

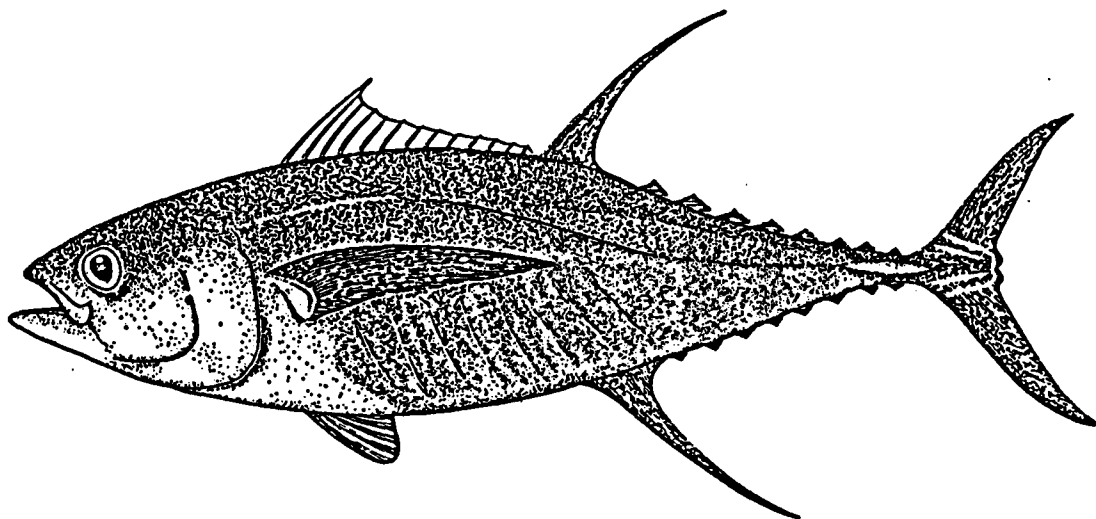
FOURTH STANDING COMMITTEE ON TUNA AND BILLFISH

17-21 June 1991
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WORKING PAPER 5

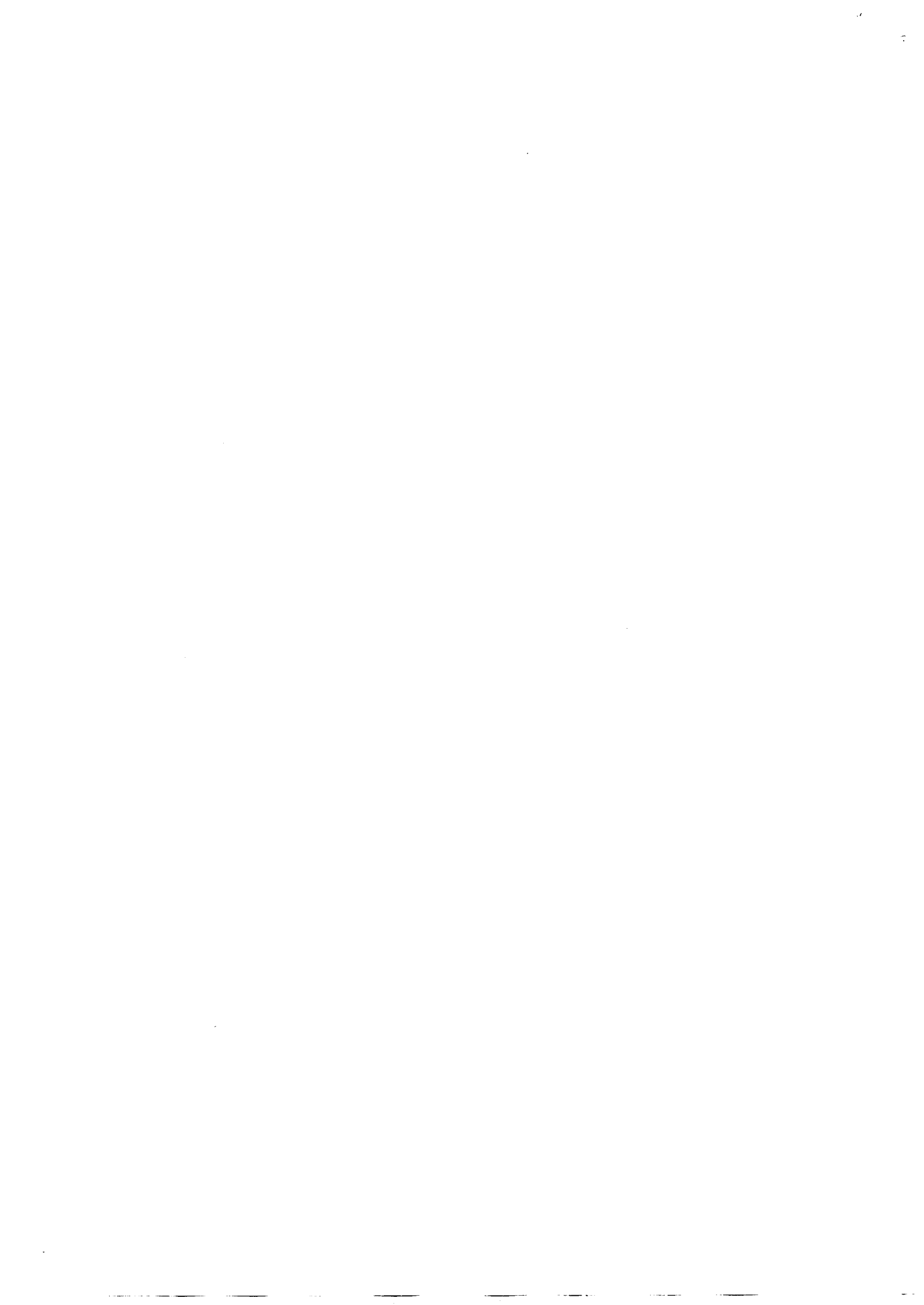
**THE SOUTH PACIFIC COMMISSION'S
TUNA AND BILLFISH ASSESSMENT PROGRAMME**

DRAFT STRATEGIC PLAN (1992-1996)



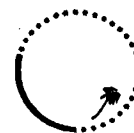
Tuna and Billfish Assessment Programme
South Pacific Commission
Noumea, New Caledonia

June 1991



DRAFT TBAP STRATEGIC PLAN

EXECUTIVE SUMMARY



The South Pacific Commission's (SPC) Tuna and Billfish Assessment Programme (TBAP) was first implemented in October 1981 as the successor to the Skipjack Survey and Assessment Programme (SSAP). The TBAP had an initial mandate to run for three years, with a priority task of establishing a Regional Tuna Fisheries Database. As tuna catches, fishing fleet diversity and fleet size in the SPC area increased, the TBAP was required to undertake a more diverse range of research tasks, and the programme was extended firstly for two years and subsequently for a further five years. This last five-year period will be completed on 30 September 1991.

SPC member countries have strongly supported the TBAP and expressed their desire for the programme to continue. As an initial step in this process, the 1990 Standing Committee on Tuna and Billfish (SCTB) recommended that "... a strategic plan for the next five-year period (1992-96) be prepared to guide the future direction of this programme, and proposed that the Standing Committee on Tuna and Billfish be authorised to develop a draft document for consideration at the 1991 Regional Technical Meeting on Fisheries...". This recommendation was accepted by the 1990 Regional Technical Meeting on Fisheries (RTMF) and the present draft strategic plan developed by a sub-committee comprising SPC Chief Fisheries Scientist Dr Antony D. Lewis, an EC-funded consultant Dr Timothy Adams, Mr Peter Sitan (FSM), Dr Talbot Murray (NZ) and Mr Andrew Richards (PNG).

The role of the TBAP has evolved from one of database development and maintenance to one that now places a greater emphasis on active, applied research, particularly in relation to the assessment of the status of tuna stocks and fishery interaction. Member country requirements and likely future fishery trends point to the need for a regional fisheries management regime for tropical tuna species. It is considered appropriate for the TBAP to fulfill the role of secretariat for the biological (scientific/technical) advisory component of such a regime and, as necessary, undertake research in support of it¹. Research activities will be influenced and directed by a number of key issues, some of which are:

- Yellowfin stock status is becoming a potential cause for concern as total catches, particularly by purse seine vessels harvesting a wide size range of fish, increase.
- There will be a need to very carefully consider ways of minimising the impact of future yellowfin catch controls on the skipjack catch in view of strong efforts by coastal states to limit yellowfin, and possibly bigeye, catches.
- Bigeye stocks, probably the most poorly understood of all tuna stocks in the western Pacific, are under increasing pressure from deep-longline gear and incidental catches of juveniles by purse seiners.
- The lack of complete data on catch and effort by Southeast Asian vessels, fleets of small longliners and certain purse seine fleets operating within the EEZs of member countries, and on high seas catches by almost all distant-water fishing nations (DWFNs), makes stock assessment particularly uncertain.
- Catch/effort data provision and size-composition data availability MUST improve if the TBAP is to realistically determine the stock status of most species.
- Interaction issues will assume much greater importance in future as coastal States increasingly manage allocations among competing interests.

¹ Such an arrangement has been proposed by Pacific Island delegations in consultations on a management regime for South Pacific albacore.

- Increasing coastal state desires to manage catches within EEZs will increase pressure to supply estimates of "maximum allowable catch".
- Regionally-coordinated port sampling will assume greater importance as nationally-based transshipments and landings increase, perhaps requiring placement of TBAP regional staff in key locations.

The draft Strategic Plan consists of a mission statement, objectives, strategies to accomplish those objectives and success indicators for each of the objectives. The revised mission statement is as follows:

To provide member countries with the scientific information and advice necessary to rationally manage fisheries exploiting the region's renewable oceanic resources.

The broad objectives of the TBAP for the 1992-96 period, associated strategies and success indicators fall into four categories: statistics and monitoring, biological research, modelling and assessment, and reporting and liaison. They are as follows:

1. Statistics and Monitoring

Objectives:

Maintenance and further development of a comprehensive statistical database covering all oceanic fisheries in the SPC statistical area, encompassing catch/effort, size-composition, tag and other data necessary for support of stock assessment, interaction and biological studies.

Monitoring any aspect of the development and operation of significant oceanic fisheries within the SPC statistical area and adjacent areas that may be needed to further the objectives of the Programme.

Strategies:

- Continue to make best efforts to improve catch/effort data coverage of all fleets by all reasonable means possible.
Indicators: Improvement in coverage rates with respect to log book data and/or acquisition of aggregated data usefully stratified for research purposes.
- Undertake scientific observer and port (transshipment and landings) sampling programmes in support of monitoring objectives.
Indicators: Incorporation of observer and port sampling data in Regional Tuna Fisheries Database, publication of results in annual report.
- Continue publication of regular (quarterly) data summaries on a region-wide basis, and confidential summaries for countries on request.
Indicators: Publication of Regional Tuna Bulletin and production of confidential country reports.
- Continue to provide timely feedback to countries supplying data to SPC, in the form of statistical tables, maps and/or through the support of in-country databases.
Indicators: Production of trip summaries and in-country databases.
- Improve tuna industry linkages and monitor product flows within and beyond the region as a means of corroborating catch data.
Indicators: Regular visits of senior staff to canneries, industry meetings, establishment of port sampling, publication of product flow data in annual report.
- Explore database linkages with tuna research agencies in adjacent regions.

Indicators: Acquisition of aggregated data usefully stratified for research purposes.

- Prepare annual fishery status reports.
Indicators: Inclusion of fishery status reports in annual report.
- Continue to develop database management systems, including appropriate graphical interfaces to the data, in collaboration with FFA.
Indicators: More efficient dissemination of information to member countries and other TBAP projects, software displays at RTMF.
- Continue to support the development of national database subsets, in collaboration with FFA.
Indicators: Production and servicing of individual in-country databases.

2. Biological Research

Objectives:

Development of a better understanding of the biology of tuna and other highly migratory species, including studies on ageing, growth, natural mortality, reproduction, vulnerability to capture, recruitment, stock structure and any spatial, environmental or temporal variability in those factors, to promote further understanding of the population dynamics of the various species.

