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**OVERVIEW OF TUNA FISHERIES IN THE WESTERN AND CENTRAL PACIFIC OCEAN,
INCLUDING ECONOMIC CONDITIONS – 2005**

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1. INTRODUCTION

The tuna fishery in the Western and Central Pacific Ocean is diverse, ranging from small-scale artisanal operations in the coastal waters of Pacific states, to large-scale, industrial purse-seine, pole-and-line and longline operations in both the exclusive economic zones of Pacific states and on the high seas. The main species targeted by these fisheries are skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*) and albacore tuna (*T. alalunga*).

Prior to the first meeting of the WCPFC Scientific Committee (WCPFC–SC1), catch estimates were compiled for the Western and Central Pacific Ocean (WCPO), which is separated from the eastern Pacific Ocean (EPO) by 150°W longitude (Figure 1). With the establishment of the Western and Central Pacific Fisheries Commission (WCPFC), catch estimates are now compiled for the WCPFC Statistical Area¹ (WCP–CA), and can be found in Information Paper WCPFC–SC2 ST IP–1 (*Estimates of annual catches in the WCPFC Statistical Area – OFP, 2006*). The estimates for the calendar year 2005 represent the best available information at the time of writing this paper, but should be considered provisional at this stage.

This paper includes sections covering a summary of total catch in the WCP–CA tuna fisheries, an overview of the WCP–CA tuna fisheries by gear, including economic conditions in each fishery, and a summary of catches by species. In each section, the paper makes some observations on recent developments in each fishery, with emphasis on 2005 catches relative to those of recent years, where information is currently available.

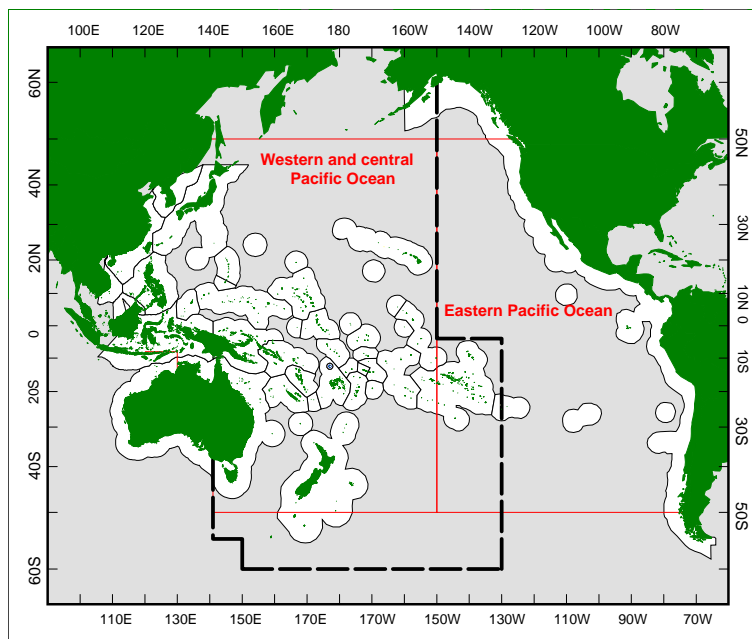


Figure 1. The western and central Pacific Ocean (WCPO), the eastern Pacific Ocean (EPO) and the WCPFC Convention Area (WCP–CA in dashed lines)

¹ “The Convention Area is defined in the text of the WCPFC Convention as follows: From the south coast of Australia due south along the 141° meridian of east longitude to its intersection with the 55° parallel of south latitude; thence due east along the 55° parallel of south latitude to its intersection with the 150° meridian of east longitude; thence due south along the 150° meridian of east longitude to its intersection with the 60° parallel of south latitude; thence due east along the 60° parallel of south latitude to its intersection with the 130° meridian of west longitude; thence due north along the 130° meridian of west longitude to its intersection with the 4° parallel of south latitude; thence due west along the 4° parallel of south latitude to its intersection with the 150° meridian of west longitude; thence due north along the 150° meridian of west longitude.

The western boundary of the Convention Area north of the north coast of Australia has not been defined in the text of the Convention. Therefore, for statistical purposes, the western boundary of the WCPO Area, which was established at the Twelfth Meeting of the Standing Committee on Tuna and Billfish in June 1999, will be used in this regard and the entire area referred to as the “WCPFC Statistical Area”. The coordinates of the western boundary are as follows: from the north coast of Australia due north along the 129° meridian of east longitude to its intersection with the 8° parallel of south latitude, thence due west along the 8° parallel of south latitude to the Indonesian peninsula, and from the Indonesian peninsula due east along the 2°30' parallel of north latitude to the Malaysian peninsula.”

2. TOTAL TUNA CATCH FOR 2005

Annual total catches of the four main tuna species (skipjack, yellowfin, bigeye and albacore) in the WCP-CA increased steadily during the 1980s as the purse seine fleet expanded and remained relatively stable during most of the 1990s until the sharp increase in catch during 1998. Over the past 5 years, there has been an increasing trend in total tuna catch, primarily due to increases in purse-seine fishery catches (Figure 2 and Figure 3). The provisional total WCP-CA tuna catch for 2005 was estimated at **2,145,367 mt**, the highest annual catch recorded, and an increase of around 5% on the previous record in 2004 (2,047,013 mt). During 2005, the purse seine fishery accounted for an estimated 1,523,373 mt (71% of the total catch—the highest catch ever for this fishery), with pole-and-line taking an estimated 205,872 mt (10%), the longline fishery an estimated 242,059 mt (11%), and the remainder (7%) taken by troll gear and a variety of artisanal gears, mostly in eastern Indonesia and the Philippines. The WCP-CA tuna catch (2,145,367 mt) for 2005 represented 77% of the total Pacific Ocean catch of 2,799,625 mt and 49% of the global tuna catch (the provisional estimate for 2005 is just over 4.3 million mt).

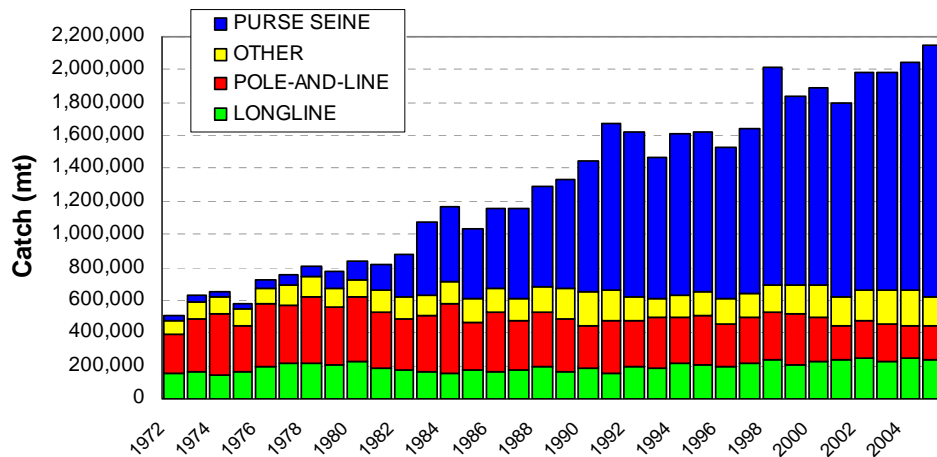


Figure 2. Catch (mt) of albacore, bigeye, skipjack and yellowfin in the WCP-CA, by longline, pole-and-line, purse seine and other gear types

The 2005 WCP-CA catch of skipjack (1,443,127 mt – 67% of the total catch) was the highest ever and more than 5% higher than the previous record catch taken in 2004. The WCP-CA yellowfin catch for 2005 (423,468 mt – 20%) was slightly higher than in 2004 (a poor catch year for yellowfin) but around 10% lower than the record catch in 1998 (466,468 mt). The WCP-CA bigeye catch for 2005 (163,419 mt – 8%) was the highest on record, although the WCP-CA albacore¹ (115,353 mt – 5%) catch was the lowest for five years.

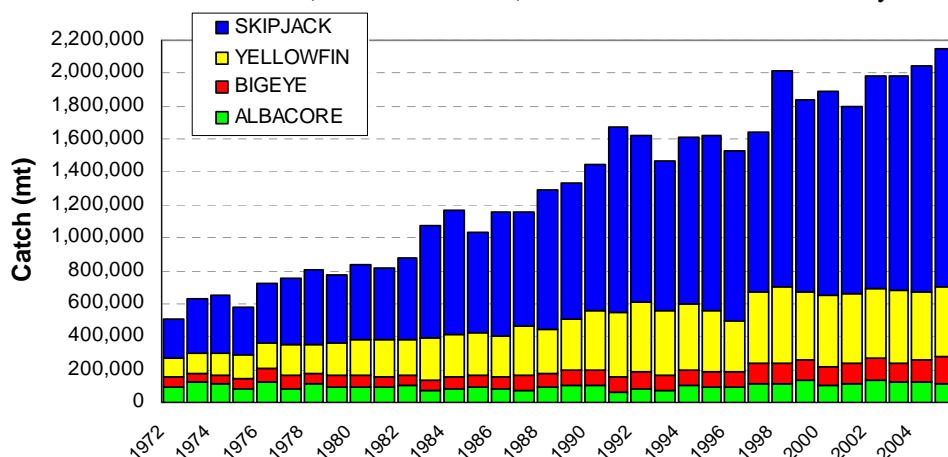


Figure 3. Catch (mt) of albacore, bigeye, skipjack and yellowfin in the WCP-CA.

¹ includes catches of North and South Pacific albacore west of 150° W, which comprised 86% of the total Pacific Ocean albacore catch of 134,002 mt in 2005; the section 7.4 “Summary of Catch by Species - Albacore” is concerned only with catches of South Pacific albacore, which make up approximately 50% of the WCP-CA albacore catch.

3 WCP-CA PURSE SEINE FISHERY

3.1 Historical Overview

The purse seine fishery has accounted for around 55–60% of the WCP-CA total catch by volume since the early 1990s, with annual catches in the range 790,000–1,260,000 mt. The majority of the WCP-CA purse seine catch has come from the four main DWFN fleets – Japan, Korea, Chinese-Taipei and USA, which numbered 147 vessels in 1995, but has gradually declined in numbers to 112 vessels in 2005. In contrast, there has been a steady increase in the number of vessels from Pacific Islands fleets, which totalled 66 vessels in 2005 (Figure 4). The remainder comes from a large number of smaller vessels in the Indonesian and Philippines domestic fisheries, and a variety of other domestic and foreign fleets, including several recent distant-water entrants into the tropical fishery (e.g. China, New Zealand and Spain).

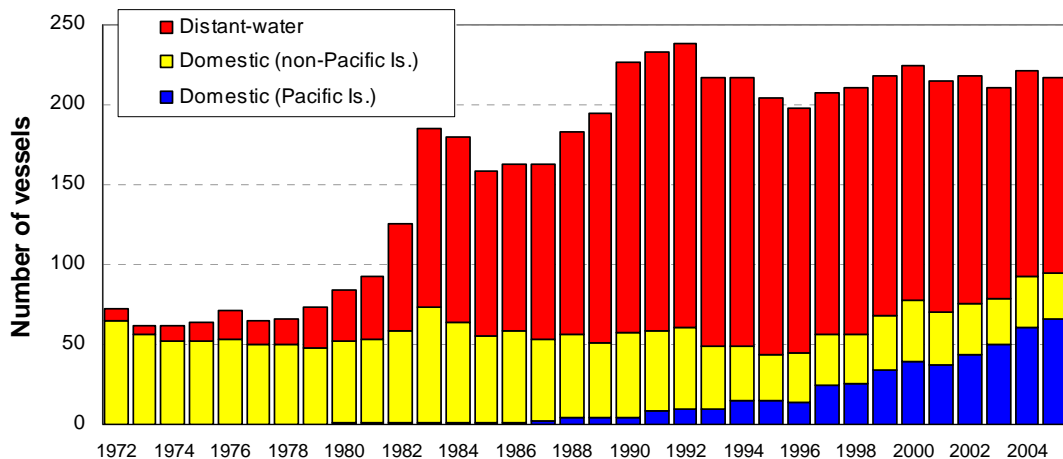


Figure 4. Number of purse seine vessels operating in the WCP-CA

(this does not include the Indonesian and Philippines domestic purse-seine/ringnet fleets which account for over 1,000 vessels)

The WCP-CA purse-seine fishery is essentially a skipjack fishery, unlike those of other ocean areas. Skipjack generally account for 70–85% of the purse seine catch, with yellowfin accounting for 15–30% and bigeye accounting for only a small proportion (Figure 5). Small amounts of albacore tuna are also taken in temperate water purse seine fisheries in the North Pacific.

