REPORT

of the

FIRST SESSION OF THE

INDO-PACIFIC FISHERY COMMISSION

WORKING PARTY OF EXPERTS ON CENTRAL AND WESTERN PACIFIC SKIPJACK

Manila, Philippines, 1-2 March 1978

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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PREPARATION OF THIS REPORT

This is the final version of the report as approved by the First Session of the Indo-Pacific Fishery Commission Working Party of Experts on Central and Western Pacific Skipjack.

Distribution

Participants in the session
Members of the Commission
Other interested nations and international organizations
FAO Fisheries Department
Fishery Officers in FAO Regional Offices

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CONTENTS

OPENING OF THE MEETING

1. The Chairman, Mr. G.D. Waugh, opened the meeting and apologized on behalf of the convener, Dr. D. Eggleston, who because of urgent business could not be present at the meeting. An apology was also received from Dr. J.A. Gulland (FAO) and in his place Mr. L.K. Boerema (FAO) took the function of technical secretary. The members of the working party are listed in Appendix A. Dr. R. Allen was appointed rapporteur.

ADOPTION OF THE AGENDA

2. The papers submitted to the working party were briefly reviewed by the Chairman and they are listed in Appendix B. The working party adopted the annotated agenda (Appendix C).

MIGRATIONS AND STOCK IDENTITY

3. Dr. R. Kearney described the progress of the South Pacific Commission's Skipjack Survey and Assessment Programme. Funding for the programme has been successfully obtained at a level of $950 000 per annum and the operational phase of the project started in August 1977. In the first five months over 19 000 skipjack and approximately 1 000 other tunas were tagged. These numbers were considerably in excess of expectations. The first interim report of the project describing activities in the waters of Papua New Guinea has been publi hed (Document II - Appendix A)and others are in preparation. The working party congratulated the South Pacific Commission and Dr. Kearney for the success both of the fund raising and of the programme.

4. There was some discussion of difficulties experience with tags becoming brittle and breaking off in the very low temperature freezing holds of some fishing boats. Dr. Kearney described work that he and Dr. W.H. Bayliff of the Inter-American Tropical Tuna Commission (I-ATTC) who is also convenor of the Working Party on Tuna and Billfish Tagging in the Indian and Pacific Oceans, had done in finding more suitable materials for making tags. He also described work they were doing on improving the design of the tags which hopefully will greatly reduce problems of tag loss. The working party noted that member countries who are planning tagging operation may wish to contact Dr. Kearney or Dr. Bayliff for information on suitable tags for skipjack.

5. The South Pacific Commission (SPC) is also studying methods of reducing mortality due to tagging and in particular is looking at the effect of reducing the tag length from 11 to 8 cm. In this connection the mortality of small tunas following tagging was discussed, and the point was made that there appeared to be an abnormally low rate of return of skipjack smaller than 40 cm. tagged using existing techniques. This is presumably because the standard size tag causes much greater mortality among small fish than larger ones. This mortality could possibly be reduced by the use of a scaled down tag but at the cost of lower visibility of the mark on the fish and increased expense.

6. The use of biochemical analysis of blood and tissue samples to identify stock structure was discussed. Samples collected from the SPC programme and other sources are being analyzed at the Australian National University by Dr. B.J. Richardson. The SPC is confident that additional funding will be available to expand the work on skipjack and that samples collected by other organizations could also be analyzed. The effectiveness of this and other techniques of stock identification was discussed and the working party concluded that there are still differences in the interpretation of results achieved with various techniques, probably because of the small scale of the sampling to date.

7. The tagging results presented by Dr. K. Kasahara were very useful as indicating fish movements in the northwestern Pacific.

8. The progress in tagging work in peripheral areas was discussed. The work being planned in the Philippines and Indonesia where small fish would be tagged was described. In the light of earlier discussion, it seemed that these projects may be severely affected by high tagging mortality if existing tags are used. It was noted that the Australian plans to tag skipjack in waters of South Eastern Australia seemed unlikely to be fulfilled. The working party expressed concern that this would constitute a serious gap in the tagging coverage.

REVIEW OF AVAILABLE CATCH AND EFFORT DATA

9. The working party commended the work of Dr. Kasahara in presenting detailed catch and effort statistics from the Japanese bait boat fishery.

10. It was noted that good detailed statistics were available from the major fisheries in the Central and Western Pacific, though these still needed to be compiled into a single set of statistics.

11. There are still, however, local fisheries particularly in Indonesia and the Philippines which together contribute a significant proportion of the total catch for which there are not yet adequate effort statistics. Excellent progress has been made in improving catch statistics by both countries. The South China Sea Programme is providing valuable assistance in upgrading the collection of statistics and the working party supports the South China Sea Programme in this endeavour.