Strategies:

- Continue organising tagging work as a primary tool in support of the study of (particularly) growth, migration and stock structure.
Indicators: Number of fish tagged, tags returned and levels of cooperation by all fleets concerned.
- Develop capacity to provide reliable estimates of age and growth for all major species.
Indicators: Development of ageing capability at SPC headquarters, publication of results in fisheries literature, summary in annual report.
- Refine estimates of natural and fishing mortality through analysis of tagging and other data.
Indicators: Publication of results in fisheries literature, summary in annual report, incorporation of parameter estimates into stock assessment and interaction models.
- Study reproduction of major species, including larval distribution and spawning.
Indicators: Publication of results in fisheries literature, summary in annual report.
- Study influences on the aggregative behaviour of tuna, towards an understanding of FAD/log/seamount dynamics.
Indicators: Publication of results in fisheries literature, summary in annual report.
- In collaboration with ORSTOM, continue to study environmental factors influencing catch and catch rates, relating yields to productivity, environmental and oceanographic variables.
Indicators: Publication of results in fisheries literature, summary in annual report.
- Study and further define the stock structure of major tuna species.
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation of results into stock assessment and interaction models.
- Document bycatch associated with tuna fisheries in the western tropical Pacific, particularly the extent of marine mammal associations with tuna schools and other possible effects of tuna fisheries on marine mammal, reptile and seabird populations, even though these are unlikely to be significant.
Indicators: Publication of results in fisheries literature, summary in annual report.

- Prepare biological synopses as required and update reviews on aspects of biology.
Indicators: Publication of synopses in fisheries literature and incorporation into confidential country reports.

3. Stock Assessment and Modelling

Objectives:

Drawing on the results of the previous two objectives, develop and implement population models and stock assessments in furtherance of national and international fisheries management initiatives.

Strategies:

- Analyse results of RTTP and subsequent tagging studies as the primary basis for stock assessment.
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation in confidential country reports.
- Develop generalised movement model for predicting interactions between spatially separate fisheries.
Indicators: Publication of results in fisheries literature, summaries in annual report, presentation to final Expert Consultation on Interaction of Pacific Ocean Tuna Fisheries.
- Develop size- or age-structured models for use in yellowfin and bigeye stock assessment and interaction studies.
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation in confidential country reports
- Develop and implement other methods of population assessment, as required (for example: linear modelling using catch/effort data for the construction of indices of apparent abundance).
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation in confidential country reports.
- Undertake specific in-country assessments where requested and where justifiable.
Indicators: Production of confidential country reports.
- Assist in the experimental design of observer, port sampling, and other biological sampling programmes.
Indicators: Reports of the results of such programmes.
- Undertake collaborative studies with other institutions, as appropriate.
Indicators: Publication of the results of such studies in fisheries literature, summaries in annual report.

4. Reporting and Liaison

Objectives:

Advising member Government and international fisheries administrations on relevant matters arising out of the previous three objectives, including advice on the historical or current status of fisheries for tuna and other highly migratory species, on the likely effects of different harvest strategies on fisheries, on optimum sustainable yields for fisheries, on the biology of individual species, and on the implementation of appropriate scientific data collection activities.

Liaison with national and international fisheries agencies for the promotion of collaborative research in furtherance of these and other objectives.

Strategies: (success indicators self-evident)

- Coordinate the production of a TBAP annual report.
- Support, or organise, such focussed scientific panels or working groups as are likely to further progress towards TBAP objectives.
- Organise any meetings necessary (perhaps in collaboration with FFA) to define a valid and workable scientific component of a regional tuna management regime.
- Present research methodology and results annually for discussion at SCTB meetings.
- Present "State of the Regional Tuna Fisheries" summaries to SCTB, RTMF (and FFC, on request) and in any other appropriate fora.
- Report progress on SCTB Action Items to SCTB members half-yearly.
- Promote personal contact between TBAP senior staff and individuals in collaborative agencies, the tuna industry, and SPC member country fisheries administrations. This contact should be aimed at promoting a clear understanding of TBAP objectives and results, improving data acquisition, and avoiding unnecessary duplication of effort.
- Coordinate TBAP contract work for other agencies if it is likely to directly further TBAP work in support of the region, or to improve extra-regional linkages in support of TBAP objectives.
- Represent TBAP, or the SPC fisheries scientific community, at meetings of other bodies or in other regions.

The future operation and management of the TBAP was considered in the areas of collaboration, funding, staffing and facilities. Collaboration with other fisheries agencies will be essential for the compilation of fisheries data necessary for stock assessment and in the implementation of required research. Collaboration through membership linkages, institutional linkages and special-interest groups are all considered. The present funding situation of the TBAP is described and future prospects outlined, including funding from existing "core" funding sources, funding from DWFNs, funding under the provisions of a regional management regime and others. Notwithstanding funding difficulties, a revised core-staff structure is recommended as a minimum requirement for undertaking the research outlined in the strategic plan. Associated with this, additional facilities, including laboratory, computer, library and accommodation, are detailed.

Upon acceptance by this Committee, it would be appropriate to invite the 23rd RTMF to endorse the revised Mission Statement, Objectives and Strategies, as outlined in this paper, noting that SCTB would continue to monitor the work of the TBAP, and recommend changes as necessary. RTMF could also be invited to give in-principal support to the revised staff structure, which would then be implemented as funding permits.

1. Background

1.1 Importance of Tuna Fisheries to the Region

Tuna fisheries are crucial to the economic development of the South Pacific Region. The western Pacific tuna fisheries are amongst the most productive in the world and the current yearly catch of tuna from the South Pacific Commission (SPC) statistical area (Figure 1) is broadly estimated at over 1,000,000 tonnes², worth around US\$2 billion. In addition, the western Pacific skipjack fishery is probably the only major global fishery remaining with significant development potential. The previous work of the SPC Tuna and Billfish Assessment Programme (TBAP) suggests that, although tuna catches have doubled over the past decade to the present level³, the current catch of skipjack from the SPC statistical area could increase substantially before approaching limits of biological sustainability⁴. The western Pacific currently supplies fully half the global catch of skipjack.

All SPC member States and Territories have tuna fisheries to varying degrees within their 200-mile Exclusive Economic or Fisheries Zones (referred to here as EEZs), and for several of these States and Territories, tuna fisheries are the largest single earner of foreign exchange. For most, the main part of this revenue accrues from access fees⁵ from the licencing of foreign fishing vessels, often from other SPC members⁶, but usually from distant-water fishing nations⁷ (DWFNs). For some, export revenue and employment already derive from national tuna fishing fleets⁸, canneries⁹ or transshipment facilities, but all Pacific Island Nations and Territories have ambitions to eventually develop their own industrial capabilities based on the fishery.

For small island countries, tuna fisheries also benefit the subsistence economy and have great nutritional, as well as cultural, significance. The per-capita fish consumption in some atoll populations ranges as high as 250kg per year and even a comparatively urbanised and agricultural island nation like Fiji consumes on average 45kg per head per year: far above the global average.

Ten species of tuna (Scombridae, Tribe Thunnini) and 15 tuna-like species (other Scombridae) occur in the SPC statistical area together with 6 species of billfish, but only 4 tuna species are of current industrial importance. The largest tuna stock in the region, in terms of biomass, is skipjack (*Katsuwonus pelamis*), which is generally

² See Attachment 3 for more detail.

³ They had previously quadrupled during the 1970's, compared to a fairly static Eastern Pacific and Japanese home waters tuna fishery in the same period.

⁴ Note that, in order to large increases in skipjack catch, fleet economics would have to be much more favourable, the bycatch would have to be minimal to avoid overfishing more fragile non-target species, and effort would have to be widely distributed across the region.

⁵ Particularly Papua New Guinea, Kiribati and the Federated States of Micronesia.

⁶ Including USA, New Zealand, Australia, Fiji, Kiribati and Tuvalu.

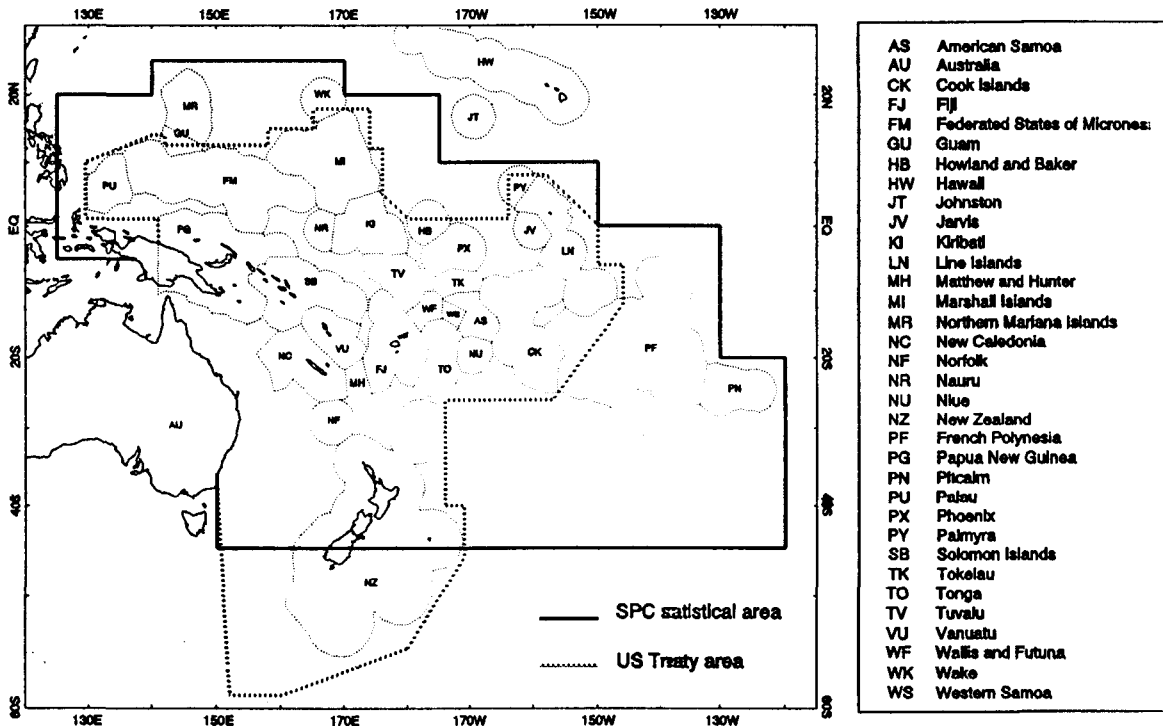
⁷ Historically mainly Japan, Taiwan and Korea, but Indonesia and Philippines distant-water fleets are growing. Mexican, Russian and Chinese vessels have also been licenced. Note that the USA is an SPC member, but its vessels fishing in the region are normally classified as distant-water vessels.

⁸ The Solomon Islands, followed by Fiji, has the most developed domestic industrial tuna fleet in the Pacific islands.

⁹ Of the SPC island members there are tuna canneries in American Samoa, Solomons and Fiji.

most prolific in the 200-mile zones¹⁰ of those western Pacific nations closer to the equator, and caught by surface fishing methods (purse-seine and, decreasingly, pole-and-line gear). Yellowfin tuna (*Thunnus albacar*) is the second most economically significant stock and is caught in association with the skipjack surface fishery although larger yellowfin and bigeye tuna (*T. obesus*) are also targeted by longliners. Little is known about the biology and stock structure of bigeye, but this species is of increasing significance to the region.

Figure 1: SPC Statistical Area



Albacore (*T. alalunga*) is a colder-water tuna found throughout the SPC statistical area, but most commonly caught by deep fishing methods (longlining) at higher subtropical latitudes. Recently, a surface fishery for albacore has developed in southern temperate waters, fished by troll and driftnet gear. Southern bluefin (*T. maccoyii*) is a temperate species which is rarely caught in Pacific Island EEZs, and is already the subject of considerable subregional research effort.

Other tuna and billfish species are of currently minor economic importance in the SPC area of interest, but may assume greater importance in future. Several genera (*Auxis*, *Euclymnus*) are of great importance to neighbouring Southeast Asian countries. The billfish will become particularly significant as tourism, and hence gamefishing potential develops in the Pacific Islands. Additionally, a targeted swordfish longline fishery has recently developed in Hawaii and may spread to Pacific Island areas.

One notable facet of the western Pacific tuna fishery is the very rapid expansion of purse-seine effort directed at skipjack and yellowfin over the past decade, whilst pole-and-line and conventional longline fisheries have declined. This impetus for expansion shows little sign of diminishing in the near future of its own accord and the rapid changes engendered by changes in fleet efficiency, fishing areas, gears and target stocks will cause some difficulty in defining specific research and management programmes.

¹⁰ Skipjack larvae are found in greatest concentrations closer to significant landmasses, and this may contribute to the often greater productivity of EEZ, as opposed to high seas, fishery.

Increases in catch have occurred not only in the EEZs of Pacific Island Nations and surrounding high-seas areas (and in particular, fishing activity continues to expand eastwards) but also in the zones of adjacent Southeast Asian countries. The Pacific Island fisheries cannot, therefore, be considered in isolation. Although several nations that exploit tuna in the South Pacific are undertaking individual biological research programmes on the fishery (notably Japan, USA, Australia and New Zealand), the TBAP is the only programme that is undertaking, and is mandated to undertake, such research on a collaborative, region-wide basis. Tuna and billfish are highly migratory species and effective stock assessment can only be carried out through such inter-governmental cooperation.

