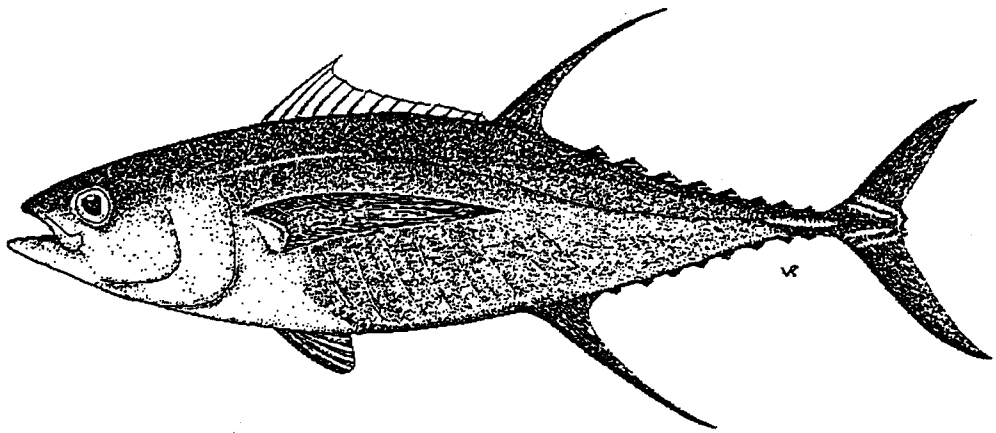
STANDING COMMITTEE ON TUNA AND BILLFISH

5-8 August 1994
Koror, Republic of Palau

INFORMATION PAPER 2

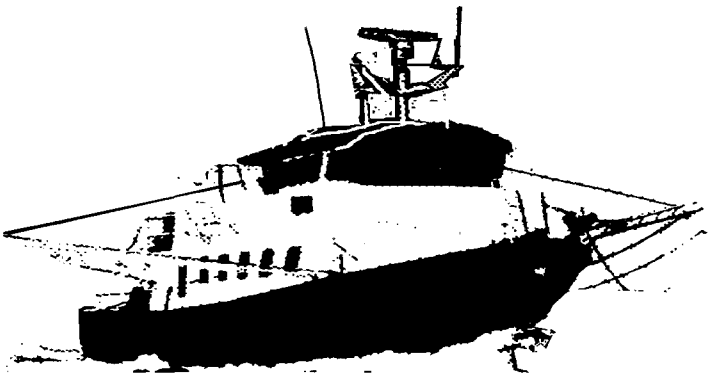
SOUTH PACIFIC ALBACORE (SPAR) NEWSLETTER



Oceanic Fisheries Programme
South Pacific Commission
Noumea, New Caledonia

July 1994

SPAR News



July 1994 Issue No. 1

IN THIS ISSUE

CHAIRMAN'S COMMENT

Unfortunately, we were unable to contact interim SPAR Chairman, Mr Albert Caton, for a comment on the new South Pacific Albacore Research (SPAR) Newsletter (latest reports have Albert touring coastal Tasmania, no doubt investigating the establishment of a marinated albacore industry and sampling accompanying wines).

Last year the Fifth SPAR Workshop decided to hold meetings biennially instead of annually. Between meetings, however, participants asked to be kept informed of developments in South Pacific albacore fisheries and research. Consequently, we have developed *SPAR News* as an informal newsletter to cover similar topics to those dealt with at SPAR meetings. We have unashamedly copied the style of NMFS's *Tuna Newsletter.* However, we would appreciate your honest feedback on SPAR News; the range of topics, level of detail, and the newsletter's frequency (annual or biannual).

The next SPAR meeting is scheduled for later this year, but a venue is yet to be found. We have approached several countries to host the meeting, and are waiting on responses. If none of these are able to host the meeting we will begin selecting volunteers . . .

Peter Ward

FISHERY UPDATE

Poor US Troll Catch

The US 1992/93 troll fishery for albacore in the South Pacific began in December 1992 and finished in April 1993. Forty-seven vessels participated in the 1992/93 season. They mostly fished on the traditional grounds, between 35-40°S and 145-160°W.

Most fishermen considered the season a 'bust' because catches, catch rates and the size of albacore were the poorest since the fishery began in 1986. They reported that albacore were widely dispersed and hard to find. Concentrations of baitfish were rare, and fronts poorly defined, conditions that might be due to El Niño influences. Total catches declined for the second consecutive season. US vessels landed 1028 mt in 1992/93, compared with 3016 mt in 1991/92.

