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REVIEW OF THE NEW ZEALAND ALBACORE FISHERY

presented by

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Developments in Albacore Fisheries from the New Zealand Area

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1. Introduction

Longline and surface troll fisheries for albacore have operated in the South Pacific for several decades. While total longline catches have fluctuated from about 20 000 t to slightly more than 40 000 t since the late 1950s, high seas surface fisheries including troll and large-mesh pelagic driftnet fisheries began expanding in 1988. Increasing effort in surface fisheries and the limited information available for stock assessment of South Pacific albacore raised concerns about the sustainability of harvests, the potential for fisheries interactions and the appropriate balance between fisheries. These issues and plans to improve the information for stock assessments have dominated discussions at South Pacific Albacore Research workshops since late 1988.

This paper summarises the development of longline fisheries for adult albacore and surface fisheries for juvenile albacore in the South Pacific in relation to developments within the New Zealand Exclusive Economic Zone (EEZ).

1.1 Longline Fisheries

South Pacific albacore fisheries began with the expansion of Japans' distant water longline fleet into the South Pacific starting in 1952 (Watanabe and Nishikawa 1990). The Japanese catch rapidly increased to a peak of nearly 39,000 t by 1962 before declining to less than 7000 t in the late 1960s. The Japanese catch throughout the 1970s and most of the 1980s ranged from 1000 to 5000 t. More recent catch estimates indicate slightly higher longline albacore catches by Japan of 5000-7000 t since 1988.

Following the success of the Japanese fleet, Korean longliners began targeting albacore in 1958 followed by Taiwan in 1967. Korean catches increased from a few hundred tonnes in the early 1960s to 10,000 t in the mid-1960s. The catch by Korean longliners has been variable and except for a few years, when catches have been on the order of 5000 to 10,000 t, catches have been 10,000 to 15,000 t. Catch data since 1987 suggest that catches by this fleet have declined to less than 10,000 t.

The first reported Taiwanese catch of South Pacific albacore was 11,751 t in 1967. Since then Taiwanese longline catches have consistently been higher (except in 1969 and 1985 when over 9000 t was caught). Longline catches while somewhat variable increased to over 20,000 t in the late 1970s before declining to about 12,000 t through the early to mid-1980s. Catch data since 1986 suggests that catches by this fleet are increasing except for the most recent two years where less than 10,000 t is estimated to have been caught.

Since 1983, South Pacific coastal States have been longlining for adult albacore. Tonga, New Caledonia and Australia all have begun targeting albacore with longlines and a number of small vessels drop line for adult albacore in French Polynesian waters. Since 1989 a growing number of New Zealand vessels have been increasingly catching albacore. The combined catch by South Pacific coastal States is less than 2000 t.

The total longline catch of albacore peaked in 1967 when over 42,000 t were caught, since then catches have generally varied between 24,000 t and 37,000 t. The longline catch of albacore has generally been at or below the estimated Maximum Sustainable Yield (MSY) of 30-35,000 tonnes (Wang et al. 1988) since the late 1970s. This MSY estimate, however, assumes a surface fishery of less than 2000 t.

1.2 Surface Fisheries

Trolling for albacore first developed in the South Pacific in the New Zealand EEZ in the late 1960s. The New Zealand troll fishery operates chiefly in a band 40-80 miles offshore of the west coast of the South Island from January through March. Season length varies from six weeks to six months depending on weather conditions. The fishery also experiences variable landings due to weather conditions and probably due to climatic factors affecting the southern limit of the distribution of juveniles. In good seasons (warm calm summers) over 200 small vessels enter this fishery and can land from 2000 t to over 4000 t of juvenile albacore. In bad seasons (cold windy summers) fewer vessels fish and landings can be less than 1000 tonnes.

