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SOUTH PACIFIC COMMISSION

TWENTY-FIRST REGIONAL TECHNICAL MEETING ON FISHERIES
(Noumea, New Caledonia, 7-11 August 1989)

REPORT ON THE
STANDING COMMITTEE ON TUNA AND BILLFISH
(Suva, Fiji, 19-21 June 1989)

1. PRELIMINARIES

1.1 Opening Address

1. Mr Jon Jonassen, on behalf of the South Pacific Commission, formally opened the meeting with an address welcoming the participants and outlining the role of the Standing Committee in advising on the work of the SPC Tuna and Billfish Assessment Programme.

1.2 Appointment of Chairman and Rapporteurs

2. Apologies were received on behalf of the representatives from the Cook Islands and Vanuatu. In the absence of the Cook Islands representative, who was intended to chair the Committee, it was unanimously agreed that Mr Albert Caton of Australia would take the chair.

3. Rapporteurs were appointed as follows:

Coordinator - Dr Tim Adams, Fiji
Agenda Item 3 - Dr Talbot Murray, New Zealand
Agenda Item 4 - Dr Jerry Wetherall, USA
Agenda Item 5 - Mr Tim Lawson, SPC
Agenda Item 6 - Mr John Hampton, SPC
Agenda Item 7 - Mr Robert Gillett, FAO

2. REPORT ON 1988 ACTION SHEET

4. Report on the Standing Committee on Tuna and Billfish from the 1988 Regional Technical Meeting on Fisheries was presented as Information Paper SCTB 1. Items from the 1988 Action Sheet arriving from that report were referred for discussion under various relevant agenda items for the Committee's further consideration.

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3. SPC TUNA AND BILLFISH ASSESSMENT PROGRAMME ACTIVITIES

5. Referring to Information Paper SCTB 2, SPC's Chief Fisheries Scientist identified fisheries statistics, tuna oceanography, and stock assessment and fisheries interactions as the main components of the TBAP (Figure 1). Under the latter component he highlighted the Regional Tuna Tagging Project (RTTP) as the major initiative for the coming year.

6. Continued understaffing and funding restrictions had, to some extent, limited progress in several areas including the RTTP. Although the RTTP was not yet ready to start, in-country tagging was nearly set to start in the Solomon Islands. In-country tagging would augment the RTTP and seek to update the original SSAP work on skipjack where current fishing is approaching the SSAP yield estimates. In-country tagging will also study the interaction between artisanal and industrial fisheries.

7. Other activities in the past year have included monitoring drift gillnet transhipments in Noumea and mounting an observer programme on albacore troll vessels along the Subtropical Convergence Zone (STCZ) with NZ MAFFish. The results of these activities were reported to the SPAR Workshop last week (SPAR 2/WP 14, SPAR 2/IP 11).

8. The TBAP has made considerable progress in acquiring catch and effort data for the regional tuna fisheries database. Outstanding data were received from several SPC member countries, so that now almost all data available through member countries have been incorporated into the regional database. The TBAP Fisheries Statistics Project has also made progress on other initiatives, including the SPC Regional Tuna Bulletin, in-country tuna databases and statistical support of other SPC fisheries projects.

3.1 Regional Tuna Tagging Project - Work Programme and Progress Report
(refer to SCTB 3, SCTB 8, and 1988 Action Items: 3, 5, 6, 7 and 8)

9. The concept of a Regional Tuna Tagging Project originally arose in 1985 in response to the increasing fishing effort by purse-seiners catching yellowfin in the equatorial western Pacific. Concern over the potential impacts on other fisheries within the area led to the Project's emphasis on fisheries interactions. Several of the Project's goals were highlighted including:

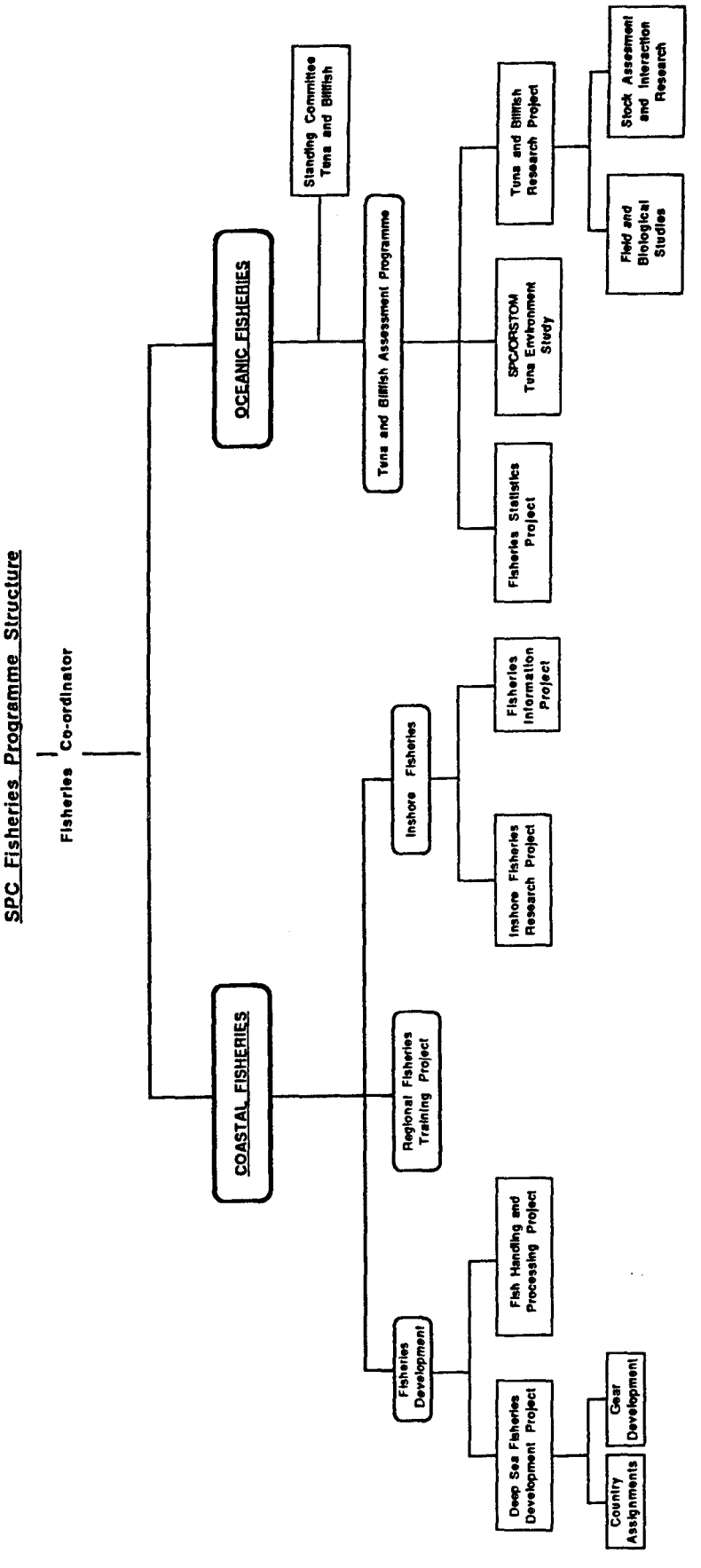
i) estimates of interactions between fisheries where several fisheries operate;

ii) use description of tuna movements to direct further modelling, including the possible use of general movement models;

iii) update skipjack estimates; and

iv) estimate the potential for further expansion of fisheries

Figure 1. SPC Fisheries Organisation Chart



10. The RTTP work plan for year 1 was outlined (SCTB 3). The start date is dependent upon the acquisition and modification of a suitable charter vessel. This task is awaiting the final tendering round and three vessels are expected to tender. Staff recruitment by SPC has been finalised and is awaiting EEC approval. Access to funds is awaiting EEC approval of the work plan.