1.2 History of the SPC's Involvement in Tuna Research

The various United Nations Conferences towards a Convention on the International Law of the Sea (UNCLOS) during the 1970s led to the assumption of sovereignty over, or jurisdiction over the resources within, marine areas within 200 nautical miles of the coasts of many nations. The South Pacific was no exception to this trend and, in 1979, the South Pacific Forum States established the Forum Fisheries Agency (FFA) with a view to:

maximising the "...benefits from the living marine resources of the region for their peoples and for the region as a whole and in particular the developing countries; and..."

facilitating "...the collection, analysis, evaluation and dissemination of relevant statistical and economic information about the living marine resources of the region, and in particular the highly migratory species..."¹¹

The declaration by the 1977 Forum meeting which led to the adoption of the FFA Convention in 1979 also contained an undertaking to "apply within the zones of member countries principles and measures for the exploration, exploitation, management and conservation of the living resources of the sea".

Clearly, these principles could not be immediately applied without the gathering of a great deal of information. The implementation of the will to "manage and conserve" these resources particularly, would require a great deal of basic and continuing research.

Prior to this, in 1975, the SPC, recognising the growing importance of skipjack to the region and the almost total lack of scientific information on stocks, proposed the establishment of a Skipjack Survey and Assessment Programme (SSAP)¹². A broadly-based and collaborative approach to tuna research was implemented at the outset by SPC, which hosted a meeting between the eminent scientists of several nations in 1976 to plan future research requirements for skipjack fisheries¹³. Under funding from member nations and DWFNs, a large field research programme was initiated in 1977, which continued until 1981. The SPC's "post-UNCLOS" scientific role was defined largely by the experience and expertise gained during this successful programme, which involved the tagging of 140,000 skipjack and the return of 6,500 tags and forms the largest body of skipjack

¹¹ Extracted from the Forum Fisheries Convention preamble.

¹² Funded entirely from SPC extrabudgetary sources: Australia, Japan, USA, France, United Kingdom, and New Zealand, in decreasing order of magnitude. The total contribution for the four-year programme was US\$3,660,096 with an additional US\$266,688 generated from miscellaneous sources.

¹³ "Ad hoc meeting of scientists to discuss skipjack fisheries developments and research requirements". South Pacific Commission, Noumea, December 1976. As well as defining appropriate directions for a tagging programme, the meeting stressed the need for all fleets to upgrade catch/effort data coverage in support of biological research.

tag/return data amassed anywhere in the world¹⁴.

The analysis of these data took some time, involving the derivation and validation of new mathematical models of tuna population dynamics and stock structure, and was continued by the TBAP, which started in October 1981¹⁵. Arising from that work, the standing stock of skipjack in the SPC statistical area was estimated at about 3,000,000 tonnes, generating an annual turnover of about 6,000,000 tonnes¹⁶. For the first time, it was thus established that the skipjack stock(s) is very large and clearly capable of withstanding a much greater fishing effort than was (or is) being applied.

The results of this work, including the extensive assessments made of baitfish resources in support of potential national investment in pole-and-line vessels, were communicated at both the national and the regional level through an extensive series of technical reports. The tagging database resulting from this work has lasting value and analyses will continue to be refined, particularly with the accretion of more complete catch/effort data.

This historical separation of functions between the FFA and SPC has proved fortuitous. The FFA, arising out of a political coalition of independent South Pacific nations, is a much more cohesive and effective budding "management and conservation" organisation than it might have been under the broader membership (including DWFNs and metropolitan countries with territories in the region) that was originally debated, whereas the SPC, with its broader membership and affiliations, is better placed to accommodate the more cosmopolitan and politically impartial needs of a research programme.

At the outset, the TBAP was charged with the development of a (mainly catch and effort) Regional Tuna Fisheries Database and to further assess the status of tuna stocks and the interactions between various fisheries. These latter tasks gradually increased in importance as the SSAP data were processed, although by 1987, over 50% of total TBAP staff time was still being spent on database development.

The original programme cycle proposed to achieve the 1981 objectives (see Attachment 4) was just three years. This was a remarkably short time to accomplish tasks which would realistically require much longer even given complete data coverage of the fisheries. However, in view of the ongoing utility of the programme in guiding the focus of regional tuna fishery development and management, and following the presentation of the SSAP/TBAP regional skipjack and baitfish assessment, the 1983 SPC Regional Technical Meeting on Fisheries (RTMF) had no hesitation in extending the TBAP cycle to September 1986.

A subsequent programme review in 1985 assessed the most appropriate institution in the region under which to locate the TBAP. It was decided, without prejudice to any long-term decisions, that the TBAP should remain at the SPC for a further 5 year period (until October 1991) with a review towards the end of the programme to decide its continued long-term future.

The TBAP was reviewed in more depth in 1987, including visits by reviewers to each of the SPC member fisheries administrations, in the context of SPC programme management. As a result, the objectives of the TBAP were reoriented (with certain functions being taken over by the SPC Inshore Fisheries Research Project) and a formal Mission Statement adopted. An annual Standing Committee on Tuna and Billfish (SCTB), reporting to the RTMF, was established to provide "peer review" of TBAP research methods and results, to assist with the acquisition of relevant data and to arrange collaboration between the TBAP and other fisheries agencies on problems of mutual interest (see Attachment 1). The terms of reference for the Standing Committee also

¹⁴ Tagging is the research method most likely to yield useful and timely results for Pacific tropical tuna stock assessment. The difficulties inherent in oceanic research on highly migratory species, as well as the lack of a comprehensive baseline of catch/effort data, rule out the "traditional" methods of assessment used in continental shelf, particularly temperate, fisheries.

¹⁵ Under SPC extrabudgetary funding from USA, France, Australia and New Zealand.

¹⁶ *Assessment of the Skipjack and Baitfish resources in the Central and Western tropical Pacific Ocean: A summary of the Skipjack Survey and Assessment Programme.* R.E.Kearney, SPC, Noumea, July 1983.

implemented a recommendation of the 1984 "Meeting of Coastal States and Distant-Water Fishing Nations" (hosted by SPC) which sought ways of enabling DWFNs to participate fully in the provision of data in the furtherance of research.

After the 1987 review, the management of the programme was considerably facilitated by the creation of the post of Fisheries Co-ordinator, responsible for the administration of all SPC fisheries activities, including funding, and freeing the TBAP Chief Fisheries Scientist to concentrate on research direction.

Late in 1989, following 12 months of planning, the long-awaited Regional Tuna Tagging Project (RTTP) was implemented, with the objectives of further elucidating the population dynamics of the tuna species targeted by the purse-seine fishery, particularly yellowfin, and providing some assessment of the significance of any interactions relating to that fishery.

Funding by the European Community (EC) arose from a 1988 ACP/EC inter-governmental exercise to define regional priorities for marine resources projects under Lomé III. Under a 10.7 million ECU project proposal submitted by the South Pacific Bureau for Economic Cooperation (SPEC, now known as the Forum Secretariat), the Pacific ACP states¹⁷ were to derive benefit from four projects under the FFA, the SPC RTTP and a seabed geophysical mapping project under CCOP/SOPAC (now known as SOPAC). This "Pacific Regional Marine Resources Development Programme" applied EC Lomé funding for the first time to biological research on South Pacific tuna stocks.

The RTTP (1989-1992), under its 3.5 million ECU grant, has consistently exceeded its nominal benchmarks, tagging 73,504 tuna by 30 April 1991 (including over 25,000 yellowfin and bigeye, and over 8,000 tuna in a collaborative in-country project). So far, over 5,000 tags have been returned. The insights gained from the analysis of these returns is likely to have as much influence on the assessment and management of yellowfin stocks as the SSAP results had on skipjack.

The TBAP once more proved its utility to the region by responding rapidly to the challenge of providing an initial expert opinion on the potential and limitations of the newly developing southern albacore surface fishery¹⁸. In December 1990, the TBAP implemented an albacore tagging project, with EC and Canadian support, to cover the 1990/91 surface southern albacore season and has greatly intensified observer and port sampling coverage of albacore fisheries.

While biological research has progressed, steady progress has also been made in extending the coverage and size of the Regional Tuna Fisheries Database. Growing regional uncertainty over the relative roles of the well-established SPC database and the newly-established FFA tuna database was resolved¹⁹.

Despite the occasional changes in emphasis and direction of the programme, reflecting the rapid changes in the fishery, the TBAP has remained true to its original mandate of facilitating and implementing applied research on regional tuna and billfish species for the purpose of providing stock assessments and scientific advice. The range of publications by the tuna programme is impressive, with 106 papers and reports produced up to June

¹⁷ Pacific component of the African, Caribbean and Pacific States: Fiji, Kiribati, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa.

¹⁸ This opinion was implemented through the convention of a collaborative and broadly-based South Pacific Albacore Research group (SPAR), which met first in 1986, and subsequently in 1989 and 1990 following worries about potential deleterious interactions and overexploitation of the stock due to rapid expansion of the driftnet fishery.

¹⁹ The FFA collects data resulting from Forum/DWFN access agreements for economic and legal purposes, while the TBAP compiles broader catch/effort and biological data from its wider membership and technical sources for scientific analysis. Both databases have essentially different analytical functions but, with the agreement of relevant contributors, raw catch/effort data provided to FFA and certain summary data compiled by SPC are held in common.

1987, and 107 since then. As well as confidential reports to SPC members to assist with the assessment of their tuna resources, the TBAP has produced or commissioned numerous overviews, statistical summaries, manuals and working papers, including some very significant contributions to the international literature on fisheries assessment methodology.

The impact of the TBAP can perhaps best be summed up by quoting the views of one member country senior fisheries official who said, to the 1987 review team, that "the work of the TBAP forms the basis on which many of the present developments and initiatives in tuna fisheries by island countries have been founded."

Regionally, the stock assessment work of the TBAP is complementary to the legal and economic role of the FFA in the development and management of regional tuna fisheries. In addition to direct research on stocks of highly migratory species in the region, the TBAP has become increasingly involved in the development of biologically-based regional tuna management initiatives. This additional role may, in future, remain restricted to advice, but may well require the provision of secretariat support to the scientific function of any future two-tier regional management regime.

The value of, and the need for, a continuation of the work of the TBAP beyond 1991 is not disputed. The Third (1990) SCTB put forward a strong recommendation that the TBAP be continued on a longer term basis, and that a draft strategic plan for the next 5-year period (1992-96) be prepared by SCTB, for consideration by the 23rd (1991) RTMF, to guide the future direction of the programme. This recommendation was adopted by the 22nd RTMF as a recommendation, and was subsequently adopted in turn by the 13th Committee of Representatives of Governments and Administrations (CRGA) and the 30th South Pacific Conference.

This paper contains such a draft Strategic Plan, prepared by a sub-committee comprising the SPC Chief Fisheries Scientist, Dr Antony D. Lewis, an EC-funded consultant Dr Timothy Adams, Mr Peter Sitan (FSM), Dr Talbot Murray (NZ) and Mr Andrew Richards (PNG).

The information and views described in this paper were also used as the basis for the preparation of a project dossier for EC consideration under Lomé IV, to fund a 5-year "South Pacific Regional Tuna Research Project" (SPRTRP). This project initiative was endorsed by the 30th SPC Conference, which recommended that the project be strongly supported for EC funding support and discussed at the ACP/EC Ministerial meeting (initially to be held in May, 1991, but now postponed until September). It is envisaged that the SPRTRP would form an integral, even a core, part of the TBAP Strategic Plan for the next 5 years.

2. Role of the Tuna and Billfish Assessment Programme

The TBAP has become the regional authority on the population dynamics and assessment of stocks of central and western Pacific tuna, and plays an increasingly influential role in global tuna research. Bearing in mind that around 50% of the tuna marketed in the world originates from the western tropical Pacific fishery, this is not an easy role to fulfil using current resources. Tuna fleet catch/effort data coverage within the SPC statistical area is probably still less than 50% although, with the assistance of member countries and the FFA, this coverage is slowly increasing. The TBAP still lacks many of the functions, particularly the regular fishery monitoring or sampling functions, that would enable it to effectively address the broader research problems.

With the longstanding exception of the western tropical Pacific, most global tuna fisheries are covered by a series of regional management and research bodies²⁰ and the spheres of interest of these agencies will inevitably impinge as tuna vessels range further and further afield, and as the population dynamics of the various tuna species are elucidated. The far western Pacific and eastern Indian Ocean fisheries are particularly closely linked through the prolific tropical tuna nurseries of Indonesia and the Philippines, and there are no particular geographical barriers to genetic interchange between eastern and western Pacific tunas.