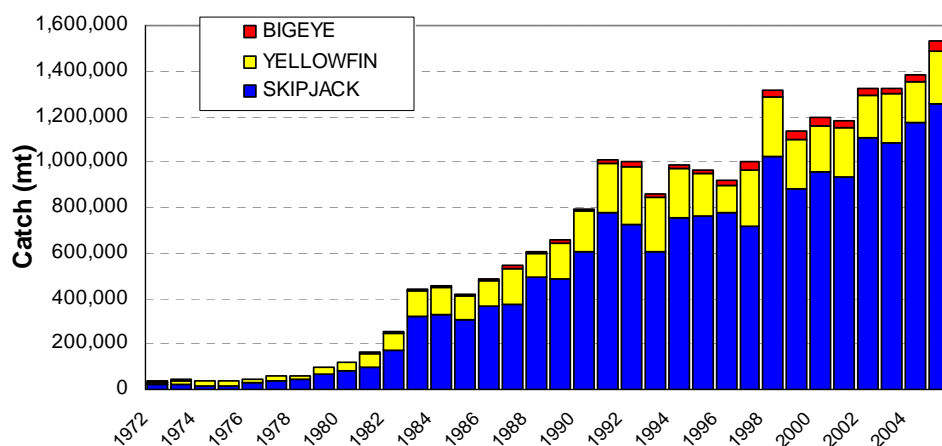


Figure 5. Purse seine catch (mt) of bigeye, skipjack and yellowfin in the WCP-CA

Features of the purse seine catch by species during the past decade include:

- Annual skipjack catches fluctuating between 600,000 and 800,000 mt prior to 1998, a significant increase in the catch during 1998, with catches now maintained above 1,000,000 mt for the past four years;

- Annual yellowfin catches fluctuating considerably between 120,000 and 270,000 mt. The proportion of yellowfin in the catch is generally higher during El Niño years and lower during La Niña years (1995/96 and to a lesser extent 1999/2000);
- Increased bigeye tuna purse seine catches, first in 1997 (37,294 mt) and then again in 1999 (38,198 mt) due to increased use of drifting FADs (since 1996). Then, over the period 2000–2004, bigeye catches were lower (in the range 26,000–32,000 mt), primarily due to a reduction in the use of drifting FADs.

3.2 Provisional catch estimates, fleet size and effort (2005)

The provisional **2005 purse-seine catch of 1,523,373 mt** was the highest on record and around 10% higher than the previous record in 2004 (1,390,764 mt), with the purse seine catch being in excess of 1,300,000 mt for the past four years. The purse seine skipjack catch for 2005 (1,249,711 mt – 82%) was the highest on record and the yellowfin catch for 2005 (231,241 mt – 15%) was a significant improvement (~28%) on the low 2004 catch (180,253 mt). The estimated purse seine bigeye catch² for 2005 (41,502 mt – 3%) was also a record, against the trend of reduced catches since the previous record in 1999 (38,327 mt).

[Figure 6](#) compares annual purse seine effort and catches for the five main purse seine fleets operating in the tropical WCP–CA in recent years. The combined 2005 catch for these fleets was the highest ever even though effort was clearly lower than in recent years, suggesting higher catch rates were experienced during 2005 (see section 3.4). The Chinese-Taipei fleet had been the highest producer in the tropical purse seine fishery until 2004, when it was surpassed by the combined Pacific Islands purse seine fleets fishing under the FSM Arrangement. The 2005 provisional catch estimate (195,039 mt) for the Chinese-Taipei fleet was similar to the level taken in 2004, but less than 60,000 mt compared to 2002, mainly due to several vessels changing flag at the end of 2002 (i.e. a reduction in vessel numbers).

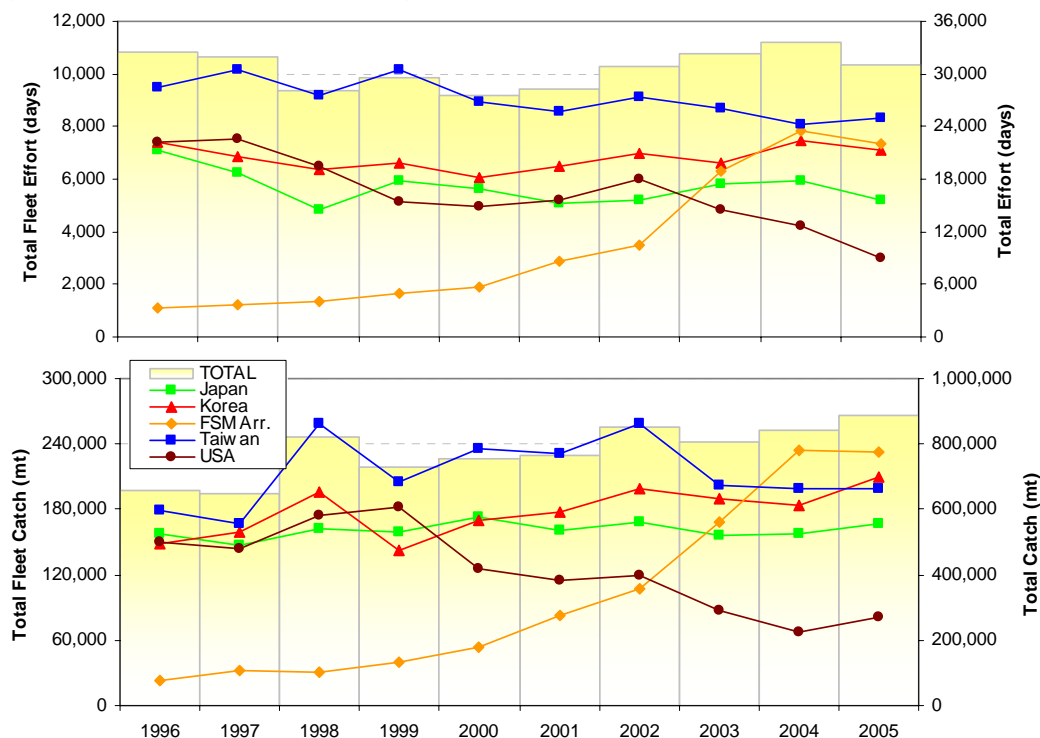


Figure 6. Trends in annual effort (top) and catch (bottom) estimates for the top five purse seine fleets operating in the tropical WCP–CA, 1996–2005.

Catches, fleet sizes and effort by the Japanese and Korean purse seine fleets have been stable for most of this time series. The increase in annual catch by the FSM Arrangement fleet since 2000 corresponds to an increase in

² Purse-seine bigeye catches have been adjusted to account for the mis-identification of bigeye as yellowfin in operational catch data and reports of unloadings; the analysis presented in Lawson (2005) was updated in 2006 with recently available observer data, and to estimate adjustment factors for all types of school association.

vessel numbers, and coincidentally, mirrors the decline in US purse seine catch, vessel numbers and effort over this period.

As mentioned earlier, the number of Pacific-island domestic vessels continued to grow in 2005 and is now at its highest level ever (66 vessels in 2005). This category is made up of vessels fishing under the FSM Arrangement (33 vessels), the Vanuatu fleet operating under bilateral arrangements (8 vessels) and domestic vessels operating in PNG and Solomon Islands waters. The FSM Arrangement fleet comprises vessels managed by the Pacific Island “Home Parties” of PNG (17 vessels), the Marshall Islands (6 vessels), FSM (6 vessels), Kiribati (1 vessels) and the Solomon Islands (3 vessels) which fish over a broad area of the tropical WCP-CA.

The domestic Philippine purse-seine and ring-net fleets operate in Philippine and northern Indonesian waters, and have taken around 150,000 t. in recent years (OFP, 2006); the domestic Indonesian purse-seine and ringnet fleets take a similar catch level³ which means that around 20% of the WCP-CA purse seine catch comes from the waters of these countries.

Figure 7 shows the annual trends in the school types set on by the major purse-seine fleets. The proportion of sets on free-swimming (unassociated) schools of tuna increased for all fleets in 2005, with a corresponding reduction on the number of sets on associated schools (logs and drifting FADs). Overall, unassociated sets accounted for about two-thirds of all sets for these fleets during 2005, compared to less than half (< 50%) in 2004. As in recent years, the Korean fleet continued to concentrate on unassociated, free-swimming schools during 2005 (80% of all sets). With regard to associated set types, log sets have been favoured over drifting FAD sets by the Asian purse seine fleets in recent years, while the US and FSM Arrangement fleets tended to set on a higher proportion of drifting FADs (than logs) during 2005.

The purse seine fishery experienced a record catch of bigeye tuna during 2005 despite a reduction in the number of associated sets, which typically account for a much higher proportion of bigeye catch in the ‘yellowfin plus bigeye’ catch than unassociated set types. The increase in the purse seine bigeye catch during 2005, despite the drop in the number of associated sets, is attributed to (i) the increase in yellowfin+bigeye catch (which was the highest in

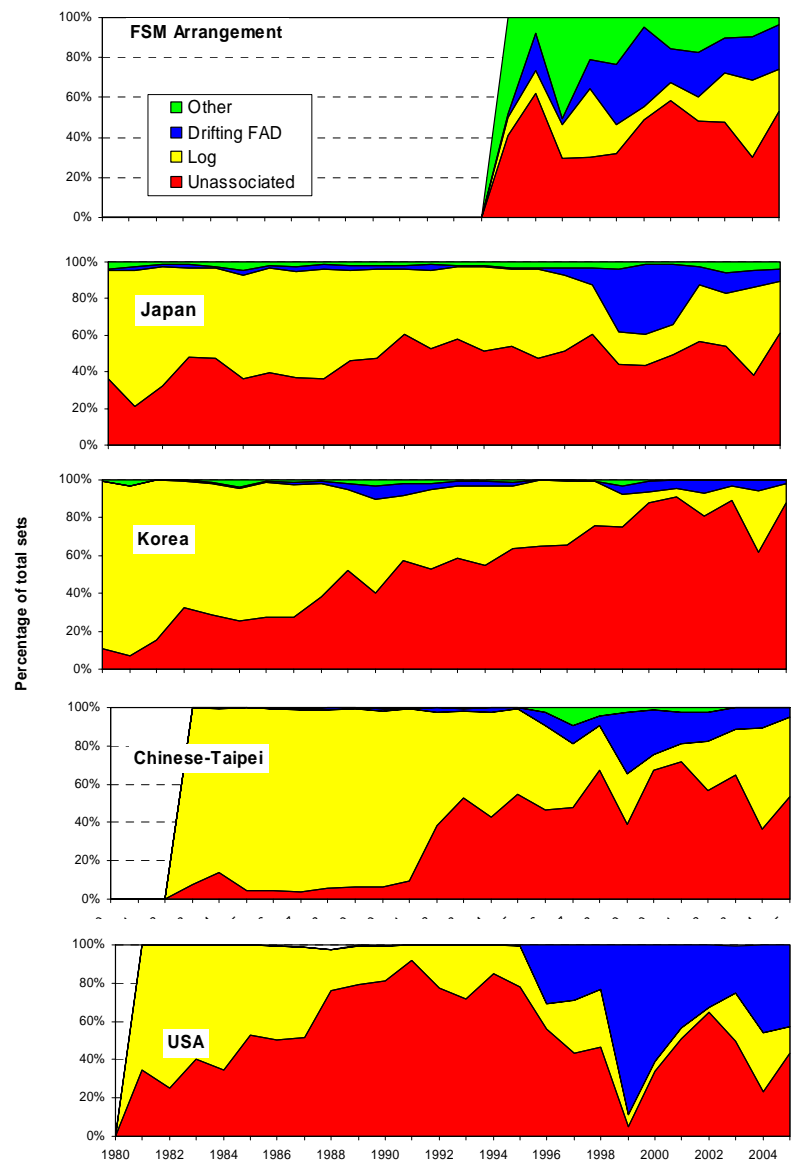


Figure 7. Time series showing the percentage of total sets by school type for the major purse-seine fleets operating in the WCP-CA.

³ Indonesia has recently revised the proportion of catch taken by gear type for their domestic fisheries which has resulted in a much larger allocation to their domestic purse seine fishery (at the expense of catches in the pole-and-line and “unclassified” fisheries) for 2005 than has been reported in previous years.

seven years) and (ii) an increased proportion of bigeye observed in the “yellowfin plus bigeye” catch for all set types, with these two factors fundamental in the estimation of the bigeye catch.

3.3 Distribution of fishing effort and catch

The purse seine catch distribution in tropical areas of the WCP–CA is strongly influenced by El Niño–Southern Oscillation Index (ENSO) events. [Figure 8](#) demonstrates the effect of ENSO events on the spatial distribution of the purse-seine activity, with fishing effort typically distributed further to the east during El Niño years and a contraction westwards during La Niña periods. The WCP–CA experienced an ENSO-transitional (or neutral) period during 2001, an El Niño period during 2002 and into the first quarter of 2003, then a return to an ENSO-transitional (neutral) period for the remainder of 2003. The ENSO-neutral state continued into the first half of 2004 and then moved to a weak El Niño state in the second half of 2004.

During 2005, the WCP–CA was generally in an ENSO-neutral state, moving from a weak El Niño in the early months of 2005 through to a weak La Niña-state by the end of 2005. With no significant evolution towards either a strong El Niño- or La Niña-state during 2005, fishing activity remained concentrated in the PNG, FSM and Solomon Islands area, as it had during 2004, although with slightly more activity in Nauru and Kiribati waters during 2005 ([Figure 8](#)).