11. Fieldwork with the chartered vessel will begin in Solomon Islands, contributing to the in-country project being undertaken there and also allowing tagging and other operational procedures to be fine-tuned. This stage will last for two months beginning in September, subject to the above constraints. Month three onwards will be based in PNG, probably Kavieng or Manus Island, and may shift to the waters of FSM or Palau as the fishery moves. The intention is to conduct tagging in the area between PNG and FSM where purse-seine activity is concentrated. Priority will be given to tagging yellowfin but skipjack will also be tagged since this species is expected to dominate the catch and there is a need to update SSAP estimates. Both free swimming and log associated schools will be fished for tagging.

12. FSM expressed concern that basing the project in PNG might result in insufficient tagging in FSM waters. SPC indicated that the choice of base for the tagging vessel would change during the season with southern FSM or Palau a likely base later in the season. SPC indicated that the choice of base for the tagging vessel was determined by where the purse-seine fleet was fishing. They further indicated that discussions were underway with FSM to examine the feasibility of a separate in-country tagging project.

13. FAO (RFSP) commented that tagging operations in national waters were often unnecessarily limited in the days that could be spent tagging. He suggested that increases in tagging time of up to 40% were possible with the assistance of regional officials. Any efforts that could be made to facilitate port clearance formalities, resupply, and especially in the provision of adequate live bait would result in increased tagging in country.

14. NZ expressed concern that it was difficult to evaluate the technical aspects of the RTTP. In particular the separation of objectives and project strategies between the RTTP and in country tagging was not clear. In addition, the RTTP suffers from a lack of a clear statement of its objectives and the strategy for meeting them. The information provided to date does not allow for the technical evaluation of the project.

15. NMFS agreed, indicating that discussion raised several questions relating to determining a strategy for the RTTP. Examples of these include:

- what is the target species?

- what interaction components are to be estimated?

- what is the distribution of components of the fishery?

- what sizes of fish can be tagged?

- what is the expected recovery rate?

- what tag distribution patterns might be possible?

16. SPC indicated that the approach they intended to use was to tag a random sample of the population of yellowfin available to the purse-seine fishery since the purse-seine fishery is believed to be having an impact on the longline fishery. The use of a pole-and-line boat is not ideal and in some ways is restrictive. However, the choice of vessel was constrained by availability and the need to minimise tagging mortality. Japan commented on their experience of tagging from pole-and-line boats and of recoveries from purse-seiners. Tagging from pole-and-line boats limits the size of fish captured to small fish so it is unlikely that the RTTP will be able to concentrate on purse-seine target-sized fish. Furthermore, recoveries made in the Tohoku skipjack tagging programme operating North of 10°N were mostly in purse-seine operations. Owing to the bulk handling of the catch most of the tags were not seen upon capture and were recovered from factories. The result was usually very poor recapture details.

17. SPC pointed out that, with effective field liaison (especially at bulk unloading locations, as is planned) this problem can largely be obviated.

18. Japan briefly outlined a project that FSFRL had carried out to estimate the interaction between purse-seine and longline fisheries based on CPUE data. The purpose of the project was to :

i) estimate the decline over time (before and after the purse-seine fishery started) in longline CPUE; and

ii) estimate the areal extent of any effect relative to the area of purse-seine fishing. The factors that were identified that might affect the analysis and hence needed to be accounted for include:

   - both purse-seine and longline fisheries are changing and simple CPUE comparisons may not reflect abundance changes

   - time stratification of the data is difficult to establish

   - similar periods of effort and fleet distribution between fisheries are needed for comparisons

   - effects of environmental variation need to be quantified (e.g. thermocline depth, which affects fishing success).

19. Thus far FSFRL have not been able to reasonably interpret the results, although longline CPUE does appear to be lower following the introduction of purse-seining in some areas.

20. SPC continued the review of the RTTP with a description of the Solomon Islands in-country tagging project. As background, the SPC pointed out that the Solomon Islands have the largest domestic tuna fishery in the region consisting of 34 pole-and-line boats and some purse-seiners. The pole-and-line boats fish primarily for skipjack in the New Georgia Strait and receive some direct protection from interaction with purse-seiners, which are confined outside the archipelagic baseline. The development goals of the Solomon Islands were based on skipjack population parameters estimated during the Skipjack Tagging Programme 10 years ago. Given the increase in purse-seine fishing and the length of time since the last tagging programme, there is a need to re-estimate these population parameters so that the Solomon Islands can reassess the development goals of their domestic fishery.

21. The Solomon Islands in-country tagging project had been developed in consultation with the Solomon Islands Government over the last 12 months. Details of the project are presented in SCTB 8. The objectives include:

- to estimate skipjack mortality rates, transfer rates, tag shedding and reporting rates;

- to update estimates of skipjack standing stock, turnover, throughput and harvest ratio;

- to estimate skipjack growth, long range movements, and school integrity;

- to obtain preliminary information on attraction of tagged skipjack to FADs;

- to train a Solomon Islands fisheries officer in all aspects of conducting a tagging experiment in order to enhance the research capabilities of SIFD.

22. The project is expected to start in July or August and will carry out four tagging cruises over a 12-month period. Cruises 1, 3 and 4 will use a SOLTAI vessel with the method of compensation based on purchase of the fish used in the tagging experiment rather than full charter. Cruise 2 will be carried out using the RTTP chartered vessel. In order to meet the objectives of the project, tagging will be carried out over as much of the fishery as possible, working both in open water and around FADs.

23. Tag attrition models similar to those used in the SSAP will be employed. The estimation procedure used will differ from the SSAP least squares and instead will be based on a maximum likelihood procedure using multinomial probabilities. Simulations indicate this estimation procedure gives less biased parameter estimates. The number of parameters that must be estimated will be largest (6) in questions of interaction. It is expected to tag up to 10,000 fish with an anticipated recovery rate of about 20%. Simulations indicate that the parameter estimates should be reliable with this sample size.

24. NMFS asked if any other tagging methodologies were being planned. SPC indicated that at this stage no other tagging approaches were being considered, although the FAD component would ideally be addressed by sonic tagging.

25. The US representative pointed out that a detailed methodological paper based on the Solomon Islands experience broken down into component steps of project development, implementation, analyses, etc. would facilitate future discussion. This paper was viewed as improving the ability of the SCTB to comment and advise on parts of the RTTP. It was further suggested that there is a need in both the in-country project and the RTTP to separate the objectives into primary and secondary objectives for future discussions.

26. SPC pointed out that the project had been cleared by the 1988 SCTB and that the methodology had been fully discussed at that meeting, so it was not felt necessary to reiterate it at this meeting. The paper presented to the 1988 RTMF on "Methods of Studying Fishery Interaction" was distributed in explanation of some of the questions raised over experimental design, but the Committee agreed that, in the absence of data occasioned by the late arrival of funding to start work on the RTTP, the SPC should produce a descriptive paper for the next SCTB, drawing on examples provided by the forthcoming Solomon Islands in country tagging project.

Action Item 1: **SPC to produce, where appropriate, a clear statement of experimental design and new techniques to be incorporated in the work of the RTTP, illustrated by examples drawn from the Solomon Islands in-country experiment, to be presented at the next SCTB.**

27. The representative of Taiwan suggested that a group of individuals from each of the fishing countries (regional and DWFN's) be established to facilitate the exchange of information, distribute tag rewards, and collect recapture information. This recommendation was unanimously endorsed.

Action Item 2: **SPC to formalise a group drawn from relevant organisations and countries, with SCTB members as nucleus, to exchange tagging data, distribute tag rewards, collect recapture data, and implement vernacular publicity.**

28. FAO (RFSP) asked what provision for advertising had been made in the upcoming Solomons tagging for local recoveries. The Solomon Islands reported that a local language tagging poster and radio announcements were to be used. SPC distributed copies of the RTTP draft poster advertising the tagging project and reported plans to distribute it in up to seven different languages.

29. Progress on the 1988 Action Sheet covered by this agenda item was reviewed and reported as follows: Items 3, 5 and 6 have all been actioned, Item 7 has been actioned by Fiji, Solomon Islands and FSM. Item 7 will be an ongoing action sheet item.

Action Item 3: **SPC to remind member countries of the 1988 request to emphasise the value of the RTTP and research cooperation in general, during access negotiations with DWFNs.**

Action Item 4: **SPC to remind member countries of the 1988 request to use national observers to publicise the RTTP (and other tagging experiments) when aboard foreign vessels.**

3.2 Existing data coverage of regional tuna fisheries (refer to SCTB 4, 5 and 6)

30. The main areas of activity of the Fisheries Statistics Project are :

i) support of member countries in the processing and reporting of daily catch and effort logsheets, and

ii) maintenance of the regional fisheries data base for monitoring and research at the regional level. The regional fisheries data base includes daily catch and effort statistics from vessel log sheets, length frequency statistics, and transhipment statistics.

31. It was stressed that virtually all data available from SPC member countries had been assembled at SPC and that these data would be reviewed on a regular basis. However, there are still major gaps in coverage of DWFN fishing activity.

32. In 1987 and 1988, data were received from 16 countries covering the fleets of 13 different tuna fishing nations, including the activities of roughly 775 vessels. Since August 1988, the data have been reported quarterly in the SPC Regional Tuna Bulletin. There is an intention to improve the Bulletin by including figures on size frequencies, fleet composition and graphical summaries of historical catch rates.

33. The present coverage of the database varies, although the largest gaps continue to result from the lack of access to statistics on most DWFNs (see Table 1). In contrast, provision of data from the US purse-seine fleet under the Pacific Islands Multilateral Treaty has resulted in roughly 90% coverage during early 1989, an increase from about 8% for 1987.

34. The problem of estimating total effort and thereby determining coverage rates was discussed. Again, lack of information on total effort from certain DWFNs has hampered estimation of coverage rates.

35. Data quality was also discussed. The availability of observer data was discussed as a means of assessing data quality. SPC reported that observer data were available only from the U.S. purse-seine fleet (about 30 vessels out of a total of some 800-900 fishing in the region). These data had not been examined as yet since they had only very recently been received at SPC. FAO (RFSP) reported that the FFA target for observer coverage is for 25% of all U.S. purse-seine trips.

Table 1. Coverage within the SPC statistical area by data holdings in the SPC database

PS = Purse seine
PL = Pole-and-line
GL = Gillnet
LL = Longline
TR = Troll

Fleet		Coverage	Vessels active
Australia	PS	unknown	2
"	LL	unknown	20-50
Fiji	PL	moderate	7
" small	LL	nil	5
Indonesia	PS	unknown	3
"	PL	nil	~500
Japan	PS	mod-good	~40
"	LL	moderate	300-350
"	PL	mod-good	70-80
"	GL	nil	?
Kiribati	PL	full	5
Korea	PS	moderate	~23
"	GL	nil	?
"	LL	poor	~120
New Caledonia	LL	full	3
New Zealand	PL	moderate	1
"	PS	nil	5
"	TR	nil	100-220
Philippines	PS	poor	~5
Solomons	PL	full	34
"	PS	full	3
Taiwan	GL	nil	?
"	PS	mod-good	~19
"	LL	poor	~120
Tonga	LL	full	1
Tuvalu	PL	moderate	1
USA	PS	1978-88 poor	
"	"	1989 full	32
"	TR	nil	48
USSR	PS	nil	?
"	LL	nil	?

36. Both NMFS and Japan strongly suggested that for many fisheries where data coverage was poor, direct contact with scientists in the field should be standard procedure. The basis for this comment was that at least the total catch in individual fisheries will have been estimated by scientists carrying out research programmes or with specific interests in tuna fisheries. SPC noted that direct contacts had been made with Japan and other DWFNs but that the release of catch statistics was usually restricted by government policy.

37. The meeting was invited to comment on the SPC statistical area (Figure 2a), which includes the EEZs of member countries and adjacent high seas areas. Following brief discussion, the statistical area was endorsed by the meeting as the area to be covered by the SPC regional tuna database. It was noted that FAO had contacted SPC, along with other fisheries agencies in the western Pacific, in an attempt to make the FAO statistical areas (Figure 2b) more consistent with the SPC area of interest and the statistical areas of others organizations, notably SEAFDEC. The representative from the US expressed concern that it appeared considerable progress had been made towards redefining the FAO statistical areas in the region without discussion with NMFS. The meeting recommended that FAO consult with national fisheries officers in countries that will be affected by the proposed changes.

3.3 Oceanography and tuna fisheries (refer to SCTB 7)

38. By ORSTOM/SPC collaboration, the TUNA/ENVIRONMENT programme investigates the impact of the environmental variability (seasonal and interannual) on the distribution and availability of tunas to the different surface fishing gears, using the databases available at ORSTOM (oceanography) and TBAP (tuna fishery).

39. A brief description of the main oceanographic features was presented. Particularly, results from PROPPAC ORSTOM's programme (aimed at estimating the relationships between hydrological structures and the planktonic biomass and production in the western Pacific) were described. These results covered the typical El Nino (September 87)/La Nina (September 88) phenomenon regarding hydrological (thermal and haline), chemical (nitrate distribution) and biological (chlorophyll, nanoplankton - cyanobacteria and microalgae, and zooplankton) structure of the water column. Enrichment due to the equatorial upwelling (1.5 times in terms of chlorophyll, 3 to 5 times in terms of nanoplankton, 2.5 times in terms of zooplankton) was clearly demonstrated.

40. The working area (135-180°E, 6°S-16°N) was divided into subareas according to the main current systems. Data sets used in those subareas were also presented: surface and subsurface (thermocline depth) parameters, geostrophic current estimates on a monthly basis (oceanographical data); Japanese pole-and-line (200-300 GRT vessels) and purse-seine (200-500 GRT vessels) raw skipjack catch per unit effort broken down by log sets and school sets (fisheries data). Standardised anomalies (i.e. standardised deviations from the whole period mean) of all these parameters were plotted and commented on. A tentative analysis of relationships between CPUE and oceanography (current intensity, thermocline depth) was also presented.

Figure 2a. SPC Statistical Area

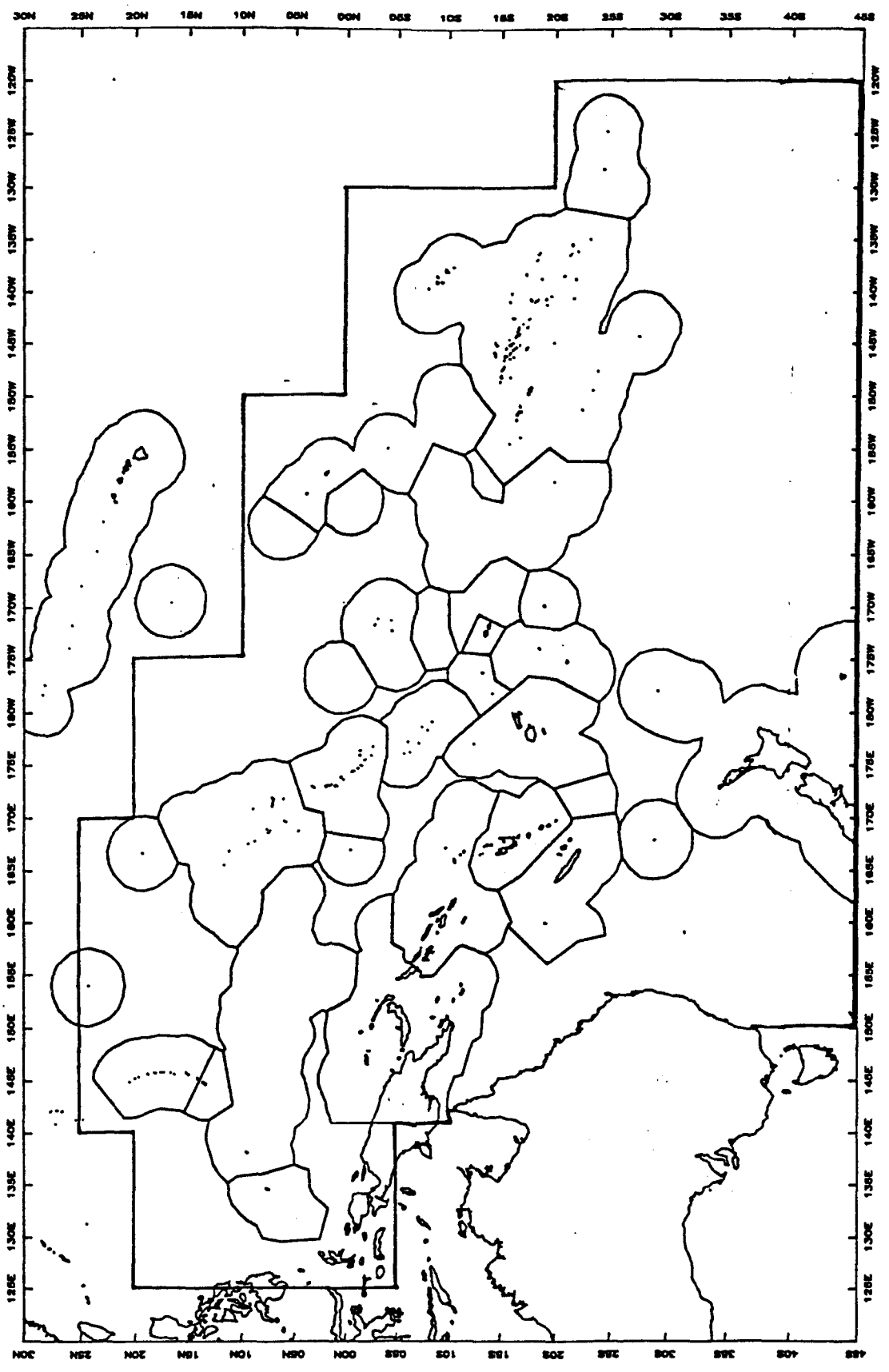
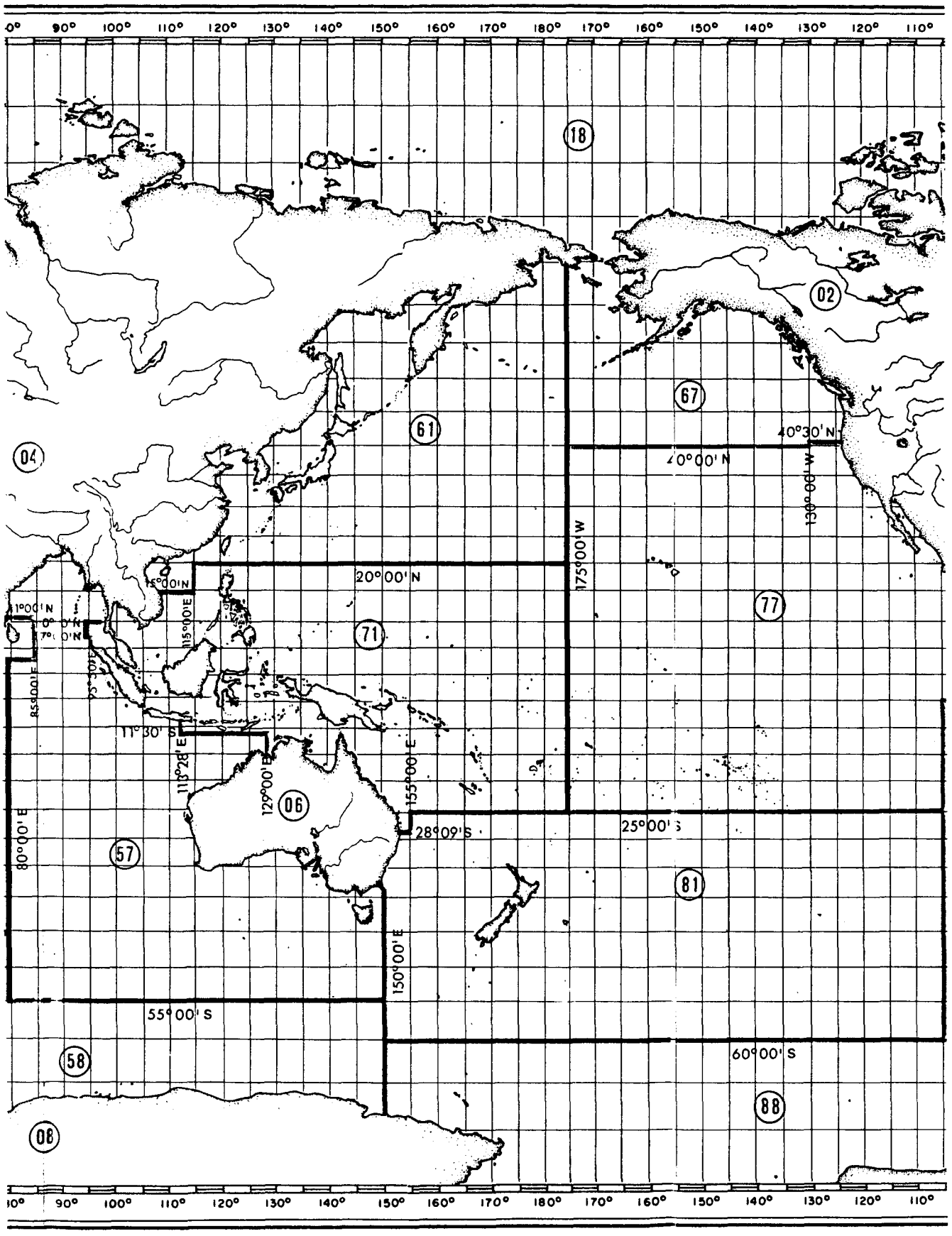


Figure 2b. FAO Statistical Area



41. Main results were as follows:

i) El Nino events (82/83 and 86/87) seem to have had a positive effect on pole and line catches, but no demonstrable effect on purse-seine catches (maybe because of the shortness of the time series);

ii) Good correlations were observed between geostrophic currents and pole and line CPUEs, but with a negative relationship instead of the positive one shown by Tanaka (1980); this result must be scrutinised;

iii) No relationship was observed between catch rates and thermocline depth, but this may be a consequence of averaging over large areas.

42. These results are preliminary and indicative only because of the shortness of the time series, the lack of information on some major fisheries and the absence in this series of a typical anti-El Nino phenomenon. The analysis will be pursued on a more precise area stratification (2° lat x 5° long) in later work.

4. WESTERN PACIFIC YELLOWFIN TUNA - REQUIREMENTS FOR STOCK ASSESSMENT AND FISHERIES INTERACTION STUDIES

43. SPC objectives in this area are to:

i) Develop size-specific abundance indices for yellowfin. Indices for juvenile yellowfin would be based on purse-seine data, whereas those for adult yellowfin would be computed from longline fishery statistics.

ii) Construct size and age-structured models of yellowfin stock dynamics.

44. Lack of data has prevented any sophisticated studies to date. Attention has been focused on monitoring CPUE, particularly in areas where both longline and purse seine vessels operate, to detect possible impacts of the purse seine catches on the longline catch rates.

45. A report was presented by Dr Suzuki describing a preliminary analysis of western Pacific yellowfin fisheries, including some inferences on stock status. The aim of the analysis was to assess interactions between the purse seine fisheries of Japan, US, Philippines and other countries and the longline fisheries of Japan, Taiwan and Korea. In general, the purse seine fisheries catch juvenile yellowfin, whereas the longliners take mostly the larger, adult fish. Several limitations of the study were explained. These included lack of data from several countries catching yellowfin in the region; uncertainty about stock structure, particularly the relationship between yellowfin occurring in the inshore areas and those on the high seas; and inclusion of some bigeye tuna in the Philippine catch data for yellowfin.

46. The historical yellowfin total catch statistics in FAO AREA 71 were reviewed in the paper. These data show a rapid increase in total yellowfin catch from the inception of purse seine fishing in the late 1970s up to the mid 1980s. The present total catch is 200,000 - 210,000 mt. The increase has been due not only to growth in high seas purse seine fleets of distant-water fishing nations, but also to expansion of coastal fisheries in the Philippines and Indonesia.

47. Longline data were analyzed to infer changes in the adult segment of the yellowfin stock. Using Japanese data, a nominal CPUE series was computed, which showed a clear trend from 1952-1976. The nominal longline catch rate for yellowfin increased to an all-time high in 1978, and subsequently has declined steadily. By 1986 it had returned to its 1976 level.

48. When the nominal longline CPUE data were re-evaluated using more sophisticated methods, different results were obtained. In particular, application of the Honma procedure, which corrects for geographical changes in longline effort over time, showed a steady decline in yellowfin CPUE during 1952-1976. This was followed by an increase in the adjusted CPUE in 1977 and a decline since 1978, as in the case of nominal CPUE. A general linear model was also used to account for effects of time period, fishing area, gear configuration (deep vs regular longline), and other factors. The model was applied to the data for 1975-1986. The general linear model index traces the same trends as the Honma index and the nominal CPUE statistics.

49. Indices of fishing success for juvenile yellowfin were computed using Japanese purse seine statistics. Indices based on catch per set, catch per fishing day, and (applied only in tropical area since 1983) catch per searching day generally show the same trends from 1976 through 1986. The overall trend in CPUE has been increasing during this period. However, it is doubtful whether these indices reflect changes in abundance of juvenile yellowfin. It is more likely that they reflect improvements in fishing tactics and technology. In particular, Japanese purse seiners have introduced a number of improvements, such as attachment of radio buoys to logs, use of radar to locate bird flocks, use of underwater lights, and vessel group search tactics.

50. The adjusted longline CPUE statistics (based on the Honma method) were combined with total yellowfin catch data for Japanese, Taiwanese and Korean longliners to estimate parameters of a surplus production model. This model applies specifically to longline fishery catch of the adult segment of the yellowfin stock. This analysis suggested an MSY of about 65,000 - 70,000 mt per year to the combined longline fleets, compared with current longline catches of about 45,000 mt. However, the production model analysis is complicated by the fact that the purse seine catch of juvenile yellowfin now dominates the overal western Pacific yellowfin harvest. Thus the average recruitment to the longline fisheries is probably less than it was prior to development of the purse seine fisheries, and the MSY for longliners is likely to be less than the 65,000 mt estimated in the analysis.

51. In the case of the purse seine fishery, Dr Suzuki plotted total yellowfin catch of US and Japanese seiners against effort. This showed a direct relationship between total catch and effort, but suggested that catch has levelled off in recent years.

52. The findings regarding interactions between the purse seine and longline fleets were described. It was shown that in many areas of the western Pacific, particularly the areas north of Papua New Guinea, Japanese longline CPUE has declined in conjunction with the increase in purse seine catch. However, to understand the interactions better it is necessary to develop age- and size-specific indices of abundance. This is a goal for future research. However, some interesting ideas for such a study are suggested in the length frequency data for yellowfin fisheries in the inshore waters of the Philippines compared to high seas purse seine and longline regions. These data suggest that only very small and very large yellowfin are present in the inshore waters, as fished by small Philippine purse seines and handlines, whereas small and medium-sized yellowfin are available offshore, the latter taken by longliners and the former by purse seiners.

53. As a prelude to more complete and sophisticated age-specific analyses, the catch-by-age for 6 years of the longline fishery (Japan, Korea, Taiwan), purse seine fishery (US, Japan) and the Philippine fisheries was computed. A number of assumptions were made in compiling these estimates, because of a lack of complete statistics. In particular the Philippines data used were provisional. The age-specific catch analysis suggested that there may have been pulses of recruitment in the Philippines fishery in 1980 and 1985. However, any reliable conclusions must await better data, particularly size-composition statistics. Also required are better methods to convert length distributions to age distributions.

54. In summarizing the presentation, the difficulty of reaching firm conclusions about the status of the western Pacific yellowfin stock was reiterated. But the fact that recent total catches have been fairly stable at 200,000 - 210,000 mt indicates that this level of catch can be sustained. Since all longline CPUE indices show a declining trend in recent years, all of the fisheries should be closely monitored. In addition, studies are needed to determine the influence of various factors on CPUE, including the ocean environment, gear changes, and nominal fishing effort.

55. Another important factor to consider in assessing the purse seine data for yellowfin is that the purse seiners are targeting skipjack tuna, so the yellowfin are caught incidentally. Hence, purse seine CPUE's are unlikely to directly reflect yellowfin abundance, even when environmental and technological effects are removed.

56. The question of stock structure is another critical issue needing resolution. Studies need to be undertaken to determine how many stocks of yellowfin are involved in the various fisheries and their geographical ranges.

57. Finally, the need for better fishery statistics cannot be overstated. Particularly important are more complete and accurate length frequency statistics.

5. PIN/DWFN/ASEAN COLLABORATION ON TUNA AND BILLFISH RESEARCH

5.1 WPFCC Tuna Research Workshop

58. The Western Pacific Fisheries Consultative Committee (WPFCC) workshop was held in Manila, Philippines, 3-6 April 1989. The workshop was organised by the WPFCC Secretariat with assistance from the SPC and the Pacific Economic Cooperation Conference (PECC) Fisheries Task Force. Funding support was provided by the Canadian International Development Agency. The workshop was attended by representatives from four Association of South-East Asian Nations (ASEAN) - Indonesia, Malaysia, Philippines and Thailand; five Pacific Island Nations (PIN) - Federated States of Micronesia, Fiji, Papua New Guinea, Solomon Islands and Tonga; and three regional organisations, including the FAO/UNDP Indo-Pacific Tuna Development and Management Programme (IPTP), PECC and SPC.

59. The meeting examined various aspects of tuna research methodology, including experimental design in tuna tagging projects; tuna tagging experiences in the Philippines; a review of tagging methods used in the Western Pacific; and the interpretation of tagging experiments.

60. The following plan of action for developing cooperation in tuna research between the ASEAN and PIN countries was approved by the WPFCC meeting:

(i) There is to be established a WPFCC Working Group on Tuna Research open to all interested scientists in the two regions;

(ii) The Working Group is to establish a quarterly Tuna Research Newsletter;

(iii) The Working Group will facilitate an exchange of scientists between the two regions to work towards standardisation of tuna tagging techniques in the two regions;

(iv) The Working Group is to ensure that a limited number of ASEAN scientists are given the opportunity to attend the SPC Standing Committee on Tuna and Billfish and to ensure that a limited number of PIN scientists are given the opportunity to attend the South-East Asian Tuna Conference;

(v) The Working Group is to facilitate the sharing of computer software between the two regions;

(vi) The Working Group should undertake to facilitate the timely sharing of catch and effort data between the two regions;

(vii) The Working Group is to plan for the holding of a tuna research workshop on, or about, June 1992 to review in detail the by-then existing results of the tuna tagging programmes in the two regions.

61. It was noted by the chair that the presence at the SCTB meeting of delegates from Indonesia, the Philippines and Malaysia demonstrated that progress in implementing the WPFCC plan of action had already been achieved. The TBAP Chief Fisheries Scientist noted that there was agreement in principle that some tuna tagging work would be carried out by the RTTP in Indonesia and the Philippines.

62. The delegate from the Philippines described recent tagging experiments in his country. Four experiments have been conducted, commencing in September, 1988, with the last in May 1989. Over 5,000 skipjack, yellowfin and bigeye were tagged from purse seiners operating on payaos. To date, 16 recoveries (5 skipjack, 8 yellowfin, 3 bigeye) have been processed, and 8 other recovered tags will be received shortly. The shortest duration from release to recovery was 3 days and the longest was 184 days. The latter was recovered in the vicinity of release.

5.2 TBAP/Japan FSFRL Collaborative Study

63. The delegate from the Far Seas Fisheries Research Laboratory (FSFRL) in Japan reported that a Japanese scientist would almost certainly be available for a collaborative research project at SPC for three months commencing in October 1989 (1988 action sheet item 4). The study was originally conceived as lasting 6 months, but it was felt by both sides that the duration should be reduced to accommodate existing workloads on staff of both organisations, and because this would be the first attempt at such a collaborative study. It was noted that if further work was required, then a second collaborative study could take place in the following year.

64. The proposed study will have as its primary objective the investigation of interactions between the longline and purse seine fleets in the western Pacific with particular reference to yellowfin. The main type of data used in the study will be catch and effort data.

65. The chairman extended his appreciation to FSFRL and SPC for the progress made on this item and thanked JICA for funding the study. He noted that the meeting was aware of the sensitivity on both sides with regard to the catch and effort data which will be used in the study. He further suggested that it would be useful for SPC to circulate a draft report after the collaborative study and the meeting agreed that this should be made an item on the next action sheet.

Action Item 5: SPC to circulate to SCTB members a draft report of the SPC/FSFRL collaborative study of longline/purse-seine interaction study before the next SCTB meeting, and to present the results of the study at that meeting.

5.3 Future collaboration, including exchange of fishery statistics

66. In introducing this agenda item the chairman recalled points made earlier in the meeting under agenda item 3.2 that

i) SPC had succeeded in gathering most tuna catch and effort data available through SPC member countries, but

ii) that these data from local fleets, or collected under access agreements, still did not adequately cover the tuna fishing activities by DWFNs in the region.

67. The inadequate coverage of DWFN fleets by data collected under access agreements is due to

i) non-submission of logsheets by certain DWFN vessels and

ii) the fact that much fishing within the region takes place in areas of high seas for which there is no requirement to submit data under most access agreements.

68. Initial discussion under this item focused on the 1988 Action Sheet.

69. In reference to item 1 of the 1988 Action Sheet, the delegate from Taiwan noted that his country regularly published statistics on the distant water longline fishery, but that a system for the collection of data on the activities of purse seiners and gillnetters had not yet been put in place. He also made reference to the fleet of roughly 1,300 smaller longline vessels based in Taiwan which catch primarily yellowfin in the waters around Taiwan, in the South China Sea, and in the northwest portion of the SPC region. He stated that ten years ago an attempt was made to collect data from these vessels, but that the attempt was unsuccessful.

70. The meeting agreed that an item for the next Action Sheet would be that:

Action Item 6: **Republic of Taiwan to report on progress with establishing data collection for purse seiners and gillnetters and, if possible, to make available to SPC any summary statistics that may exist on catch and effort in the SPC statistical area by purse seiners, gillnetters and the fleet of smaller longliners.**

71. In reference to item 2 on the 1988 Action Sheet, the representative from Japan stated that his country was prepared to provide estimates for 1984-86 by gear type of the proportion of tuna fishing effort spent within EEZs of SPC member countries in comparison with that in high seas areas of the SPC statistical area, under the following conditions:

i) that such estimates remain confidential;

ii) that they be used for research purposes only; and

iii) that SPC make efforts to obtain similar estimates from other DWFN fleets operating in the region.

72. The TBAP Chief Fisheries Scientist noted that each of these conditions was covered under the mandate of the TBAP and that SPC would, in principle, be able to accept these conditions. As an item for the next action sheet, the meeting agreed that:

Action Item 8: **SPC again to formally request all DWFNs operating, or previously operating, fleets in the SPC statistical area for a breakdown of fleet effort between regional EEZs and the remainder of the SPC statistical area, if such data have not already been supplied and are known to exist.**

73. In reference to item 9 on the 1988 Action Sheet, the representative of IPTP expressed the continued willingness of IPTP to assist SPC with the provision of data for Indonesia and the Philippines. During the discussion it was noted that the statistical areas used by IPTP were different from the SPC statistical area and that it might be more appropriate for SPC to contact Indonesia and the Philippines directly regarding the exchange of data.

74. The meeting agreed that as an item for the next action sheet:

Action Item 9: **SPC and IPTP to discuss the best way in which summaries of data pertaining to the SPC area could be provided and, if required, approach Indonesia and the Philippines directly regarding an exchange of data with SPC.**

75. In reference to item 10 on the 1988 Action Sheet the representative of the United States mentioned that shortly after the previous meeting of the SCTB a request was conveyed to U.S. authorities for U.S. purse seine data for the period 1978-83, but that no further action had occurred, primarily due to problems of confidentiality of these data within industry. He expressed his personal support of the request, but was not optimistic that U.S. industry be able to modify their position in the near future. The representative of NMFS suggested that:

Action Item 10: **SPC request NMFS to construct annual estimates of U.S. purse seine catch in the SPC statistical area for the period 1978-88, and to provide these estimates to SPC.**

76. Discussion then focused on strategies that might be taken to obtain historical data, particularly from the American Tunaboat Association (ATA), which deals with such requests on behalf of the US purse seine fleet. It was felt by some that if data aggregated by one degree square by month were unavailable then a request for more highly aggregated data might be successful. Others stressed

that, in making any request, the exact uses to which the data would be put, namely monitoring and/or research, should be stressed. The meeting agreed that, as an item for the next Action Sheet:

Action Item 11: **SPC to reopen dialogue with the American Tunaboat Association, with assistance from NMFS, concerning acquisition of 1978-88 U.S. purse seine catch data for the SPC statistical area, and negotiate a level of aggregation acceptable to both parties with assurances of confidentiality.**

77. The meeting also agreed that, as an item for future consideration, member countries which are also members of the Pacific Forum consider requesting historical data for 1978-88 in the context of the Multilateral Treaty with the USA and in any future multilateral access negotiations or consultations.

78. In reference to item 11 on the 1988 Action Sheet, the representative of Australia was asked what information was available on Australian purse seiners operating in the region. He stated that the Australian Government did not collect data from purse seiners fishing outside the Australian Fishing Zone and that therefore no information was available. The meeting agreed that as an item for the next Action Sheet:

Action Item 12: **SCTB request that Australia take measures to expand its data collection programme to include Australian vessels operating in tuna fisheries in the SPC statistical area outside the Australian Fishing Zone.**

79. Further to the discussion on item 9 on the 1988 Action Sheet, the representative of Indonesia stated that statistics on the Indonesian pole-and-line and purse seine fleets in the SPC area could be made available to SPC. The representative of the Philippines noted that the coverage of Filipino purse seiners by the SPC database is better than by the Government of the Philippines and that he was not optimistic that the situation would change.

80. The meeting agreed that as an item for the next Action Sheet:

Action Item 13: **JFSFRL to convey a request to Japanese authorities for regular provision to SPC of aggregated data (gillnet and longline 5° square by month; purse seine and pole-and-line 1° square by month) covering the activities of all Japanese fleets operating in the SPC statistical area.**

81. The meeting then discussed the establishment at SPC of a common database consisting of data provided by all fishing nations, in addition to the data currently assembled by SPC that are obtained by member countries under access agreements. After much discussion, the following points represented the concensus:

i) the establishment of a common database at SPC would be extremely useful and would solve current problems of inadequate coverage of the tuna fisheries in the region;

ii) data should be provided at a level of aggregation consistent with levels of aggregation used by other tuna research organizations, i.e. by 5° square and month for longliners and gillnetters and by 1° square and month for other gear types;

iii) data held in the common database should be made available to all countries that provide data to the common database, subject to the minimum level of aggregation (i.e. 5° square by month for longliners and gillnetters and 1° square by month for other gear types).

82. Participants from the Federated States of Micronesia, Fiji, Papua New Guinea, Solomon Islands and Tonga were queried on their views on the establishment of a common database and the prospect of aggregated data being made available to countries outside SPC which contributed to the database. Without exception, they stated that such data exchanges would not present problems as long as the data were adequately aggregated.

83. The participant from Japan noted that his Government was cautious in releasing data, but that if other DWFN data were held in a common database then Japan would most likely be more open to participating. The meeting strongly reaffirmed the importance it attaches to item 13 on the next action sheet.

84. The Committee recommended that:

Action Item 14: **SPC to work towards the implementation of a common regional tuna database, holding data aggregated to an acceptable level, which would be available to all contributing partners via a defined distribution network.**

This could perhaps be discussed further at the next RTMF.

85. Discussion then turned to the participation by other significant DWFNs in future meetings of the SCTB. It was noted that an invitation to the current SCTB had been extended to Korea, but that Korea was unable to attend due to a shortage of staff. It was further noted that in spite of Korea's inability to attend, the relationship between SPC and Korea had improved markedly following a visit by the TBAP Chief Fisheries Scientist to Korea in February 1989.

86. It was agreed that:

Action Item 7: **SPC request Korea to advise SPC on progress in establishing data collection from purse seiners, and if possible, to provide SPC with data in the agreed common database level of aggregation for all fleets operating in the SPC statistical area.**

87. It was noted by the Committee that the objectives of SCTB are purely scientific and that other considerations should not affect the overriding importance of promoting scientific cooperation and the collection of complete statistics on the tuna fisheries of the region. The Committee therefore recommended that:

Action Item 15: SPC extend invitations to DWFNs which have, or have had, fleets operating in the SPC area to attend future SCTB meetings, to facilitate scientific cooperation and data exchange for tuna resource assessment purposes.

6. REPORT ON SPAR WORKSHOP

88. Chairman of the second SPAR workshop, Dr. A.D.Lewis, informed the meeting that the workshop was held in Suva on 14-16 June 1989, and presented a brief summary of the workshop report. He stressed that the report was for information only and did not require formal approval by SCTB.

89. The major achievements of the workshop were to reach a concensus on the best estimates of current albacore catches in the South Pacific and an appraisal of the current status of the fishery. Also, key issues relevant to the management of the fishery were identified as:

i) surface fishery effort and catches have increased rapidly to an alarming level and further increases would worsen the situation;

ii) catch estimates take no account of mortality caused by escapement and dropout;

iii) reliable, quantitative stock assessment advice will not be available in the short term;

iv) continued harvests of small fish of 34 - 59,000 mt with the current fishery pattern will reduce recruitment to the spawning stock and longline catch rates;

v) reduced recruitment to the spawning stock could result in reduced recruitment to the surface fisheries;

vi) if declines in recruitment to the surface fishery occur, stock (and yield) recovery could take many years because of lag effects.

90. Data requirements for stock assessment were reviewed in detail. All participants agreed on the format of a common database that would form the basis of future stock assessments. The database would be co-ordinated by SPC and distributed to participants at regular intervals. All arrangements for data submission are to be in place by 31 October 1989.

91. In view of developments in the fishery, several research needs became apparent. Substantial discussion and endorsement of a number of research projects, including tagging, spawning, age and growth, oceanography and fishing success and estimation of drop-out rates from drift gillnets, took place.

92. The Committee endorsed the SPAR report and noted several items for action on the Action Sheet arising from this meeting.

93. Items endorsed for further action arising from the report of the SPAR 2 meeting are:

Action Item 16: **National Taiwan University (NTU) to pursue development and implementation of catch, effort, and size-composition data collection systems for the South Pacific albacore gillnet fleet.**

Action Item 17: **JFSFRL and NTU to initiate assessment of the availability and quality of any existing commercial catch data from South Pacific albacore gillnet fisheries.**

Action Item 18: **NMFS, New Zealand (NZ), Fiji, French Polynesia, Tonga, New Caledonia, Japan, Taiwan, and SPC to make efforts to continue and improve systems for collecting albacore size composition data.**

Action Item 19: **SPC to act as clearing house for the reception and distribution of albacore fishery statistics, and produce an annual summary of South Pacific albacore catches derived from these statistics.**

Action Item 20: **SPC, NMFS, and NZ to coordinate tagging of as many albacore, in as broad a geographical area as possible during the 1989/90 season using SPAR tags and tagging protocols.**

Action Item 21: **NMFS to investigate the possibility of undertaking laboratory analyses of albacore gonads to determine seasonality of spawning and egg production.**

Action Item 22: **NMFS and NZ to continue work on validation and comparison of banding periodicities in otoliths and vertebrae.**

Action Item 23: **NZ to continue production of satellite sea-surface temperature charts of the Subtropical Convergence Zone for the 1989/90 southern albacore season.**

94. It was agreed that the next SPAR workshop be held within two years, but the exact timing remain flexible and responsive to developments in the fisheries. Specifically, it was recommended that:

Action Item 24: **SPC maintain liaison with SPAR participants to determine the timing and venue of the next SPAR meeting, depending both on developments in the albacore fishery and other relevant meetings to be held. In any event, the 3rd SPAR meeting should be held before July 1991, with the likely venue in New Caledonia (SPC/ORSTOM) or USA (NMFS).**

7. PROPOSED FAO EXPERT CONSULTATION ON THE STATUS OF STOCKS AND INTERACTIONS OF PACIFIC OCEAN TUNA RESOURCES

95. The representative of FAO Headquarters gave a progress report on the plans for the FAO Expert Consultation on the Status of Stocks and Interactions of Pacific Ocean Tuna Resources.

96. It was explained that the idea of holding the consultation originated in 1986, but due to financial limitations, plans for the meeting were postponed until recently.

97. A planning meeting is now scheduled for the end of October in Noumea. FAO extended its appreciation to SPC for offering to host the meeting. FAO has indicated that several working groups have been created: 9 groups by species and one general interaction group. Attendance at the October planning session will include the chairmen of these groups as well as representatives of Pacific Island countries. It was indicated that the agenda for the actual consultation is still flexible and that the goals and objectives for the consultation can be modified in light of the outcome of the planning meeting.

98. In response to questions, FAO explained that the planning meeting would include discussion of arrangements for the consultation as well as objectives, agenda, time frame, venue, and finance.

8. OTHER BUSINESS

99. There was no other business.

9. ARRANGEMENTS FOR NEXT MEETING

100. At the inaugural SCTB meeting, in 1988, it was proposed that future meetings be held over 3 days, and that the chair should be held by a scientist representing the same country as the RTMF chairman. No alterations were suggested over this arrangement and the chairman of the 1990 SCTB will be drawn from the Federated States of Micronesia.

101. A final decision on the date and venue of the next Standing Committee meeting was deferred to the RTMF, as a decision more appropriate for that body.

102. The Chairman extended his thanks to participants for their contribution to the work of the meeting. In particular, he expressed the Committee's appreciation of the attendance by ASEAN and DWFN participants, indicating that continued DWFN involvement had contributed significantly to the prospects for data exchange and should ensure future progress in that regard. Before closing the meeting, he expressed appreciation for the hospitality provided by Fiji in hosting the meeting and made special mention of the efforts of the rapporteurs and secretarial staff in developing this meeting report.

APPENDIX I

REVIEW OF 1988 ACTION SHEET

Action Item 1: **Republic of China to provide summarised catch and effort statistics for the SPC statistical area and possibly for the China Sea and Philippines waters.**

Not possible at present to comply with the request since data-collection system is not yet complete.

Action Item 2: **FSFRL to provide estimates of the proportion of tuna fishing effort spent within EEZs of member countries in comparison with that in high seas areas.**

Data are available and will be released on assurance of confidentiality, of restriction to scientific analysis, and of similar requests being made to other DWFNs. All these conditions are covered either by the SPC constitution or past actions, and a written statement to this effect by SPC made.

Action Item 3: **Regional organisations (particularly IPTP and SPC TBAP) to maintain contact regarding tuna tagging programmes in areas of common interest, especially in areas adjacent to the SPC region.**

Contact is certainly maintained and IPTP, in particular, is represented at this meeting.

Action Item 4: **SPC and JFSFRL to seek approval and make final arrangements for a JICA-sponsored Japanese scientist to work on a collaborative research project at SPC for six months in 1989.**

The arrangement has been approved in principle, but it is only possible to make the attachment for three months, with an option for further work in the following year. There are still some problems with data confidentiality on both sides, but work is expected to begin shortly.

Action Item 5: **JFSFRL to make arrangements to act as tag-receival centre for Japanese recoveries of tags to be released during SPC's Regional Tuna Tagging Project.**

Underway, with preparation of vernacular posters and T-shirts.

Action Item 6: **SPC to request Republic of China to encourage their fishermen to return SPC tags, either to authorities in Republic of China or to NMFS in Pago Pago, whichever is appropriate.**

Underway, after the visit of TBAP Chief Scientist to Taiwan.

Action Item 7: **SPC to request member countries to emphasise the value of the Regional Tuna Tagging Project and research cooperation in general during access negotiations with DWFNs.**

Actioned by several countries, including Australia, FSM, Fiji and Solomons. Point to be re-iterated on 1989 action sheet.

Action Item 8: **SPC to request member countries to use national observers to publicise the Regional Tuna Tagging Project when aboard foreign vessels.**

Actioned, but point to be reiterated in 1989 action sheet and other country, or regional, tagging programmes to be included in publicity if possible.

Action Item 9: **IPTP to provide data on tuna fisheries peripheral to the SPC area, including Philippines and Indonesia.**

Data are available, but still need to coordinate statistical boundaries, and areas of common interest, to make exchange meaningful.

Action Item 10: **NMFS to convey a request to US authorities for US purse-seine data for the period 1978-1983.**

Actioned immediately after 1988 meeting, but a negative response received. U.S. authorities sympathetic, but ATA considers the data are still too sensitive to release. Alternative approaches, with guarantees of confidentiality, may be necessary.

Action Item 11: **JFSFRL to provide estimates of Japanese drift gillnet catch data for the South Pacific.**

Rough estimates were provided to the SPAR meeting. The data are incomplete, since licensing of gillnetters in South Pacific International waters is not compulsory, but efforts are being made to improve voluntary catch returns.

Action Item 12: **SPC, NMFS, ORSTOM, NZ to conduct second South Pacific Albacore Research Workshop in 1989.**

Actioned, and the report of SPAR 2 was heard at this meeting. Implications for the SPC work programme were noted and the SPAR report will eventually be published as an SPC Report. No final decision on the date of the next SPAR meeting was taken, but SPC was requested to maintain liaison with SPAR participants about the next meeting as per the 1989 Action Sheet.

APPENDIX II

1989 ACTION SHEET

Action Item 1: SPC to produce, where appropriate, a clear statement of experimental design and new techniques to be incorporated in the work of the RTTP, illustrated by examples drawn from the Solomon Islands in-country experiment, to be presented at the next SCTB.

Action Item 2: SPC to formalise a group drawn from relevant organisations and countries, with SCTB members as nucleus, to exchange tagging data, distribute tag rewards, collect recapture data, and implement vernacular publicity.

Action Item 3: SPC to remind member countries of the 1988 request to emphasise the value of the RTTP and research cooperation in general, during access negotiations with DWFNs.

Action Item 4: SPC to remind member countries of the 1988 request to use national observers to publicise the RTTP (and other tagging experiments) when aboard foreign vessels.

Action Item 5: SPC to circulate to SCTB members a draft report of the SPC/FSFRL collaborative study of longline/purse-seine interaction study before the next SCTB meeting, and to present the results of the study at that meeting.

Action Item 6: Republic of Taiwan to report on progress with establishing data collection for purse seiners and gillnetters and, if possible, to make available to SPC any summary statistics that may exist on catch and effort in the SPC statistical area by purse seiners, gillnetters and the fleet of smaller longliners.

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Action Item 24: SPC maintain liaison with SPAR participants to determine the timing and venue of the next SPAR meeting, depending both on developments in the albacore fishery and other relevant meetings to be held. In any event, the 3rd SPAR meeting should be held before July 1991, with the likely venue in New Caledonia (SPC/ORSTOM) or USA (NMFS).

APPENDIX III

LIST OF SCTB INFORMATION DOCUMENTS

SCTB 1	Report on the Standing Committee on Tuna and Billfish (RTMF, 20th August 1988)
SCTB 2	Tuna and Billfish Assessment Programme (TBAP)
SCTB 3	SPC Regional Tuna Tagging Project. Work Plan for Year One.
SCTB 4	Data Catalogue, TBAP (SPAR 2/WP 16)
SCTB 5	Regional Tuna Bulletin - 4th Quarter 1988 (SPAR 2/IP 17)
SCTB 6	Estimates of Catch and Effort for Tuna Fisheries in the Central and Western Pacific Ocean for 1987 and 1988 (SPAR 2/IP 18)
SCTB 7	Oceanography and Tuna Fisheries in the Intertropical Western Pacific (R.Pianet)
SCTB 8	An investigation of the fishery interactions and population dynamics of skipjack tuna (*Katsuwonus pelamis*) in waters of the Solomon Islands (proposal)
SCTB 9	Methods of studying fishery interaction (RTMF, 20 August 1988)
SCTB 10	Preliminary analysis of fisheries and some inference on stock status for yellowfin tuna in the Western Pacific (Z. Suzuki, N. Miyabe and S. Tsuji, JFSFRL).

APPENDIX IV

AGENDA

DAY 1

1. Preliminaries

   1.1 Opening Address
   1.2 Appointment of Chairman and Rapporteurs

2. Report on Draft Action Sheet

3. SPC Tuna and Billfish Assessment Programme Activities

   3.1 Regional Tuna Tagging Project - work programme and progress report
   3.2 Existing data coverage of regional tuna fisheries
   3.3 Oceanography and tuna fisheries

DAY 2

4. Western Pacific Yellowfin Tuna - requirements for stock assessment and fishery interaction studies

5. PIN/DWFN/ASEAN collaboration on tuna and billfish research

   5.1 WPFCC Tuna Research Workshop
   5.2 TBAP/JFSFRL collaborative study
   5.3 Future collaboration, including exchange of fishery statistics

6. Report on SPAR Workshop

7. Proposed FAO expert consultation on the status of stocks and interactions of Pacific Ocean Tuna resources

8. Other business

9. Arrangements for next meeting

DAY 3

10. Adoption of the Report and Action Sheet

APPENDIX V

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