Further exchange of ideas and research results between the South Pacific and adjacent regional agencies would

²⁰ ICCAT in the Atlantic, IATTC in the eastern Pacific, IOTC in the Indian Ocean in the near future.

appear to be essential in defining the status of shared resources, and the good relationship between the TBAP and the Inter-American Tropical Tuna Commission (IATTC) in the East, and the Western Pacific Fisheries Consultative Council (WPFCC) and Indo-Pacific Tuna Development and Management Programme (IPTP) in the West, coupled with the cooperative attitude experienced during recent RTTP tagging cruises in Indonesia and the Philippines, bodes well for the future. In addition, good working relationships with individual DWFN agencies (particularly Japan Fisheries Agency and U.S. National Marine Fisheries Service) continue to be of mutual benefit.

It is unlikely that intensive tuna research will be carried out on a regular global basis within the near future: most tuna stocks fall within political groupings that are sufficiently well-defined to mandate regional, or sub-regional cooperation for most efficient progress. For this reason, Pacific-wide coordination of tuna research and management is unlikely in view of the biological and other conditions that pertain. However, the TBAP must be prepared to present regional research, and seek support, in any appropriate international fora that arise.

2.1 Role of TBAP in Relation to FFA and Regional Management

There is no agreed international management of highly migratory species covering the South Pacific Region (of which the SPC Statistical Area is the most appropriate current definition; see Figure 1) in operation at the present time. Such management is generally agreed to be a desirable goal to ensure long-term sustainable exploitation of these resources. If nothing else, coastal States are urged by the United Nations Law of the Sea to cooperate with other interested parties (other regional coastal States and DWFNs) "with a view" to ensuring conservation and promoting the objective of "optimum" utilisation of highly migratory species.

There are two international organisations that are working "with a view to" ensuring and promoting the above. The SPC TBAP is developing a biological context for the management of highly migratory species in the region, and FFA is developing legal instruments to further cooperation both between different coastal States in the region (eg, the draft Forum Convention on mutual cooperation in fisheries surveillance and enforcement) and between regional coastal States and extra-regional DWFNs (eg. the Treaty on Fisheries between the Governments of certain Pacific Island States and the Government of the United States of America).

Both organisations provide secretariat support to interested parties in their respective areas of specialisation (including meetings between representatives of coastal States and DWFNs), and both provide comprehensive advisory services to members. It is stressed that the TBAP operates purely as a scientific and technical research programme, and maintains strict principles of scientific objectivity in its research and in the advice offered to member countries.

Both SPC and FFA are charged with the economic and social development of Pacific peoples. Their differences include the much broader overall programme of the SPC, covering health, agriculture, womens' affairs, youth and adult education, socio-economic statistical services, fisheries and the environment, whilst the FFA covers only fisheries²¹. Another major difference, and one of considerable significance, is in their membership. The FFA includes all 16 South Pacific Forum States (essentially all independent South Pacific Nations) in its membership, whilst the SPC (a much older organisation with a membership of 27) includes metropolitan States with territories in the region (including additional representation by those territories) as well as the Forum States.

Effective international management of tuna fisheries in the region is a long-term goal of all Pacific Island Nations, and at least some DWFNs as well. From the continuing negotiations between SPC/FFA members and

²¹ The FFA is an agency under the Forum Secretariat, which covers economics, transport, trade and communications between South Pacific Forum members but, compared to the TBAP, the FFA is comparatively autonomous with its own core funding and management, and executive power resting within its own secretariat under the guidance of a committee. The Standing Committee of the TBAP is advisory only and executive authority lies at a series of levels above the TBAP. Thus it is considered appropriate to compare FFA with SPC rather than with the TBAP.

certain DWFNs on a possible management regime for South Pacific albacore, it is clear that South Pacific coastal States insist on a management body based on existing South Pacific regional fisheries organisations. A two-tier system is envisaged, with the FFA providing the secretariat for the management and compliance function and the TBAP providing the secretariat for the scientific research and advisory function.

Whilst this split in responsibilities would not be optimal for a management body emplaced *de novo*, it is a sensible development of existing resources and responsibilities, and would have the added advantage of providing a much broader outlook to the whole structure, hopefully giving reassurance to both DWFNs and coastal States.

As noted previously, SPC has a much broader membership than FFA and, whilst the independent South Pacific island nations tend to be wary of metropolitan powers (particularly those who have distant-water fleets fishing in the region) sitting in on their deliberations, this broader membership is seen as beneficial because:

- It provides a mechanism whereby the South Pacific territories of these metropolitan countries can participate in fisheries management arrangements on a semi-autonomous basis. The incorporation of marine areas under their jurisdiction into such arrangements is necessary if a regional tuna management body is to be completely effective²².
- It is desirable for the scientific component of any management regime to have as wide-ranging and as impartial a membership as possible. The inclusion of metropolitan countries through the SPC enables the region to access a large pool of highly skilled scientific expertise, and greatly improves the prospects for funding tuna research.

It is thus seen as essential that the TBAP should remain separate from FFA, although closer links through the evolution of regional tuna fisheries management will inevitably develop.

2.2 Role of the TBAP within the South Pacific Commission

It might possibly be said that the work of the TBAP, which was refined by a series of reviews in 1987 to include only tuna research (rather than artisanal and inshore "development") functions, does not sit logically within the SPC structure. The SPC Charter is to encourage and promote the economic and social welfare and advancement of Pacific peoples. However, many SPC functions would now appear to be concentrated on research, or facilitation of research (plant protection, health etc.), and it would be illogical to single out the TBAP in this respect.

The TBAP, of course, accomplishes considerable original research but it is completely practically-oriented research. This research is aimed at providing advice to member countries to directly improve their economic and social welfare and, for several SPC members, tuna has become the single largest foreign currency earner.

Since the SPC Charter was endorsed, several other regional organisations have been set up which are specifically mandated to directly promote economic and social welfare and it would appear to make sense for the SPC to specialise on certain functions within its broader mandate. Tuna research and advice is one area where the SPC excels in providing a service to its members, and is an area which no other regional organisation covers. Also, given the high cost of oceanic research and the need for broad areal coverage, no Pacific Island Nation can undertake such work in isolation.

However, there may be possible advantages to be gained by splitting off the TBAP as a semi-autonomous entity under the SPC "umbrella" in the same way as the South Pacific Regional Environment Programme (SPREP) as follows:

²² There are signs of progress in this direction with the USA under the new Magnuson Act whereby US South Pacific Territories may possibly be able to assume the benefits from the fisheries of their 200-mile zones without the USA relinquishing sovereignty.



- If current proposals to broaden the membership of SPC to include other nations do not meet with approval, DWFN membership of a semi-autonomous TBAP might still be possible. At the moment, DWFNs have no political incentive to provide data to the TBAP, and membership would automatically formalise this to some extent. The move might also lead to increased funding support for tuna research, or even TBAP core programme support.
- If future international management of tuna through a "two-tier" system is to become a reality, formal linkages between the SPC and the already-autonomous FFA would need to be made, and the role of the TBAP acknowledged. It may possibly be easier to assume this role if the TBAP were semi-autonomous²³.

The SSAP/TBAP has always been entirely funded from SPC extrabudgetary sources. SPC administrative support (for which the TBAP now reimburses the SPC core budget), and regional accountability through RTMF, CRGA and SPC Conference could still be maintained, and there would be no need for extra regional meetings under this arrangement. The TBAP already convenes an annual Standing Committee and the SCTB, with its broad membership, is already well set-up as a steering committee for a SPREP-type TBAP.

If such a move is seen as desirable to improve collaborative links and programme support, there appear to be no significant procedural disadvantages to the TBAP or to current SPC members, but the implications for the rest of the SPC Fisheries Programme would need to be carefully considered. The main point to stress, if such a move were proposed, would be that the TBAP would *not* become yet another regional organisation with an additional overhead of meetings to attend and membership funding to provide.

2.3 Summary of Considerations Relating to TBAP Role

- It is considered appropriate for the TBAP to fulfill the role of secretariat for the biological (scientific/technical) advisory component of a two-tier management regime and, as necessary, undertake research in support of it.
- This would require no change to the current emphasis of research but would require additional administrative functions (political/legal linkage maintenance, increased government and industry liaison, special interest group support etc) to accrete as necessary.
- Some of these functions might possibly be more easily implemented by loosening the formal linkage between SPC and the TBAP.

3. Fisheries Trends and their Implications for the TBAP

Several possible trends in the development of regional tuna fisheries are likely and must be taken into account by the Strategic Plan.

In general, and in continuation of current trends, there is likely to be an increase in the geographical scope of existing fleets, an increase in the total volume of catch resulting from both increased efficiency and increased effort, together with a general blurring of the distinction between the western tropical Pacific and adjacent fisheries (particularly the eastern tropical Pacific, and Southeast Asia). Markets, at least for canned tuna (the main consumer of raw product) are likely to continue increasing by up to 10% per year.

Specific trends are likely to include the following:

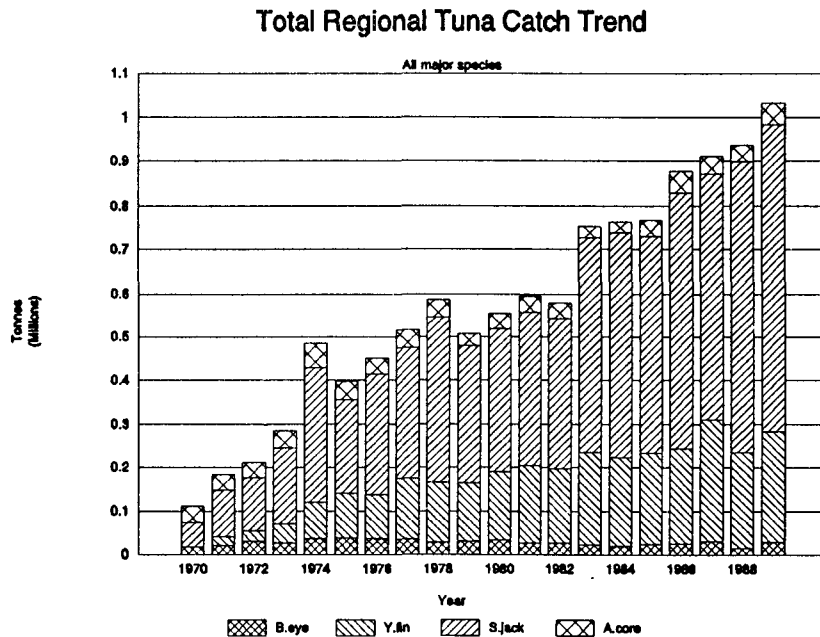
²³ One possible formal link that could be made in the near future would be if FFA, SPC and the USA were to agree to the TBAP acting as the secretariat to any forthcoming "scientific technical meetings" at the annual FFA/USA multilateral treaty consultations.



3.1 Exploitation Trends

- Total catches of all species of tuna, particularly skipjack, within the region are likely to continue to increase (see Figure 2: Total Regional Tuna Catch Trend).