The distribution of effort by set type [Figure 8](#) (right) for the past seven years shows that the establishment of the El Niño event during 2002 resulted in a higher proportion of log-associated sets east of 160°E than in the previous three years when drifting FADs were used to better aggregate schools of tuna in the absence of logs, and/or where unassociated schools were not as available in this area. The reduction in the use of drifting FAD sets over recent years is probably related to the displacement of effort further west to an area where free-swimming and log-associated tuna schools were more available to purse seine fleets, and therefore less of a need to use drifting FADs. There was a significant increase in the number of log sets made during 2004 suggesting that, for one reason or another, more logs had moved into the main fishing area and had successfully aggregated tuna schools. There were fewer log sets made during 2005 (than in 2004), with a similar distribution of effort by set type as in 2003.

[Figure 9](#) through 13 show the distribution of purse seine effort for the five major purse seine fleets during 2004 and 2005. The distribution of effort in 2005 was very similar to that of 2004, the exceptions being an extension further east (into Nauru and Kiribati waters) by the Korean fleet in 2005, and a contraction westwards by the US fleet during 2005. Unlike preceding years, there was clearly more overlap in the area fished by the US fleet to the area fished by the other major fleets during 2005 ([Figure 13](#) – right). The FSM Arrangement fleet tends to fish in a similar area to the Asian fleets, although there is also activity in the home waters of some vessels ([Figure 9](#)).

[Figure 14](#) shows the distribution of catch by species for the past seven years, [Figure 15](#) shows the distribution of skipjack and yellowfin catch by set type for the past seven years, and [Figure 16](#) shows the distribution of estimated bigeye catch by set type for the past seven years. Unassociated sets tend to account for a higher proportion of the total yellowfin catch in the area to the east of 160°E than they do for the total skipjack catch. Higher proportions of yellowfin in the overall catch (by weight) usually occur during El Niño years as fleets have access to “pure” schools of large yellowfin that are more available in the eastern tropical areas of the WCPO. There was evidence of this during 2001 ([Figure 15](#)) and for the most recent El Niño year (2002), despite it being considered an overall poor year for yellowfin catch (Langley et al., 2005). Yellowfin comprised a slightly higher proportion of the total catch in 2005 than in 2004 ([Figure 14](#)), with most of the yellowfin catch taken from unassociated sets ([Figure 15](#)–right). In contrast, associated sets usually account for a higher proportion of the skipjack and bigeye catch in the respective total catch of each species ([Figure 15](#)–left and [Figure 16](#)). As mentioned in the previous section, the estimated proportion of bigeye in the “yellowfin plus bigeye” catch was higher in 2005 than in recent years ([Figure 14](#)–right) and with a higher “yellowfin plus bigeye” catch in 2005, has both contributed to the record purse seine catch for bigeye tuna. A large proportion of the bigeye catch for 2005 appears to have been taken in PNG waters from sets undertaken on logs and anchored FADs ([Figure 16](#)).

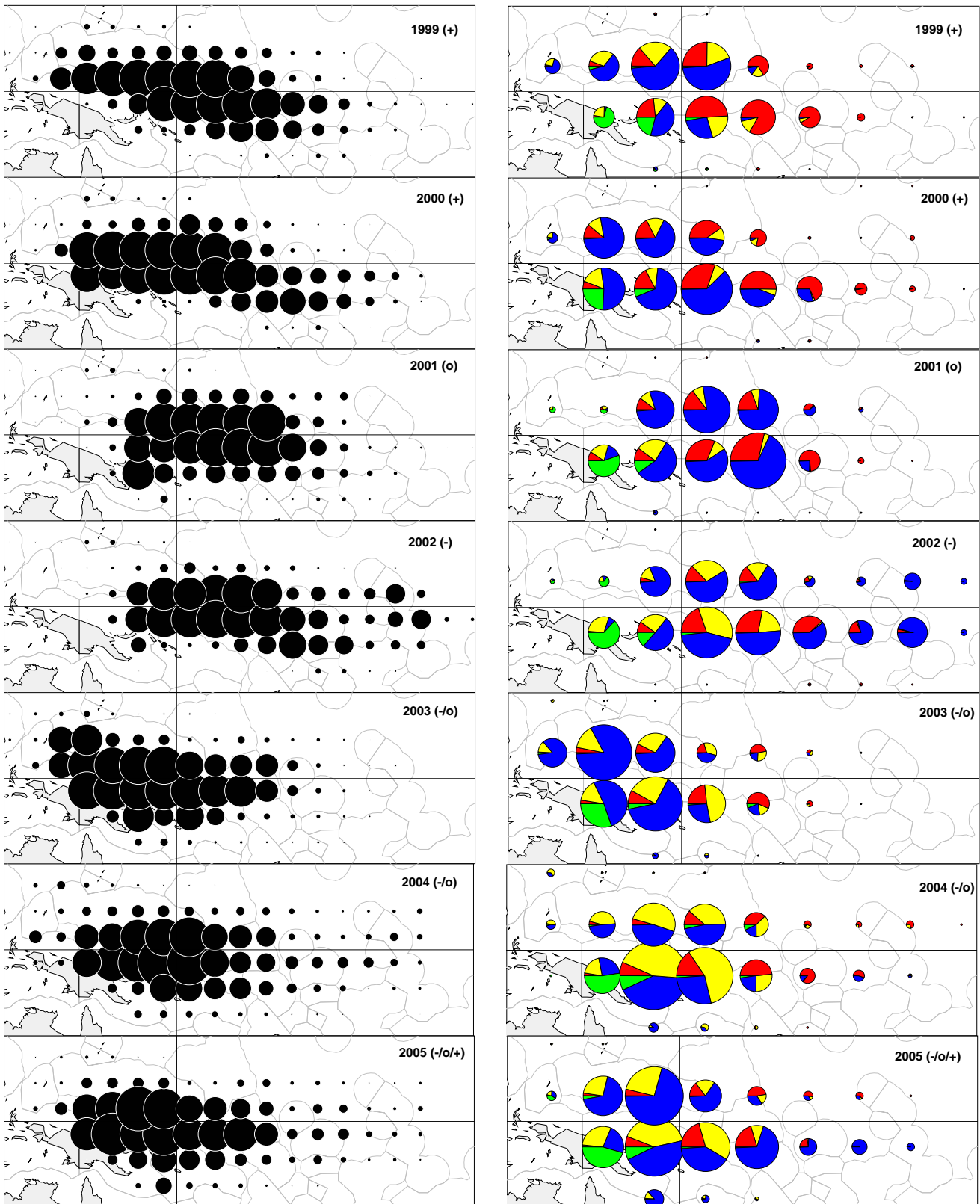


Figure 8. Distribution of purse-seine effort (days fishing – left; sets by set type – right), 1999–2005. (Blue–Unassociated; Yellow–Log; Red–Drifting FAD; Green–Anchored FAD). ENSO periods are denoted by “+”: La Niña; “-”: El Niño; “--”: strong El Niño; “o”: transitional period.

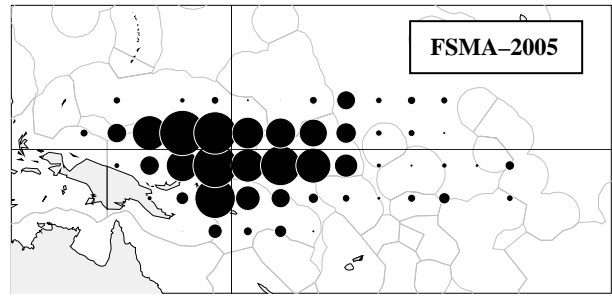
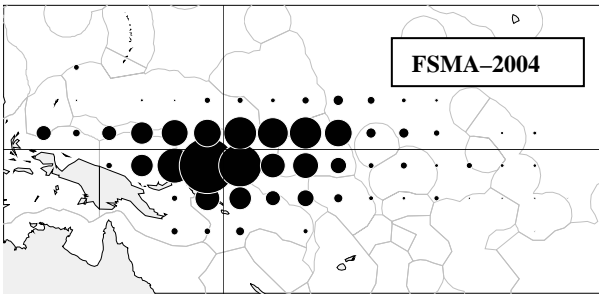


Figure 9. Distribution of effort by fleets operating under the FSM Arrangement during 2004 and 2005
lines for the equator (0° latitude) and 160°E longitude included.

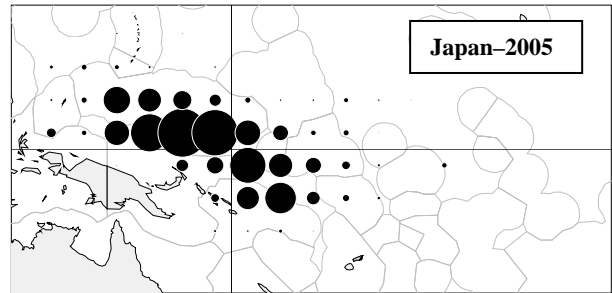
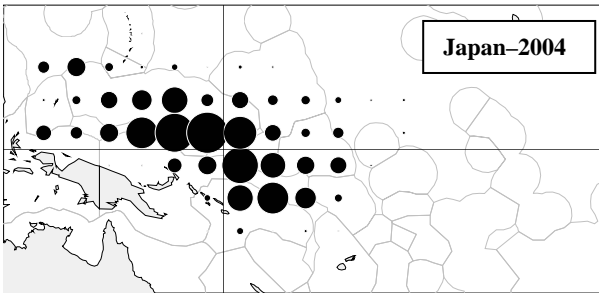


Figure 10. Distribution of effort by the Japanese purse seine fleet during 2004 and 2005
lines for the equator (0° latitude) and 160°E longitude included.

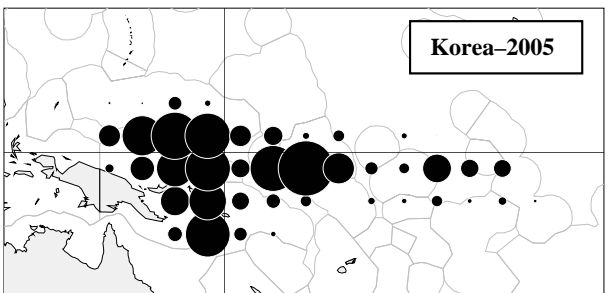
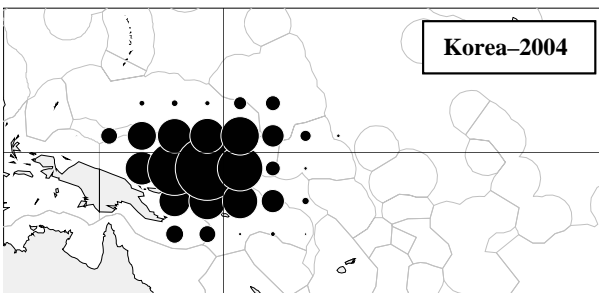


Figure 11. Distribution of effort by the Korean purse seine fleet during 2004 and 2005
lines for the equator (0° latitude) and 160°E longitude included.

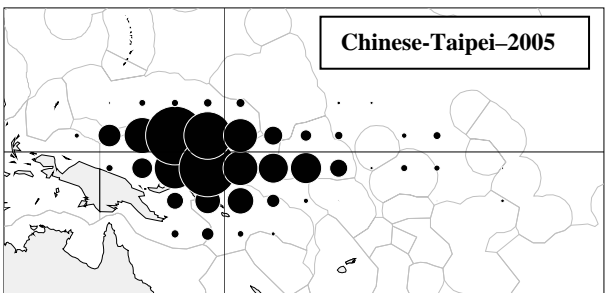
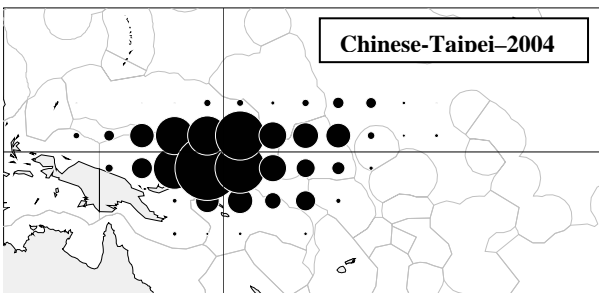


Figure 12. Distribution of effort by the Chinese-Taipei purse seine fleet during 2004 and 2005
lines for the equator (0° latitude) and 160°E longitude included.

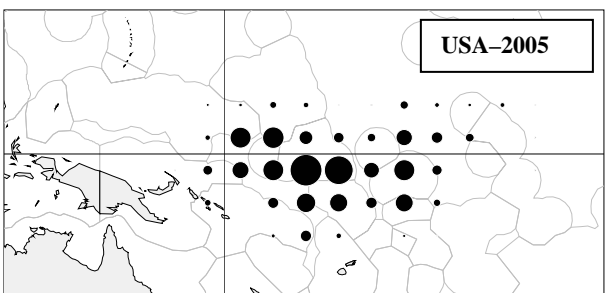
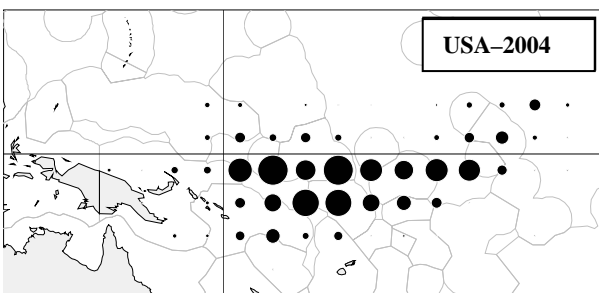


Figure 13. Distribution of effort by the US purse seine fleet during 2004 and 2005
lines for the equator (0° latitude) and 160°E longitude included.