Catch rates continued a downward trend that began in 1990. In 1992/93 US troll vessels averaged 45 albacore per day, a substantial decrease from 72 (1991/92) and 114 a day in 1990/91. Average size declined from 7.6 kg (1991/92) to a record low of 5.9 kg in 1992/93.

Due to the poor catches in 1992/93, many US fishermen said they could not afford to return to the South Pacific. Instead, they remained in the North Pacific where catches have improved over the past two seasons. Preliminary logbook reports and landings suggest that catches might have improved in the South Pacific in 1993/94. Twelve US vessels landed a total of 530 mt in American Samoa. One vessel also conducted exploratory trolling in the Tasman Sea in November 1993.

Gary Sakagawa & Al Coan

. . . But Good NZ Season

The total New Zealand catch of albacore was 4400 mt in 1993/94. On the west coast of the South Island fishermen began trolling in February, where albacore were abundant until May. About 200 boats landed just under 2800 mt during the season. These albacore averaged 4.5 kg.

There was also a significant albacore catch around the North Island. Here, fishermen reported large numbers of small albacore throughout the season. They caught about 1400 mt on the west coast, and an additional 300 mt in the Bay of Plenty. Between 60 and 80 boats were involved. Most were trolling, but longliners also reported good albacore catches.

Brian Jones

Gearing-up in New Caledonia

Tuna fishing in New Caledonia began a new stage in its development with the commissioning of two new longliners in 1994. This brings the total number of longliners here to six.

The two new longliners are part of a series of eight vessels that will begin fishing over the next three years. With up to six crew members, they are 16 m long, and fitted with Lindgren-Pitman monofilament longline systems. Their range extends to week-long fishing trips. Tuna are stored at 0°C before they are packed and air-freighted to Japan. Other fish, that are not sashimi quality, are frozen on board and marketed locally or freighted to canneries.

The first longliner began fishing in March, with most of the sea time spent training crew members in the use of the monofilament longline gear. The vessels are already setting 1500 hooks a day, which is the same number set by crews of nine on local longline boats with traditional Japanese gear.

At 100 kg per 100 hooks, initial catch rates are below that expected. Nevertheless, catches are improving with each trip, and good reports have been received on the quality of tuna sent to Japan.

Over the past few years a "cheap sashimi" market has developed in Japan for large albacore (25 kg or more) found in southern waters during winter. This market for fresh albacore is complementing the traditional cannery destination for albacore supplied by the three distant-water style longliners still operating in New Caledonia.

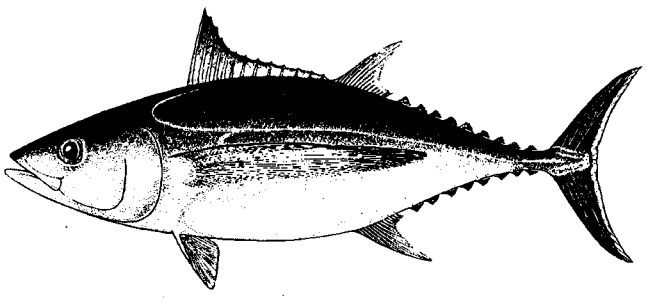
Régis Etaix-Bonnin

LONGLINE (outstanding data submissions are highlighted)

Country	1993 Provisional catch estimates	1992 Catch and effort data	1992 Size frequency data
Australia	Provided (AFMA)	Transferred from RTFD	No sampling ?
Fiji	Provided (Fiji Fish.)	Transferred from RTFD	Port sampling in Suva; provided
French Polynesia	Provided (EVAAM)	Provided by EVAAM	Provided by EVAAM
Japan	Provided (NRIFSF)	Provided by JFA (NRIFSF)	Requested of NRIFSF
Korea	to be provided (NFRDA)	Requested of NFRDA	(i) Port sampling in Levuka; provided
			(ii) Port sampling in Pago Pago? (NMFS)
New Caledonia	Provided (Marine marchande)	Transferred from RTFD	Port sampling in Noumea; provided
New Zealand	to be provided (MAF)	Transferred from RTFD	No sampling
Taiwan	to be provided (NTU)	Provided by NTU	(i) Port sampling in Levuka; provided
			(ii) Port sampling in Pago Pago? (NMFS)
Tonga	To be provided (Tonga Fish.)	Transferred from RTFD	No sampling