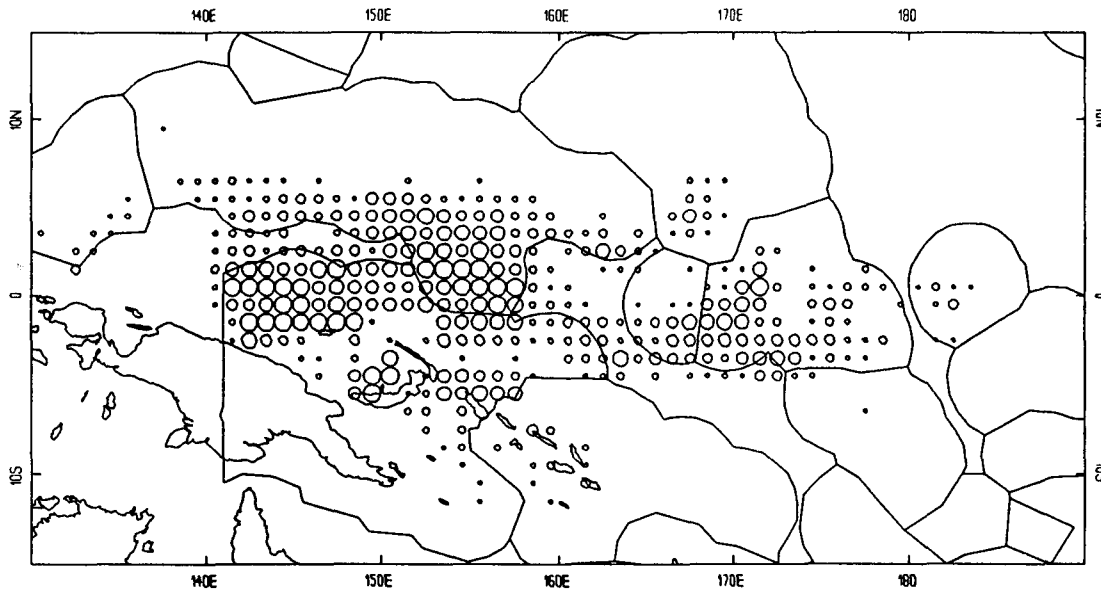
Figure 2



- South-western Pacific purse-seine vessels are likely to continue to widen their area of operation, particularly eastwards, as increasing numbers of purse seiners enter the fishery and harvesting efficiency improves. Increased exploitation by purse seiners in Indonesian waters is also likely (see Figure 3: Distribution of Purse Seine Fishing Effort in 1990).
- Some increase in seasonal catches at higher latitudes could be expected if Triplex-type purse seiners (capable of setting in rougher seas) are introduced, possibly through EC distant-water fishing fleets or from coastal-state investment arising out of a successful implementation of the proposed SPC/EC purse-seine test fishing project.
- Distant-water fishing fleets may continue to increase in size with expanding interest from Central American, South-East Asian and EEC operators (unless limited by Forum EEZ access agreements, as currently proposed). The development of modern South-East Asian purse-seine capability has been particularly rapid, and the construction of new vessels continues. This modernisation, combined with lower labour costs is likely to make these fleets very competitive compared to U.S. and Japanese seiners unless these fleets seek other labour sources.
- Distant water pole-and-line fisheries face an increasingly uncertain future as purse-seine efficiency improves and purse-seine skipjack and yellowfin catch volumes increase. Economic intervention may become necessary if the premium price paid for pole-and-line caught fish does not outweigh factors of competition and likely future decreases in world price caused by increasing market supply.
- There will be a continued increase in targeting on bigeye by conventional freezer and fresh-sashimi longliners, because of its comparatively high value, although this will depend in the long term on Japanese domestic market futures.

Figure 3

Distribution of Purse-seine Fishing Effort in 1990



- Production from the South Pacific surface albacore fishery should remain fairly stable in the short term. Decreases in the driftnet fleet are likely to be offset by increases in the troll fleet. The medium term is uncertain, but the prospects for significant, sustained expansion of albacore catches appears limited.
- Recent declining trends in effort for DWFN longline albacore fleets indicate increasing economic problems for this fishery. As with the purse-seine/pole-and-line economic interaction, increases in albacore surface fisheries are liable to provide stiff competition for albacore longliners unless the price differentials in favour of larger fish are sufficiently high.
- The landing of by-catch species in tropical areas as Pacific Island Nations become more involved in the fishery may increase.
- There may be increasing interest in the exploitation of slender tuna and butterfly kingfish in temperate areas.
- Swordfish longline fisheries, as in Hawaii, may develop elsewhere in the Pacific.

3.2 Economic Trends

- Tuna consumption (both canned and fresh) is likely to continue to increase in the medium-to-long term. The sashimi tuna market is the more fragile, being essentially tied to the health of the Japanese economy.
- The relocation of large numbers of small Asian longliners to Micronesia, and the resultant higher catches, is likely to have a deleterious impact on prices in traditional sashimi markets, and lead to considerable competition for expanding Pacific Island domestic fleets.



- Southeast Asian interests (and increasingly, Indonesia) are likely to continue to dominate the canned tuna market. The viability of Pacific Island Nation canneries will be under increasing threat and may require economic intervention.
- U.S. and Japanese purse-seiners may decrease in comparative viability, due partly to high crew costs, although their innovative technology has kept them at the forefront. The sale or lease of US and Australian purse seiners to other countries is likely to continue.
- The impact of new cannery policies regarding "dolphin-free" tuna on the western Pacific fishery is uncertain and, although dolphin-associated purse-seine sets are almost unknown in the western Pacific, it has the potential to be very negative for purse-seine fleets in general. US purse-seine effort in the western Pacific will increase in the short term because of the effects of this cannery policy on the eastern Pacific, but may decrease in the longer term due to high operational costs²⁴.
- Increasing transshipments through regional ports will occur, possibly to increase the time spent fishing on more distant fishing grounds, but more probably as a result of the regional implementation of more stringent Forum minimum terms and conditions for access. As well as greatly increasing the prospect for substantive Pacific island benefit from the resource (including joint-ventures with distant-water fleets), it will also provide greater opportunities for catch monitoring and sampling.
- Any fuel price increases will significantly affect the profitability of distant water fishing fleets;
- There will always be unforeseen developments in fisheries and marketing, as was the case with albacore driftnetting and the "dolphin-associated" purse-seine fishery. Fishing is a volatile business simply because it is usually marginally profitable. When one fishery drops below economic levels (usually for socio-economic reasons -- increasing wage rates, increasing competition, changes in consumer preference etc. -- rather than biological reasons), operators either gear up quickly for another fishery or go out of business.

3.3 Implications for TBAP Research

In a contextual vein, it should be noted that the doubling of tuna catch from the western tropical Pacific experienced during the past decade has not been accompanied by a commensurate increase in research effort. Given a continuing increase in catches, and bearing in mind the SPC aim of encouraging and promoting economic and social welfare and advancement of Pacific peoples, future research will need to take account of the following points:

- Yellowfin stock status is becoming a potential cause for concern as total catches, particularly by purse-seine vessels harvesting a wide size range of fish, increase.
- Bigeye stocks, probably the most poorly understood of all tuna stocks in the western Pacific, are under increasing pressure from deep longline gear and catches of juveniles by purse seiners.
- The lack of complete data on catch and effort by Southeast Asian vessels, fleets of small, fresh-water longliners and certain purse-seine fleets operating within the EEZs of member countries, and on high-seas catches by almost all DWFNs, makes stock assessment particularly uncertain.
- Catch/effort data provision and size-composition data availability MUST improve if the TBAP is to realistically determine the stock status of most species.

²⁴ The current trend appears to be for US purse-seine vessels to be sold to Asian interests once they have returned their initial investment. This may be more a reasonable private-sector response to the demand currently existing rather than an indicator of inviability, and the increasing turnover of vessels within the US fleet allows design innovations and improvements to be rapidly incorporated.

- Albacore stock status has been under intensive study since 1990, and a comprehensive stock assessment should be available in 1993.
- Interaction issues will assume much greater importance in future as coastal States increasingly manage allocations among competing interests.
- Interaction concerns will be increasingly raised by the sportfishing lobby as tourism expands in the region, particularly regarding billfish bycatches.
- Increasing coastal State desires to manage catches within zones will increase pressure to supply estimates of "maximum allowable catch". Such estimates within single EEZs are not entirely appropriate but, because of the requirements of many national legislations, political expectations will be high.
- Regionally-coordinated port sampling will assume greater importance as nationally-based transshipments and landings increase, perhaps requiring placement of TBAP regional staff in key locations.
- Experience over the past 13 years has shown that SPC tuna research programmes tend to work most effectively when pursuing an active fieldwork programme.
- Multilateral arrangements and moves towards comprehensive fisheries management regimes will inevitably expand, requiring increased effort from regional bodies. For the TBAP, intensified regional stock-assessment work on particular species will tend to require the formation of further collaborative working groups along the lines of the South Pacific Albacore Research (SPAR) group. Plans for a yellowfin working group are already approved, and other species may need to be added in future.

4. Draft Strategic Plan

4.1 Mission Statement

The 30th South Pacific Conference adopted the RTMF recommendation that SCTB prepare a draft 5-year strategic plan for the TBAP which "should reflect the current programme directions and initiatives, and use as a starting point the existing TBAP mission statement".

The existing TBAP mission statement, adopted by RTMF 19, in 1987 is as follows (see Attachment 1 for source):

In order to help member countries develop, manage and rationally exploit the renewable oceanic resources of the region for the long-term, the Tuna and Billfish Assessment Programme will conduct scientific research on the stocks which support these fisheries and on the environmental factors which affect them.

A somewhat more concise mission statement is suggested, but one in which current programme directions and initiatives, and contemporary regional priorities are reflected. The suggested revised mission statement is as follows:

To provide member countries with the scientific information and advice necessary to rationally manage fisheries exploiting the region's renewable oceanic resources.



4.2 Objectives

The specific objectives of the TBAP, formulated in 1987 and included in Attachment 1, incorporated activities to be accomplished mainly during the year 1987/88. While the general thrust of these objectives remains valid, trends in the fisheries and a greater expectation of member countries for advice on the biological aspects of tuna fisheries management has led to the objectives of the TBAP being reformulated in this Strategic Plan. The revised objectives, which may be subject to "fine-tuning" by the ICTB from time to time, if deemed necessary by RTMF, are as follows:

Statistics and Monitoring:

Maintenance and further development of a comprehensive statistical database covering all oceanic fisheries in the SPC statistical area and encompassing catch/effort, size-composition, tag and other data necessary for support of stock assessment, interaction and biological studies.

Monitoring any aspect of the development and operation of significant oceanic fisheries within the SPC statistical area and adjacent areas that may be needed to further the objectives of the Programme.

Biological Research:

Development of a better understanding of the biology of tuna and other highly migratory species, including studies on ageing, growth, natural mortality, reproduction, vulnerability to capture, recruitment, stock structure and any spatial, environmental²⁵ or temporal variability in those factors, as a prerequisite to further understanding of the population dynamics of the various species.

Stock Assessment and Modelling:

Drawing on the results of the previous two objectives, develop and implement population models and stock assessments in furtherance of national and international fisheries management initiatives.

Reporting and Liaison:

Advising²⁶ member government and international fisheries administrations on relevant matters arising out of the previous three objectives, including advice on the historical or current status of fisheries for tuna and other highly migratory species, on the likely effects of different harvest strategies on fisheries, on optimum sustainable yields for fisheries, on the biology of individual species, and on the implementation of appropriate scientific data collection activities.

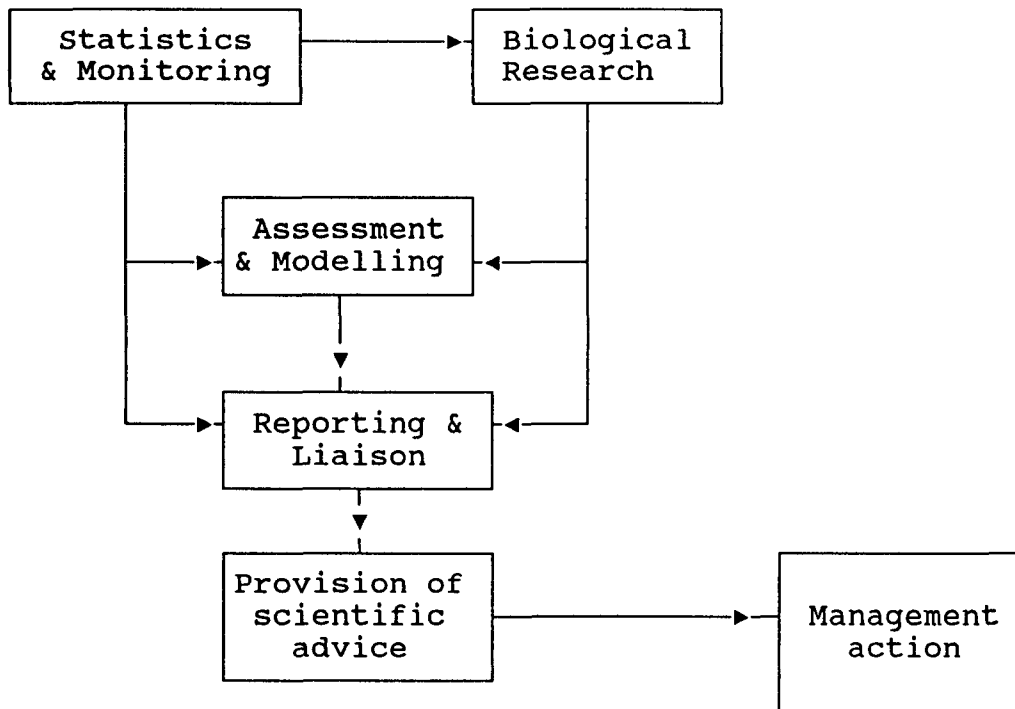
Liaison with national and international fisheries agencies for the promotion of collaborative research in furtherance of these and other objectives.

The relationships among the four objectives could be considered as follows:

²⁵ This might include trophic and other interactions between species as well as oceanographical factors.

²⁶ Note the omission of that constraining phrase "on request".