The troll fishery expanded into high seas areas in 1986 following exploratory fishing along the Subtropical Convergence Zone (STCZ) east of New Zealand. The STCZ albacore troll fishery has developed from 100 tonnes and two vessels in 1985/86 to over 4000 tonnes and more than 50 vessels since 1988/89. The STCZ troll fishery operates entirely in high seas areas primarily from 39° to 41° S, between 165° and 140° W. Approximately 50 US, 6 New Zealand, 2 French Polynesian, and one Fijian troll vessel participate in this fishery. In the 1990/91 season one JAMARC vessel also fished by trolling but reportedly was unsuccessful. Effort in this fishery is not expected to increase much beyond the 1990/91 level. Some exploratory fishing in high seas areas of the Tasman Sea has also been done since 1989/90 season with limited success.

While the STCZ troll fishery was developing, a large-scale pelagic driftnet fishery for albacore involving vessels from Japan, Taiwan and Korea was also developing in high seas areas east and west of New Zealand. This fishery was started by Japan in 1982/83 in high seas areas of the Tasman Sea. The rapid expansion of the driftnet fishery from 10 vessels in 1986/87 to perhaps as many as 198 in 1988/89 and the magnitude of driftnet catches resulted in considerable concern over the sustainability of harvests of juveniles at 1988/89 levels. Concern over interactions between driftnet and troll fleets also arose since both fisheries caught similarly sized fish in the same area at the same time. However, reductions in driftnet fleet size in 1989/90 and the commitment to stop driftnet fishing by July 1991 has increased confidence that it will be possible to manage the resource effectively.

Table 1 summarizes the catches in surface albacore fisheries in the South Pacific by country and fishing method.

2. Geographical and Seasonal Distribution of Fisheries

Surface fisheries are restricted to austral summer months, primarily December into April. The geographical extent of areas where surface fishing is effective is also limited to mid-temperate latitudes where summer sea surface temperatures tend to be 17 to 19 C. In the South Pacific high seas fishery (east of New Zealand and in the Tasman Sea) most fishing takes place between 39° and 41°S. Along the shelf edge of New Zealand especially in the Tasman Sea, commercial concentrations are more broadly distributed from about 37° to 45°S.

The longline fishery for albacore operates year round, moving from north to south seasonally. These patterns are summarised by Wang (1988) for the Taiwanese fleet and by Wetherall and Yong (1989) for the Korean fleet. The pattern is assumed to be similar for the Japanese fleet while the area of fishing activity extends further east (Polacheck 1987). The general pattern is southwards during January to April and northwards from July to October. The Taiwanese fleet appears to concentrate fishing from 5° to 45°S while Korean vessels fish from north of the equator to 45°S. Most albacore longlining by Taiwanese and Korean fleets is west of 120°W and relatively little has been in the Tasman Sea or the area around New Zealand in recent years. Data presented by Wang (1988) and Wetherall and Yong (1989) suggests that the Tasman Sea and New Zealand EEZ were extensively fished prior to the early 1980s while more recent fishing is predominantly in high seas areas.

Polacheck (1987) indicates that Japanese longline fishing pattern for albacore differs from those of Korea and Taiwan. Japanese longliners appear to fish a narrower band east of New Zealand from 10° to 35°S and as far south as 50°S in the Tasman Sea and around New Zealand. Japanese vessels also appear to fish further east across the South Pacific than the other fleets.

3. Trends in Fisheries

Total catches by the longline fishery have been reasonably stable (at or below 35,000 t) since the late 1970s.

South Pacific surface fisheries have seen dramatic changes over the last three years. Following the rapid increase in driftnet fishing to at least 130 vessels in 1988/89, the fleet was progressively reduced to 30 vessels in 1989/90, to 7 vessels in 1990/91 and no further driftnet fishing is expected. The troll fleet on the other hand has increased at a moderate rate. These changes are reflected in the total surface fishery catch which declined from at least 34,000 t in 1988/89 to about 8,000 t in 1990/91. Despite the reduction in driftnet fishing the 1991/92 season and the 1992/93 season are likely to be significantly below preceding seasons. Based on discussions with fishers, the reason for the decline is likely to be at least partially attributable to el niño conditions and related effects on the depth of the thermocline, changes in albacore forage distribution, forage composition, etc.

4. CPUE in the New Zealand area

Indices of abundance for the South Pacific longline fishery have been published in summary form for the periods 1971 to 1985 (Wang 1988) and 1983 to 1987 (Wetherall and Yong 1989). The only other index of abundance for the longline fishery is that of Watanabe and Nishikawa (1990) for the aggregated non-target longline fishery (presumed to be all target species combined) for the period 1971-1987. The area used by these authors covers that part of the South Pacific west of 130°W from 5°N to 60°S and includes data from seasons and areas where albacore are not caught.

Catch and effort has also been monitored for longline fleets in the New Zealand EEZ since the establishment of the 200 mile EEZ. Three fleets differing in target species and area of operation are licensed to longline, these include a Japanese fleet of up to 38 vessels targeting southern bluefin tuna, a Japanese fleet of up to 20 vessels targeting bigeye tuna and swordfish, and a Korean fleet of up to 20 vessels targeting albacore. All longline vessels have high catches of albacore north of about 40°S. Table 3 summarises the frequency of albacore targeting by these fleets in each year. It is clear that only Korean vessels regularly target albacore although catch rates are also high for Japanese vessels in the "Northern" fishery (see Table 4). The relatively short time series represented by the data in Table 4 are difficult to interpret. The CPUE data from the Korean fleet for the most recent years, however, show the same declining trend described by Wetherall and Yong (1990) that typifies the Korean and Taiwanese fleets across the South Pacific. The Japanese CPUE data while reflecting albacore CPUE as a by-catch species, exhibits a decline only between 1989 and 1990 in an area where albacore are commonly caught (the "Northern" fishery) while the aggregate "Southern" fishery by-catch CPUE suggests a stable but low and variable abundance. Both patterns differ from that of the aggregated Japanese longline fishery (all targets and areas combined) presented by Watanabe and Nishikawa (1990) which indicates an increase in CPUE from 1984 through 1987.

Until recently data from the New Zealand domestic longline fishery was unavailable and data from the troll fishery was only available for the landed catch while effort data was not accessible. The data access problem has improved over the past year and indices of abundance for albacore in the New Zealand EEZ are given in Table 2 for the domestic troll and longline fisheries. The trends for both fisheries exhibit an increase in CPUE from 1989/90 through 1991/92 with the longline catch rate about twice that of the troll fishery. In contrast using the average weight data in Table 5 and CPUE data in Table 4 it appears that foreign licensed CPUE is on the order of 10-50% of the domestic longline fishery. This may be due to the difference in performance of kuralon longline gear in the foreign licensed fishery and monofilament longline gear in the domestic fishery.

5. Longline Size Composition from the New Zealand EEZ

Average albacore weight has been estimated from the longline catch data in the New Zealand EEZ, these are summarised in Table 5 by fishery and year. No clear trend in size of fish caught is evident within a fishery over time. However, albacore caught in the "Southern" fishery are consistently larger than those caught in the "Northern" fishery. This may result from area exclusions for "Northern" longline vessels which can only fish

north of 34°S on the east coast and north of 38°S on the west coast while the "Southern" fishery can fish these and more southern areas. It may also be due to differences in discarding practises between fleets.

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Table 1. Surface fishery catches (tonnes) of South Pacific albacore since 1967 by country and gear. Asterisks indicate estimated catch.

	Year	Australia Various*	Total Driftnet	N Z Troll	STCZ Troll	Japan pole & line	Total
1966/	1967			5			5
	1968			14			14
	1969			n/a			n/a
	1970	200		50			250
	1971	200		n/a			200
	1972	200		268			468
	1973	200		484			684
	1974	200		898			1098
	1975	200		646			846
	1976	200		25			225
	1977	200		621			821
	1978	200		1686			1886
	1979	200		814			1014
	1980	100		1468		19	1587
	1981	100		2085		8	2193
	1982	50	?	2434		1	2485
	1983	50	?	744		2	796
	1984	50	1563	2773			4386
	1985	50	1905	3253			5208
	1986	50	1919	1911	89		3969
	1987	50	587	1227	748		2612
	1988	50	5801	330	3527		9708
	1989	50	25-49 000	4800 ¹	3810		34-58 000
	1990	50	7526	1785 ¹	4535		13 896
	1991	50	821	1626 ¹	5530		8027
1991/	1992		?	3156 ¹			n/a

