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SOUTH PACIFIC COMMISSION

THIRTEENTH REGIONAL TECHNICAL MEETING ON FISHERIES

(Noumea, New Caledonia, 24 - 28 August 1981)

REPORT

Noumea, New Caledonia
September 1981

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I. OPENING ADDRESS

1. The Secretary-General, the Honourable M. Young Vivian, opened the Meeting and presented the following address:

"Distinguished delegates, observers, ladies and gentlemen, good morning. Welcome to the South Pacific Commission and to the Thirteenth Regional Technical Meeting on Fisheries.

Those of you who have attended our regional fisheries meetings over the years will have noted the continuing increase in the numbers of participants and observers at these gatherings. Attendance this year is even higher than at the Twelfth Fisheries Meeting and in fact exceeds that at any of this Commission's technical meetings on any subject. This, once again, endorses the importance of fisheries to the countries for which this Commission works and the part we play in undertaking projects geared to the assessment and development of fisheries resources.

This Meeting provides a means for us to advise the countries in our area of the results of the work we have carried out and to discuss with you the significance of our findings to future fisheries development and/or management. We welcome this opportunity to freely discuss these matters with you. At the same time we welcome observers from outside our area, many of whom have some co-operative interest in the fisheries which operate in this region, and others who are here to evaluate the progress and achievements of our projects, and to consider how the results from them might be relevant to fisheries in their own area.

Our previous fisheries meetings have tended to concentrate on one or other of our two main areas of work, that is, either Coastal Fisheries or Oceanic Fisheries. This year's agenda is different in that it is divided between both of these items, even though some extra emphasis may be given to the Oceanic Fisheries section. As the only regional body in the South Pacific working towards the development of coastal fisheries in island states, this Commission has strongly supported our Deep Sea Fisheries Development Project and has encouraged its evolution. It is significant that as results from this project have indicated new potentials and new avenues for fisheries development, so the objectives of the project have also evolved. Recommendations from previous regional technical meetings have steered this project through a phase of exploratory fishing and training, which has already involved operation of the project at least once in most of the countries of our area, to a new phase of gear development. Results from both phases will be presented and we look forward to your comments.

Presentations on the Oceanic Fisheries will, of course, be centred around the concluding results of the Skipjack Survey and Assessment Programme. As I mentioned last year, I have followed the work of this, the Commission's largest programme, with great interest. The Programme has operated in all of the countries and territories in the area of the Commission, and has been acclaimed as an outstanding success. This acclaim is of course not restricted to our region and, as you are aware, the Programme has earned for itself considerable international recognition. I am particularly pleased that all aspects of the Programme have been completed on schedule. This is in itself a great achievement for such a comprehensive programme, and as a consequence,

we are now in a position to present to you results which will, in my opinion, have far-reaching implications on the future of fisheries development and resource management throughout this region in the years to come. In fact, it is likely that the implications of this Programme will extend beyond the boundaries of this Commission and the extensive representation from outside the region at this Meeting confirms this suggestion.

Although the conclusion of the Skipjack Programme on 30th September will represent the end of an era in the Commission's history, I quickly point out that it does not represent a decrease in our interest or activities in the general field of highly migratory species. Our Tuna and Billfish Assessment Programme will follow on from the Skipjack Programme. We at the Commission are confident that this new endeavour will share the same success as its predecessor. I certainly do not foresee any decrease in the Commission's role in fisheries in the years ahead; quite the contrary, with the broadening of the horizons of the Deep Sea Fisheries Development Project combined with the increased number of highly migratory species to be covered by our Tuna Programme, I am certain that the Commission has a bright, if somewhat demanding, future in the fisheries field.

I have no doubt that the significance of these regional technical meetings on fisheries will continue to increase and that they will continue to serve the primary function of disseminating information and ideas to the countries for which this Commission works. Of course this assumes the success of this present Meeting; I myself have already taken this for granted.

I trust you will find this week in Noumea both pleasant and informative, and I can assure you that the South Pacific Commission will do everything in its power to make your stay enjoyable."