It is suggested that all four objectives be considered as functions or projects for the purposes of work-plans and funding. For the purposes of implementation, staff working under each of the first three objectives (Statistics and Monitoring, Biological Research and Assessment and Modelling) would each address their own specific Reporting and Liaison functions, possibly with the assistance of an additional staff member dedicated to this project (see section 5.3 Staffing).

4.3 Basic Strategies to Accomplish Objectives

Although the TBAP technically ends its current cycle at the end of September 1991, a new 5-year cycle has been approved in principle and three of the four "core donors" have indicated ongoing support. In addition, the TBAP has two ongoing extrabudgetary projects which extend beyond the end of the current cycle.

The SPRTRP proposal to the EC is intended to form the core of TBAP field and associated work for the October 1991-1996 cycle, while the RTTP and the Albacore Research Project will continue until 1992.

Arising from current priorities defined by ongoing projects (including the definite need to continue database maintenance) and the objectives defined earlier, the following strategies, with success indicators where appropriate, can be suggested:

4.3.1 Statistics and Monitoring

- Continue to make best efforts to improve catch/effort data coverage of all fleets by all reasonable means possible.
Indicators: Improvement in coverage rates with respect to log book data and/or acquisition of aggregated data usefully stratified for research purposes.

- Undertake scientific observer and port (transshipment and landings) sampling programmes in support of monitoring objectives.
Indicators: Incorporation of observer and port sampling data in Regional Tuna Fisheries Database, publication of results in annual report.
- Continue publication of regular (quarterly) data summaries on a region-wide basis, and confidential summaries for countries on request.
Indicators: Publication of Regional Tuna Bulletin and production of confidential country reports.
- Continue to provide timely feedback to countries supplying data to SPC, in the form of statistical tables, maps and/or through the support of in-country databases.
Indicators: Production of trip summaries and in-country databases.
- Improve tuna industry linkages and monitor product flows within and beyond the region as a means of corroborating catch data.
Indicators: Regular visits of senior staff to canneries, industry meetings, establishment of port sampling, publication of product flow data in annual report.
- Explore database linkages with tuna research agencies in adjacent regions.
Indicators: Acquisition of aggregated data usefully stratified for research purposes.
- Prepare annual fishery status reports.
Indicators: Inclusion of fishery status reports in annual report.
- Continue to develop database management systems, including appropriate graphical interfaces to the data, in collaboration with FFA.
Indicators: More efficient dissemination of information to member countries and other TBAP projects, software displays at RTMF.
- Continue to support the development of national database subsets, in collaboration with FFA.
Indicators: Production and servicing of individual in-country databases.

4.3.2 Biological Research

As a general strategy, as well as developing specific TBAP capabilities where feasible, support should also be given to appropriate research elsewhere. The TBAP is not expected to undertake oceanographic fieldwork, for example, or highly technical laboratory analyses, but should contract out or provide collaborative (or reciprocal) assistance to relevant initiatives by other agencies.

- Continue organising tagging work as a primary tool in support of the study of (particularly) growth, migration and stock structure.
Indicators: Number of fish tagged, tags returned and levels of cooperation by all fleets concerned.
- Develop capacity to provide reliable estimates of age and growth for all major species.
Indicators: Development of ageing capability at SPC headquarters, publication of results in fisheries literature, summary in annual report.
- Refine estimates of natural and fishing mortality through analysis of tagging and other data.
Indicators: Publication of results in fisheries literature, summary in annual report, incorporation of parameter estimates into stock assessment and interaction models.
- Study reproduction of major species, including larval distribution and spawning.
Indicators: Publication of results in fisheries literature, summary in annual report.
- Study influences on the aggregative behaviour of tuna, towards an understanding of FAD/log/seamount

dynamics.

Indicators: Publication of results in fisheries literature, summary in annual report.

- In collaboration with ORSTOM, continue to study environmental factors influencing catch and catch rates, relating yields to productivity, environmental and oceanographic variables.
Indicators: Publication of results in fisheries literature, summary in annual report.
- Study and further define the stock structure of major tuna species.
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation of results into stock assessment and interaction models.
- Document bycatch associated with tuna fisheries in the western tropical Pacific, particularly the extent of marine mammal associations with tuna schools and other possible effects of tuna fisheries on marine mammal, reptile and seabird populations, even though these are unlikely to be significant.
Indicators: Publication of results in fisheries literature, summary in annual report.
- Prepare biological synopses as required and update reviews on aspects of biology.
Indicators: Publication of synopses in fisheries literature and incorporation into confidential country reports.

4.3.3 Stock Assessment and Modelling

- Analyse results of RTTP and subsequent tagging studies as the primary basis for stock assessment.
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation in confidential country reports.
- Develop generalised movement model for predicting interactions between spatially separate fisheries.
Indicators: Publication of results in fisheries literature, summaries in annual report, presentation to final Expert Consultation on Interaction of Pacific Ocean Tuna Fisheries.
- Develop size- or age-structured models for use in yellowfin and bigeye stock assessment and interaction studies.
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation in confidential country reports
- Develop and implement other methods of population assessment, as required (for example: linear modelling using catch/effort data for the construction of indices of apparent abundance).
Indicators: Publication of results in fisheries literature, summaries in annual report, incorporation in confidential country reports.
- Undertake specific in-country assessments where requested and where justifiable.
Indicators: Production of confidential country reports.
- Assist in the experimental design of observer, port sampling, and other biological sampling programmes.
Indicators: Reports of the results of such programmes.
- Undertake collaborative studies with other institutions, as appropriate.
Indicators: Publication of the results of such studies in fisheries literature, summaries in annual report.

4.3.4 Reporting and Liaison

Most current activities in support of this objective are implicit in the reporting activities of TBAP staff working under other objectives. The items defined here represent reporting activities synthesising the whole work of the



programme, or general liaison duties of the Chief Fisheries Scientist, as well as specifically flagging secretariat activities in support of scientific panels and working groups. Most of these functions, particularly highly technical functions, would be carried out by specialists under the other three objectives. However, there may soon be a need for a "Scientific Liaison Officer" to fulfill general coordination, liaison and communication functions.

- Coordinate the production of a TBAP annual report.
- Support, or organise, such focussed scientific panels or working groups as are likely to further progress towards TBAP objectives.
- Organise any meetings necessary (perhaps in collaboration with FFA) to define a valid and workable scientific component of a regional tuna management regime.
- Present research methodology and results annually for discussion at SCTB meetings.
- Present "State of the Regional Tuna Fisheries" summaries to SCTB, RTMF (and FFC, on request) and in any other appropriate fora.
- Report progress on SCTB Action Items to SCTB members half-yearly²⁷.
- Promote personal contact between TBAP senior staff and individuals in collaborative agencies, the tuna industry, and SPC member country fisheries administrations. This contact should be aimed at promoting a clear understanding of TBAP objectives and results, improving data acquisition, and avoiding unnecessary duplication of effort.
- Coordinate TBAP contract work for other agencies if it is likely to directly further TBAP work in support of the region, or to improve extra-regional linkages in support of TBAP objectives.
- Represent TBAP, or the SPC fisheries scientific community, at meetings of other bodies or in other regions.

5. Future Operation and Management of the TBAP

The following discusses some questions of broad significance to the future operation of the TBAP, under the headings "Collaboration", "Funding", "Staffing" and "Facilities". Some of these will require management decisions to be made in the near future, either as recommendations to RTMF arising from this Strategic Research Plan, or at some later date when funding support is clarified or operational limits otherwise defined.

5.1 Collaboration

If the work of the TBAP is to be successful, then effective data coverage of fishing activity over the whole SPC statistical area, and occasionally beyond, is essential. The TBAP has an advantage in that it is narrowly mandated to undertake scientific research, and can thus claim access to data that might not be provided to a more politically-motivated organisation.

This point is continually stressed in consultations with data sources, particularly nations with distant-water fleets fishing in the region, and should continue to be stressed. This advantage can only be pressed home if the TBAP is seen to continue to uphold scrupulous standards of confidentiality in its data handling and objectivity in the advice that it gives to member countries.

²⁷ More to provide a clear mandate to remind SCTB members of any outstanding commitments than to burden the project with another level of accountability.

However, more formal linkages with data sources may provide both better access to data and more freedom to usefully apply the results from the analyses of those data.

5.1.1 Linkages Through Membership

The TBAP is presently an integral part of the activities of the SPC. While the SPC has a broad membership which covers most of the geographical entities in the region, the majority of tuna fishing is undertaken by entities from outside the region.

There is considerable merit in broadening the membership of the TBAP, both from the point of view of facilitating data provision and to increase funding and technical assistance prospects. This has been discussed earlier and may be easier to accomplish by instituting the TBAP on a semi-autonomous basis under the SPC administration.

5.1.2 Institutional Linkages

Another, and more immediately feasible, option to pursue is the furtherance of linkages between the TBAP and other agencies, either national or international. Formal linkages with FFA, particularly in the agreed delineation of roles, are advisable, and data-exchange protocols with the IPTP, or its successor, and the IATTC will need to be strengthened. The SCTB has been valuable in fostering linkages, particularly in improving contacts with national DWFN bodies and fisheries agencies from adjacent regions²⁸. Further efforts to involve Korea and Taiwan, particularly, should be pursued.

At the moment, the *quid pro quo* for any body contributing to the SCTB database must be access to a usefully broad range of suitably aggregated and stratified data, and the snowball effect will apply. The more comprehensive the SCTB database the greater the incentive to contribute. But if the TBAP develops into a scientific secretariat for a future regional tuna management body, then the acquisition of data would become a legally-enforceable function.

Direct contact with fleet associations and canneries, already a notable part of TBAP work, should be continued both to obtain timely indications of future developments in the fishery, and to facilitate direct data acquisition (via observer placements and port sampling).

5.1.3 Linkages Through Special Interest Groups

The SPAR group has proved useful in coordinating broad research effort on an area of common interest, and it is likely that the support of this sort of international special interest group involving other species would be a useful focus for TBAP activity in future²⁹. Such groups are likely to become even more valuable during the initial development of a regional tuna management regime, particularly in the provision of consensus "best estimates", and could possibly be convened as separate workshops during a single meeting. Ideally, they should not be formalised as meetings of national representatives, but should remain informal meetings of individual scientists in the interests of facilitating the free flow of ideas.

²⁸ The Western Pacific Fisheries Consultative Committee (WPFCC) has been similarly useful, and SPC participation in this committee should be continued. Additionally, the newly constituted Trans-Pacific Fisheries Consultative Committee may become a useful body for fostering collaborative research.

²⁹ Future plans include a yellowfin working group to be held alongside the 4th SCTB in June, 1991; a yellowfin workshop in 1992 to assist in reviewing the RTTP; and SPC will host the FAO meeting on tuna fisheries interactions in December 1991.

5.2 Funding

The SPC tuna programmes have always been supported entirely from extrabudgetary sources. SPC core-budget funding (members' contributions) has only been utilised to the extent of the provision of office space and administrative support (although the TBAP now reimburses the SPC core budget to a large extent for such support) and, since 1988, the programme management services of the SPC Fisheries Co-ordinator³⁰. It is worthwhile noting that the 1987 review of the TBAP recommended that "sufficient funds be allocated from the SPC (core) budget to meet the cost of the core functions of the TBAP for its scheduled duration" but, at the moment, the services of the TBAP are provided at essentially no cost to the Pacific Islands.

The basic TBAP support funding currently (and since the start of the programme) comes mainly from four extrabudgetary sources: France (35%), USA (24%), Australia (17%), and New Zealand (10%), with the remaining 14% of the basic funding coming from miscellaneous sources, including exchange rate fluctuations. (The figures in brackets are percentages of the total US\$644,000 TBAP "core" budget for 1989, which vary from year to year according to currency fluctuations). In addition to this ongoing programme maintenance support, there are varying amounts in support of special projects. For example, the EC funding support for the RTTP and albacore tagging projects is ECU 4 million over 3 years.

The annual USAID contribution of US\$160,000 to the TBAP will end on 30th September 1991 with little or no prospect of renewal. The other "core" donors have indicated their continuing strong support, but the loss of 25% of the core funding will cause serious difficulties for any continuation of the TBAP, particularly at a time when current "core" funding is barely adequate to cover programme overheads³¹. An EC contribution to cover the loss of US support until the end of the RTTP is being sought, based on the fact that the EC-funded RTTP results cannot be analysed effectively without full TBAP services, but it is clear that another "permanent" source must be found in the near future.

Drawing on EC Lomé IV regional funds for significant long-term support (in the form of the proposed 5-year³² SPRTRP is the most likely future option, and this proposal has already received strong support from all relevant authorities. A slight disadvantage of a reliance on this source is the nationality constraint that it normally puts on the recruitment of project staff (ACP or EC nationals), thus substantially reducing the available pool of expertise and experience. This is not expected to be a major hindrance, and is certainly not a restriction applied only to EC funding.