¹ does not include New Zealand catches in STCZ (361 t in 1988/89, 740 t in 1989/90, and 838 t in 1990/91, 1991/92 not currently available)

Table 2. Domestic albacore catch and effort by gear type within the New Zealand EEZ for fishing year 1989/90 through 1991/92 (fishing years run from 1 October through 30 September).

<u>Fishing Year</u>	<u>Gear type</u>	<u>No. of vessels</u>	^{MAF records.} <u>Days fished</u>	^{landings} <u>kg. reported caught in EEZ</u>	<u>CPUE kg/day</u>
1989/90	troll	217	4095	1 785 000	435.9
1990/91		227	3588	1 626 000	453.2
1991/92		252	4355	3 156 000	724.7
1989/90	dom. longline	13	327	249 093	761.7
1990/91		14	349	324 665	930.3
1991/92		20	504	705 806	1400.4
1989/90	JV longline	5	n/a	40 300	
1990/91		3	n/a	22 400	
1991/92		4	n/a	7 100	
1989/90	handline	17	63	2 918	
1990/91		10	26	1 188	
1991/92		5	5	160	
1989/90	other/unknown	23	79	26 112	
1990/91		41	141	121 813	
1991/92		37	105	27 504	

Trying to extend back.

Small days/season for boats

Table 3. Frequency of target fishing (% of sets*) for albacore by foreign licensed longline vessels in the New Zealand EEZ.

Year	Southern Fishery Japan	Northern Fishery Japan	Northern Fishery Korea
1980	0.0	-	-
1981	0.0	-	100.0
1982	0.5	0.0	100.0
1983	<0.1	0.0	100.0
1984	0.0	0.0	100.0
1985	0.0	24.7	100.0
1986	0.0	18.1	100.0
1987	0.0	35.3	100.0
1988	0.0	17.6	100.0
1989	0.0	0.0	100.0
1990	0.0	0.0	-
1991	0.2	0.0	-
1992	0.4	-	-

* excludes sets where target species is not recorded

Table 4. Comparison of albacore CPUE (number of fish per 1000 hooks) when albacore are targeted vs. all targets combined by foreign licensed longline fishery and vessel flag in the New Zealand EEZ.

Year	Southern Fishery	Northern Fishery		Northern Fishery	
	Japan all sets	all sets	Japan albacore sets	all sets	Korea albacore sets
1980	0.8	-	-	-	-
1981	1.9	-	-	24.5	24.5
1982	2.9	12.1	-	22.7	22.7
1983	3.1	3.6	-	43.5	43.5
1984	3.1	12.1	-	30.3	31.1
1985	2.7	7.5	10.6	34.4	35.5
1986	2.8	16.5	20.2	62.0	61.3
1987	2.7	12.6	15.4	61.7	62.6
1988	3.1	18.9	17.5	36.5	36.9
1989	2.5	18.6	-	25.8	24.2
1990	4.0	10.2	-	-	-
1991	2.4	15.2	-	-	-
1992	3.5	-	-	-	-

Table 5. Average size (in kg) of albacore caught by foreign licensed longline fisheries in the New Zealand EEZ.

Year	Southern Fishery	Northern Fishery	
	Japan	Japan	Korea
1980	11.3	-	-
1981	9.6	-	11.1
1982	10.8	13.7	12.6
1983	10.8	13.5	11.8
1984	11.8	10.8	11.3
1985	10.8	11.2	8.8
1986	10.4	8.7	8.7
1987	11.0	9.1	9.8
1988	11.6	8.2	9.8
1989	11.9	7.0	9.0
1990	12.5	8.5	-
1991	11.8	9.4	-
1992	10.9	-	-