12. A small group comprising of Dr. Kasahara, Dr. Yonemori, Mr. Shomura, Mr. Buzeta and Dr. Kearney was appointed to compile the statistics available to the working party.

13. The meeting recognized that for the first time statistics were available which enabled an accurate estimate of the total annual skipjack catch from the central and western Pacific (Table 1 (Appendix D). Also for the first time detailed effort and catch per unit effort figures per five by ten degree rectangle were available from the Japanese southern water bait boat fishery (working paper 3). These Japanese data were representative of the only wide ranging skipjack fishery of major significance in this area and were therefore of unequalled value to the estimation of stocks or the impact of fishing on them. An assessment of the skipjack stocks exploited in the Japanese southern water bait boat fishery was presented to the meeting (working paper 1) and the meeting felt that it was at this time not possible to improve on or add substantially to the document available which reported that no relationship between effort and catch per unit effort could be established for the region as a whole. Minor additions to the catch per area for the numerous smaller fisheries have been made.

14. In general the total catch from the area has increased in recent years but marked fluctuations in total catch and catch per unit of effort are a feature of most skipjack fisheries, particularly smaller coastal ones.

15. In view of the growing high seas fishery, by purse seiners, the working party recommends that the IPFC draws the attention of members to the need for these vessels to supply catch and effort data. The working party also noted that for stock assessment purposes, catch statistics from all vessels fishing the area are essential.

MEASURES OF CATCH PER UNIT EFFORT AND RELATION TO ACTUAL ABUNDANCE AND BEHAVIOUR

16. Following considerable discussion the working party was not satisfied that at present there is any reliable measure of effort but recommends that the maximum amount of data should be collected, in the anticipation that analyses of such data may, in time, provide a satisfactory measure of catch-effort.

17. It was the opinion of the working party that there is in general no detectable effect of the fishery upon the catch rate yet, and it is thought that until effort becomes more widespread a clear relationship will not be observed.

18. Recent work on improving the use of catch per unit of effort for purse seiners as an estimate of abundance was discussed, searching time was considered to be most useful as a measure of fishing effort.

19. Problems relating to non random distribution of fish (Appendix B, documents 9 and 10) and changes in vulnerability as a result of behavioural changes, and methods of relating these to environmental information such as thermal structures were considered, however their incorporation into measures of abundance have not yet been developed for the South West Pacific.

ESTIMATION OF THE CURRENT STATE OF THE STOCKS

20. Various methods of estimating the state of the stocks were discussed. The use of catch and effort data was reviewed in the previous section. It was recognized that there is a body of recent work that shows it is possible for serious stock declines (for example in clupeoid fisheries) to occur without a corresponding decline in catch rates, and that this should be borne in mind when catch rates are used to estimate the state of the stocks.

21. At the moment there is little information on stock assessment based on other techniques, but present and future tagging programmes should add valuable extra information. Direct evaluation by acoustic techniques on aerial surveys for example may be useful in surveying local abundance of fish. There is some work proceeding on egg and larval surveys, but much more information would be needed before these could be used as a reliable tool for stock assessment. The particular problems to be solved are specifying appropriate areas and times for surveys which would yield useful results and the difficulty of distinguishing the eggs of tunas and other pelagic species.

22. It was thought that cohort analysis would not be very useful because of the fragmented nature of the fishery, and because there are only one or two age groups present at a given time and place.

23. The working party believed that the stocks, with possible local exceptions such as the Japanese home fishery, were exploited at a low rate, and was unable to predict the magnitude of potential annual yields.

COOPERATION WITH THE SOUTH PACIFIC COMMISSION

24. Possible duplication of effort by the South Pacific Commission and IPFC was discussed. However, apart from the fact that both organizations held meetings of experts on skipjack tuna, there was little evidence of duplication.

25. Members agreed that meetings in the same year of two groups of experts, some of whom would be present at both meetings and might to some extent be discussing the same problems was not the best use of available manpower. IPFC working parties normally meet biennially whilst the South Pacific Commission under the terms and conditions of its Skipjack Assessment Programme is required to hold annual meetings of its expert committee on tropical skipjack to review progress and consider future development of the Programme. The working party considered joint meetings of experts could make much more progress in arriving at an understanding of the total stocks of the Central and Western Pacific skipjack.

26. It was the view of the working party that both organizations could well profit of the experience gained by the other in promoting common objectives. For example, the South Pacific Commission has made considerable advances in the field of skipjack tagging programme.