DWFN core-funding support for TBAP would become likely in future if SPC or TBAP membership is extended to those countries, and alternative USA funding may be available should the TBAP be asked to provide secretariat services to a technical review group under the Forum/USA Multilateral Treaty on Fisheries. So, although prospects for further funding are promising, the current reality is that the TBAP faces an immediate 25% budget cut with no definite way of making up the difference.

It has probably been sufficiently established by now that the TBAP is an ongoing, open-ended programme (although it may have to be further formally acknowledged) providing a scientific assessment of an ever-changing fishery, and cannot be considered a short-term project to address a specific problem. For the long term, a regular source of core funding must be secured to ensure stability and avoid hiatus. This financial

³⁰ Note: the SPC Fisheries Co-ordinator (F/COORD) supervises both the Coastal Fisheries and the Oceanic Fisheries (TBAP) programmes of SPC. The Coastal Fisheries Programme lacks a supervisory position equivalent to the TBAP Chief Fisheries Scientist (although a position has now been approved) so the majority of F/COORD time is spent on the Coastal Programme.

³¹ Currently, one senior position remains vacant because of insufficient "core" funds.

³² Possibly renewable to 10 years.

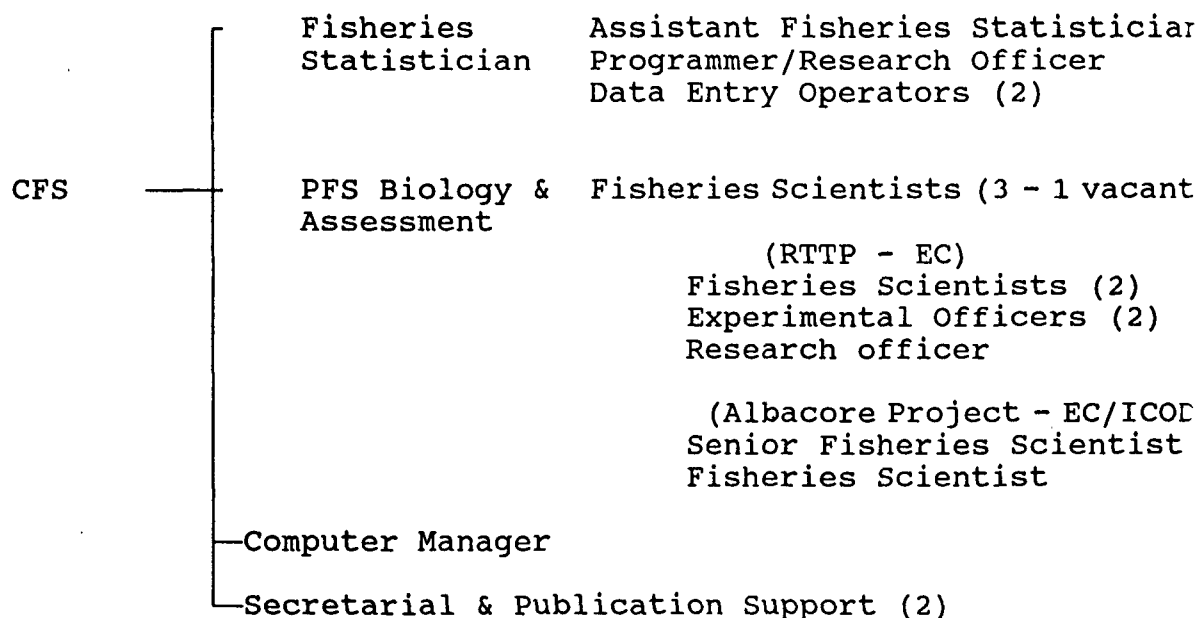


stability could be attained through the provision of services in support of regional, or even national³³, fisheries management. However, a less direct application of the "user-pays" principle, such as broadened membership payments, would be less likely to compromise principles of impartiality.

5.3 Staffing

In order to carry out the research detailed in this Strategic Plan, expansion of the current TBAP staff establishment, shown below, would be necessary.

Present TBAP Staff Establishment



A revised establishment, along the following lines, is recommended.

³³ For example, if a country wants a stock assessment to determine the optimum number of, say, Taiwanese longliners to licence, it might be prepared in future to dock a percentage of its access fee to pay for that report. DWFNs are unlikely, at this stage, to agree to such a development, and coastal States unwilling to promote when external funding for research is available.



Recommended TBAP Staff Establishment

CFS	PFS Statistics	Database Manager Port Sampling Manager Observer Manager Programmers (2) Data Entry Operators (4)
	PFS Biology	Biologists (3) Lab. Technicians (2) Field Technicians (3)
	PFS Assessment	Analysts (2) Programmer
	Reporting and Liaison ³⁴	
	Computer Manager	Systems Programmer
	Admin. Support	Financial, Personnel Publications, Secretarial

In addition to this core of regular staff, who would all be recruited on merit, there might be "floating" positions set aside for attachment and on-the-job training for island member country fisheries staff, both towards the improvement of national tuna research capabilities and to enable the TBAP to draw on short-term assistance from member countries which have particular areas of expertise. These might be similar to the attachment fellowships presently supported by the FFA, but would preferably be of longer-term (at least 2 years) duration to enable a realistic contribution to the programme.

The TBAP has never been easy to fully staff. At the time of the 1987 review over 50% of the 11 professional staff positions were vacant. This appears to have been a transient problem and staffing at the present time is more complete, with good morale. However, the previous quality of TBAP innovative research, particularly in stock and population modelling, has set a norm that is well above the abilities of most SPC member countries to currently match. The TBAP still has one senior "assessment and modelling" staff position vacant.

It follows that, if this standard is to be maintained, there must be continued access to a wide pool of expertise. Unfortunately, constraints on the nationality of staff recruited under extrabudgetary funding sources are becoming an increasing problem for regional agencies.

Unless some sort of "core" funding can be allocated for these positions it must be accepted that the TBAP will face increasing constraints in recruiting appropriate staff at appropriate times. More reliance may have to be placed on the provision of short-term specialist services by experts seconded from other bodies, or under cooperative arrangements.

A useful strategy might be to pursue the concept of the TBAP as a centre for tropical tuna research, to attract

³⁴ Recommended future position to organise meetings, liaison with members & other bodies & general 'front man'. Generally take the weight off the CFS as scientific secretariat role increases.



collaborative researchers and postgraduate student placements³⁵. This possibility would have some relevance to the following discussion on facilities.

5.4 Facilities

The TBAP has traditionally performed most effectively with the focus of an active fieldwork programme. It is recommended that such programmes be maintained as a regular feature of the TBAP work programme in the future, perhaps with a focus on individual countries or specific regional problems. The effort that has been put into the RTTP cannot perhaps be maintained indefinitely without pausing to draw breath, but it is not advised that the long gap that passed between the 1977-1981 SSAP and the 1989-1992 RTTP be repeated. The pursuit of active fieldwork would have some fairly definite implications for future work programmes.

These tagging projects have been accomplished using chartered commercial vessels and the question will inevitably arise: would it be worthwhile for the TBAP to maintain its own research vessel? In view of the massive overheads required, together with good prospects of obtaining space on commercial vessels (under access agreements, or arising out of industry interest in stock assessment), this may be a premature development and could be referred to future reviews.

Other new "facilities" that might be suggested to facilitate the work of a continuation of the TBAP, particularly in adding a more continuous fishery monitoring capability, are:

- **Laboratory facilities:** At present biological analyses are largely contracted out to national laboratories, or facilitated through working groups. Such research as ageing (otolith counts and other hard-part analyses), population genetics (electrophoresis etc), stomach content analysis, larval counts etc. might be considerably facilitated by the maintenance of a limited³⁶ laboratory facility.
- **Specialist scientific observers:** Dedicated scientific observers on board fishing vessels are one means by which accurate and reliable data can be obtained. While the placement of occasional member-country fisheries staff is often sufficient for surveillance-oriented observers, scientific observers require a high level of biological training. It would be most cost effective for the TBAP to maintain a small corps of dedicated, trained, scientific observers for this duty. Such a programme would complement national efforts and the FFA/US Treaty observer programme, which are currently limited in the range of fleets that they cover. Additionally, TBAP scientific observers would also be able to help train national staff and FFA observers to collect useful data.
- **Port samplers:** In a similar vein, the placement of in-country staff at strategic transshipment and landing points would be a very cost-effective way of gathering essential data, including the recovery of tags, monitoring of landings to validate logsheet information, collecting specimens and length-frequency samples for analysis, and generally improving the links with industry that are so essential for monitoring changes in the fishery and planning future work. For extra-regional placements, collaboration with other agencies would be most effective in the first instance. For regional placements (eg. FSM, Fiji, Solomons, Guam), dedicated TBAP port samplers could be used.
- **Library facilities:** The SPC library is one of the most comprehensive in the island region, however is generally inadequate to support a large tuna research programme such as the TBAP. The maintenance of state-of-the-art tuna fisheries science will require the setting aside of a considerable sum of TBAP money for subscription to the many scientific journals relevant to the field. Neither the

³⁵ This is unlikely to conflict with the interests of the University of the South Pacific, which does not pursue a large-scale postgraduate programme, and which would be likely to welcome the possibility of placement of Pacific Island postgraduate students being made available by SPC under joint supervisory arrangements.

³⁶ "Limited" in the sense that Scanning Electron Microscopes and Gas Liquid Chromatographs or Mass Spectrometers are not likely to be required by the TBAP within this millennium.

University of the South Pacific (USP), which is largely a teaching (rather than research) institution, nor the Pacific Islands Marine Resources Information System (PIMRIS), which is to improve the dissemination of practical information to national administrations, can be expected to maintain the whole range of specialist publications required by the TBAP.

- **Computer facilities:** The TBAP currently has an advanced (relative to island country fisheries offices) computer system, consisting of an HP9000 minicomputer and a range of IBM-compatible and Macintosh microcomputers. It is planned to connect these computers and associated peripherals via a dedicated network in the near future. As the scope of the TBAP broadens and the amount of data being collected increases, there will be a need to continually acquire new hardware and software in the coming years. At the moment, the Programme is "locked in" to the HP9000 stream, and experience has shown that major upgrading of this system is required about once every two years. There may be a point when it is advisable to review the TBAP's computer resources and a decision made regarding possible changes in direction in line with the requirements of the Programme.
- **Accommodation:** The question of a possible change in site for the SPC headquarters has not yet been resolved. If the SPC is to move, even within Noumea, considerable expense on new buildings will be incurred and it may be an opportunity for the TBAP to seek another venue, if it is felt desirable. Even without SPC relocation, operational costs might be reduced by a move away from New Caledonia, particularly if additional expenditure on office space is needed to house an expanded TBAP.

6. Conclusion

From its inception, the TBAP has operated largely as a research programme highly responsive to member-country needs, conducting various projects on a somewhat *ad hoc*, as-needed basis. To a large extent, as evidenced by the nature of its funding, the TBAP has never been viewed, at least by donors, as a "permanent" institution, and has had little opportunity to develop beyond this short-term, "stage 1" organisation. It is equally clear, however, that the expectations of member countries are increasingly of a more open-ended TBAP.

Developments in regional tuna fisheries during recent years and likely future trends have created the clear need for a more permanent programme, with a secure funding base, capable of carrying out the research necessary to advise member countries, both individually and collectively, on the biological considerations of tuna resource management. The development of the TBAP to this extent -- into a "stage 2" programme -- may be enabled through EC funding of the SPRTRP, if the funding application is successful.

The next evolutionary step would then be to a "stage 3" research programme in support of a regional tuna management regime, with a firm basis in international law, formal linkages with all relevant fishing nations and assured core funding for the Programme, possibly derived from a form of national membership payment.

This Strategic Plan is intended to help guide the TBAP into at least the "stage 2" type programme described above. Upon acceptance by this Committee, it would be appropriate to invite the 23rd RTMF to endorse the revised Mission Statement, Objectives and Strategies, as outlined in this paper, noting that SCTB would continue to monitor the work of the TBAP, and recommend changes as necessary. RTMF could also be invited to give in-principal support to the revised staff structure, which would then be implemented as funding permits.



ANNEX I**MISSION STATEMENT FOR TUNA & BILLFISH ASSESSMENT PROGRAMME**

The meeting [RTMF 19 of 1987] formally agreed on the need for a carefully defined Mission Statement for the Tuna and Billfish Assessment Programme and after due consideration adopted the following:

Mission Statement for Tuna & Billfish Assessment Programme

In order to help member countries develop, manage and rationally exploit the renewable oceanic resources of the region for the long-term, the Tuna and Billfish Assessment Programme will conduct scientific research on the stocks which support these fisheries and on the environmental factors which affect them.