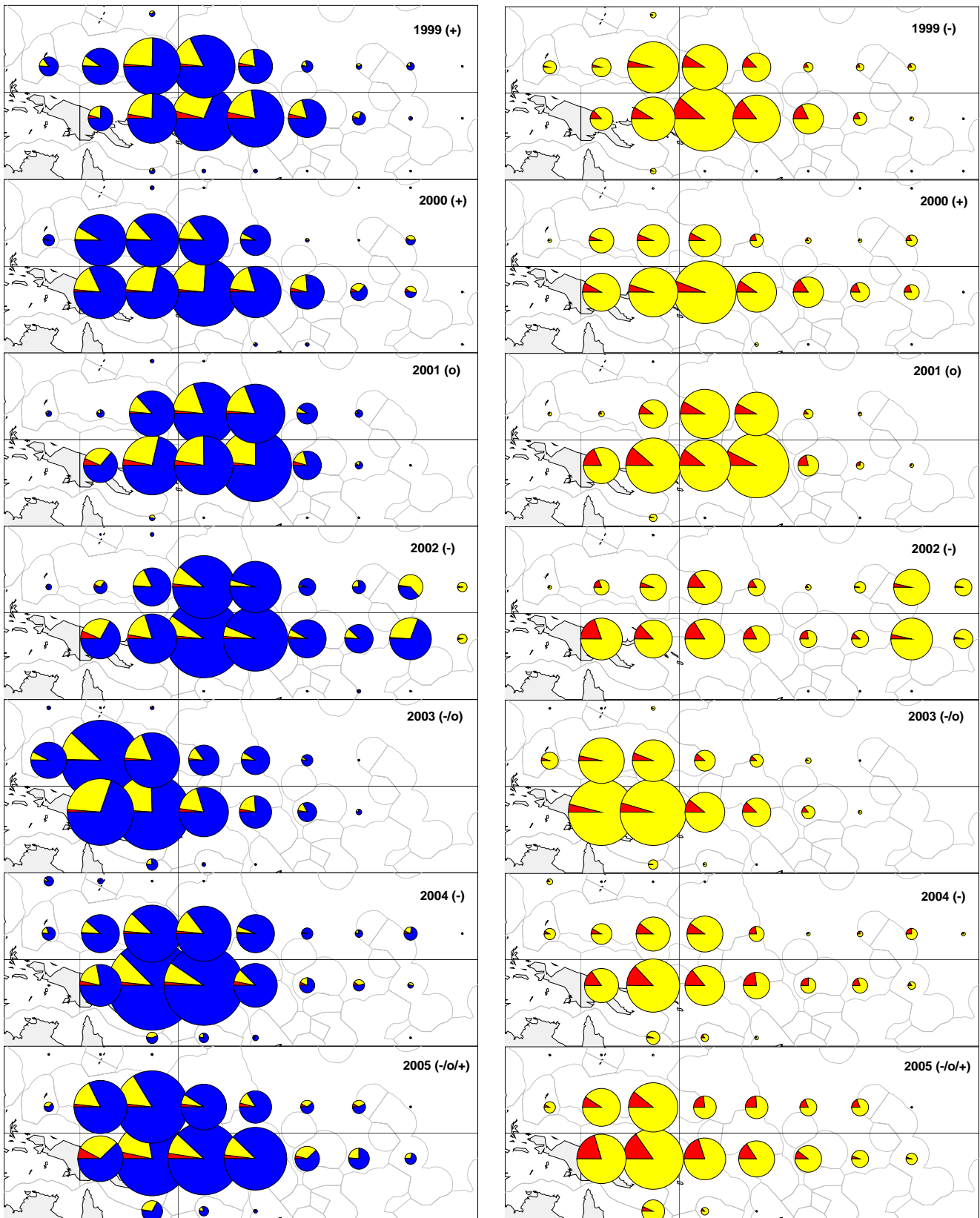


Figure 14. Distribution of purse-seine skipjack/yellowfin/bigeye tuna catch (left) and purse-seine yellowfin/bigeye tuna catch only (right), 1999–2005 (Blue–Skipjack; Yellow–Yellowfin; Red–Bigeye).

ENSO periods are denoted by “+”: La Niña; “-”: El Niño; “-””: strong El Niño; “o”: transitional period.

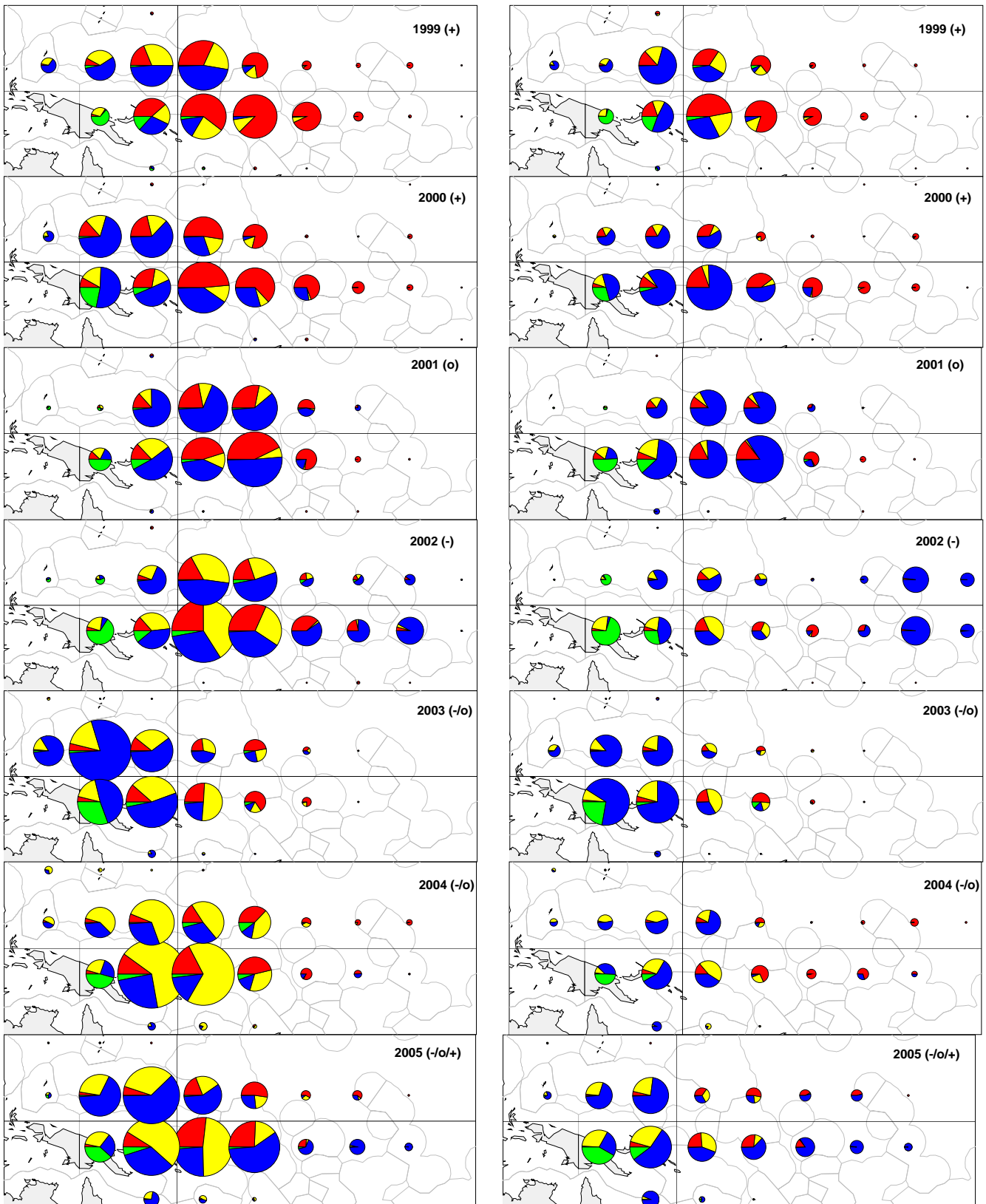


Figure 15. Distribution of skipjack (left) and yellowfin (right) tuna catch by set type, 1999–2005 (Blue–Unassociated; Yellow–Log; Red–Drifting FAD; Green–Anchored FAD).

ENSO periods are denoted by “+”: La Niña; “-”: El Niño; “--”: strong El Niño; “o”: transitional period.

Sizes of circles for all years are relative for that species only.

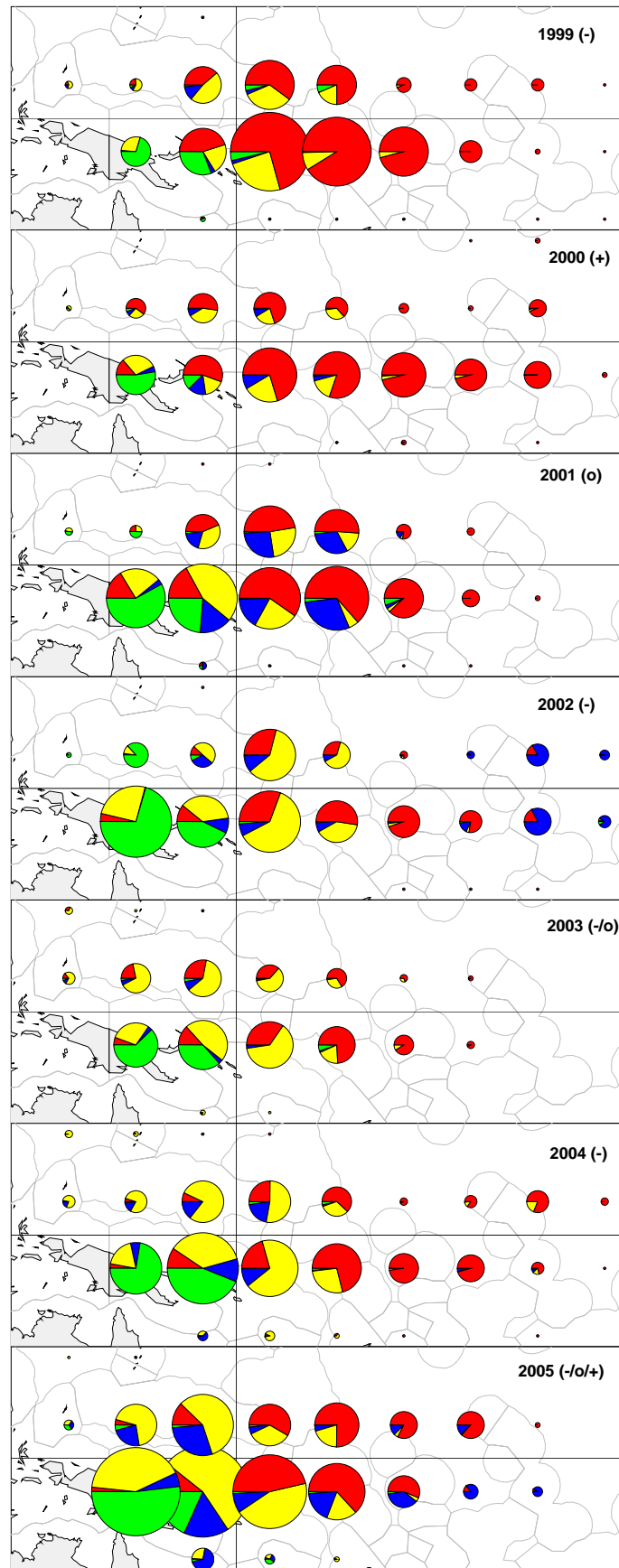


Figure 16. Distribution of estimated bigeye tuna catch by set type, 1999–2005 (Blue–Unassociated; Yellow–Log; Red–Drifting FAD; Green–Anchored FAD). ENSO periods are denoted by “+”: La Niña; “-”: El Niño; “--”: strong El Niño; “0”: transitional period.

3.4 Catch per unit of effort

Figure 17–19 show the annual time series of CPUE by set type and vessel nation for skipjack, yellowfin and bigeye tuna, respectively. The 2005 skipjack CPUE for unassociated sets for all major fleets was clearly higher than in 2004, and skipjack CPUE for the associated set types was generally higher for most fleets in 2005. The total skipjack CPUE for 2005 was therefore higher than in 2004 for all but one of the major fleets, since the majority of sets (~ two-thirds in total—Figure 7) were undertaken on free-swimming schools. The higher (overall) skipjack CPUE during 2005 resulted in a record catch, despite what appears to have been less overall effort expended (see Figure 6). For the first time in about five years, the skipjack CPUE for the US fleet in 2005 returned to the level of the other major fleets. One of the main reasons for this situation is probably the greater overlap in areas fished by the US and other fleets during 2005 (compared to recent years – see Figure 9–13).

As noted in previous sections, yellowfin catches were higher in 2005 than in 2004, and this is reflected in the CPUE graphs (Figure 18). Yellowfin CPUE for all fleets and set types improved in 2005, and were generally on par with the level of 2003, a year with similar effort by set type (Figure 7). Associated (log and drifting FAD) sets generally produce higher catch rates (mt/day) for skipjack than unassociated sets (Figure 17), yet unassociated sets produce a higher catch rate for yellowfin than associated sets (Figure 18). This is mainly due to unassociated sets taking large, adult yellowfin, which account for a larger catch (by weight) than the (mostly) juvenile yellowfin encountered in associated sets.

