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A REVIEW OF THE SOUTH PACIFIC ALBACORE FISHERY: RESEARCH AND FISHING ACTIVITIES

(Paper prepared by the Secretariat)

Introduction

1. Historically, the South Pacific albacore fishery has been mainly exploited by Asian longliners and more recently gill-netters, with a limited involvement of Pacific coastal states, principally Tonga and New Caledonia. There is also a small localised surface fishery in New Zealand and occasional by-catches of albacore are taken in Australia's southern bluefin tuna surface fishery. Other Pacific Island countries (PICs), Fiji, French Polynesia and Western Samoa, have benefited indirectly from the resource through transhipping or unloading. On the basis of longline statistics, the stocks were estimated to be fully exploited and increasing effort was not expected to yield greater catches (Wetherall and Yong 1984). Drawing on the experience with the northern fishery, it was inferred that New Zealand surface concentrations could extend along the subtropical convergence zone, and that increases in yield could only come from an expansion of the surface fishery. Recognising the potential benefits this developing fishery could offer to the region and aware of the risks of interaction with the longline fishery, the PIC delegates to the 17th Regional Technical Meeting on Fisheries in 1985 endorsed the desirability of coordinating research activities.

2. The first South Pacific Albacore Research workshop was held the following year with objectives to 1) review existing fisheries, 2) identify types of fisheries statistics currently collected and their availability, 3) review research programmes and present preliminary findings, 4) identify and assign priorities of future research, and 5) provide for the coordination of research on albacore in the South Pacific. The proceedings of this workshop were reported to the 18th Regional Technical Meeting on Fisheries (SPC 1986). Noting the value of regular scientific consultations on North Pacific albacore, a second workshop on South Pacific abacore was deemed highly desirable and tentatively scheduled for August 1988. It was also decided to publish a newsletter to keep participants informed of progress in research.

3. The rapid development of the surface fishery during the 1987-1988 season has shifted the research objectives from purely exploratory and environmental questions more toward stock assessment related concerns. The purpose of the planned workshop was modified accordingly, putting the emphasis on data requirements and analysis. Because of the complexity of the task and time constraints, the workshop was postponed until after the 1988-1989 season.

4. To keep PICs informed of the evolution of the fishery, this paper proposes to review the developments of the surface fishery for South Pacific albacore, summarising the research and fishing activities in preparation for the upcoming workshop.

Summary of research activities

5. With a long established small-scale troll fishery, New Zealand through its Ministry of Agriculture and Fisheries (MAF) has had the longest record of research activities on South Pacific albacore. Cruises investigating species distribution and environmental factors associated with the occurrence of surface concentrations have been conducted for several years, concentrating more recently on the Chatham Rise and the Subtropical Convergence Zone (STCZ).

6. Other institutions such as the United States National Marine Fisheries Service (NMFS) as an extension of their involvement in the North Pacific fishery, and France's Institut francais de recherche pour le developpement en cooperation (ORSTOM) within their oceanography programme have now also entered this field of research.

7. The positive results of the exploratory research cruise conducted by the latter organization in 1982, the first of its kind in the STCZ, was the impetus for the first NMFS cruise in 1986 and the combined MAF, NMFS and ORSTOM surveys in 1987. In 1986 the research vessel, the *Townsend Cromwell*, was accompanied by two Californian trollers, a number which rose to seven the next season.

8. The objective of these surveys were primarily to locate areas of high albacore concentration along the STCZ and define the oceanographic conditions associated with these concentrations. The approximate zones and dates of the various cruises in 1987 are shown in Figure 1.