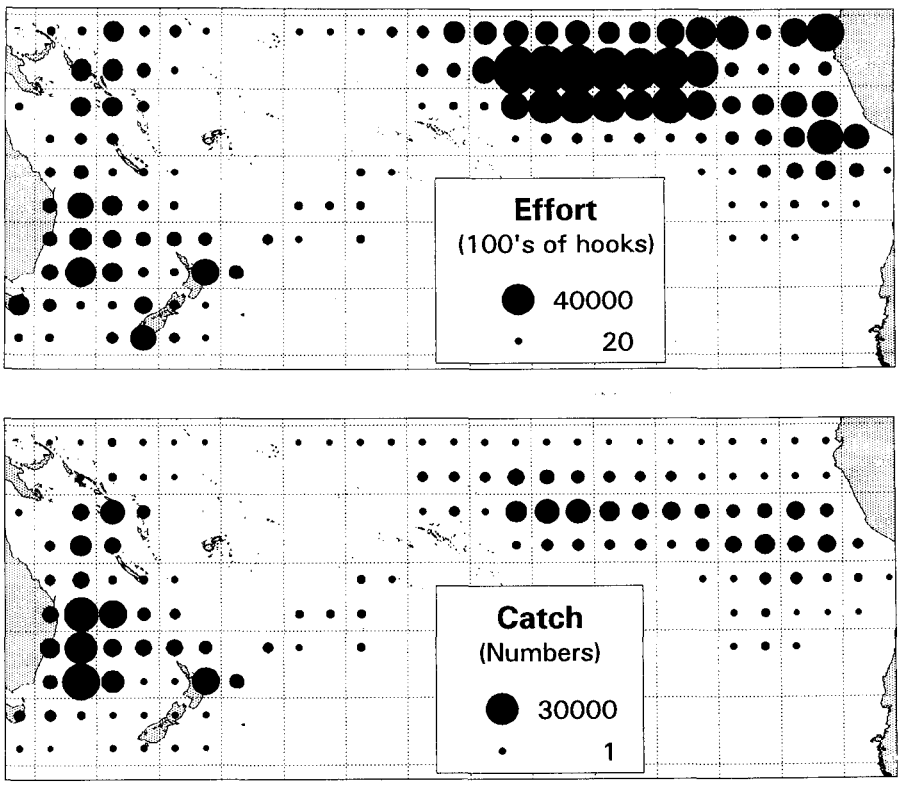
TROLL

Country	1993/94 Provisional Catch Estimates	1992/93 Catch & Effort Data	199/93 Size Frequency Data
Australia	To be provided (BRS)	Transferred from RTFD	No sampling
French Polynesia	To be provided (EVAAM)	Provided by EVAAM.	Provided by EVAAM
New Zealand	To be provided (MAF)	Transferred from RTFD	No sampling
United States	To be provided (NMFS)	To be provided (NMFS)	To be provided (NMFS)



1994 Recaptures of Albacore Tagged and Released in the South Pacific by SPC, NMFS and MAF.

Release					Recapture							
Date	**Lat.**	**Long.**	**Tag No.**	**FL (cm)**	**Date**	**Gear**	**Flag**	**Lat.**	**Lon.**	**FL (cm)**	**Nm**	**Days**
19-Jan-92	3816S	15040W	A16556	64	14-Jan-94	LL	TW	3858S	14339W	90	423	726
24-Dec-91	3526S	16625W	A02909	69	20-Jan-94	LL	TW	1450S	17650E	97	1593	758
05-Feb-91	4034S	16220W	A00479	—	20-Jan-94	LL	TW	3903S	14610W	87	974	1080
07-Feb-92	3915S	14644W	A20126	63	23-Jan-94	LL	TW	3906S	14318W	81	206	716
07-Feb-92	3927S	14646W	A04834	64	27-Jan-94	LL	TW	3910S	14640W	79	18	720
01-Jan-92	3656S	15638W	A03315	71	30-Jan-94	LL	TW	0039S	14229W	—	2337	760
12-Jan-92	3759S	15053W	A19375	60	11-Feb-94	LL	TW	3853S	14225W	—	511	761
08-Apr-92	3749S	14033W	A11857	75	22-Feb-94	LL	TW	3831S	13753W	65	165	685
08-Apr-92	3749S	14033W	A00711	61	01-Mar-94	LL	TW	3819S	14507W	79	518	1115
08-Apr-92	3749S	14033W	A00712	61	01-Mar-94	LL	TW	3819S	14507W	79	518	1115
08-Apr-92	3749S	14033W	A11858	75	18-Mar-94	LL	TW	3931S	14457W	76	283	709
05-Jan-92	3757S	15323W	A19143	64	11-Feb-94	TR	NZ	4030S	15205W	80	172	768



Albacore catch and effort by Japanese longliners in the South Pacific, 1992.

Longline Catches Down

Catches of albacore reported by Japanese longliners in the South Pacific decreased from 4400 mt in 1991 to 3700 mt in 1992. The reduction in albacore catches in this area was mostly due to a 25% decrease in longline effort during this period. Albacore accounted for 21% of the number of tuna caught by longline, compared with 47% for bigeye and 21% for yellowfin.

Japanese longliners caught 70% of the albacore in the western half of the South Pacific. However, they mostly fished in the north-east, reporting 80% of their effort from there.

Yuji Uozumi

Tasman Sea Pole-and-line

Japanese pole-and-line vessels, fishing for skipjack in international waters of the Tasman Sea in 1992, reported 2200 mt of skipjack and 50 mt of albacore. *Katsuo-Maguro Tsushin* reported 1126 mt of skipjack here in 1993. In 1994 four pole-and-line vessels, including JAMARC's research vessel, fished in the Tasman Sea, landing 748 mt of skipjack.

Yuji Uozumi

DATA COLLECTION

Albacore Port Sampling

SPC and the Université Française du Pacifique (UFP) signed a memorandum of understanding on port sampling in Noumea in June 1994. Since March, SPC has funded Sébastien Sarramégna, a doctoral student at UFP, to help Régis Etaix-Bonnin (Marine marchande), in sampling local longliners each week.

Stephen Yen (EVAAM) reports that port sampling in Papeete now covers about 20% of landings by domestic longliners which seasonally target albacore. However, the number of American trollers calling at Papeete has decreased considerably, and sampling of these has almost ceased in Papeete.

Ashok Kumar continues to sample distant-water and offshore longliners landing tuna at the PAFCO cannery in Levuka, Fiji. During 1993, 16 Taiwanese distant-water vessels, 5 Korean distant-water vessels, and 3 Fiji-Korea joint venture vessels unloaded at Levuka.

In Suva, Faiyez Saheb sampled the landings of 16 domestic longliners and 5 Fiji-Korea joint venture longliners in 1993.

SPC's Albacore Project, which commenced in 1990, initiated port sampling of albacore in Fiji, French Polynesia and New Caledonia. These sampling programmes have continued despite the termination of the Albacore Project in 1992. The sampling programmes will continue over the next five years with technical and financial support from the SPC South Pacific Regional Tuna Resource Assessment and Monitoring Project (SPRTRAMP).

Tim Lawson

SPAR Database

OFP has continued to receive data for the SPAR database over the past 12 months, with the only significant gap being post-1988 aggregated data for the Korean longline fleet.

Submissions of data for the SPAR database are due on **September 1, 1994**. SPAR5 reviewed guidelines for the timing of submission of data and amended the submission date from March 29 to April 1, 1993. The current guidelines require:

- *provisional estimates of total annual catch* for longline (calendar year) and surface fisheries (season) by September 1;
- catch and effort data for longline and surface fisheries aggregated by 5° square and month, by September 1 (20 months after the end of the calendar year for longline, or 18 months after the season for surface fisheries); and
- length-frequency data stratified by 5° latitude and 10° longitude by month when submitting aggregated catch and effort data.

OFP has already received most data due for the September 1 deadline. Please review the schedule of data submissions shown below to ensure that you provide your data on time. Be sure to advise OFP well in advance if you have any problems with providing data or meeting the deadline.

We expect to distribute the latest version of the SPAR database to participants at the next SPAR meeting.

Peter Williams

Port Sampling Workshop

With assistance from the Micronesian Maritime Authority, SPC organised a four-day port sampling workshop in Moen (FSM). Participants included port samplers and supervisors of current and proposed port sampling programmes in American Samoa, FSM, Fiji, Guam, Kiribati, Marshall Islands, New Caledonia, Palau, Papua New Guinea and the Solomon Islands.

The workshop first reviewed port sampling programmes in the region, noting the initiation of many programmes in response to increased small-scale longlining in the tropical Western Pacific and last year's ban on high seas transshipment. Participants then examined procedures for compiling unloading weights; sampling protocols for the collection of species composition and length-frequency data; data collection forms; conversion factors; species codes; and procedures for submitting port sampling data to SPC. As a result, OFP is preparing a regional port sampling manual for the longline, pole-and-line, purse seine and troll fisheries.