The trend in total skipjack CPUE over this time series (Figure 17) is clearly upwards and related to increased abundance and improved efficiency in fishing strategy and technological advances in equipment used to better locate schools of tuna. In contrast, the trend in total yellowfin tuna CPUE since 1998 has been gradually downwards (Figure 18).

The difference in the time of day that sets are undertaken is thought to be one of the main reasons why bigeye tuna are rarely taken in unassociated schools compared to log and drifting FAD schools, which have catch rates an order of magnitude higher (Figure 19).

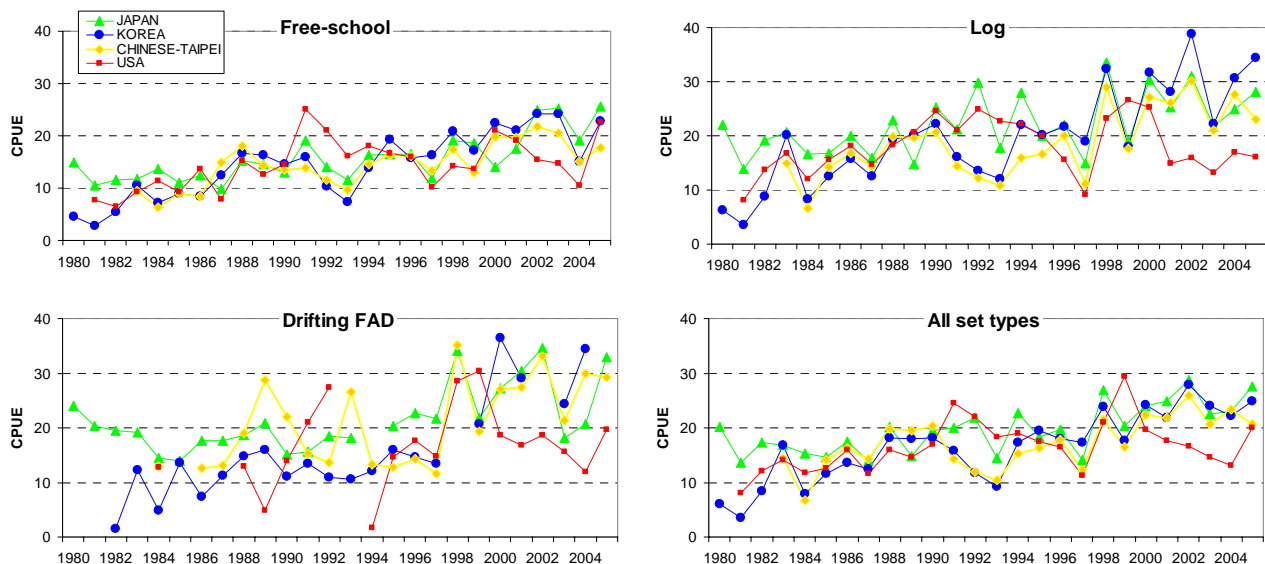


Figure 17. Skipjack tuna CPUE (mt per day) by major set-type categories (free-school, log and drifting FAD sets) and all set types combined for Japanese, Korean, Chinese-Taipei and US purse seiners fishing in the WCP-CA. Effort and CPUE were partitioned by set type according to the proportions of total sets attributed to each set type.

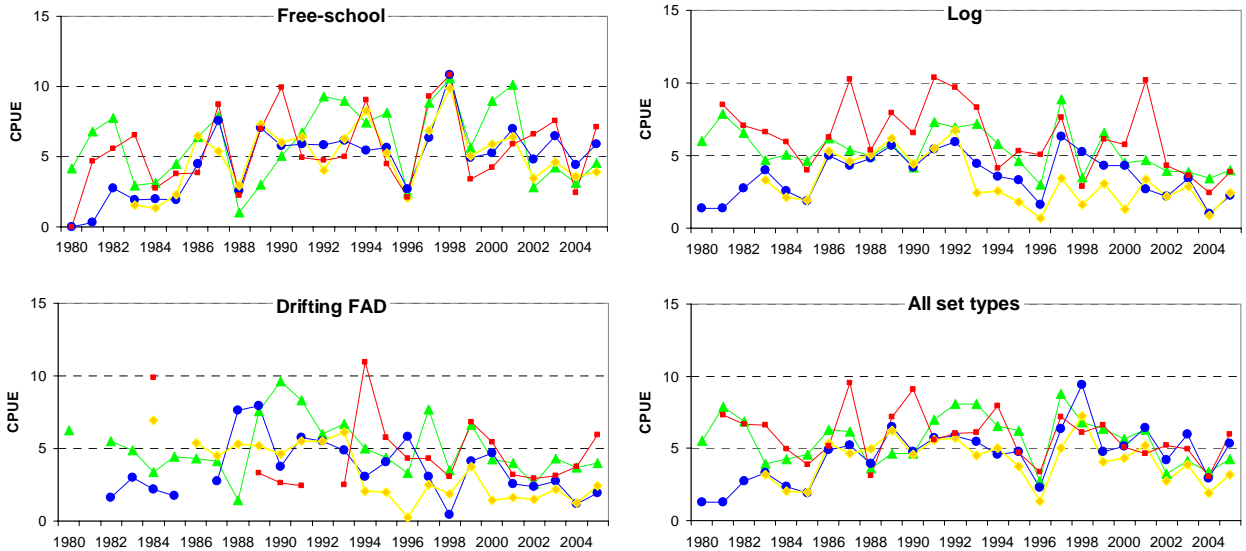


Figure 18. Yellowfin tuna CPUE (mt per day) by major set-type categories (free-school, log and drifting FAD sets) and all set types combined for Japanese, Korean, Chinese-Taipei and US purse seiners fishing in the WCP-CA. Effort and CPUE were partitioned by set type according to the proportions of total sets attributed to each set type.

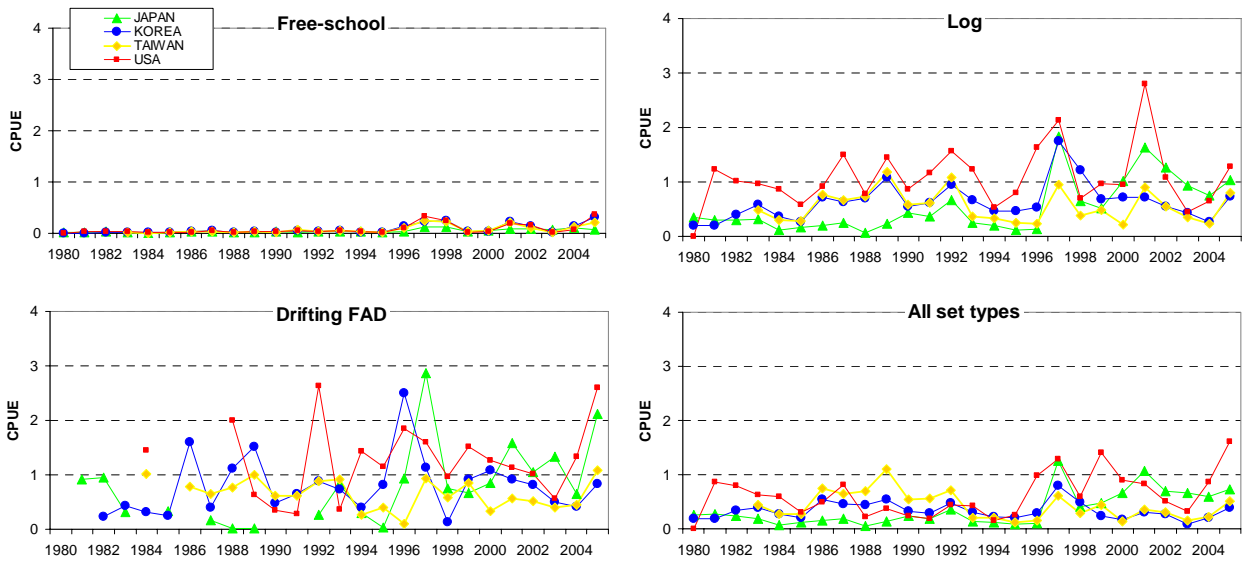


Figure 19. Estimated Bigeye tuna CPUE (mt per day) by major set-type categories (free-school, log and drifting FAD sets) and all set types combined for Japanese, Korean, Chinese-Taipei and US purse seiners fishing in the WCP-CA. Effort and CPUE were partitioned by set type according to the proportions of total sets attributed to each set type.

3.5 Economic overview of the purse seine fishery

3.5.1 Price trends – Skipjack

While skipjack prices continuing to display short term volatility during 2005, in terms of 12 month moving averages they have been relatively stable since mid 2004. Bangkok benchmark skipjack prices (4-7.5lbs, c&f) started 2005 at around US\$680/Mt then trended up through the period to mid-August reaching around US\$1030/Mt before declining for the remainder of the year to finish the year at around US\$700/Mt. 2005 monthly prices at Yaizu for purse seine caught tuna in US\$ terms varied between a low of US\$742/Mt in December and a high of US\$1044/Mt in April.⁴

Since August 2004 the 12 month moving average price for Bangkok skipjack prices (4-7.5lbs, c&f) has remained in a narrow band of US\$840/Mt to US\$920/Mt. Similarly, the 12 month moving average price for purse seine caught skipjack at Yaizu has been in a range of US\$880/Mt to US\$975/Mt since June 2004.

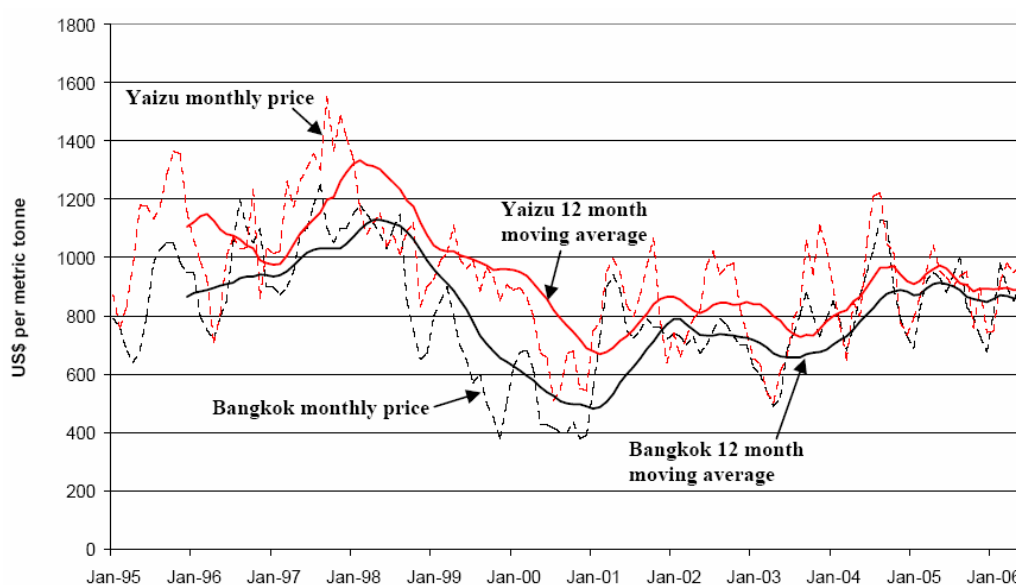


Figure 20. Skipjack prices, Bangkok (4-7.5lbs, c&f) and Yaizu (ex-vessel) monthly and 12 month moving average

Note: The Bangkok prices shown in the above figure are indicative figures only. They reflect estimates of the mid-point of prices paid during the respective month based on information received from a range of sources

3.5.2 Price trends – Yellowfin

Bangkok yellowfin prices (20lbs and up, c&f) over 2005 ranged from a low US\$1170-1180/Mt in late November to a high of US\$1450-1500/Mt from mid-July to early September, levels rarely seen since early 1998. Bangkok yellowfin prices have been trending up for much of the period since 2000 with the average price over 2005 of around US\$1380/Mt the highest annual average price since 1997. Yaizu purse seine caught yellowfin average monthly prices in 2005 in US\$ terms ranged from US\$1191/Mt in November to US\$1879/Mt in August. The average price over 2005 was US\$1598/Mt, its highest level since 1995.

⁴ Where prices are obtained in currencies other than US\$ they are converted using inter-bank exchange rates as given by www.oanda.com/convert/fxhistory.

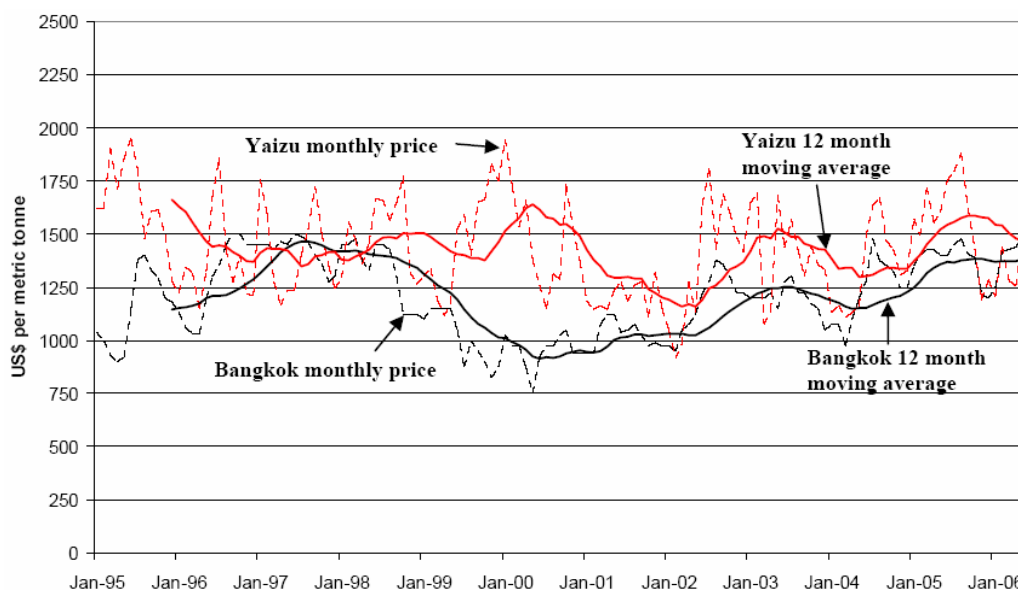


Figure 21. Yellowfin prices, Bangkok (20lbs and up, c&f) and Yaizu (ex-vessel) monthly and 12 month moving average

Note: The Bangkok prices shown in the above figure are indicative figures only. They reflect estimates of the mid-point of prices paid during the respective month based on information received from a range of sources

3.5.3 Value of the Purse-seine Catch

As a means of examining the effect of the changes to prices and catch levels since 1995 estimates of the “delivered” value of the purse seine fishery tuna catch in the WCPFC Area from 1995 to 2005 are obtained (Figure 22–24). In deriving these estimates certain assumptions were made due to data and other constraints that may or may not be valid and as such caution is urged in the use of these figures.⁵

The estimated delivered value of the purse seine tuna catch in the WCPFC area for 2005 is US\$1,463 million the highest level since at least 1995. This represents an increase of US\$176 million or 13 per cent on the estimated delivered value of the catch in 2004. This increase was driven by a US\$103 million (50 per cent) increase in delivered value of the yellowfin catch, which was estimated to be worth US\$303 million in 2005, resulting from a 28 per cent increase in catch and a 19 per cent increase in the composite delivered price. The value of the skipjack catch also rose, increasing by US\$61 million (6 per cent), with the catch rising by 7 per cent and the composite delivered price declining marginally by around 1 per cent.

Figure 25 provides a breakdown of the estimated delivered value of the purse seine fleet by flag, while Figure 26 provides estimated delivered value of catch per active vessel for the 5 main fleets.⁶

⁵ The delivered value of each years catch was estimated as the sum of the product of the annual purse catch of each species, excluding the Japanese purse seine fleet’s catch, and the average annual Thai import price for each species (bigeye was assumed to attract the same price as for yellowfin) plus the product of the Japanese purse seine fleet’s catch and the average Yaizu price for purse seine caught fish by species. Thai import and Yaizu market prices were used as they best reflect the actual average price across all fish sizes as opposed to prices provided in market reports which are based on benchmark prices, for example, for skipjack the benchmark price is for fish of size 4-7.5lbs.

⁶ The estimated delivered value of the catch per active vessel average delivered is calculated by dividing the estimated delivered value of a fleets catch by the number of active vessels in that fleet in a given year. It is not intended to be an estimate of actual average revenues for a fleet.

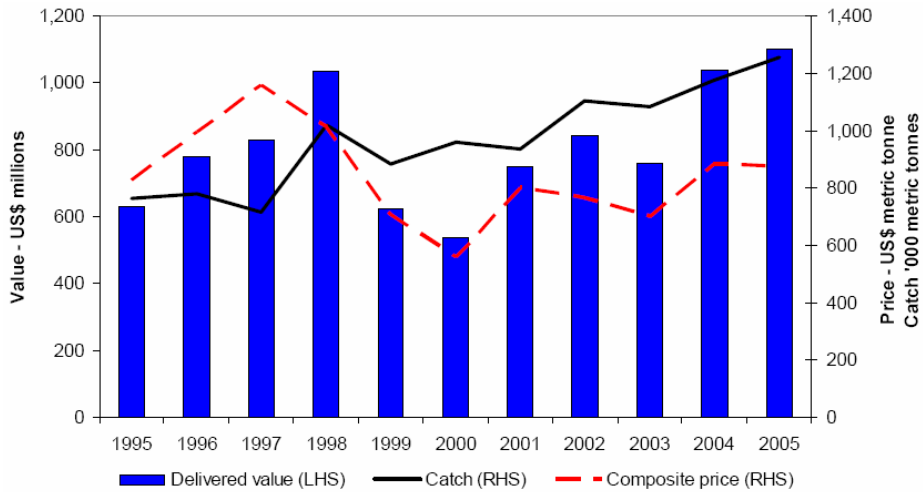


Figure 22. Skipjack in the WCPFC purse seine fishery – Catch, delivered value of catch and composite price

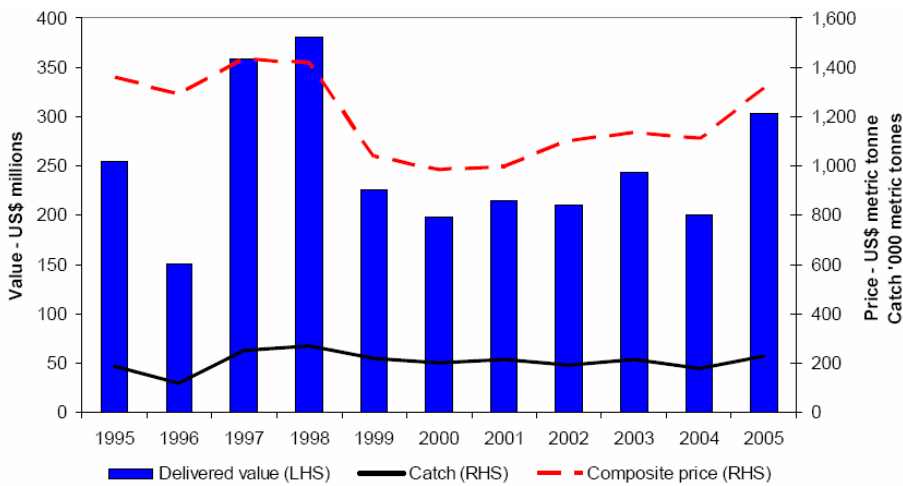


Figure 23. Yellowfin in the WCPFC purse seine fishery – Catch, delivered value of catch and composite price

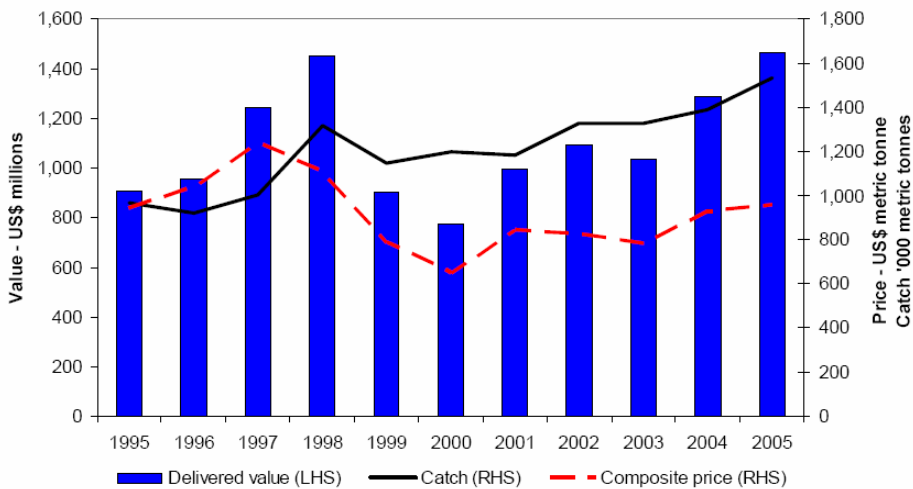


Figure 24. All tuna in the WCPFC purse seine fishery – Catch, delivered value of catch and composite price

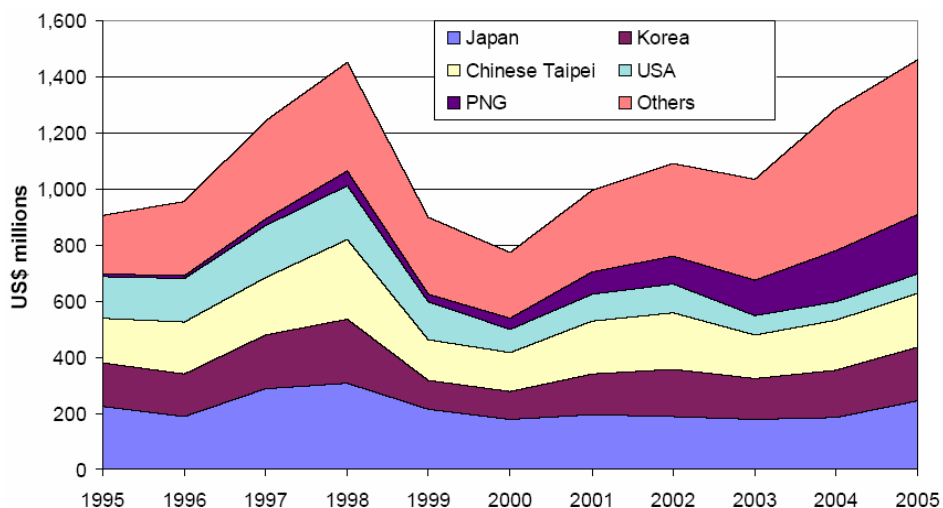


Figure 25. Delivered value of catch by fleet

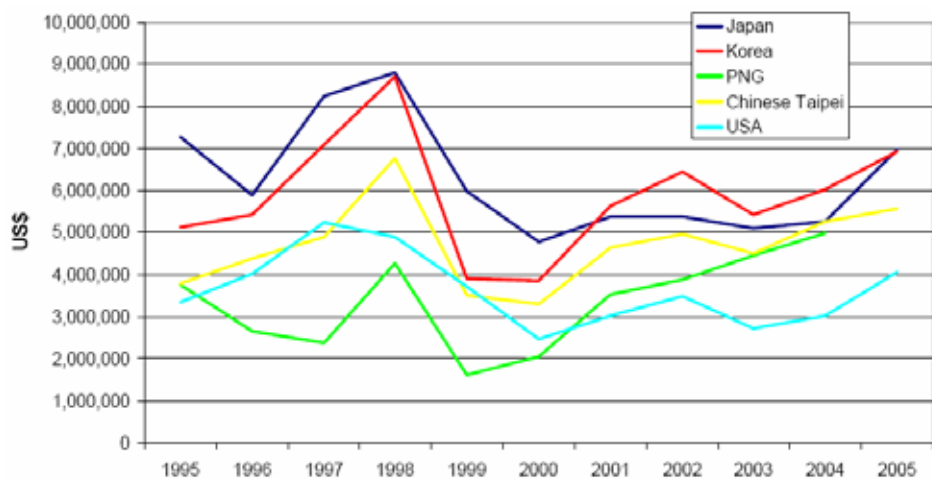


Figure 26. Delivered value of catch per active vessel by fleet

4 WCP-CA POLE-AND-LINE FISHERY

4.1 Historical Overview

The WCP-CA pole-and-line fishery has several components:

- the year-round tropical skipjack fishery, mainly involving the domestic fleets of Indonesia, Solomon Islands and French Polynesia, and the distant water fleet of Japan
- seasonal sub-tropical skipjack fisheries in the home waters of Japan, Australia, Hawaii and Fiji
- a seasonal albacore/skipjack fishery east of Japan (largely an extension of the Japan home-water fishery).

Economic factors and technological advances in the purse seine fishery (primarily targeting the same species, skipjack) have seen a gradual decline in the number of vessels in the pole-and-line fishery (Figure 27⁷) and stabilisation in the annual pole-and-line catch during the past 15–20 years (Figure 28). The gradual reduction in numbers of vessels has occurred in all pole-and-line fleets over the past decade. Pacific Island domestic fleets have declined in recent years – fisheries formerly operating in Palau, Papua New Guinea and Kiribati are no longer active, only one or two vessels are now operating (seasonally) in Fiji, and fishing activities are only now starting to improve after problems in the Solomons fishery in recent years. Several vessels continue to fish in Hawai'i, and the French Polynesian *bonitier* fleet remains active, but more vessels have turned to longline fishing. Provisional statistics also suggest that the Indonesian pole-and-line has also declined over the past decade.

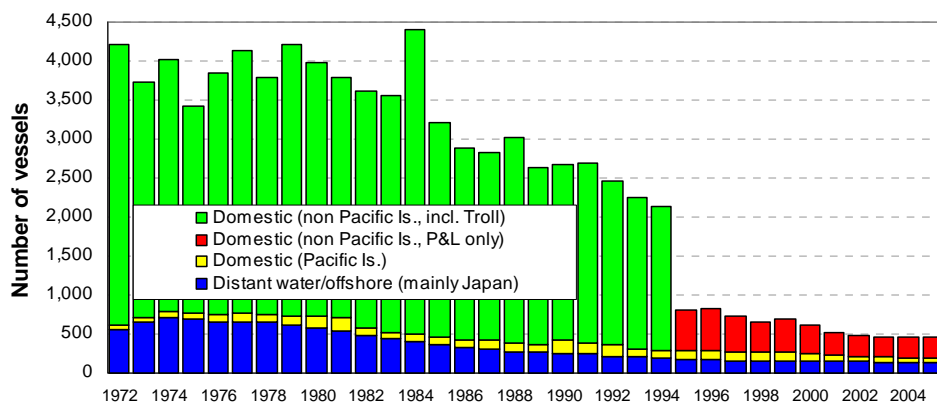


Figure 27. Pole-and-line vessels operating in the WCP-CA
(excludes pole-and-line vessels from the Indonesian domestic fishery)

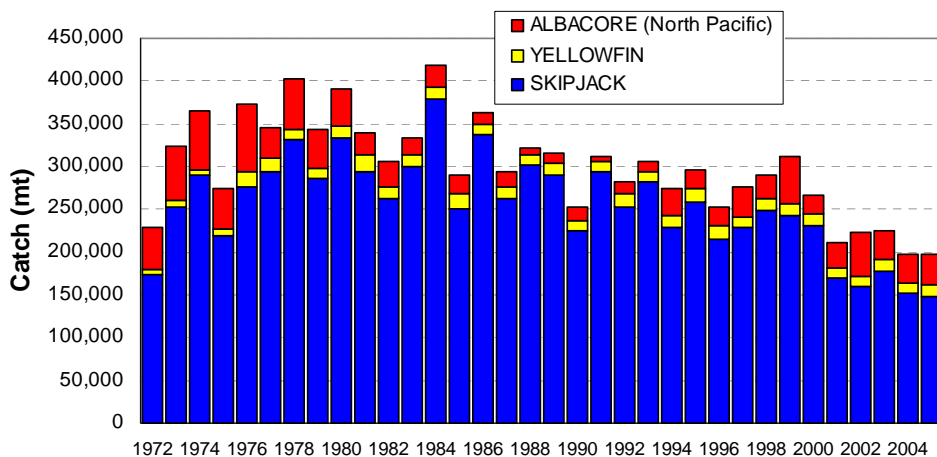


Figure 28. Pole-and-line catch in the WCP-CA

⁷ (note that distinction between troll and pole-and-line gears in the Japanese coastal fleet was not possible for years prior to 1995)

4.2 The Year 2005 Fishery (provisional)

The 2005 catch estimates for most pole-and-line fleets operating in the WCP–CA have yet to be provided, although the total catch estimate is expected to be similar to the level of recent years (i.e. 200,000–230,000 mt). Skipjack tends to account for the vast majority of the catch (typically around 70–80% of the total catch), while albacore, taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific (typically around 15–20% of the total catch), yellowfin (5–7%) and a small component of bigeye (~1%) make up the remainder of the catch. The Japanese distant-water and offshore (138,281 mt in 2004) and the Indonesian fleets⁸ (41,049 mt in 2005) account for most of the WCP–CA pole-and-line catch. The Solomon Islands fleet (6,882 mt in 2004) continues to recover from low catch levels experienced in recent years (only 2,778 mt in 2000), but is still far from the level (of over 20,000 mt annually) experienced during the 1990s.

[Figure 29](#) shows the average distribution of pole-and-line effort for the period 1995–2004, which is likely to reflect effort patterns in recent years (2005 data are incomplete). Effort in tropical areas is usually year-round and includes the domestic fisheries in Indonesia and the Solomon Islands, and the Japanese distant-water fishery. The pole-and-line effort in the vicinity of Japan by both offshore and distant-water fleets is seasonal (highest effort and catch in the 2nd and 3rd quarters). There was also some seasonal effort by pole-and-line vessels in Fiji and Australia during this period. The effort in French Polynesian waters is essentially the *bonitier* fleet. Effort by the pole-and-line fleet based in Hawaii is absent from this figure.

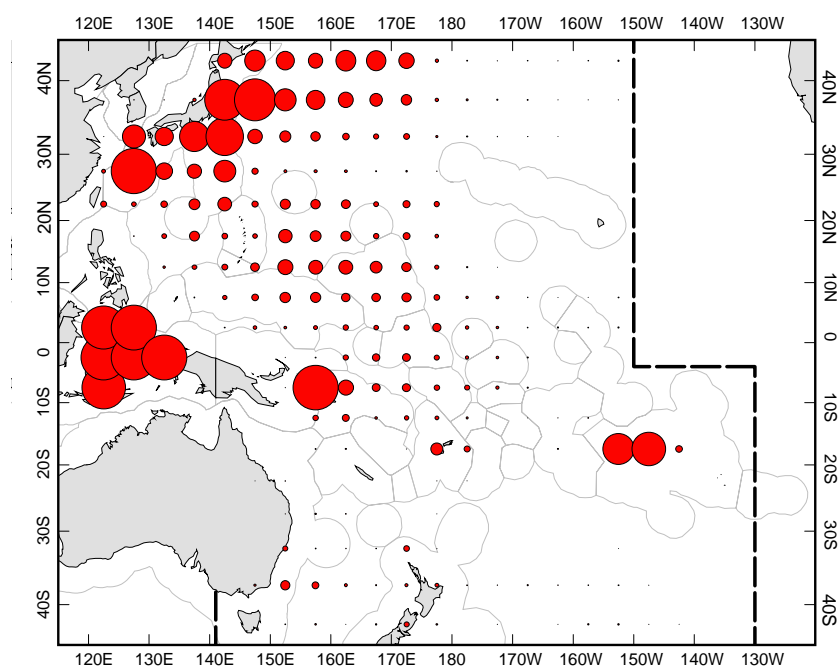


Figure 29. Average distribution of WCP–CA pole-and-line effort (1995–2004).

⁸ Indonesia has recently revised the proportion of catch taken by gear type for their domestic fisheries which has resulted in a much larger allocation to their domestic purse seine fishery (at the expense of catches in the pole-and-line and “unclassified” fisheries) for 2005 than has been reported in previous years.

4.3 Economic overview of the pole-and-line fishery

4.3.1 Market conditions

During 2005, the Yaizu price of pole-and-line caught skipjack in waters off Japan averaged 129JPY/kg (US\$1171/Mt), a decline of nearly one third on 2004. In stark contrast, the Yaizu price of pole-and-line caught skipjack in waters south of Japan averaged 146JPY/kg (US\$1326/Mt) during 2005, a decline of just 5 per cent on 2004.

4.3.2 Value of the pole-and-line catch

As a means of examining the effect of the changes to prices and catch levels over the period 1995-2004 a rough estimate of the annual delivered value of the tuna catch in the pole and line fishery in the WCPFC Area are provided in [Figure 30](#) and [Figure 31](#). As catch estimates for the Japanese pole and line fleet for 2005 were not available at the time of writing of this report no catch value estimates have been derived for this year.⁹

The estimated delivered value of the total catch in the WCPFC pole and line fishery for 2004 is US\$283 million. This represents a decline of US\$20 million or 7 per cent on the estimated value of the catch in 2003. The estimated delivered value of the skipjack catch in the WCPFC pole and line fishery for 2004 is US\$192 million. This represents a decline of US\$3million or 2 per cent on the estimated value of the catch in 2003 with a 16 per cent increase in the composite price being more than offset by a decline in catches.

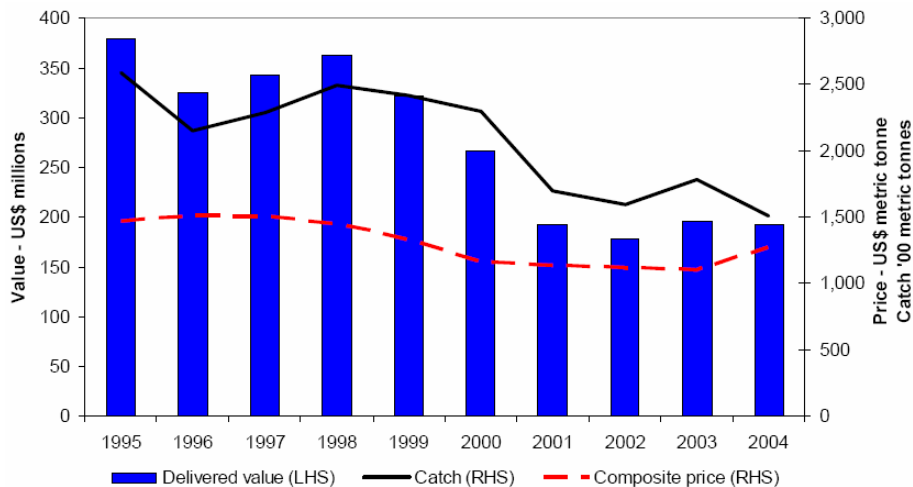


Figure 30. Skipjack in the WCPFC pole and line fishery – Catch, delivered value of catch and composite price

⁹ Delivered skipjack prices for the Japanese pole and line fleet are based on a weighted average of the Yaizu ‘south’ and ‘other’ pole and line caught skipjack prices. Delivered yellowfin price for the Japanese pole and line fleet are based on the Yaizu purse seine caught yellowfin price. All other prices are based on Thai import prices.

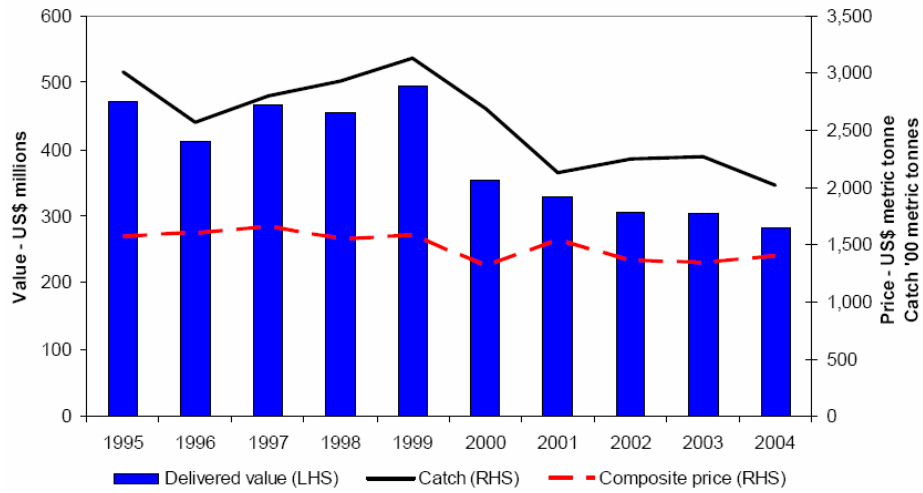


Figure 31. All tuna in the WCPFC pole and line fishery – Catch, delivered value of catch and composite price

5 WCP-CA LONGLINE FISHERY

5.1 Overview

The longline fishery continues to account for around 10–12% of the total WCP-CA catch (OFP, 2006), but rivals the much larger purse seine catch in landed value. It provides the longest time series of catch estimates for the WCP-CA, with estimates available since the early 1950s (OFP, 2006). The total number of vessels involved in the fishery has generally fluctuated between 4,000 and 5,000 for much of this period (Figure 32).

The fishery involves two main types of operation –

- large (typically >250 GRT) **distant-water** freezer vessels which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical (yellowfin, bigeye tuna) or subtropical (albacore tuna) species. Some voluntary reduction by one major fleet (Japan distant-water) has occurred in recent years;
- smaller (typically <100 GRT) **offshore** vessels which are usually **domestically-based**, with ice or chill capacity, and serving fresh or air-freight sashimi markets. These vessels operate mostly in tropical areas.

Additionally, small vessels in Indonesia, Philippines and more recently in Papua New Guinea target yellowfin and bigeye by handlining and small vertical longlines, usually around the numerous arrays of anchored FADs in home waters (although, not included in Figure 32). These fisheries have similar species composition to longliners operating in the same area.

