

SPC/Fisheries 20/Information Paper 10
28 July 1988

ORIGINAL: ENGLISH

SOUTH PACIFIC COMMISSION
TWENTIETH REGIONAL TECHNICAL MEETING ON FISHERIES
(Noumea, New Caledonia, 1 – 5 August 1988)

SOUTH PACIFIC ALBACORE

by
Jerry A. Wetherall and Marian Y.Y. Yong
Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
2570 Dole Street, Honolulu, Hawaii 96822-2396

SOUTH PACIFIC ALBACORE REPORT 1/

Jerry A. Wetherall and Marian Y.Y. Yong

Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
2570 Dole Street, Honolulu, Hawaii 96822-2396

I. Preface

This report provides general information on the state of the Asian longline fisheries for South Pacific albacore, reviews developments in the offshore surface fishery (mostly by U.S. trollers), and describes the South Pacific albacore research program of the National Marine Fisheries Service (NMFS). Although it comments briefly on local albacore fisheries in member countries of the South Pacific Commission (SPC) and on activities of other research agencies, individual SPC "Country Reports" should be consulted for more complete and current information on these topics.

II. State of the Fisheries

A. Longline Fishery

The South Pacific albacore resource has supported an important Asian longline fishery for the past 35 years. It has been a steady source of albacore for the global market, accounting for about 20% of the total world production in 1985. It has contributed significantly to the economy of American Samoa, and to a lesser degree the economies of other South Pacific communities, e.g., New Zealand, Fiji, Vanuatu, Tonga and Tahiti.

In recent years, the total longline catch of South Pacific albacore has been about 25,000 - 30,000 metric tons (t) annually. Most of this is taken by Taiwanese and Korean vessels based in American Samoa, landing their catch at the 2 U.S. tuna canneries in Pago Pago. Home-based Japanese longliners account for less than 10% of the albacore catch. However, since 1980 estimation of the Japanese catch has been difficult because tuna longline catch and effort statistics compiled by the Japan Fisheries Agency are no longer available outside Japan. Small quantities of South Pacific albacore are also taken by longliners from Tonga, Fiji, and the Soviet Union.

1/ Prepared for the 20th Regional Technical Meeting on Fisheries, South Pacific Commission, Noumea, New Caledonia, 1-5 August 1988.

Since 1963, NMFS has monitored the activities of the longliners based in American Samoa and has a full-time biological technician stationed in Pago Pago to collect statistics on cannery landings, receive logbooks kept by longline vessel captains, and take length measurements on samples of offloaded albacore.

The number of vessels involved in the longline fishery and the nominal fishing effort exerted by them decreased during the past decade due to a depressed market for cannery tuna and higher operating costs. For example, in 1980 there were 174 Korean and 100 Taiwanese vessels operating out of American Samoa and delivering tuna to the canneries. In 1987, only 64 Korean, 60 Taiwanese and 1 Tongan longliner offloaded their tuna to the Pago Pago canneries. And of these vessels, 19 Korean and 1 Taiwanese vessel landed only trivial amounts of tuna to the canneries, concentrating instead on the sashimi market [primarily for bigeye tuna]. An additional 10 sashimi vessels with Korean crews but carrying flags of convenience [Honduras, Panama or Cayman Islands] also delivered part of their catch to the canneries.

The nominal longline effort, indicated by the number of days of fishing by vessels based in American Samoa also declined during the past several years. As the table below shows, the reduction in total fishing days occurred despite significant increases in the average length of a trip. Note that the statistics for average trip length and nominal effort include only days spent fishing, not time in transit, and exclude the vessels which focus on sashimi tuna.

5-yr period	Number of vessel trips		Average trip length (days)		Thousands of vessel-days		Average albacore catch per vessel-day (t)	
	Korea	Taiwan	Korea	Taiwan	Korea	Taiwan	Korea	Taiwan
1962-66*	429	372	35.7	27.0	15.3	10.0	1.05	0.89
1967-71	1288	1471	47.4	38.6	61.0	56.8	0.79	0.80
1972-76	1677	1390	55.6	53.5	93.2	74.3	0.49	0.58
1977-81	1378	877	71.4	71.8	98.4	63.0	0.51	0.59
1982-86	576	463	95.3	89.8	54.9	41.6	0.76	0.81

* Taiwan statistics based on 1964-66 only.