II. APPOINTMENT OF CHAIRMAN AND OTHER OFFICE BEARERS

2. Mr Julian Dashwood, Chief Fisheries Officer, Cook Islands, was unanimously elected Chairman of the Meeting, and Mr Jim Crossland, Vanuatu, was elected Vice-Chairman. A drafting committee comprising Mr Molean Chapau, Papua New Guinea, Mr Ray Cross, Tuvalu, Mr Tony Lewis, SPC Consultant, Mr Pierre Rosenberg, New Caledonia, and Mr Ray Walker, Australia was elected.

III. APPROVAL OF AGENDA AND TIMETABLE

3. One small change to the order of presentation was suggested, namely, that a discussion of item 4.1(d) "Suitability of motor-sailing vessels for fisheries development" be deferred until after item 4.3.

4. The provisional agenda was then amended and adopted.

5. It was noted that country statements from several participants had been distributed to the Meeting.

AGENDA

1. Opening Address
2. Appointment of Chairman and Other Office Bearers
3. Approval of Agenda and Timetable
4. COASTAL FISHERIES
 - 4.1 Deep Bottom Resources
 - (a) Activities and achievements of the Deep Sea Fisheries Development Project
 - (b) Report of the review of the above project by the SPC Planning and Evaluation Committee
 - (c) Progress report on field trials of other types of fishing gear which can be used in conjunction with deep handlining
 - (d) Proposed Deep Sea Fishery Resources Survey
 - 4.2 Other Coastal Resources
 - 4.3 Training, Study Visits and Short-Term Consultancies
 - 4.4 Suitability of Motor-Sailing Vessels for Fisheries Development
5. OCEANIC FISHERIES
 - 5.1 Final results and discussion of the Skipjack Survey and Assessment Programme
 - 5.2 Discussion of details of agreed programme proposal for the Tuna and Billfish Assessment Programme
 - 5.3 Recent developments in the use of Fish Aggregation Devices
 - 5.4 Discussion of agenda and possible timetable for a workshop on the co-ordination of a programme for observers on foreign fishing vessels
6. Other Matters
7. Adoption of Report

IV. COASTAL FISHERIES

6. The activities of the SPC in the development of coastal fisheries throughout the region were briefly reviewed.

Activities and achievements of the Deep Sea Fisheries Development Project

7. The activities of this, the major coastal fisheries project, were outlined by the Fisheries Adviser, Mr Barney Smith, who stressed that the considerable success enjoyed by this project was due to its flexibility and mobility and to the dedication and hard work of the master fishermen involved. Most of the countries in the region have been visited at least once and a measure of the success of the project is the number of requests received for return visits.

8. From the ensuing discussion, during which participants expressed their satisfaction with the contribution the project had made to the development of their countries' artisanal fisheries and the training of local personnel, three areas emerged which warrant further consideration:

- (i) market acceptability of deep-water snapper
- (ii) need for follow-up by individual governments following visits by the project
- (iii) lack of information as to the robustness of the resource.

Report of the review of the above project by the SPC Planning and Evaluation Committee

9. The Meeting considered the recommendations of an evaluation of the project prepared for, and endorsed by, the Planning and Evaluation Committee. These included the expansion of the project by continuation of the development component and establishment of a research component. It was stressed that to date the primary orientation of the project had been towards development and training.

Proposed Deep Sea Fishery Resources Survey

10. The Meeting was informed that extra-budgetary funding was likely to be available for implementing the proposed Deep Sea Resources Survey. To assist in its implementation and to bring together all available information on the topic, the Meeting made the following recommendation.

Recommendation No. 1

The Meeting recommended that the South Pacific Commission convene a workshop on resource assessment and biology of deep bottom species as part of the 1982 Regional Technical Meeting on Fisheries.

Evaluation and development of small-scale fishing gears and techniques

11. Mr Smith reported on recent preliminary trials of different types of fishing gear carried out in response to a recommendation from the previous meeting. Results to date suggested that within the guidelines of operational and technical simplicity and small vessel size, fishing with wooden handreels was the most effective method. It was agreed, however, that other methods such as subsurface trolling and bottom longlining might have application in certain circumstances. A lengthy and informative discussion ensued on these and other gear types, including Kona crab traps, Z-traps and various types of gill nets, and the following recommendation was made.

Recommendation No. 2

The Meeting recommended that continuation of trials with various gear suited to the capabilities of small-scale fishermen was necessary and that extra funding be sought for this purpose.