Tagging methods have been improved, new tags are being developed, standardized recording scheme for tagging and recoveries is established and compute programmes and facilities for input and analysis exist in Noumea. Provided agreement between the two organizations can be achieved, it would be desirable for IPFC itself or member governments contemplating studies in the greater area of the Central and Western Pacific, to avail themselves of the expertise in South Pacific Commission. The working party was pleased to note that provided funds were available the activities of the Skipjack Survey and Assessment Programme could be extended outside the South Pacific Commission area.

RECOMMENDATIONS

1. That IPFC draw the attention of the working group on the tagging of tunas and billfishes in the Pacific and Indian Oceans to the problems of designing a suitable tag and tagging procedure for small skipjack. It is further recommended that the Honolulu laboratory of the United States National Marine Fisheries Service be encouraged to undertake research into the survival of small skipjack following tagging.

2. That because biochemical analysis coupled with tagging results can be of great value in distinguishing fish stocks the working party recommends that the fullest possible support be given to the work of the Australian National University.

3. Noting that the Philippines and Indonesian waters as a source of young skipjack are likely to be of major significance to the stocks of the Western Pacific, the working party recommends that the planned tagging programmes receive the fullest possible support through the South China Sea Programme and if possible through the South Pacific Commission Programme.

4. In view of the possibility that Central Pacific waters receive skipjack from both the northwestern and eastern Pacific, the working party recommends that IPFC ask the Japanese Government to consider increasing its tagging programme in the northwestern Pacific.

5. The working party noting the work on data analysis being done by ORSTOM[1/] New Caledonia recommends that IPFC draw to the attention of scientists of member countries the offer to assist if possible with analysis of their data.

6. The working party noting that data on catch and effort are available in a number of countries recommends that IPFC should consider the possibility of establishing some central repository for such data which would be then available for analysis.

7. Noting that the time available for worthwhile conclusions to be drawn on the stocks of the Western and Central Pacific was insufficient at the time of the 18th session of IPFC, the working party recommends that it should continue to work by correspondence until a separate workshop can be set up and a detailed analysis of the stock situation can be made.

8. That IPFC explore with the South Pacific Commission ways of organizing meetings of skipjack tuna experts who could advise on coordinated programmes for studies of the fish throughout its range in the Central and Western Pacific.

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1/ Office de la recherche scientifique et technique d'outre-mer
(Office of Overseas Scientific and Technical Research)

Appendix A

LIST OF PARTICIPANTS

| | | |
|---|---|---|
| R.L. Allen | - IATTC | (Rapporteur) |
| L.K. Boerema | - FAO | (Technical Secretary) |
| R. Buzeta | - South China Sea Fishery Project | |
| B. Castillo | - Philippines | |
| T.B. Curtin | - Australia | |
| K. Kasahara | - Japan | |
| R.E. Kearney | - South Pacific Commission | |
| J.C. Le Guen | - New Caledonia | |
| G.I. Murphy | - Australia | |
| K.C. Park | - Republic of Korea | |
| R.S. Shomura | - United States of America | |
| B.R. Smith | - Papua New Guinea | |
| J. Uktolseja | - Indonesia | |
| G.D. Waugh | - New Zealand | (Chairman) |
| J.A. Wetherall | - United States of America | |
| A.G. Woodland | - South China Sea Fishery Project | |
| T. Yonemori | - Japan | |

Appendix B

LIST OF DOCUMENTS

1. Assessment of skipjack stocks in the Japanese bait boat fishery (Kohei Kasahara)

2. Atlas of catch and speed of skipjack tuna in the Japanese bait boat fishery 1972-1976 (anon)

3. Processed skipjack catch effort data 1972-76 (Japanese bait boat fishery (anon)

4. Distribution of spawning skipjack tuna on the Western Pacific (Skira Naganuma)

5. Collection on catch and effort statistics (Kohei Kasahara)

6. Review of Japanese tagging experiments of skipjack tuna (Kohei Kasahara)

7. Historical trends in catch, fishing effort, and catch per unit of effort in the Hawaiian fishery for skipjack tuna 1968-76 (R.A. Skillman and F.V. Riggs)

8. Descriptive statistics on the size composition of skipjack tuna landed in the Hawaiian pole and line fishery 1976-77 (R.A. Skillman and F.V. Riggs)