Objectives of Tuna & Billfish Assessment Programme

The following are suggested activities to be completed during the next year grouped under the priority areas.

1. **Collection and evaluation of fisheries data and maintenance of regional oceanic fisheries assessment database**
 - a. Acquire modern database management software;
 - b. Implement log-sheet database on new software;
 - c. Consult with FFA and begin collaborative joint development of a fisheries database;
 - d. Publish tabular data summaries and maps of catch distribution in the region;
 - e. Participate in the design and evaluation of port sampling projects and analyse resulting data;
 - f. Continue attempts to increase data coverage.
2. **Assessment of interaction between fisheries for oceanic species**
 - a. Begin field work for a collaborative in-country tagging project;
 - b. Begin large-scale yellowfin tagging project;
 - c. Renew attempts to collaborate with Japanese scientists on a joint analysis of Skipjack Programme tag return data and Japanese pole-and-line fisheries data;
 - d. Examine length-frequency data as an indicator of potential for fisheries interaction.
3. **Assessing and monitoring the levels of exploitation of stocks of commercially important tuna and billfish species**
 - a. Review fisheries data and begin to assess tuna stocks on sub-regional and country-specific basis;
 - b. Review data holdings on billfish and albacore fisheries.
4. **Studies on the biology and ecology of commercially important tuna, billfish and bait species**
 - a. Relate yield per unit area of fishing ground to known distribution of oceanic productivity;
 - b. Correlate CPUE measures with oceanographic data;
 - c. Conduct baitfish analyses if requested.



5. Provision of fisheries observers and advice on development of observer programmes

- a. Participate in observer training courses;
- b. Conduct observer trips on longline vessels target fishing on albacore;
- c. Assist in processing observer data.

6. Monitoring the use of fish aggregation devices

- a. Conduct small-scale tagging operations in relation to FADs;
- b. Participate actively in FAD research workshop and subsequent field activities.

**TERMS OF REFERENCE AND COMPOSITION OF THE
STANDING COMMITTEE ON TUNA & BILLFISH**

After consideration of a report prepared by the SCTB working group which met on 31 July 1987, the meeting agreed on the following terms of reference and composition for the Standing Committee on Tuna & Billfish:-

**Terms of reference and composition of the
Standing Committee on Tuna & Billfish**

The intended role of this Committee is purely advisory and consultative. Its work will assist in the conduct of pelagic fisheries research through the provision of expertise, information and technical advice.

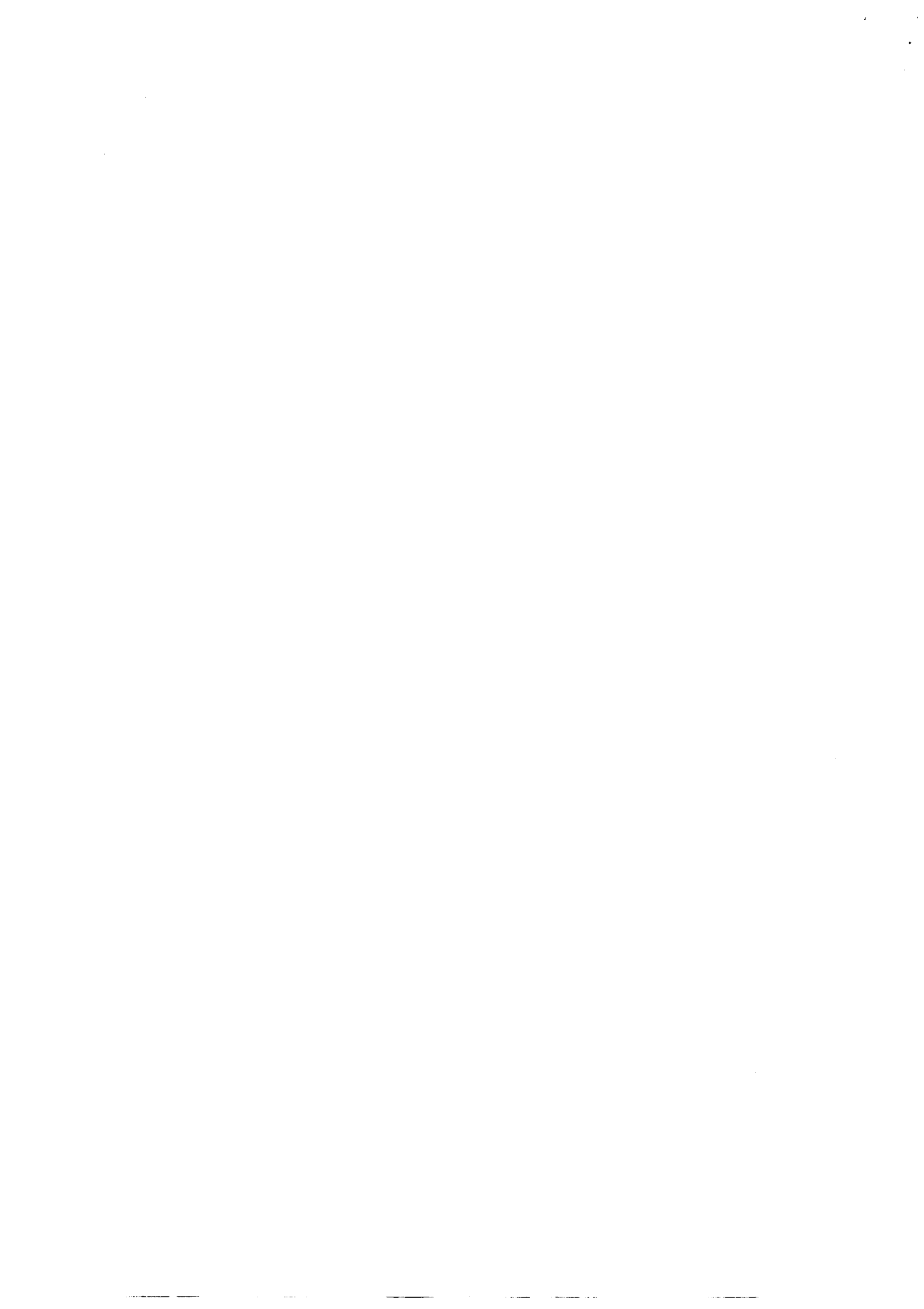
The Committee shall advise the Regional Technical Meeting on Fisheries on biological research on stocks which support oceanic fisheries for tuna and billfish in the SPC region by:

- (1) Assisting with the rigorous scientific review of the work of the Tuna and Billfish Assessment Programme and suggesting improvements to the scope and techniques of the TBAP's research;
- (2) assisting with and advising on the acquisition of relevant data to the TBAP, specifically that relating to fishing activities on the high seas surrounding the EEZs of South Pacific Commission member countries;
- (3) arranging collaboration between South Pacific Commission staff and outside workers on problems of mutual interest.

Composition of the Standing Committee

It is expected that the composition of the Committee would vary according to the specific tasks before it. In general, however, it shall consist of the following members:

- (1) TBAP Co-ordinator [latterly the Chief Tuna Scientist] or his representative;
- (2) A representative from the Forum Fisheries Agency;
- (3) Scientists from countries with a commitment to tuna fishing in the SPC region, specifically including both Island states and distant water fishing Nations;
- (4) Technical experts invited by the TBAP Co-ordinator as necessary to assist in analysis of specific problems.



ATTACHMENT 2

South Pacific Commission member countries and territories

* denotes South Pacific Forum member States.

South Pacific Territories of metropolitan states indented

** denotes Pacific ACP states (all of which are Forum members)

Australia*
Cook Islands*
Federated States of Micronesia*
Fiji**
France
 French Polynesia
 New Caledonia
 Wallis & Futuna
Kiribati**
Marshall Islands*
Nauru*
New Zealand*
 Tokelau
Niue*
Palau*
Papua New Guinea**
Solomon Islands**
Tonga**
Tuvalu**
United Kingdom
 Pitcairn
United States of America
 American Samoa
 Guam
 Northern Marianas Islands
Vanuatu**
Western Samoa**

Some nations and their territories that might be included in an extended fisheries statistical area

Chile
 Easter Island
Indonesia (eastern half only)
Japan
 Bonin Islands
 Volcano Islands
Philippines
U.S. Hawaii and other Pacific territories



ATTACHMENT 3

Summary of 1989 South Pacific Tuna Fishery Catches
in the SPC statistical Area
(based on logsheet data provided to SPC database)

	Total tonnes	Number of Vessels	Fishing Days/ *Hooks x100	Catch per unit effort
<u>Purse seine</u>				
US	139,865	36	6,633	21.08
Taiwan	22,138	26	4,587	4.82
Solomons	10,791	4	336	32.12
Philippines	8,855	10	587	15.08
Korea	37,460	22	3,112	12.03
Japan	95,915	37	4,827	19.87
Indonesia	2,607	3	167	15.61
<u>SUBTOTAL</u>	<u>317,631</u>	<u>138</u>	<u>20,249</u>	<u>15.66</u>
<u>Pole-and-line</u>				
Solomons	25,868	33	7,122	3.63
Japan	47,513	58	4,296	11.05
Kiribati	0	0	0	
Fiji	2,826	6	670	4.22
<u>SUBTOTAL</u>	<u>76,207</u>	<u>97</u>	<u>12,088</u>	<u>6.30</u>
<u>Longline</u>				
Taiwan	1,643	133	4,165*	.3945
Korea	5,185	96	16,791*	.3088
Japan	38,018	464	72,314*	.5257
Tonga	260	1	451*	.5765
New Caledonia	666	4	735*	.9061
Australia	613	93	682*	.8988
<u>SUBTOTAL</u>	<u>46,385</u>	<u>791</u>	<u>95,138*</u>	<u>.4876</u>
<u>TOTAL</u>	<u>440,223</u>	<u>1,026</u>		
<u>Totals by flag of vessel</u>				
Japan	181,446			
USA	139,865			
Korea	42,645			
Solomons	36,659			
Taiwan	23,781			
Philippines	8,855			
Fiji	2,826			
Indonesia	2,607			
New Caledonia	666			
Australia	613			
Tonga	260			



Notes on Attachment 3

- Logbook coverage of all fleets operating within EEZs is not complete. Catch returns are not always filed even where national regulations require. Of the DWFNs, US purse-seine logbook coverage can be considered complete and Japanese fleet coverage is good. Other DWFNs are less compliant, and the Taiwanese purse-seine fleet demonstrates a remarkably low reported catch per unit effort. Coastal state fleet logbook coverage is often complete or, at least, known to be available.

- Most DWFN fleets, apart from the USA within the US/Forum multilateral treaty area, do not supply logbooks covering high seas fishing. 35% of the SPC statistical area is high seas. The catches of more than one entire fleet (eg Southern albacore driftnet and troll fleets) are not accounted for, as well as 35% of the Japanese purse-seine catch & others.

- This total reported catch of 440,000 tonnes of tuna from the SPC statistical area in 1989 should be compared to the broadly estimated total of 1,000,000 tonnes actual catch (from re-adjusting figures in the light of estimated reporting rates, estimates of high-seas catches and comparison with known landings). Clearly, there is some way to go before the SPC catch-effort database can be considered complete, but further progress will be dependent on the implementation of more comprehensive access arrangements and management agreements.



ATTACHMENT 4

Original (1981-84) TBAP objectives.

1. Development of a regional statistical programme.
2. Estimation of the degree of interaction between pole-and-line and purse-seine fisheries and assessment of the impact of each on tuna resources, principally of skipjack and yellowfin tuna.
3. Assessment and monitoring of the levels of exploitation of the stocks of the commercially important billfish species, especially black marlin, blue marlin, striped marlin, sailfish & swordfish.
4. Continued analyses of the data generated by the Skipjack Programme and evaluation of the impact of these data on resource assessment.
5. Assessment and monitoring of the levels of exploitation of the stocks of the commercially important tuna species, especially yellowfin tuna, bigeye tuna & albacore.
6. Assessment of the biological information necessary for the study of population dynamics of the dominant species.
7. Studies of the biology and ecology of the most important baitfish species used for catching tunas.
8. Comparison of the biological data on major species with relevant oceanographic and environmental information with a view to obtaining a description of the habitat available to each species, and hopefully predicting abundance in certain areas.
9. Evaluation of the use of anchored rafts as tuna aggregating devices.
10. Estimation of the degree of interaction between surface and longline gears exploiting yellowfin tuna, bigeye tuna and albacore, and assessment of optimal exploitation of each species by gear type.
11. Co-ordination of observer programmes on distant water fishing vessels.
12. Assessment of the impact on the stocks of changes in the type of longline gear used, especially the trend towards gear which fishes at greater depth.
13. Evaluation of alternative fish attraction devices.

