

Noumea, New Caledonia
August 21 - 23, 1995

EXPERIENCE OF LONGLINE TAGGING OF SBT

Pelagic Fisheries Resources Program
Division of Fisheries
CSIRO
Australia

Working paper for the 5th Meeting of the Western Pacific Yellowfin Tuna Research Group,
Noumea, New Caledonia, August 21-23, 1995.



DIVISION OF FISHERIES

PELAGIC FISHERIES RESOURCES PROGRAM

To: **ROBERT CAMPBELL**

Date: **18/8/95**

Company:

Fax No: **0015 687 26 3818**

From: **ANN PREECE**

Page 1 of **8**

Hi Rob,

Here is some information on longline tagging of SBT. All this stuff was presented at the recruitment monitoring workshop last week.

Page 2 (of this fax) shows the number of tags released from longliners. It also shows the % recoveries, which are really good. They are compared with South Australian % recoveries and inshore Tas (both of which are surface capture methods - at time of tagging).

Top table on Page 3 is from the 1994 recruitment monitoring workshop. It shows that there is rapid movement (<30 days) and a high degree of interaction between the longline and surface fisheries around Tasmania.

Bottom of page 3 shows the number of tags released from all three release sites (just for comparison).

Page 4 shows the qualitative movement data that we get back from releases from S.A. and W.A. (this example is just for 1990/1991 releases).

Page 5 shows the qualitative movement data that we get back from the longline releases. They are really useful because they show us where fish are moving to when released from sites other than S.A. and W.A.

Page 6 is just to let you know that the growth rates of SBT released off Tas (predominantly from longliners) looks the same as for SA and WA releases. Page 7 and 8 are the graphs showing that growth rates are similar to the 1980's growth curve (as are SA and WA releases).

I hope this helps.
Have fun over there!
Ann Preece.

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~~communication, especially in regard to the tagging program.~~

TAG RECOVERIES FROM TAGS DEPLOYED FROM JAPANESE LONGLINERS

During 1992, 1993, 1994 and 1995 a number of tags were released into SBT from Japanese longliners (Table 8). These were initially deployed on an experimental basis by K. Williams (WW Fisheries), since then CSIRO has trained a number of AFZ and RTMP Observers to carry out these duties. The deployment of these tags from Japanese longliners has only been possible due to the co-operation of the vessels fishing masters and Japan Tuna. The experiment seems to be working quite well to date with tags being deployed over wider areas than previously possible. The percentage recaptures to date are also shown in Table 8.

TABLE 8: SBT TAGGING FROM JOINT VENTURE LONGLINERS.

	Releases	Recaptures	%
1992			
CHIDORI 17	88	12	13.6
1993			
CHIDORI 17	366	51	13.9
1994			
KINEI 118	74	6	
TOKACHI 88	22	1	
KAIKO 28	62	2	
TOTAL	158	9	5.7
1995			
CHOYO 27	31		
TOKUJU 7	29		
TAIWA 18	1		
SEISHIN 25	7		
SHINMEI 38	8		
KAIYO 38	8		
TOTAL	84		

COMPARISONS WITH OTHER TAGGING LOCATIONS/TECHNIQUES

% RECOVERY TO 15/7/95

Year	SA tagging	Longliner tagging	Inshore Tasmania
1991	10.8		18.8
1992	8.4	13.6	
1993	5.6	13.9	38.0
1994	3.5	5.7	

TAG AND SAMPLE RECOVERY 1995

From: Whitelaw, Stanley, Gunn ~~Tag~~ (RMWS/95/31)

Table 8: Summary of results from fish tagged off eastern Tasmania in 1991, 1992 and 1993

	1991 Releases Troll Caught Fish	1992 Releases Longline Caught Fish	1993 Releases Longline Caught Fish	1993 Releases Troll Caught Fish
Number released	86	88	364	33
Number recaptured				
total	15	0	31	10
days at liberty < 30	11	0	20	5
days at liberty > 200	4	7	6	2
Mean release length	89.1 (s.e. = 0.21)	90.4 (s.e. = 0.56)	93.6 (s.e. = 0.30)	94.3 (s.e. = 0.96)
First release date	28/5/91	10/6/92	29/5/93	28/4/93
Last release date	19/6/91	14/6/92	11/6/93	2/6/93