9. CPUE des senneurs et abondance (A. Laurec & J.C. Le Guen)

10. CPUE des palangriers et abondance (A. Laurec & S.C. Le Guen)

11. Report of the BFAR/SCSP Workshop on fishery resources of the Visayan and Sibuyan Sea area, 18-22 October 1976

12. Report of the BFAR/SCSP Workshop on the fishery resources of the Sulu Sea, Bohol Sea and Moro Gulf areas

13. Report of the Ad Hoc meeting of livestock to discuss skipjack fishery developments, etc. (SPC)

14. Skipjack fisheries in the waters around Taiwan, Summary only (Yang Rong-Tszong)

15. Summary report of the Workshop on management of resources of the Sunda Shelf, Malacca Strait and related areas, Manila, 7-9 December 1977

16. Summary report of the Workshop on the biology and resources of mackerels (Rastrelliger spp.) and round scads (Decapterus spp.) Penang, Malaysia, 7-11 November 1977

17. Skipjack tuna (Katsuwonus pelamis) pole and line fisheries in East Indonesian Waters (Uktolseja J.C.B.)

18. Interim report of the activities of the skipjack survey and assessment programme in the waters at Papua New Guinea (R.S. Kearney)

Appendix C

ANNOTATED AGENDA

1. Adoption of the agenda

Procedural.

2. Migrations and stock identity

It is hoped that the meeting will be informed on the progress of the South Pacific skipjack tagging programme; on the basis of this and other information it should decide what area/seasonal groupings of statistical data should be used to correspond to unit stocks. The meeting should also consider whether any action by the working party is needed to supplement the work of the tagging programme on stock identification.

3. Review of available catch and effort data

The meeting should examine the available statistics, make compilations as necessary on a stock by stock basis, of total catch, total effort, and catch per unit effort, in a form suitable for stock assessment analysis, and determine the adequacy of the available data and methods of compilation. If these are inadequate, proposals for improvement should be made.

4. Measures of catch per unit effort and relation to actual abundance and to behaviour

For stock assessment purposes it is necessary to have an index that is proportional to the stock abundance, and changes from year to year in accordance with abundance changes. In "well-behaved" fisheries, e.g. many trawl fisheries, the catch per unit effort (with a suitable measure of effort) provides a satisfactory index. The meeting should discuss what measure of effort might be suitable for skipjack, and to what extent the most readily available measures might be affected by e.g. changes in behaviour.

5. Estimation of current state of stocks

On the basis of the statistical data and any other relevant information, e.g. on abundance of eggs or larvae, or comparison with other areas, the meeting should attempt to determine the state of exploitation of the skipjack stock or stocks in the region, and the magnitude of the potential annual yields. It should also describe the reliance that can be placed on these estimates.

6. Cooperation with the South Pacific Commission

The meeting should advise IPFC on how its work should be coordinated so as to avoid duplication with other activities and to ensure the most effective utilization of the resources and expertise available to each group.

7. Proposals for further activities

The meeting should set out what needs to be done to improve our knowledge of skipjack in the western Pacific, distinguishing what can be done by countries individually, and what requires some international coordination or assistance.

8. Any other business

If required.

9. Adoption of the report

Appendix D

Table 1

Summary of catches (thousand tons) of skipjack in the Pacific

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 |
|---|---|---|---|---|---|---|---|
| Papua New Guinea | 2 | 17 | 12 | 27 | 40 | 15 | 26 |
| Solomon Islands | 0 | 5 | 8 | 6 | 10 | 7 | 17 |
| Japan Southern Waters | 53 | 79 | 80 | 107 | 196 | 120 | 144 |
| Palau | 8 | 2 | 2 | 3 | 5 | 7 | 6 |
| Philippines | 0 | 1 | 21 | 27 | 17 | (25) | 29 |
| Indonesia | - | - | 20 | 22 | (23) | 24 | (25) |
| Total Area 71 | 63 | 104 | 143 | 192 | 291 | 198 | 247 |
| Japan Home Islands (Area 61) | 151 | 99 | 156 | 201 | 128 | 133 | 149 |
| Taiwan | 1 | 1 | 1 | 2 | (2) | (2) | (2) |
| Total West Pacific (Areas 61, 71) | 214 | 203 | 300 | 395 | 421 | 333 | 398 |
| New Zealand (Area 81) | - | - | - | - | - | 1 | 5 |
| Tahiti | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hawaii | 3 | 6 | 5 | 5 | 3 | 3 | 4 |
| E.P. Ocean | 56 | 105 | 33 | 45 | 79 | 116 | 130 |
| Total Areas 77, 87 | 60 | 112 | 39 | 51 | 83 | 120 | 137 |
| TOTAL PACIFIC | 274 | 315 | 339 | 446 | 504 | 453 | 535 |

Note ( ) Based on available statistics up to 1974, and estimations by the group for 1975 and 1976.