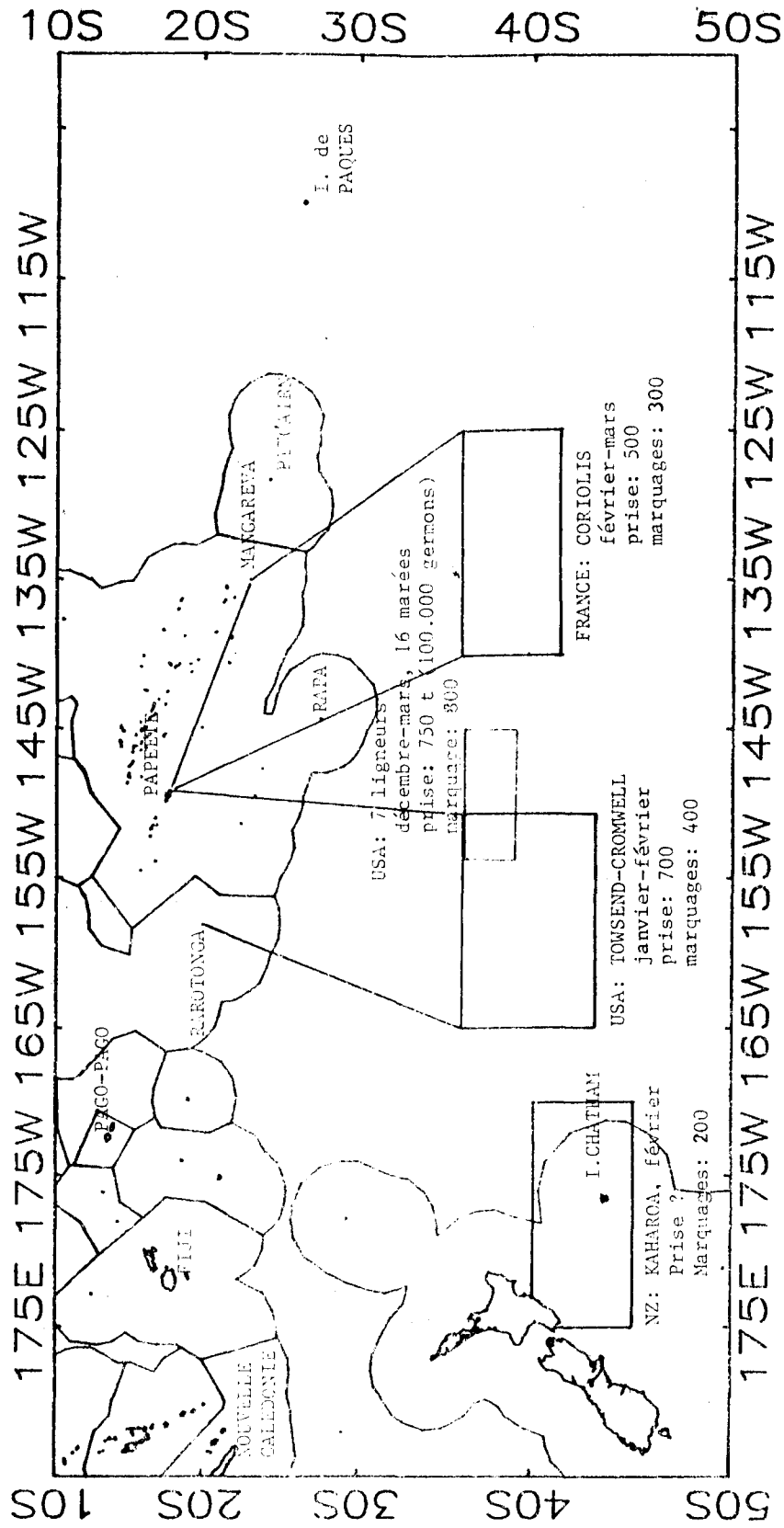
Results

9. Table 1 summarises the number of fish caught and tagged during the 1987 operations.

Table 1. Summary of the number of South Pacific albacore caught and tagged during the 1987 research and exploratory cruises.

Vessel name	No. fish	
	Caught	Tagged
R.V. Kaharoa	----	178
Townsend Cromwell	638	426
NO Coriolis	490	190
Trollers	----	800+

Figure 1. Approximate zones and dates of the MAF, NMFS and ORSTOM 1987 cruises (Pianet, in prep.).



10. This represents a total of approximately 2 300 fish tagged (the exact number of fish tagged by the commercial vessels is still unknown). An additional 711 fish were released in the Tasman sea by New Zealand and Australia. As a comparison, only about 800 fish were tagged during the previous season while it is hoped that the commercial fleet will have been able to release over 3 000 fish during the 1988 season (Wetherall, pers. com.)