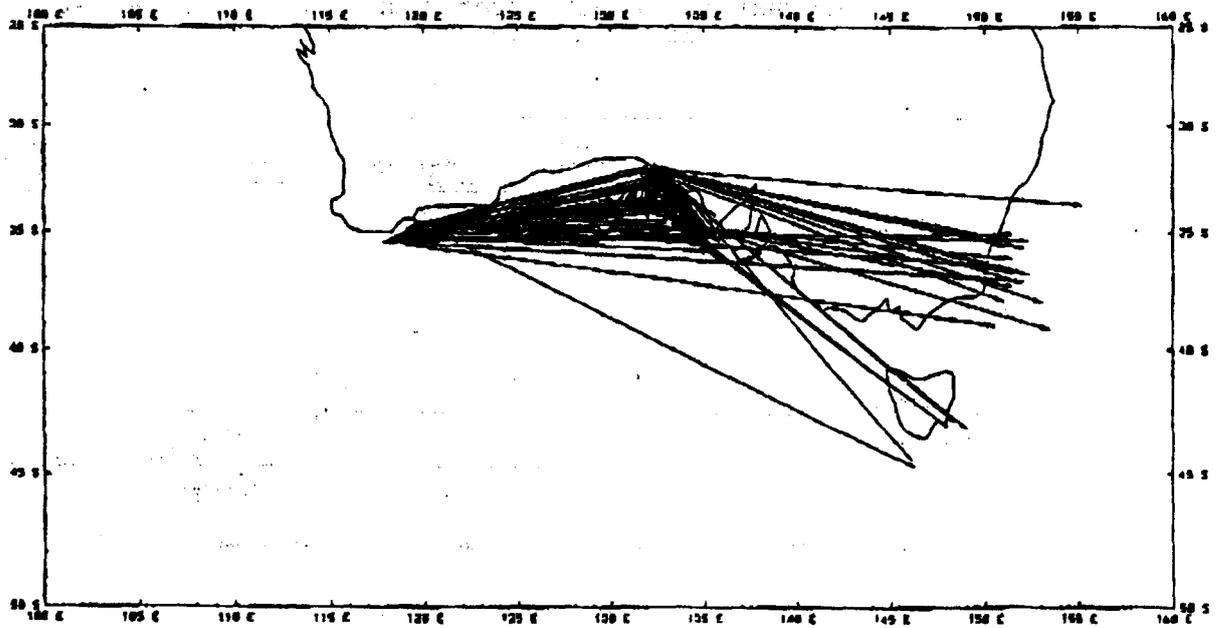
From Polachek RMWS/94/6.

From Whitlaw et al RMWS/95/3

TABLE 1. TAG RELEASES 1990-1994

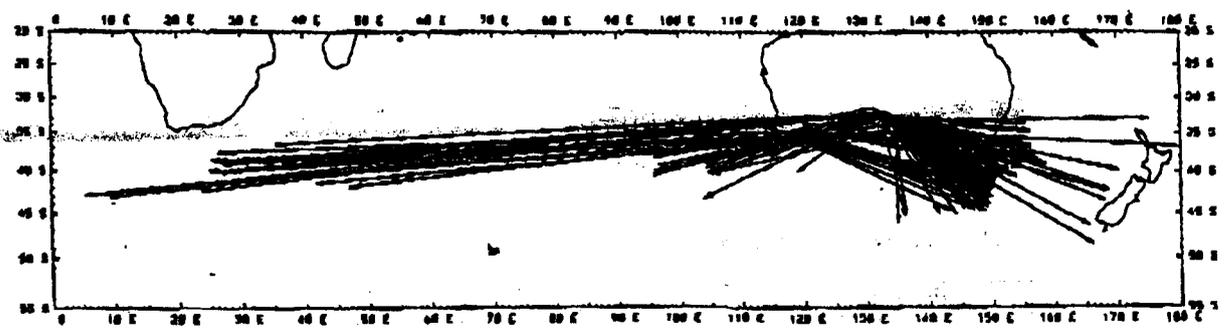
Period of Release	Area Released	Number Released
Nov. 90 - Jan. 91	WA	3,306
Jan. - Feb. 91	SA	4,355
May - June 91	Tas	86
Dec. 91 - Jan. 92	WA	3,054
Jan. - Feb. 92	SA	4,998
June 92	Tas	88
Nov. 92 - Mar 93	WA	4,912
Jan. - Feb. 93	SA	5,883
May - June 93	Tas	366
Jan. - March 94	WA	8,679
Jan. - Feb. 94	SA	7,629
May - June 94	Tas	196
Jan. - Mar 95	SA	7,648
Jan. - Mar 95	WA	10,160
May - July 95	Tas (offshore)	84
Total		61,444

3



Recaptures from 1990-1991 tagging program. Caught by Australian fishery from 1990-1995.

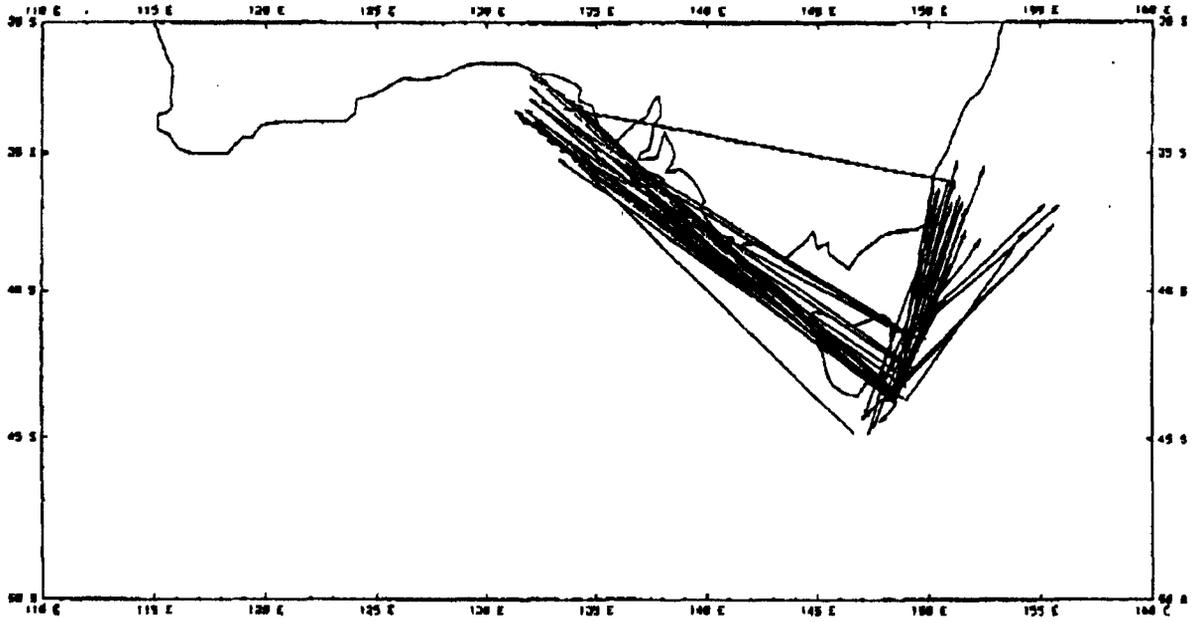
Figure 4.



Recaptures from 1990-1991 tagging program. Caught by Japanese fishery from 1990-1995.

Figure 5.

(4)



Fish released from long-liners. 1990-1995

Figure 19.

5

From Precet Polacheck RMWS/95/4

Comparison of the growth increments from tag returns from Japanese and Australian vessels does not suggest any large differences in the growth rates of fish caught by off-shore longliners and those caught in the surface fisheries and by near-shore longliners (Figures 7 to 10). Similarly, the growth increments from tag releases off Western Australia and South Australia do not suggest any large tendency for a difference in growth for fish released from these two areas (Figures 11-14). Finally, examination of the growth increments from tagged fish released off eastern Tasmania (primarily from longline vessels) suggest that these tagged fish are growing at comparable rates to those fish tagged in the surface fisheries off Western and South Australia. This is one additional positive indication that tagging juvenile fish from longline vessels may be viable.

From Polachuck + Preece RMWS/95/5

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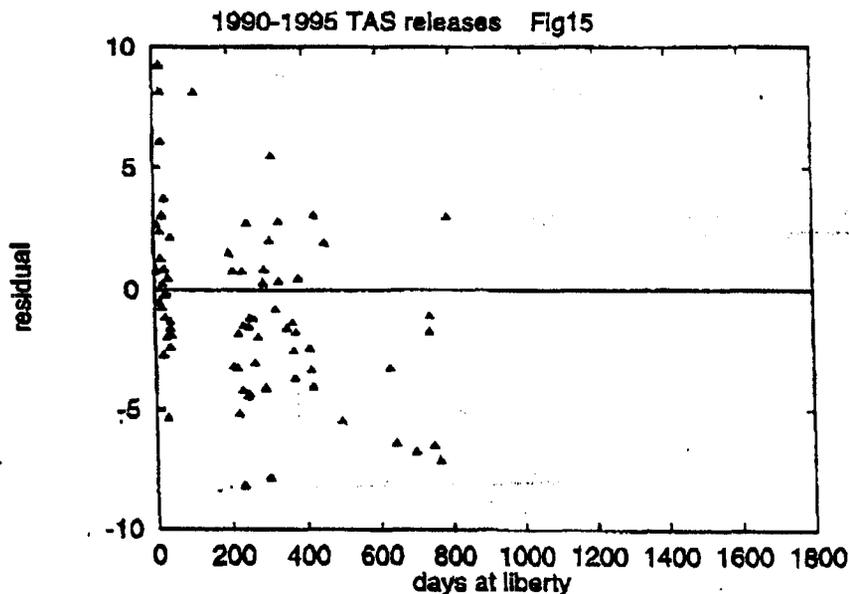
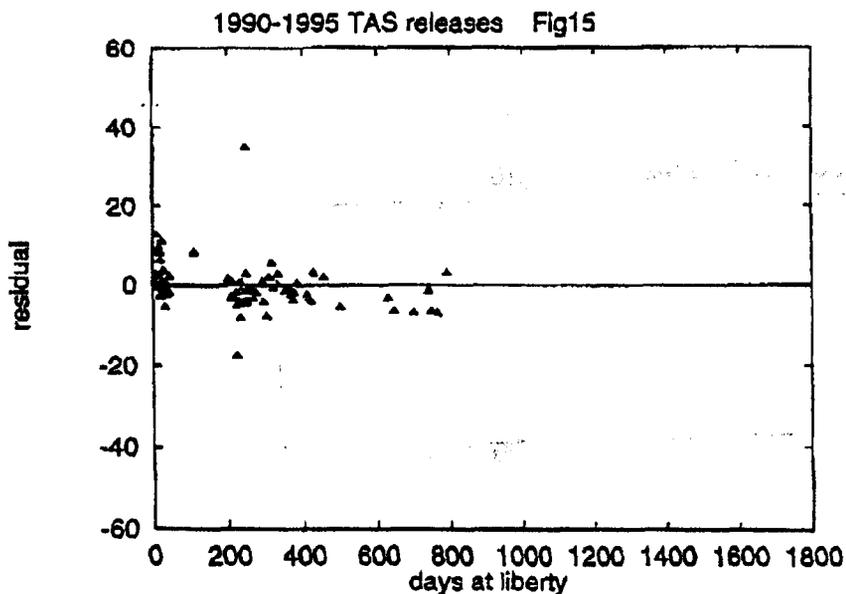


Figure 15: The deviation from the expected growth increment (i.e. the measured growth increment minus the predicted growth increment) for the 1980's two stanza growth curve (see Anon. 1994) as a function of number of days at liberty for recoveries from releases around eastern Tasmania. The top panel is for all fish recovered from these releases from the 1990/91 to 1994/95 tagging experiments and the lower panel excludes recoveries in which the residual exceeds 10cm.

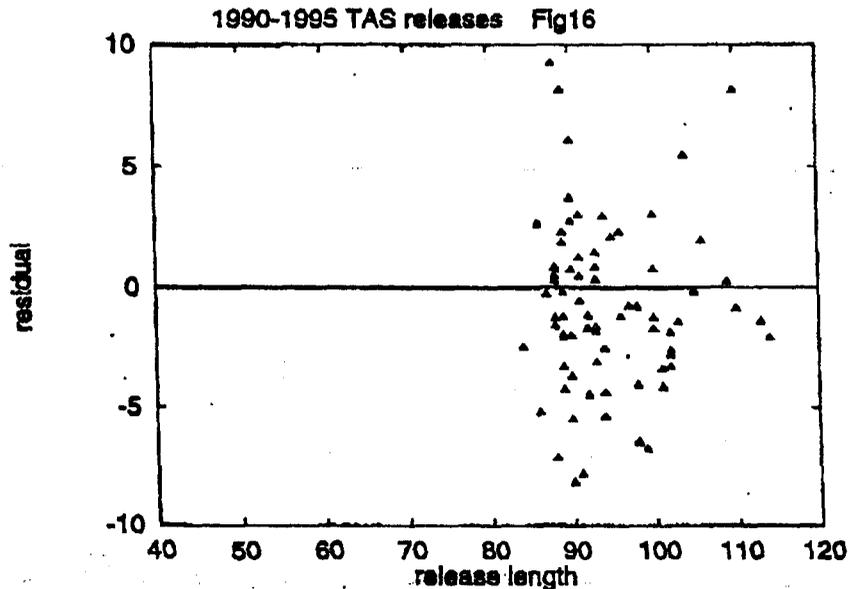
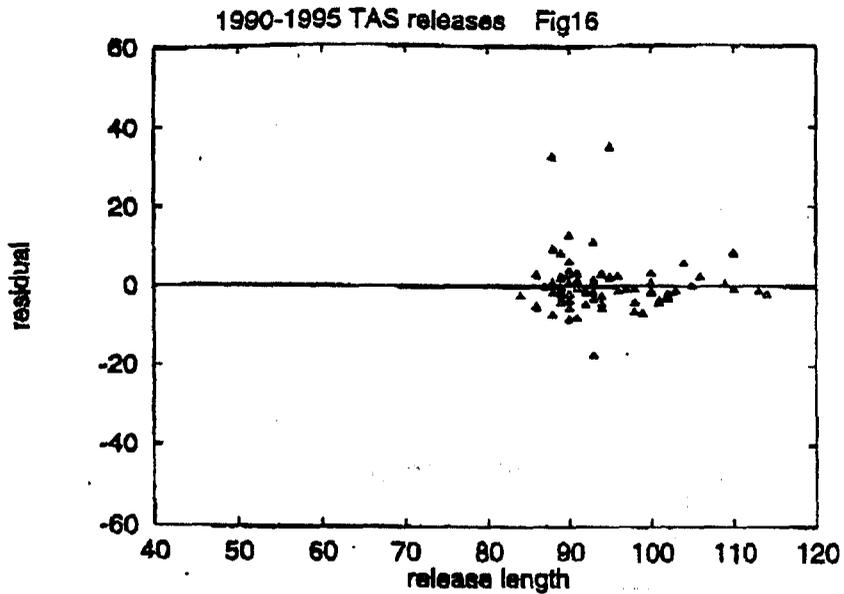


Figure 16: The deviation from the expected growth increment (i.e. the measured growth increment minus the predicted growth increment) for the 1980's two stanza growth curve (see Anon. 1994) as a function of length at release for recoveries from releases around eastern Tasmania. The top panel is for all fish recovered from these releases from the 1990/91 to 1994/95 tagging experiments and the lower panel excludes recoveries in which the residual exceeds 10cm.

YELLOW FIN TUNA LANDING IN FIJI (1976 - 1994)

Subodh Sharma, Fiji Fisheries Division
August 1995

Yellow Fin tuna (*Thunnus Albacares*) is unloaded by Domestic Longline vessels at the processing Centre in Lami, together with catches of albacore, bigeye, swordfish, marlin and others.

Yellowfin is also caught by pole and line vessels and unloaded to the PAFCO Cannery in Levuka, together with catches of skipjack. This forms the basis of the valuable F\$43 million export fishery.

Troll fishery is the other method used to catch yellowfin . Tuna is now becoming important artisanal fishery in Fiji. Fijian fisherman, traditionally fish inshore but with the Fish Aggregation Device (FAD) deployment, the tendency to fish around the FAD has increased. This has further resulted in an increase in artisanal tuna catches in Fiji.

The selling price for fresh yellowfin tuna ranges from (F\$3.00 - \$3.50) .per kg. In contrast, inshore fish species which are most preferred by Fijians would have a price range of F\$3.50- \$5.50 per kg. The difference in price, lack of fresh inshore fish species have contributed a lot to consumers buying fresh tuna .

THE INDUSTRIAL TUNA FISHERY

The industrial tuna is primarily export orientated with the PAFCO tuna cannery at Levuka having sold a record of F\$43 million in 1994. This fishery is dependent upon 3 types of tuna, namely Albacore, Skipjack and YellowFin.

POLE AND LINE LANDING

Yellowfin tuna account for 13% of all fish landed at PAFCO cannery at Levuka by pole & line vessels, while 24% yellowfin is landed by Domestic Longline vessels at Fish Processing Centre at Lami in Suva. The landing of yellowfin catches of Pole & line , Longline and Troll fishery is represented in Fig 1.

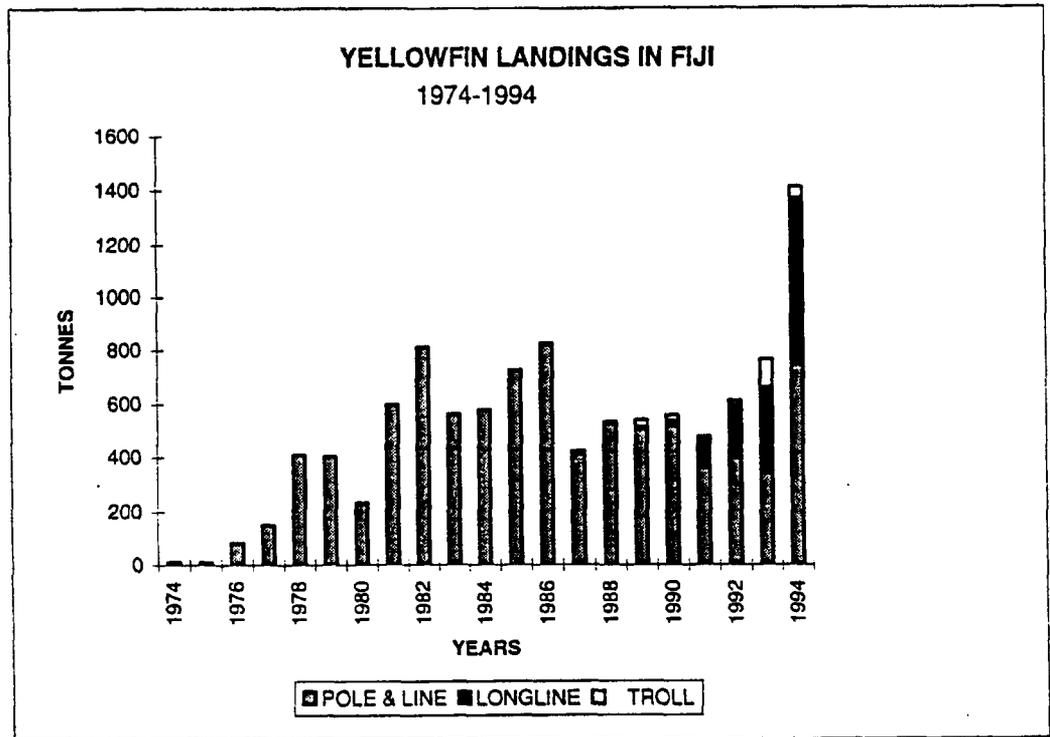


Fig 1. Yellowfin Tuna Landing

**TABLE 1 YELLOWFIN LANDING IN FIJI IN METRIC TONNES
(1970 - 1994)**

YEAR	POLE & LINE	LOGLINE	TROLL	TOTAL
1970	0	0	0	0
1971	0	0	0	0
1972	0	0	0	0
1973	0	0	0	0
1974	12	0	0	12
1975	11	0	0	11
1976	83	0	0	83
1977	151	0	0	151
1978	409	0	0	409
1979	403	0	0	403
1980	233	0	0	233
1981	599	0	0	599
1982	813	0	0	813
1983	562	0	3	565
1984	580	0	0	580
1985	724	0	3	727
1986	823	0	6	829
1987	410	0	13	423
1988	526	0	9	535
1989	506	10	26	542
1990	516	23	20	559
1991	358	106	13	477
1992	395	202	15	612
1993	337	323	104	764
1994	743	625	41	1409
TOTAL	9194	1285	253	10736

**SOURCES: POLE & LINE LANDING, LONG LINE LANDING AND TROLL
FROM (1970 - 1994)**

- A) Pole and line landing data represents landings received at Pacific Fishing Company cannery in Levuka (see map of Fiji Islands for location).
- B) Longline vessels, are Domestic Longline Vessels fishing for target species-bigeye. They also catch substantial amount of yellowfin and albacore (data received from processing centre base in Lami Suva).
- C) Troll vessels, vessels trolling for yellowfin and skipjack tuna around (Fish Aggregation Devices close to Suva). The data collected by Market Research Unit of Fisheries Division.

TABLE 2. Number (except for Japan) of longline vessels, pole and line and troll vessels fishing for tuna in Fiji

YEAR.	POLE & LINE	LOGLINE	TROLL	TOTAL
1970	0	0	0	0
1971	0	0	0	0
1972	0	0	0	0
1973	0	0	0	0
1974	0	0	0	0
1975	0	0	0	0
1976	2	0	0	2
1977	6	0	0	6
1978	6	0	0	6
1979	8	0	0	8
1980	11	0	0	11
1981	12	0	0	12
1982	14	0	0	14
1983	13	0	0	13
1984	11	0	0	11
1985	7	0	0	7
1986	6	0	0	6
1987	8	0	0	8
1988	11	0	0	11
1989	14	4	4	22
1990	14	6	4	24
1991	11	9	7	27
1992	11	18	7	36
1993	10	21	9	40
1994	10	37	7	54
TOTAL	185	95	38	318

In the years (1974-1994) yellowfin landing has ranged from (12-1409) tonnes (Table 1). The highest catches 9194 tonnes were reported by Pole & line fishery, 1285 tonnes by Domestic Longline followed by troll fishery 253 tonnes.

Troll fishery only represent 4%(253) tonnes of the artisanal fishery which account for total catches landed at municipal markets, roadside centres, shops, retail outlets and butchers (1985-1994).

TARGET SPECIES (Domestic Longline Fishery)

Catch report forms and landing records are received from Domestic Longline Vessels fishing for sashimi tuna. A domestic joint venture of small longline fleet of 37 vessels operated in Fiji waters in 1994. The target species for the Fijian domestic longline fishery are large bigeye and yellowfin tunas. Albacore and other tuna species are also landed. Though the target species are bigeye and yellowfin, bulk of the catch was albacore.

This fishery caught 2423 tonnes of fish in 1994 which included 624 tonnes yellowfin, 249 tonnes big eye, 841 tonnes albacore and 707 tonnes miscellaneous species. There was 100% increase in landing.

Billfish, although not targeted, are also landed in large quantities, striped marlin, and spearfish comprise the bulk of the billfish landings. Small percentage of other species are also reported in the catches.

Longline Species Landed at Fiji Fish Processing Centre in Lami, Suva.

TABLE 3 SPECIES COMPOSITION FOR DOMESTIC LONGLINE FISHERY

YEAR	VESSEL ACTIVE	VESSEL COVERED	YELLOW FIN	BIG EYE	ALBACORE	OTHERS	TOTAL (TONNES)
1989	5	4	10.08	13.6	3.42	25.53	52.63
1990	10	6	22.50	27.49	68.5	39.29	157.86
1991	18	9	106.04	122.7	207.88	135.81	572.43
1992	23	18	201.56	186.55	243.22	252.09	883.42
1993	21	21	323.66	205.11	330.06	320.07	1178.81
1994	37	37	624.8	249.27	841.95	707.26	2423.29
TOTAL			1288.72	804.72	1695.03	1480.05	5268.44

TUNAS

Common Name

Scientific Name

Big Eye

Thunnus obesus

Yellowfin

Thunnus albacares

Albacore

Thunnus alalunga

PELAGIC SPECIES

Common Name

Scientific Name

Striped Marlin

Tetrapterus audax

Blue Marlin

Makana majara

Short nosed spear fish

Tetraoterus anqustrostris

Black Marlin

Makaira indica

Sailfish

Istiophorus platypterus

Swordfish

Xiphias gladius

Mahi Mahi

Coryphaena hippurus

Miscellaneous

Common Name

Scientific Name

Moonfish

Lampris regis

Landings

Total landings for all commercial fishing for all tuna species combined is shown in Table 4 from (1970 - 1994).

Foreign Longline Fishery (EEZ) ranked the highest followed by Pole and Line, Purse Seine, Domestic Longline and Troll Fishery.

TABLE 4

TOTAL TUNA LANDING BY POLE & LINE, FOREIGN LONGLINE, DOMESTIC LONGLINE, PURSE SEINE AND TROLL VESSELS AT CANNERIES, MARKET, OUTLETS CENTRES AND PROCESSING IN METRIC TONNES

YEAR	FOREIGN LONGLINE	DOMESTIC LONGLINE	POLE AND LINE	PURSE SEINE	TROLL FISHERY	TOTAL (MT)
1970	8519	0	0	0	0	8519
1971	6132	0	0	0	0	6132
1972	11954	0	0	0	0	11954
1973	6172	0	0	0	0	6172
1974	3984	0	0	0	0	3984
1975	2188	0	0	0	0	2188
1976	3640	0	747	0	0	4387
1977	5558	0	1711	0	0	7269
1978	8418	0	2524	0	0	10942
1979	3573	0	3495	0	0	7068
1980	5237	0	2500	47	0	7784
1981	3220	0	5829	772	0	9821
1982	1573	0	4664	1006	0	7243
1983	1384	0	4185	1006	0	6575
1984	1432	0	4572	557	0	6561
1985	2051	0	3948	0	3	6002
1986	1181	0	3115	0	15	4311
1987	108	0	3885	0	58	4051
1988	4886	0	4287	0	23	9196
1989	3478	53	5883	916	46	10376
1990	3322	158	4028	0	44	7552
1991	4150	572	4428	0	37	9187
1992	4480	883	4106	0	59	9528
1993	4258	1178	3175	0	204	8815
					253	9623
1994	3533	2423	3414	0	742	176359
				4304		
TOTAL	104451	5267	70496	4304	742	176359

SOUTH PACIFIC COMMISSION TUNA RESEARCH FOR FLII

The South Pacific Commission carried out assessment of tuna stock for Fiji Waters to find out the states of tuna stock that can support the fishery. The assessment used the log sheet data supplied to them by Fiji Fisheries Division.

YELLOWFIN

Recent tagging - based stock assessment work by the South Pacific Commission's Offshore Fisheries Programme has indicated that Western Pacific Yellowfin stocks are in sound condition, and may be able to withstand some further increase in total catch above the present 400,000 tonnes. There is some evidence that the Fiji stock mixes to some extent with other areas, and is not a resident self - sustaining stock. There is probably no compelling biological reason to limit the Fiji harvest, particularly as the nearest significant areas of harvest of adult yellowfin are relatively distant.

Fiji Fisheries Division requested SPC to establish the total allowable catches for Fiji's Tuna Fisheries.

Total Allowable Catch proposed by SPC are listed below:

SPECIES	PRESENT CATCH	SUGGESTED TAC
Skipjack	pole/line 3650 t	16000 t
	U.S purse seine 6000t	
Yellowfin	Fiji's Sashimi longline - 350t	6000t
	Cannery longline - 400t	
	pole line - 350t	
	U.S purse seine - 2000t	
Big Eye	Fiji's Sashimi longline - 500t	3000t
	Cannery longline - 1600t	

The TAC should be related to the proposed fisheries categories as follows.

Category 2	Category 3	Category 4
Tuna pole and line	Tuna longline	Tuna purse seine
8500t skipjack	3000t Albacore	7500t skipjack
1500t yellowfin	2500t yellowfin	2500t yellowfin
	2000t big eye	