Perhaps in response to the substantial reduction in longline effort, the albacore stock abundance, as measured by the average catch of albacore per vessel-day by non-sashimi Taiwanese and Korean vessels, has recovered to its highest levels since the late 1960's (see table above). Statistics for Taiwanese vessels are probably more suitable for computing an index of albacore

abundance because the Taiwanese tend to target on albacore, whereas Korean longliners catch relatively more yellowfin and bigeye tuna. However, the two series of catch rates follow the same trends.

B. Surface Trolling Fishery

By the early 1970's, it was evident that the South Pacific albacore longline fishery had reached its limit, i.e., more longlining effort would not result in higher albacore catches. Analyses of catch and effort statistics suggested that the maximum average sustainable yield for the longline fishery was about 35,000 t of albacore per year. However, the stock assessments pointed out that the longline fishery takes mostly large, mature albacore at considerable depths, leaving the younger, smaller fish in the population unexploited.

The possibility of expanding the total albacore harvest by catching members of the younger, immature age classes occurred to many observers. In fact, up to about 2,000 t per year of the smaller albacore had been taken by local fisheries in New Zealand, Australia and Chile for years. Further, during their years of developing the South Pacific longline fishery the Japanese had collected information on albacore distribution by size-group, showing that the immature albacore were distributed in the southern region of the longline fishing grounds. On the basis of this data, knowledge of ocean circulation, and models of albacore distribution in the North Pacific (where extensive longline and surface fisheries existed) they predicted in 1979 that a surface pole-and-line fishery could be developed along the Subtropical Convergence Zone (STCZ).

The STCZ extends between New Zealand and Chile between about 37°S and 41°S. At these latitudes, water of the temperature preferred by albacore (15-19°C) is found at or near the sea surface during November-March, making the albacore available to capture by trollers, pole-and-line boats or driftnets. During the late 1970's and early 1980's exploratory work was done in this area by drift gillnet vessels from the Japan Marine Fishery Resource Research Center (JAMARC) in a survey aimed primarily at slender tuna. Two other surveys focused on skipjack and albacore resources near New Zealand were undertaken by a JAMARC pole-and-line vessel in 1980 and 1982, in cooperation with the New Zealand Ministry of Agriculture and Fisheries (MAF). The first exploratory albacore trolling survey in the offshore waters of the STCZ was completed by the research vessel Coriolis of the Institut Francais de Recherche Scientifique pour le Developpement en Cooperation (ORSTOM) in 1982.

The potential for a surface albacore fishery in the STCZ was also apparent to the U.S. albacore fleet operating in the North

Pacific. During the late 1970's a few U.S. trollers and pole-and-line (baitboat) fishermen, with support from U.S. tuna canners, briefly explored the potential for an albacore fishery off Chile. Nothing came of these efforts. But in the early 1980's, tuna cannery closings in California and Hawaii drastically reduced the U.S. market for raw albacore in the North Pacific. Faced with a rapidly deteriorating situation in the North Pacific, the U.S. industry decided to make a concerted effort to establish new fishing grounds in the South Pacific, where vessels would have access to the major tuna canneries in Pago Pago, and other landing and resupply facilities in Suva and Papeete. Accordingly, in 1986 the first commercial venture in the offshore region of the STCZ was launched by 2 U.S. trollers, with support from Saltonstall-Kennedy funds. Results of the 1986 trials were excellent. In 1987, again with partial S-K support, 7 U.S. trollers explored the region with similar success.

During the recent 1988 season (December 1987 through April 1988) a fleet of 43 U.S. trollers, without S-K funds, fished the STCZ. They were joined by a few boats from Canada, French Polynesia and Fiji. Since information from the fleet is still coming in, a full report on the fishery is not yet available. However, based on preliminary data the 1988 results for the U.S. vessels were impressive, with roughly 4,000 t of albacore worth US\$6.8 million ex-vessel landed at canneries in Pago Pago or at facilities in Papeete or Suva. The average catch per day on the grounds was roughly 2 t, with the albacore averaging about 8 kg. Most of the vessels delivered 2 full loads, and several vessels 3 loads.

However, the fishery was not without problems. Aside from periods of rough weather and seas, which were not unexpected, the trollers encountered direct competition in the form of drift gillnets, apparently set by a fleet of Taiwanese vessels. Reports from the U.S. boats indicated that about 20 Taiwanese driftnetters were operating in the STCZ. On some occasions trollers reportedly were close enough to the Taiwanese vessels to observe albacore drop-outs during net retrievals. In addition to reported Taiwanese gill netting, apparently there was some activity by Japanese gill net vessels targeting albacore in the Tasman Sea (well to the west of the trolling fleet). [Note: Official confirmation of the reports on gill net activity have not yet been received from Taiwanese or Japanese sources.]

The gill nets are a cause of great concern for several reasons: (1) albacore which drop out of the nets during soaking or retrieval may be killed incidentally, wasting the resource, (2) drop-outs which survive the gill nets and are recaptured by trollers may be so badly damaged or scarred by the nets that they fetch a greatly reduced price, and (3) the gill nets are a hazard to navigation. In support of the trollers, U.S. tuna packers in Pago Pago reportedly agreed not to purchase the gill-net caught

fish. The Taiwanese driftnetters apparently offloaded their catch to a tender for delivery to the Neptune (Mitsubishi) facility in Puerto Rico.

Aside from the driftnet impact problems, the simple presence of foreign competition is quite disconcerting to some vessels in the U.S. trolling fleet. Since U.S. vessels pioneered the offshore STCZ surface fishery many captains may have expected a "honeymoon" period of fishing without competition. Instead, in some areas of the STCZ they were competing directly with driftnets for a share of the resource.

However, the entry of the gill net vessels to the high seas surface fishery was predictable. Extensive exploratory gillnetting was done by Japanese vessels (JAMARC) during the late 1970's and early 1980's, identifying albacore as a major resource in surface waters of the STCZ. Reportedly, Japanese gill net vessels were to begin commercial operations in 1986 or 1987. Taiwan, the world's principal albacore harvester (30% of the global albacore catch in 1985), was also interested in the region's potential; they sent a research gill net vessel to the STCZ in early 1987 on an albacore survey. Expansion of pelagic gill net fisheries in the South Pacific is consistent with the Taiwan strategy elsewhere. A Taiwanese gill net fleet is already active in the Indian Ocean, and took over 15,000 t of albacore there in 1986.

The understandable disappointment of the U.S. fishermen may have unfortunate repercussions for NMFS data collection efforts. Some trollers reportedly are reluctant to volunteer further information on their fishing activities to NMFS biologists because they believe that the driftnet fleets were "tipped off" by NMFS reports of the U.S. exploratory fishing in 1986 and 1987. This perception should be corrected. It must be understood that the entry of the gill net fleets occurred independently of developments in the troll fishery. In fact, the full cooperation of trolling vessel captains in keeping accurate logbooks will only help their cause. The information gathered in the logbooks will be essential to NMFS efforts to document impacts of gill net operations.

With the support of the U.S. trollers, data on Pago Pago landings in the surface fishery have been collected by the NMFS technician there, who also supplies vessels with logbooks and albacore tagging kits. Troll catches of albacore landed in Papeete have been sampled by staff of the Etablissement Pour la Valorisation des Activites Aquacoles et Maritimes (EVAAM), with the cooperation of ORSTOM.

III. Research

A. Early Work

Research on South Pacific albacore dates back at least to 1962, when the U.S. Government research vessel Charles H. Gilbert and the French research vessel Coriolis collaborated in a longline survey, plankton sampling and maturity studies around Vanuatu, New Caledonia, Tonga, Fiji and Samoa. The Gilbert repeated the Southwest Pacific survey in 1963, also releasing the first tagged South Pacific albacore (7 fish). In 1966, during an Anton Bruun longline survey in the Southeast Pacific, NMFS biologists employed a Chilean shrimp trawler and the R/V Tiberiades, a vessel owned by the Catholic University of Valparaiso, in an unsuccessful effort to catch albacore for tagging.

Since these early efforts, South Pacific albacore research has been undertaken by the U.S., France (ORSTOM), New Zealand, Japan, Taiwan and the South Pacific Commission. Studies have focused on several topics, including the yield potential of the longline fishery (U.S.), the depth range of albacore and their vulnerability to longline gear (France and SPC), the distribution of albacore in relation to sea surface temperature and local submarine topography (New Zealand) and the catch rates of albacore in surface gill nets (Japan and Taiwan).

B. The Auckland Workshop

In 1986, the likelihood of an expanded surface fishery by a multinational fleet of vessels intensified the need for cooperation in fishery monitoring, stock assessment and research. Accordingly, the First South Pacific Albacore Research Workshop was convened in Auckland, New Zealand in June, 1986, to review knowledge of South Pacific albacore, discuss current research programs, and develop means of strengthening collaboration.

The workshop was hosted by MAF and coordinated by SPC. Participants included scientists from SPC, MAF, NMFS, ORSTOM, National Taiwan University, the Taiwan Council of Agriculture, the South Pacific Forum Fisheries Agency (FFA), and fishery departments in Australia, Cook Islands, Fiji, New Caledonia, Tonga, and Vanuatu. A report of the meeting was issued by SPC in October, 1986, and the 18 working papers presented at the workshop were compiled by MAF.

C. The SPAR Program

The most significant product of the workshop was the formation of the collaborative South Pacific Albacore Research

program (SPAR), an informal mechanism for data exchange and cooperative research among the workshop participants.

An immediate benefit of the SPAR arrangement was a coordinated survey of the STCZ by NMFS (R/V Townsend Cromwell), MAF (R/V Kaharoa) and ORSTOM (R/V Coriolis) during January-March 1987. This survey added to information gathered by the Cromwell and the Kaharoa during STCZ cruises in 1986, and by the Coriolis during its PROSGERMON survey in 1982. Biologists from Tonga, Cook Islands, New Caledonia (ORSTOM), and New Zealand were able to participate in the Cromwell surveys with support from the SPC.

During the 1987 joint survey, the three research vessels collected observations on vertical temperature and salinity structure along several transects through the STCZ, estimated the relative abundance of albacore with trolling gear, made various kinds of hydrographic observations, and collected biological observations for studies of age and growth, feeding habits, stock structure and maturation.

In addition, the research vessels tagged and released albacore after injecting them with a tetracycline solution. Recoveries of these fish will provide essential information for validation of ageing methods and development of migration models. Albacore tagging is also being done by U.S. and New Zealand commercial vessels. To date, about 3,000 albacore have been tagged and released, over half of these by commercial vessels.

Only 3 tagged South Pacific albacore have been recovered so far, all caught by longline vessels.

A comprehensive data report of the 1987 Townsend Cromwell survey, containing detailed records of oceanographic observations is nearing completion. The Cromwell oceanographic data have been provided to ORSTOM and MAF scientists as part of the SPAR data exchange agreement. Joint analyses are being proposed, involving the trolling survey data and the oceanographic observations (both shipboard data and satellite infrared sea surface temperature imagery).

Analyses of the Cromwell biological data are also underway. These include a study of albacore gut contents (by a New Zealand biologist), an analysis of albacore age and growth using daily increments on otoliths (NMFS), and a study of albacore maturation (NMFS).

D. Strategic Planning

In 1987, NMFS biologists, in collaboration with an MAF albacore scientist developed a strategic plan to guide their South Pacific albacore research program over the next 10 years. The

plan, to be distributed soon, identifies research needs in 4 major areas: stock assessment, fishery monitoring, fishery development and fishery interactions.

The plan stresses the necessity of an interagency data exchange program, using SPAR as a clearinghouse and "node" in the data network, and the establishment of routine procedures for monitoring and sampling South Pacific albacore landings. It also stresses the central importance of the tagging program, involving the cooperation of research agencies and commercial trolling vessels, to develop models of albacore migration and stock structure. Basic biological and oceanographic studies necessary for models of stock dynamics and distribution are identified, as are operations research studies and other economic analyses useful for fishery development decisions.

Due to budget constraints, the NMFS South Pacific albacore program in the upcoming fiscal year (FY89 - October 1988 through September 1989) will be restricted to basic fishery monitoring. NMFS will continue to record the landings of albacore by vessels offloading at American Samoa, and will extract samples for analysis of size composition. Tagging kits and data forms will be provided to trollers willing to assist in the tagging program, and logbooks for recording daily fishing conditions will be distributed to cooperating fishing vessels.