Research on ciguatera

12. The SPC had held a workshop on ciguatera (February 1981) and it was noted that good progress had been made by the University of Hawaii and the Institut Louis Malardé in research on ciguatera, in particular in the development of a suitable test, preferably usable in the field, for the presence of ciguatoxin. It was clear that ciguatera was not a constraint on the development of the deep bottom resource. The Meeting, however, accepted the need for continued dissemination through SPC of information on ciguatera research.

Other coastal resources

13. Other coastal resources, notably bêche-de-mer, were discussed and it was noted that a handbook for lobster fishermen had been produced.

Training, study visits and short-term consultancies

14. The Meeting noted with appreciation that, following a recommendation made at the last Technical Meeting, the Nelson Polytechnic Fishing Cadet Course had been reinstituted with a revised syllabus appropriate for the needs of the countries of the region. This was possible largely through the generous support of the New Zealand Government. The assistance of the Commonwealth Foundation and the SPC in this regard was also acknowledged.

15. The Meeting was informed of a number of study visits and short-term consultancies funded during the past year. As such grants-in-aid are approved largely on the basis of their regional application, it was agreed that results should be disseminated as widely as possible.

Information services

16. Mr Smith emphasized the important role of SPC in the collection and dissemination of information and invited individual countries to make more use of this service.

Suitability of motor-sailing vessels for fisheries development

17. The Meeting was given a very informative overview of the use of sail-powered vessels in artisanal fisheries by Mr John Fyson of FAO. Comment was solicited on a proposal by FAO for the design, construction and demonstration of low-energy fishing vessels, and participants commented in the light of their own experiences and development plans.

V. OCEANIC FISHERIES

FINAL RESULTS AND DISCUSSION OF THE SKIPJACK SURVEY AND ASSESSMENT PROGRAMME

18. In introducing the final results, the Skipjack Programme Co-ordinator, Dr Robert Kearney, outlined the background to, and stated aims of, the Programme, and broadly reviewed its achievements which far exceeded the operational targets originally set. He emphasized that, as the results stem from a co-operative effort, the various scientists who would be presenting papers were not necessarily the only individuals conducting the relevant research and analysing the data.

Effects of skipjack tagging procedures on subsequent tag recoveries

19. Mr Robert Gillett presented results pertaining to the effectiveness and quality of tagging procedures. Data from a double tagging experiment were analyzed to estimate tag shedding rates, and comparisons were made of return rates, growth, and migration of single versus double tagged fish. The shedding rate was estimated to be approximately 7.5 per cent, one-third to one-tenth that of previous double tagging studies on a variety of species of tuna. Comparisons between single and double return rates showed no differences except when comparing the smallest size classes. Single tagging comparisons show differences in return rates for different size classes, and a tagger/cradle effect was noted for all the data aggregated. However, no effect was noticed when only experienced taggers were considered.

20. Discussion after the presentation centred around accounting for the observed effects, tagging procedures, and the difficulties of estimating tag-induced mortality. The Programme was commended for its very thorough evaluation of the basic assumption that tagging does not have a major effect on skipjack behaviour.

Skipjack migration, mortality and fishery interactions

21. Dr Pierre Kleiber presented analyses of data relevant to this most important topic. It was recognized, however, that analysis of these data is necessarily incomplete. Little in the way of an advective migration pattern has as yet been discerned. In considering the aggregate data set, an overall estimate of population turnover of 20 per cent per month was obtained. The fisheries in the region appear to be directly exploiting only a portion (estimated at 17 per cent on average) of the adult skipjack population in the region. This was interpreted to be at least in part due to a concentration of fishing effort in small areas within the whole of the region. The fish in the actively fished areas appear to exchange rapidly with the fish in the surrounding unfished areas.

22. The harvest rate in terms of the proportion of the total adult population harvested per month was estimated to be $0.003/p$ where "p" is a correction for short-term tagging mortality and non-reporting of recaptured tags. The harvest rate in terms of the population in the actively fished areas was $0.02/p$ per month. The present harvest rates are therefore small relative to the total population turnover.