11. All fish tagged by the research vessels were also injected with tetracycline, a chemical which is deposited on the hard parts, particularly the otoliths, marking the time of release. These marks can be used subsequently to validate the interpretation of growth increments (rings) and infer the age of the fish.

11. As of May 1988, only three fish had been recaptured, all by longline operations. The first fish, released by MAF in February 1987 at 30°40' South and 171°45' East, was recaptured by a Japanese longliner at 40°40' South and 177°01' East. The second fish recaptured by a Taiwanese vessel has been reported to have moved 260 mi eastwards staying in the STCZ. The last fish was recovered by a Korean longliner also east of its release location.

12. Most albacore were caught in surface waters between 16° and 21° C. The best catches were taken between 18° and 20° C between 37° and 38° South and 149° and 152° East and between 16° and 18° C between 38° and 41°20' South and 138° and 127°W.

13. Biological samples from over 200 fish were also collected for parasite, ageing and feeding studies. The preliminary results were presented at the last Regional Technical Meeting on Fisheries (Murray et al.).

Output

4. Most of the tagging data have been incorporated into a single data base, using the commercial package *dBase III*. At this point in time, it does not seem necessary to centralize research data but rather to provide scientists from the various organizations with a complete set for independent analysis. As the data base increases, particularly with commercial records, this position may need to be revised. The protocols for data collection and exchange will be addressed at the next workshop.

15. Each research institute has produced summary reports in various formats. MAF and NMFS activities are well covered in the MAF publication *Catch* (Anon 1986b; Murray and Bailey 1986; Bailey 1987; Beardsell 1987; Murray 1987;) and NOAA *Tuna Newsletter* (Laurs 1988), while the ORSTOM cruises are published in their "Rapports Scientifiques et Techniques" series (Pianet, in prep.).

Development of the fishery

16. The surface fishery for South Pacific albacore has long been confined to Australia where approximately 1 000 tonnes are caught annually by pole and line and purse seine incidentally to the southern bluefin fishery, and New Zealand, where the total catch of trollers has increased from only about 900 tonnes in 1974 to 2500 tonnes in 1985. In excess of 100 vessels have participated in the New Zealand troll fishery in recent years. The combined surface fishery catch represents about 12% of the total catch of albacore in the South Pacific.

17. The extension of the fishery along the STCZ, triggered by the scientific exploratory cruises, has been spectacular. Starting with only two trollers from California sponsored partially by the American Fishermen's Research Foundation in 1986 and seven boats in 1987, the fishery now includes approximately 50 jig boats from the US, Canada, Tahiti and Fiji. Total catch has increased proportional from 118 tonnes in 1986 to 750 tonnes in 1987 and news reports for the 1988 season quote even higher catches of 2-5 tonnes per day (Wetherall, pers.com.). We could thus expect the total 1988 catch to exceed 5 000 tonnes.

18. Fishing success was good in 1987, with more than 250 fish being landed 55% of the boat-days and more than 500 on 33% of the boat days for an average catch of 345 fish per fishing day (Laurs 1988). In comparison, news reports for 1988 quote average catches of 300-900 fish per day (Wetherall, pers. com.). In 1987, Fish ranged between 2 and 27 kg for an overall average weight of 7.5 kg (Laurs 1988). The reported average weight for 1988, is somewhat larger with 8.5 kg (Wetherall, pers. com.).

19. In 1987, the average trip lasted 29 days for an average catch of 47 tonnes and each boat made at least two trips. Troll-caught albacore was fetching US$ 1 300 per short ton and most of the catch transited through Papeete. In 1988 in Pago Pago, the price has increased to US$ 1 600 per short ton for fish above 5 kg and US$ 1 500 per short ton for smaller fish , with a minimum acceptable weight of 4 kg. Prices have been about US$ 100-200 less in Papeete, however some fish might still have been landed there as the fishery moved east as the season progressed.

20. These new grounds in the STCZ have also attracted Asian gill-netters and some 20 Japanese gill-net boats were expected to target albacore in the South Pacific this year. This information however remains to be substantiated and the number of gill-netters under other flags is unknown.