Participants witnessed the transshipment and sampling of purse seiners and longliners in Moen. They became actively involved in the sampling, and were rewarded with an unexpected swim when their speed boat capsized while being lowered into the water.

Tim Lawson

RESEARCH

Two studies, using different genetic approaches, have recently been completed.

Electrophoretic Pilot Study

During 1992-93, a pilot study of genetic variation in South Pacific albacore used electrophoretic analyses of blood proteins sampled from five South Pacific sites and three North Pacific sites. South Pacific sampling sites included Tasmania, New Zealand, New Caledonia, Fiji and French Polynesia. The North Pacific sites were Japan and northern and north-east Hawaii.

None of the screened loci showed significant heterogeneity among the South Pacific locations, suggesting that gene flow is sufficient to maintain genetic homogeneity in the South Pacific albacore population. Including the North Pacific samples resulted in heterogeneity in one of the allozyme loci studied. It does, however, appear that there may generally be sufficient genetic exchange across the equator to prevent genetic differentiation.

Lindsay Brown

Pacific and Atlantic Albacore Distinct

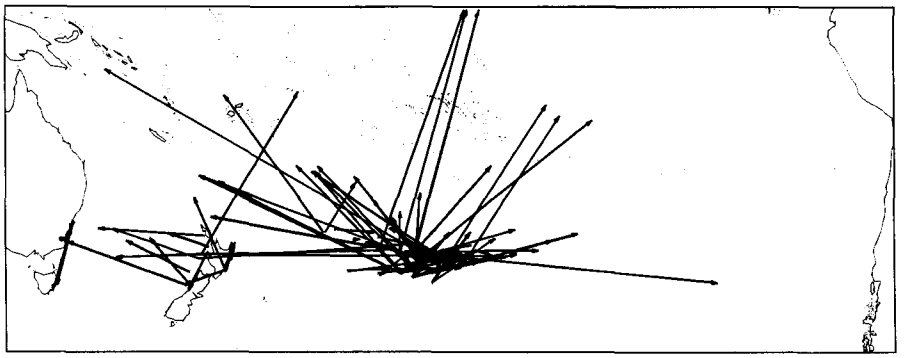
NRIFSF scientists have detected high polymorphism in the mitochondrial ATPase6 gene of albacore.

They used restriction fragment length polymorphism analysis in small DNA fragments amplified by polymerase chain reaction (PCR-RFLP) analysis. *Mse* I endonuclease digestions on the DNA fragment generated five (A, B, C, D, E) restriction types. Those on *Rsa* I gave three (A, B, C) restriction types. Using these types, they identified seven haplotypes among the 436 albacore sampled at nine sites. They found no significant difference between north (Bay of Biscay) and south (Brazil) Atlantic albacore, or between these albacore and those from the Cape of Good Hope. All six Pacific samples were homogenous.

In contrast, the difference between the Atlantic and Pacific albacore was highly significant. The results suggest that restricted gene flow between the Atlantic and Pacific has maintained genetically distinct populations in each ocean.

On the other hand, haplotype frequencies in each ocean were stable, and there may be more gene flow between the northern and southern hemispheres than previously suspected. Nevertheless, the genetic marker used in this study might not be sufficiently sensitive to detect differences between samples. Underway is an analysis of a non-coding region of mtDNA where higher polymorphism is expected. Indian Ocean material is yet to be examined.

Seinen Chow & Hideto Ushiama



Straight-line movements of tagged albacore recaptured in the South Pacific.

Longliners Take Tagged Albacore

Recaptures of tagged albacore are coming in steadily. During 1986-92 SPC, NMFS and MAF tagged and released 17 231 albacore, mostly in the New Zealand and STCZ troll fisheries. Fishermen have now reported recapturing 115 (0.7%) of these tagged albacore. Few of the tagged albacore were caught near the release site. Only seven were recaptured in the troll fishery, and the former driftnet fishery reported two.

Longliners, widely dispersed over the South Pacific, have reported 91% of the recaptures. The longest period of liberty is over five years: an albacore tagged and released by NMFS in December 1988 and recaptured by a Taiwanese longliner in February last year.

On average, the distance between the recapture position and release site is much greater for albacore (925 nm) than for other tunas, like skipjack and yellowfin. The longest straight-line movement was for an albacore released by SPC 1200 nm south of Tahiti. It was recaptured by a Taiwanese longliner fishing 3531 nm away near Papua New Guinea.

Tagged albacore tended to move north from the release sites. Yet, despite their ability to move large distances, no albacore tagged in the South Pacific has been recaptured in the North Pacific. Nevertheless, longliners fishing just south of the equator near the Marquesis Islands recently recaptured tagged albacore.

Peter Ward

Albacore Spawn Annually

To investigate spawning seasonality, gonads were collected from albacore caught by longline in New Caledonia and Tonga during 1990-92. Gonado-somatic indices (GSIs) were calculated for 246 female and 444 male albacore, and oocyte samples from 150 ovary pairs were measured to determine the extent of their development.

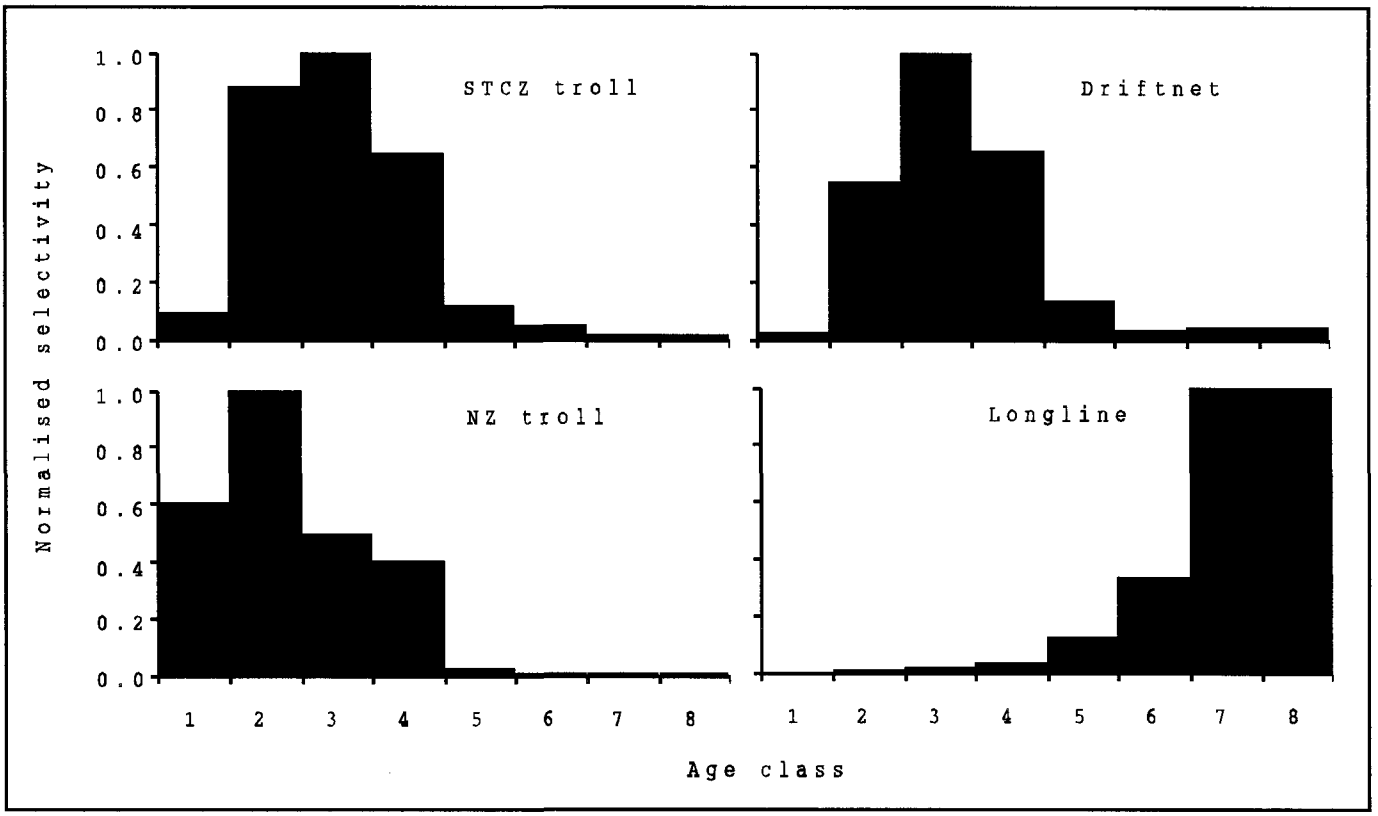
The monthly variation in GSI's and average oocyte diameter clearly showed that albacore spawn annually, during November-February. Most showed increased spawning activity when they had reached a fork length of 80 cm, although a few were active at 70-79 cm.

At two collection sites most of the gonads on the right-hand side of the body cavity weighed more than the left-hand side gonads. However, examination of oocyte diameters showed no significant difference between left and right ovaries.

Darlene Ramon

Decline in Biomass

Analyses of albacore length-frequency, catch and effort data using the SPARCLE model are now close to completion. Many different SPARCLE runs on the albacore data have been completed since preliminary results were presented at the last SPAR meeting in Tahiti. These runs have tested the effects of various assumptions (e.g., number of significant age classes in the length frequency data) and constraints (e.g., form of the selectivity schedule for each fishery) on the parameter estimates. While, in theory, SPARCLE can estimate the rate of natural mortality (M), it is unlikely that sufficient information exists in real fisheries data to do this. Attempts to estimate M from the albacore data produced biologically impossible values (very close to zero). So we fixed M at either 0.2 or 0.4 yr^{-1}. We did, however, assume higher M values for the oldest three of the eight significant age classes



Normalized selectivities for each fishery.

to account for the rapid disappearance of female albacore from the population at fork lengths larger than 96 cm.

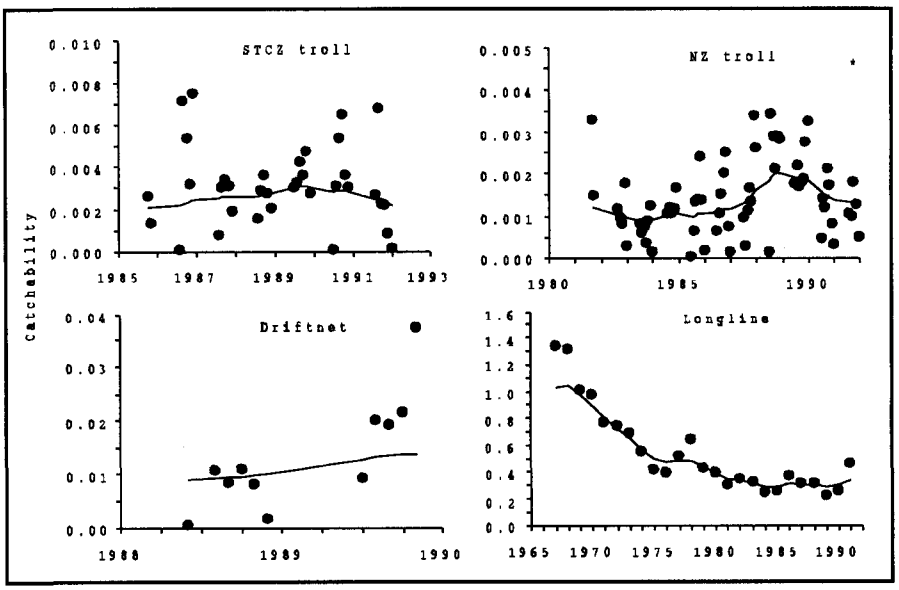
For most runs, SPARCLE gave similar patterns in the time-series of population biomass, recruitment and catchability by fishery (STCZ troll, NZ troll, driftnet, longline). The normalized selectivities reflect the proportion of the population of each age class available to a fishery, relative to the most available age class. The three surface fisheries have similar patterns, although the NZ troll fishery has a larger availability of albacore from the youngest age class (possibly age 3). On the other hand, longline fully selects only the oldest albacore.

The predicted trends suggest that catchability in the longline fishery has been decreasing since the beginning of the time-series. Longline effort deviations are tight, indicating a good fit of observed and predicted effort. The effort deviations are larger for the other fisheries, and the catchability trends are less significant.

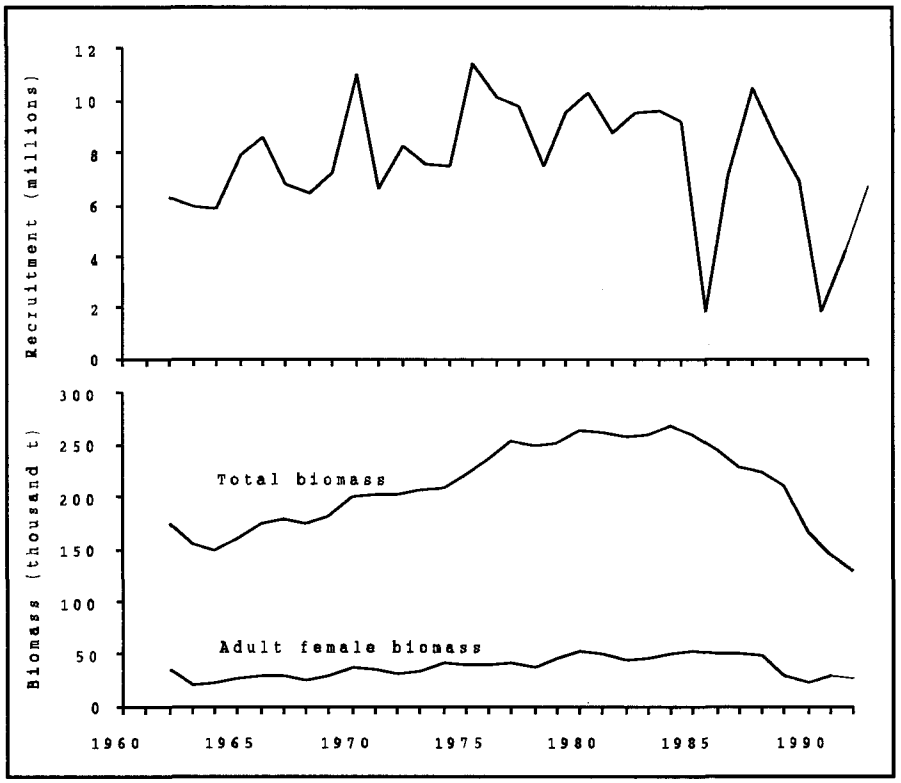
Time-series show very low recruitments in 1985 and 1990, which probably correspond to the 1982/83 and 1987/88 spawning seasons. It is interesting to speculate on whether environmental conditions related to the ENSO events during those years might have affected recruitment, e.g., by causing poor larval survival. However, it is also possible that the greater variability in estimated recruitment since the mid 1980s reflects much better information on year class strength in the surface fishery. It may be that similar variation in recruitment occurred throughout the time-series, but the estimates are blurred by ageing errors during the period when only the longline fishery operated.

The biomass time-series shows a decline from the mid 1980s as the two poor year classes move through the population. This decline is likely to continue for several years, and its impact on longline catch rates may be substantial. The estimated biomass of adult females was calculated using sex ratio at size data, and shows a sharp drop in 1988 and 1989 when the poor 1985 year class reached adult size. We expect a further drop in 1993 when the poor 1990 year class recruits to the adult stock.

While the poor recruitments and associated biomass decline are probably due to factors other than fishing, continued fishing at the current or increased levels could exacerbate the decline. If the biomass



Estimated time series of catchability for each fishery.



Estimated time series of recruitment and relative biomass.

time-series is an accurate portrayal of the stock condition, we would have to conclude that overfishing is now a possibility. The analysis indicates that longline fishing mortality is high relative to fishing mortality by the surface gears (which have declined further in recent years). Therefore we could caution against further development of albacore-targeted longlining until there is evidence of stock recovery.

John Hampton & Dave Fournier

RECENT PUBLICATIONS

Bartoo, N. & D. Holts 1993. Estimated gillnet selectivity for albacore *Thunnus alalunga*. *Fishery Bulletin, U.S.* **92**:371-78.

Brill, R.W. & D.B. Holts 1993. Effects of entanglement and escape from high-seas driftnets on rates of natural mortality of North Pacific albacore, *Thunnus alalunga*. *Fishery Bulletin, U.S.* **91**:798-803.

Labelle, M. 1993. A review of albacore tagging in the South Pacific. Tuna and Billfish Assessment Programme Technical Report No. 33. South Pacific Commission, Noumea, New Caledonia. 17 pp.

Labelle, M., J. Hampton, K. Bailey, T. Murray, D.A. Fournier & J.R. Sibert 1993. Determination of age and growth of South Pacific albacore (*Thunnus alalunga*) using three methodologies. *Fishery Bulletin, U.S.* **91**:649-63.

Ramon, D. & K. Bailey (in press). Reproductive patterns of south Pacific albacore, *Thunnus alalunga*, as indicated by examination of gonads and oocyte development. *Fishery Bulletin, U.S.*

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