23. The appropriate catch statistics were available for six of the countries in the region, allowing individual estimates of turnover, population and harvest rates for their local fisheries. The international tag migrations among those fisheries then allowed estimates of interaction between several pairs of fisheries to be made. The estimates, expressed in terms of the per cent of the population in the country of origin migrating to the destination country each month, ranged from 0.0005 to 0.01, and were low relative to the total population turnover. It was pointed out that the degree of interaction among fisheries would be expected to increase as they expanded. When more detailed and complete catch data become available, further analysis of Skipjack Programme tag results should contribute to quantitative prediction of changes in interaction to be expected from changes in the intensity and distribution of fisheries.

24. The presentation generated considerable discussion which included assumptions inherent in the models used, the availability of necessary catch statistics and other data, and the need for continuing analysis of the tagging results.

An appraisal of the genetic analysis of skipjack blood samples

25. Mr Sandy Argue reviewed results from two workshops[★], convened by the SPC Skipjack Programme, to discuss analysis and interpretation of skipjack blood genetics data in concert with tagging and biological data for skipjack.

26. The second meeting of experts concluded that two population structures could reasonably be inferred from the available data: 1) a cline, where there is a continuum of breeding skipjack across the SPC region; 2) two or more major breeding groups near the longitudinal extremes. It is not possible to distinguish between such hypotheses, and these hypotheses imply vastly different potentials for fishery interactions. Limitations of the blood genetics methodology for inferring fishery interactions were discussed at length by Mr Argue.

27. In the discussion which followed it was concluded that basic information on biology and ecology of skipjack, particularly young skipjack, was still required before results from blood genetics analyses will prove useful for future management and development of the skipjack resource in the SPC region.

[★]Results of the first workshop have been published as Skipjack Programme Technical Report No. 1. Results of the second workshop have been published as Skipjack Programme Technical Report No. 6.

An overview of results from analyses of data on growth of skipjack

28. Mr Tim Lawson reviewed progress in obtaining accurate estimates of skipjack growth from the tagging data. Although estimates have been slightly revised since the last meeting, the main conclusions still stand, namely that young skipjack grow very rapidly in both the Eastern and Western Pacific, but that growth slows markedly in larger fish, especially in Western Pacific skipjack. The data further suggest that geographic and temporal variation in growth rates within the Central and Western Pacific is substantial, and that growth rates appeared to be partially correlated with several environmental variables, including sea surface temperature, and with skipjack abundance.

29. There was much discussion on environmental heterogeneity within the Eastern and Western Pacific and its relationship to skipjack population processes, particularly in regard to coastal versus open ocean habitats, and ecological compartments.

Further observations on fishing performance of baitfish species in the South Pacific Commission area

30. Mr Jean-Pierre Hallier used Skipjack Programme data to compare the performance of four families of wild baitfish and two species of cultured baitfish in terms of their fishing effectiveness and hardiness in the bait-wells. Analysis showed that fishing effectiveness was most influenced, in order of importance, by hours fished, sea conditions, and the amount of bait carried at the commencement of fishing. For baitfish mortality regarding anchovies and sprats, it was found that the mortality rate decreased when larger amounts of bait were carried and in general the mortality rate increased with bait handling.

31. Anchovies produced the highest tuna catches and hardy heads the lowest. Mollies, milkfish and sprats had the lowest daily mortality rates. It was noted that even the least effective bait species can sometimes produce reasonable catches.

32. Discussion of the topic was deferred until after presentation of the following closely related topic.

An assessment of baitfish resources in the South Pacific Commission area

33. Mr Charles Ellway considered the Skipjack Programme survey data on catches and catch composition, together with published information on other baitfish surveys. Whilst the survey data included information on "bouki-ami" and beach seine capture methods, the individual country assessments were based on the ability of their baitfish resources to support catches by "bouki-ami" units of the type used in the commercial pole-and-line tuna fishery. It was noted that the potential for bait fisheries varied widely over the area.

34. During discussions it was noted that the resources can vary considerably with time, both in quantity and composition and that some baitfish species were vulnerable to sustained fishing pressure. Natural baitfish supplies could occasionally be supplemented by importation from other areas or by local culture.

Summary of Skipjack Programme results and their implications

35. The Skipjack Programme Coordinator, Dr Robert Kearney, summarized the presentations of Skipjack Programme results, and the implications of these results for skipjack fisheries within the SPC region.

36. The Programme's analyses of baitfish data were the nearest to completion and have illustrated that resources of effective baitfish species are variable throughout the region and limited for several countries. This may restrict the development of locally based pole-and-line fisheries in some countries.

37. The exploitable skipjack resource appears much larger than previously estimated, perhaps of the order of 10 million tonnes.

38. Present skipjack catches in the region are small in comparison to losses due to natural causes from the standing stock. From a biological viewpoint there is great potential for increased catches, limitations to date being of an economic and technical nature.

39. Interactions are presently insignificant amongst locally based skipjack fisheries in countries of the SPC region. This may change if these and distant water fleets expand the areas they fish, and if they increase their use of more effective gear types. Additional interactions will be investigated as data becomes available.

40. On behalf of the Meeting, Fiji warmly commended the Programme for its remarkable achievements and noted the considerable value of these to member countries. The Meeting expressed its appreciation and support with spontaneous applause.

Discussion of the agreed programme proposal for the Tuna and Billfish Assessment Programme

41. In accordance with the wishes of the last Technical Meeting (paragraph 57), Dr Kearney outlined progress made in planning of projects which will comprise the SPC Tuna and Billfish Assessment Programme, due to commence on October 1st, 1981. It was noted that several of these are in fact under way and the Meeting ascertained in discussion that priorities accorded these projects are not rigid and can change according to the needs of member countries. It was stressed that the full co-operation of countries was essential for the success of many of these projects.

42. A proposal that a Tuna and Billfish Expert Advisory Committee be established was discussed at length and the Meeting approved the following recommendation:

Recommendation No. 3

The Meeting recommended that a Tuna and Billfish Expert Advisory Committee, such as was established for the Skipjack Survey and Assessment Programme, be set up to assist the SPC Tuna and Billfish Assessment Programme.

Fish Aggregation Devices

43. Mr Richard Shomura, NMFS, Hawaii, commented briefly on the workshop held recently in Hawaii and stressed the importance of using marine engineering expertise in the design and construction of FADs. The FAO Regional Fisheries Coordinator, Mr Harry Sperling, spoke on the materials and equipment necessary for the construction of FADs and suggested some improvements in design.

44. All countries showed interest in the use of FADs and many related their experiences with them. There was agreement that they provided a useful method of augmenting fish production. Other points raised in the general discussion included design, availability of materials, sociological problems and the importance of FADs to small-scale fisheries. The importance of careful siting and appropriate designs for differing water depths and sea conditions was emphasized. The Meeting was reminded that, in planning FAD programmes, countries should consider the need for servicing and replacement of these devices.

Relationship of skipjack abundance to the Pacific equatorial upwelling

45. Mr William Bour of ORSTOM gave a presentation on the relationship between catch effort of the Japanese pole-and-line fleet in the Western and Central tropical Pacific and the development of the equatorial upwelling.

Discussion on a proposed workshop on observer programmes

46. Dr Kearney explained that it had not been possible to implement Recommendation No. 7 of the 1980 Meeting because of the financial constraints experienced by SPC. The discussion revealed that the needs of the region were diverse and there would be considerable benefit in the exchange of experience and close co-operation between members.

47. Because of the importance of effective monitoring of the fisheries of the region the Meeting saw benefit in holding a workshop on the topic at the time of the 1982 Meeting and made the following recommendation:

Recommendation No. 4

The Meeting recommended that the Tuna and Billfish Programme team be responsible for establishing contacts and exchanging information in order to gauge the needs of the region and to facilitate harmonization of national and international programmes of observers on fishing vessels and that a workshop to consider this be held in conjunction with the 1982 Meeting.

VI. OTHER MATTERS

48. The Meeting noted that some delegates experienced difficulties with travel arrangements and expressed the wish that future meetings be scheduled to avoid peak tourist seasons and that as much notice as possible of meeting dates should be given. Next year's meeting was tentatively scheduled for the first week in August.

49. Mr Jean-Claude Le Guen mentioned that an oceanographic survey satellite programme is planned for the Pacific region which would provide data that could be readily applied to fisheries. He indicated that close collaboration with SPC would be possible.

50. The Meeting recalled its recommendation made at the 1980 Meeting that the Tuna and Billfish Programme study area should be flexible but governed primarily by the distribution of the tuna and billfish stocks common to the countries of the SPC.

Recommendation No. 5

The Meeting noted the particular importance of interactions with tuna fisheries to the west of the SPC area and recommended that attention should be given to this matter.

51. The Meeting recognized the benefits which accrued from close co-operation with other organizations and countries.

Recommendation No. 6

The Meeting recommended that the South Pacific Commission, through its Tuna Programme, should continue its policy of close co-operation with countries and organizations involved in the study and management of tuna and billfish resources.

Observer countries and organizations

52. Mr A. Weinborn of the Chilean Fisheries Bureau read a paper outlining his country's fisheries technical assistance programme and invited approaches from South Pacific and other countries present at the Meeting.

53. The Chairman thanked the attending countries, observers and organizations for their contributions to the Meeting.

VII. SUMMARY OF RECOMMENDATIONS

COASTAL FISHERIES

Proposed Deep Sea Fishery Resources Survey

Recommendation No. 1

The Meeting recommended that the South Pacific Commission convene a workshop on resource assessment and biology of deep bottom species as part of the 1982 Regional Technical Meeting on Fisheries.

Evaluation and development of small-scale fishing gears and techniques

Recommendation No. 2

The Meeting recommended that continuation of trials with various gear suited to the capabilities of small-scale fishermen was necessary and that extra funding be sought for this purpose.

OCEANIC FISHERIES

Discussion of the agreed programme proposal for the Tuna and Billfish Assessment Programme

Recommendation No. 3

The Meeting recommended that a Tuna and Billfish Expert Advisory Committee, such as was established for the Skipjack Survey and Assessment Programme, be set up to assist the SPC Tuna and Billfish Assessment Programme.

Discussion on a proposed workshop on observer programmes

Recommendation No. 4

The Meeting recommended that the Tuna and Billfish Programme team be responsible for establishing contacts and exchanging information in order to gauge the needs of the region and to facilitate harmonization of national and international programmes of observers on fishing vessels and that a workshop to consider this be held in conjunction with the 1982 Meeting.

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ANNEX ILIST OF WORKING PAPERS PRESENTED AT THE MEETING

- SPC/Fisheries 13/WP.1 - Country Statement - Niue.
- WP.2 - Country Report - New Caledonia. Tuna survey and assessment operations in the EEZ of New Caledonia.
- WP.3 - The use of sail power in fishing vessels, by Fishery Industry Officer (Vessels), Fisheries Technology Service, Fishery Industries Division, FAO of the United Nations, Rome, Italy.
- WP.4 - Workshop on fish aggregation devices, Fisheries Newsletter N°22, pp.1-5, July 1981.
- WP.5 - Evaluation of the Deep Sea Fisheries Development Project, by I. Walkden Brown, Fisheries Biologist, Queensland Fisheries Service, Australia.
- WP.6 - The South Pacific Commission Tuna and Billfish Assessment Programme, by the Skipjack Programme.
- WP.7 - Summary report of South Pacific Commission activities under the fisheries work programme - Coastal resources, December 1980 - August 1981.
- WP.8 - Effects of skipjack tagging procedures on subsequent tag recoveries, by the Skipjack Programme.
- WP.9 - Skipjack migration, mortality and fishery interactions, by the Skipjack Programme.
- WP.10 - An appraisal of the genetic analysis of skipjack blood samples, by the Skipjack Programme.
- WP.11 - An overview of results from analyses of data on growth of skipjack, by the Skipjack Programme.
- WP.12 - An assessment of baitfish resources in the South Pacific Commission area, by the Skipjack Programme.
- WP.13 - Further observations on fishing performance of baitfish species in the South Pacific Commission area, by the Skipjack Programme.
- WP.14 - Country Statement - Australia, by Fisheries Division, Department of Primary Industry.

SPC/Fisheries 13/WP.15 - Country Statement - French Polynesia.

WP.16 - Country Statement - Kingdom of Tonga.

WP.17 - Tuna fishery statistics for the Indian Ocean
and the Indo-Pacific, by Robert A. Skillman,
Southwest Fisheries Center, Honolulu.

WP.18 - Oversight of Tuna and Billfish Program, by Australia.

WP.19 - Country Statement - Fiji.

Information Paper 1 - Design, construction and demonstration of low
energy fishing vessels for Island Communities.

2 - List of Skipjack Survey and Assessment
Programme publications, by the Skipjack Programme.

3 - Offer by Government of Chile to representatives
present at the Thirteenth Regional Technical
Meeting on Fisheries.

ANNEX II

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