21. The situation has created some gear conflict on the fishing grounds, with troll boats reporting gill-net-marked fish on many occasions and occasionally fouling up on the nets. This is of particular concern since both regional outlets in Pago Pago and Tahiti have decided not to purchase gill-net caught albacore. Also gillnets are reported (although this has yet to be substantiated) to be catching large numbers of small fish, which may have substantial stock assessment and interaction implications.

22. Troll boat operators have been very cooperative, maintaining detailed logbooks and many are tagging fish. As mentioned previously, up to 3 000 albacore could be tagged this season. In addition, several US boats are now equipped with XBT recorders and probes to collect data on vertical temperature structure. One operator has also been testing a Satellite and Weather Information Processor. The commercial activity has been reported by NMFS in *NOAA Tuna Bulletin* (Laurs 1988) and *NMFS Administrative Report* (Laurs et al. 1987) and EVAAM (Etablissement pour la Valorisation des Activités Aquacoles et Maritimes in French Polynesia) in their *Document Technique* series (Yen 1987).

Next steps

23. The rapid evolution of the surface fishery along the STCZ has somewhat changed the research priorities set during the first SPAR workshop. The emphasis had been placed on the collection of biological data and tagging to estimate vital population parameters. While this information is essential in the long term for a complete understanding of the dynamics of the stocks, catch statistics for monitoring the fishery are required immediately.

24. Data on a developing fishery are essential for the rational management of that fishery and the opportunity should not be lost. Our first priority should thus be to implement the mechanisms that will ensure the collection of the appropriate data.

25. Because this fishery is mostly in international waters and concerns several countries, standardized data collection protocols need to be formulated and a data exchange system established along with guide-lines for data distribution. This will be an objective of the next SPAR workshop, tentatively scheduled for mid-1989 (proposed agenda annexed). Preliminary consultations will be held to formulate draft protocols paving the way for final adoption at the workshop itself.

Conclusions

26. After its commercial potential was identified by exploratory research cruises several years ago, the concentration of South Pacific albacore along the STCZ has now generated sufficient interest from the fishing industry to create a new rapidly growing fishery. Catches from this new fishery alone are expected to exceed 5 000 tonnes this year, doubling the surface catch generally taken in New Zealand and Australian waters. In addition, there is an unknown number of Asian gill-net vessels further augmenting the catch.

27. This situation, however dependent on market prices and weather prevailing in the STCZ, is already giving rise to gear conflict and warrants immediate attention, particularly in view of the high value of the resource. It will thus be the objective of the next workshop to ensure that data requirements for the rational development of the fishery are met and that priorities for stock assessment, fisheries analysis and monitoring objectives are set.

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Annexe. Proposed agenda for the Second South Pacific Albacore Research Workshop.

Proposed Venue: Noumea, New Caledonia

Proposed Time: Early 1989 (4 days)

The rational development of South Pacific surface fisheries for albacore requires data which are currently unavailable for most stock assessments, analyses of fisheries interactions, and for monitoring the status of fisheries and stocks. Increasing interest by Pacific States in exploiting the surface albacore resource and the rapid expansion of U.S. troll vessels into the South Pacific imposes an urgent need to assess future data requirements and related issues. We therefore propose to convene a small specialist workshop in conjunction with the South Pacific Commission to:

- identify data requirements
- inventory and assess available data
- formulate standardised collection protocols for new data
- review existing and proposed data base management systems
- establish a data exchange system and guidelines for data distribution

Proposed Agenda:

Day 1 : establish priorities for stock assessment, fisheries analyses, and monitoring objectives (e.g. consideration of model types and analytic techniques likely to be used).

: define data needs for each objective.

: inventory available historical data.

: document data collection and processing procedures.

Day 2 : assess utility of available data.

: produce best estimates of historical fishery data.

: formulate standardised collection protocols for new data.

Day 3 : data collection protocols continued.

: discuss and describe existing and proposed data base management systems.

: establish data exchange system.

Day 4 : discuss and approve workshop report and any supporting documents.

Please send suggestions on the proposed orientation, agenda and indicate likelihood of participating to: