuna fisheries and the stocks that support them. The reports are based primarily on logsheet data obtained through access agreements with DWFN's and submitted to SPC by the member country concerned.

These reports, in their new detailed format, have been well received by recipient countries, and the TBAP has several outstanding requests for more, including Fiji, Papua New Guinea, Palau and Marshall Islands. Some of these reports will now benefit from the availability of, in some cases, extensive tagging data. Recent experience has shown that each report requires approximately three man months to prepare. Subject to availability of funds, it is expected that 2-3 reports can be completed during 1992-93.

#### 4. Reporting and Liaison

The reporting and liaison function of the TBAP ensures that (i) member country requirements are adequately catered for by the work of the Programme; (ii) the results of TBAP research are communicated in appropriate form to member countries; and (iii) member countries receive the best available scientific advice regarding the management of their tuna fisheries. Much of this is achieved through informal contact between TBAP staff and Fisheries Officers during country visits, regional meetings, etc. Formal activities are also undertaken and in 1992-93 will include:

*Activity 4.1                      Publication of RTTP Results* (Funding: RTTP)

During 1992-93, work will commence on the detailed analysis of the variety of data collected during the course of the project, some of which has been detailed above. As well as the host of scientific papers that will result from these analyses, it is believed that there would be considerable value in publishing an overall report of the project as a monograph. A draft outline for such a monograph is attached as Appendix 1. It is expected that work on the monograph will continue into 1993-94.

*Activity 4.2                      Sixth Standing Committee on Tuna and Billfish* (Funding: TBAP core and member countries)

*Activity 4.3                      Scientific Workshop on Western Pacific Yellowfin Stock Assessment and Interaction* (Funding: To be identified)

This workshop was the subject of recommendation 2 of the Third SCTB (Noumea, June 1990) and is seen as the culmination of the activities of the Western Pacific Yellowfin Research Group. The workshop will bring together international experts and Pacific Island fisheries personnel to review available data and analyses on yellowfin stock assessment and fisheries interaction. It is expected that the workshop will focus on, but not be restricted to, the results of the RTTP.

## 5. Albacore Research Project

Several research, bio-sampling and fishery monitoring activities were implemented for the 1991-92 season to obtain vital statistics on the albacore population and the fishery. Planned activities for the 1992-93 season will consist, to a large extent, of extensions to the activities initiated last season. These will include:

### *Activity 5.1 Port Sampling* (Funding: MEDITOM)

Monitoring of catch size composition and collection of logbook data will be continued at key South Pacific ports where albacore are unloaded regularly. Current sampling sites include Noumea (New Caledonia), Suva and Levuka (Fiji), Papeete (French Polynesia) and Westport (New Zealand).

### *Activity 5.2 Albacore Tagging* (Funding: MEDITOM)

Over 20,000 albacore were tagged in the South Pacific since 1981, but less than 30 recoveries have been reported so far. Efforts will be made to conduct additional tagging in the Tasman Sea and New Zealand EEZ to increase the number of tag recoveries, and assess the likelihood of various hypotheses proposed to account for the low recovery rates. A report will be made of the temporal and seasonal patterns of tagging effort and the corresponding recovery rates.

### *Activity 5.3 High-Sea Fishery Observers* (Funding: MEDITOM)

Observers will be placed on commercial troll vessels during the fishing season to monitor fishing conditions and collect biological data, primarily size composition. Observers may also be placed on domestic longline vessels to provide a better coverage of this fleet, which is expanding in many South Pacific countries. All data collected since 1986 will be analysed to assess the level of spatial and temporal variation in oceanographic conditions, fleet distribution, fishing conditions and juvenile population structure.

### *Activity 5.4 Age and Growth* (Funding: MEDITOM)

Investigations on albacore age and growth were conducted during 1991-92, but the ageing methods remain to be validated. Tetracycline labelled otoliths and vertebrae collected so far will be subject to laboratory examination during 1993 for this purpose.

### *Activity 5.5 Stock Structure Pilot Study* \*\*\* New Activity \*\*\* (Funding: MEDITOM and Govt. of Chile [?])

A pilot study the stock structure of South Pacific albacore by means of electrophoretic techniques was initiated during 1992. The objective of the pilot study is to obtain a preliminary indication of extent of genetic variation among several different South Pacific locations: southeastern Australia, New Zealand, Fiji, French Polynesia, and, hopefully, Easter Island or closer to the Chilean mainland. Comparisons of these samples with a North Pacific sample will allow points of reference for variation between stocks that are known, on the basis of biological observations, to be allopatric. Blood samples have already been collected from several locations and will be processed shortly. If the results of this pilot study prove promising, a larger-scale sampling programme may be mounted in a future year.

### *Activity 5.6 Estimation of Fishing Effort Directed at South Pacific Albacore* \*\*\* New Activity\*\*\* (Funding: ICOD)

Longliners from Japan, Korea and Taiwan harvest adult albacore throughout the South Pacific, but not all fleets, or all vessels from any one fleet, target albacore when fishing. Scientists attending the 1991 SPAR meeting noted the lack of a standardized longline catch effort time

series, which, if available, would allow a less biased trend in albacore longline CPUE to be determined. Efforts will therefore be made to produce a preliminary time series of longline effort directed at South Pacific albacore, based mainly on statistical analyses of daily logsheet records.

*Activity 5.7                      Development of an Age Structured Model* (Funding: ICOD)

An extension to the MULTIFAN model is currently being developed to analyse catch-at-age data and produce estimates of various population and fishery parameters, such as natural mortality, exploitation rates, stock availability and gear selectivity. During 1993, preliminary estimates of these parameters will be generated, based on the available data, and further refinements to the model will be made if need be.

## **6. Philippines Tuna Research Project**

**\*\*\* New Activity \*\*\*** (Funding: ADB via Govt. of Philippines and PRIMEX)

The TBAP, with the approval of SPC management and under the auspices of the WPFCC, has been contracted as consultant to the Philippines Tuna Research Project, which has as its goal an assessment of the skipjack and yellowfin tuna resources of Philippines waters. The work, to span a two year period from December 1991, will be based on tagging experiments using the Te Tautai, under an extension of the present RTTP arrangement. It will involve existing TBAP staff, as well as additional short term recruitment as necessary.

The project, undertaken on the basis of its relevance to TBAP objectives resulting from the shared nature of exploited tuna stocks between the western Pacific and Philippines/eastern Indonesia, will not detract from normal TBAP services, and revenue generated will ensure that existing services to member countries do not have to be cut back as a result of declining support from traditional sources.

Field work will span the August-October 1992 period, with final analyses to commence in mid-1993, subject to satisfactory implementation. Progress reports and formal agreements covering the project are available.



## APPENDIX I

### DRAFT OUTLINE FOR RTTP WRITE-UP

#### 1. INTRODUCTION

- background on WPO tuna fisheries
- review previous work
- outline scientific problems, their importance
- evolution of the RTTP, its objectives and how these address the above problems
- implementation of the project, financing, how carried out, etc
- outline contents of this report/monograph

#### 2. FIELD PROCEDURES

- 2.1 Tagging vessels - descriptions, concentrating on *Te Tautai*
- 2.2 Tagging equipment - describe cradles, tags, applicators
- 2.3 Tagging methods
  - 2.3.1 Tuna fishing strategies and methods
  - 2.3.2 Single tagging
  - 2.3.3 Double tagging
  - 2.3.4 Fishing and tagging large tuna
- 2.4 Data collection
  - 2.4.1 Daily log and school sightings
  - 2.4.2 School data
  - 2.4.3 Tag release data
  - 2.4.4 Biological data and sampling
- 2.5 Field data processing
- 2.6 Baitfishing methods

#### 3. TAG RECOVERY PROCEDURES

- 3.1 Sources of tag recoveries
- 3.2 Recovery mechanisms
  - 3.2.1 Key contact points
  - 3.2.2 Tag rewards
  - 3.2.3 Tag lotteries
- 3.3 Tag seeding experiments
- 3.4 Processing and quality control of tag recovery data

#### 4. TAGGING RESULTS

- 4.1 Tag releases - summary of tag releases by area/time strata, country, etc
- 4.2 Tag recoveries - summary of tag recoveries by area/time strata, gear, vessel flag, etc

#### 5. ANALYSES OF SKIPJACK, YELLOWFIN AND BIGEYE TAGGING AND BIOLOGICAL DATA (skj, yft and bet could be separate chapters, or constitute separate sections of the headings below)

- 5.1 Analysis of morphometric and meristic characters
- 5.2 Reproductive condition
- 5.3 Food and feeding
- 5.4 Condition factor
- 5.5 Age and growth
- 5.6 School characteristics
- 5.7 Population models

- 5.7.1 Tag shedding
- 5.7.2 Non-reporting
- 5.7.3 Other sources of tag loss
- 5.7.4 Spatially-aggregated tag attrition models
- 5.7.5 Spatially-disaggregated movement models
- 5.7.6 Spatial interactions
- 5.7.7 Gear interactions

## 6. CONCLUSIONS

- 6.1 Current status of tuna fisheries in the WPO based on tagging and other data
- 6.2 Exploitation potential of tunas in the WPO
- 6.3 Tuna fishery interactions
- 6.4 Management implications
- 6.5 The way ahead -- future tuna research in the WPO

## APPENDIX

Analysis of baitfishing results