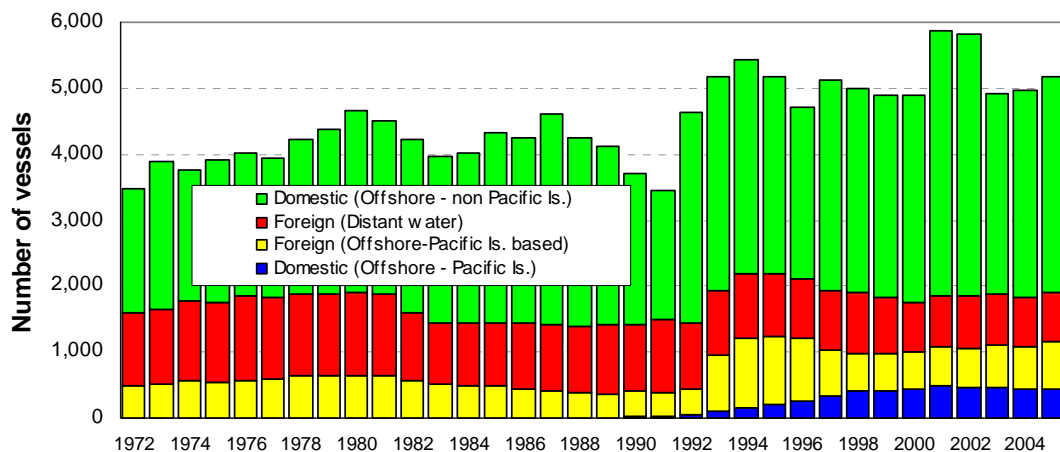


Figure 32. Longline vessels operating in the WCP-CA

There have been significant changes in fleet operations during the past two decades. For example, a feature of the 1980s was an increase in depth deployment of the longline gear to target higher-valued bigeye in preference to yellowfin. During the 1990s, there was a gradual increase in the number of **Pacific-Islands domestic vessels**, such as those from American Samoa, Cook Islands, Fiji, French Polynesia, New Caledonia, Samoa, Solomon Islands and Tonga; these fleets mainly operate in subtropical waters, with **albacore** the main species taken. The entrance into the fishery and subsequent decline of the smaller “offshore” sashimi longliners of Chinese-Taipei and mainland-China, based in Micronesia, during the past 10–15 years is also noteworthy. There has also been a trend towards flexibility in species targetting in some fleets, notably those with ultra-low temperature freezing capacity – for example, some vessels in the distant-water Chinese-Taipei fleet have recently switched from albacore targeting in the South Pacific to targeting bigeye and yellowfin in the eastern regions of the tropical WCP-CA. Large Chinese (distant-water) longliners targeting albacore in the high seas areas of the South Pacific and bigeye/yellowfin tuna in the eastern areas of the tropical WCP-CA, are a recent addition to the fishery. There has been rapid development of the longline fishery in Vietnam in recent years (Lewis, 2005), although catch estimates for this fleet are not yet available, and the emergence of the distant-water and offshore fleets from Vanuatu is another significant development in recent years (there were 57 vessels active in this fleet during 2005).

The WCP–CA longline tuna catch steadily increased from the early years of the fishery (i.e. the early 1950s) to 1980 (227,204 mt), but declined in the five years after this to 156,601 mt in 1984 (Figure 33). Since 1984, catches steadily increased over the next 15 years until the late 1990s, when catch levels were again similar to 1980. However, the composition of the catch in the late 1970s and early 1980s, a period when yellowfin tuna were targeted (e.g. ALB–19%;BET–27%;YFT–54% in 1980), has since become more balanced, particularly in recent years (e.g. ALB–30%;BET–36%;YFT–32%; SKJ–2% in 2005).

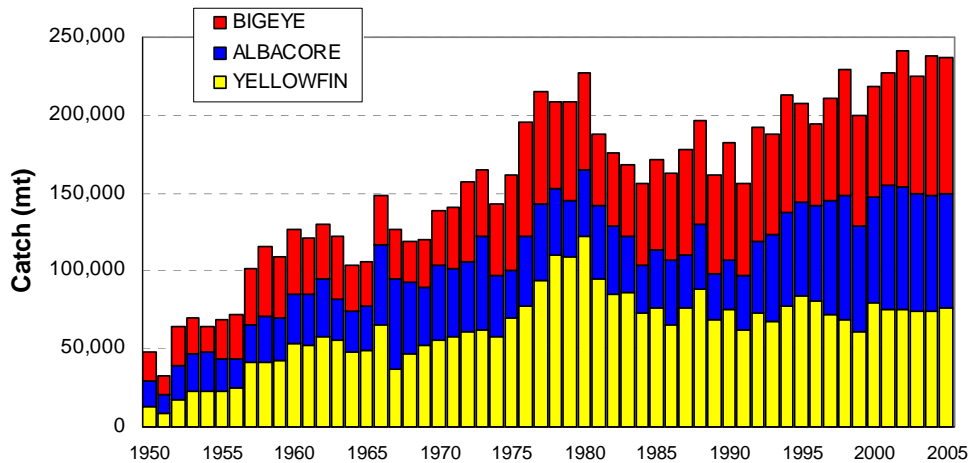


Figure 33. Longline catch (mt) of target tunas in the WCP–CA

5.2 Provisional catch estimates and fleet sizes (2005)

The provisional WCP–CA longline catch (242,059 mt) for 2005 was only 3,000 mt lower than the highest on record which was attained in 2002 (245,335 mt). The WCP–CA albacore longline catch (73,400 mt – 30%) for 2005 was similar to catch levels of in recent years, although catches have declined slightly since 2001, primarily due to a drop in catches by key fleets that continue to move away from albacore as a target species. The provisional bigeye catch (87,159 mt – 36%) for 2005 was the third highest on record, and the yellowfin catch (76,521 mt – 32%) was at a similar level to catches in recent years, but notably, the highest since 2000.

A significant change in the WCP–CA longline fishery over the past 5 years has been the growth of Pacific-Islands domestic albacore fisheries, which have gone from taking 32% of the total south Pacific albacore longline catch in 1998, to accounting for over 53% of the catch in 2005. The clear shift in effort by some vessels in the Chinese-Taipei distant-water longline fleet to targeting bigeye in the eastern equatorial waters of the WCP–CA has resulted in a reduced contribution to the overall albacore catch in recent years and a significant increase in bigeye catches. During the 1990s, this fleet consistently took less than 2,000 mt of bigeye tuna each year, but in 2002 the bigeye catch went up to 8,741 mt, and by 2004 it was up to 16,888 mt.

Domestic fleet sizes continue to increase at the expense of foreign-offshore and distant-water fleets (Figure 32), although the Chinese-Taipei distant-water longline fleet increased by ~80% over the period 2000–2003 (from 78 in 2000 to 142 vessels in 2003, but has stabilised at 133 vessels in 2005). The evolution in fleet dynamics no doubt has some effect on the species composition of the catch. For example, the increase in effort by the Pacific-Islands domestic fleets has primarily been in albacore fisheries, although this has been balanced to some extent by the switch to targeting bigeye tuna (from albacore) by certain vessels in the distant-water Chinese-Taipei fleet. More detail on individual fleet activities during recent years is available in the WCPFC–SC2 National Fisheries Reports.

5.3 Catch per unit effort

Time series of nominal CPUE provides a broad indication of the abundance and availability of target species to the longline gear, and as longliners target larger fish, the CPUE time series should be more indicative of adult tuna abundance. However, more so than purse-seine CPUE, the interpretation of nominal longline CPUE is

confounded by various factors, such as the changes in fishing depth that occurred as longliners progressively switched from primarily yellowfin tuna targeting in the 1960s and early 1970s to bigeye tuna targeting from the late 1970s on. Such changes in fishing practices will have changed the effectiveness of longline effort with respect to one species over another, and such changes need to be accounted for if the CPUE time series are to be interpreted as indices of relative abundance.

This paper does not attempt to present or explain trends in longline CPUE or effective effort, as this is dealt with more appropriately in specific studies on the subject. For example, SC2 Working Paper **ME WP-2** (Bigelow, 2006) looks at certain oceanographic factors that can be used in the standardization of CPUEs, SC2 Working Paper **ME IP-1** (Langley, 2006) looks at spatial trends in longline CPUE indices for yellowfin and bigeye in the western and central Pacific Ocean, and SC2 Working Paper **FT WP-2** (Campbell, 2006) looks at measuring effective longline effort in the Australian longline fishery.

5.4 Geographic distribution

[Figure 34](#) shows the distribution of effort by category of fleet for the period 2000–2004 (representing the most recently available data for all fleets, but reflecting the likely distributions for 2005).

Effort by the large-vessel, distant-water fleets of Japan, Korea and Chinese-Taipei account for most of the effort but there has been some reductions in vessel numbers in some fleets over the past decade. Effort is widespread as sectors of these fleets target bigeye and yellowfin for the frozen sashimi market, and albacore in the more temperate waters for canning. Activity by the foreign-offshore fleets from Japan, mainland China and Chinese-Taipei are restricted to the tropical waters, targeting bigeye and yellowfin for the fresh sashimi market; these fleets have limited overlap with the distant-water fleets. The substantial "offshore" effort in the west of the region is primarily by the Indonesian and Chinese-Taipei domestic fleets targeting yellowfin and bigeye. The growth in domestic fleets in the South Pacific over recent years has been noted; the most significant examples are the increases in the American Samoan, Fijian and French Polynesian fleets and the recent establishment of the Cook Islands fleet ([Figure 35](#)). As noted above, there is a steady increase in the number of vessels in the distant-water mainland-Chinese and Chinese-Taipei longline fleets that are now targeting bigeye in the eastern equatorial areas of the WCP-CA.

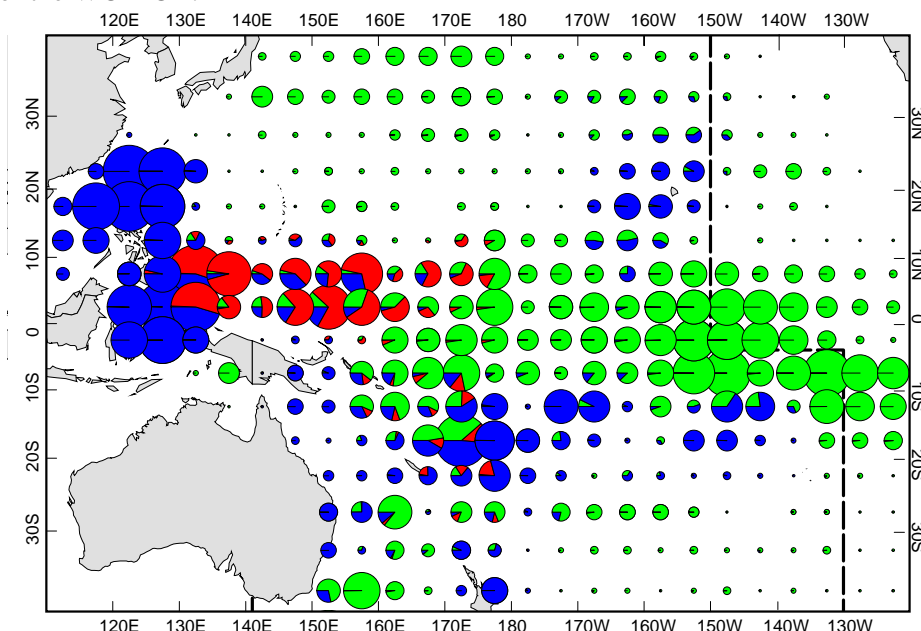


Figure 34. Distribution of longline effort for distant-water fleets (green), foreign-offshore fleets (red) and domestic fleets (blue) for the period 2000–2004.

(Note that the domestic fleet effort excludes the Japanese coastal fishery and the Vietnam fishery; distant-water effort for Chinese-Taipei and other fleets targeting albacore in the North Pacific are poorly covered)

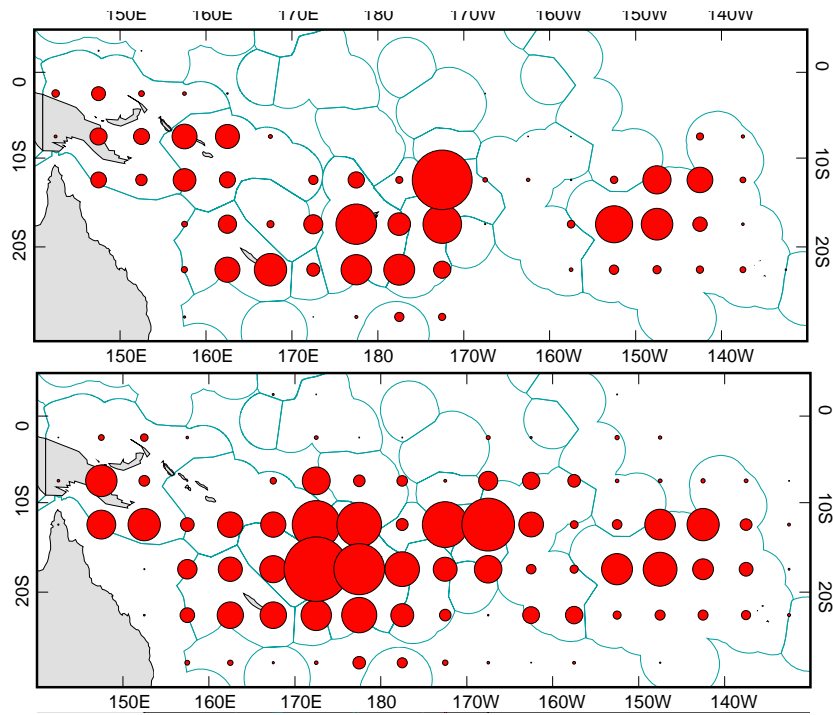


Figure 35. Distribution of Pacific-islands domestic longline effort for 1999 (top) and 2004 (bottom).

[Figure 36](#) shows species composition by area for 2003 and 2004 (2005 data incomplete). The majority of the yellowfin catch is taken in tropical areas, especially in the western parts of the region, with smaller amounts in seasonal subtropical fisheries. The majority of the bigeye catch is also taken from tropical areas, but in contrast to yellowfin, mainly in the eastern parts of the WCP-CA, adjacent to the traditional EPO bigeye fishing grounds. The albacore catch is mainly taken in subtropical and temperate waters in both hemispheres. Species composition is likely to vary from year to year in waters where there is some overlap in species targeting, for example, in the latitudinal band from 10°–20°S.

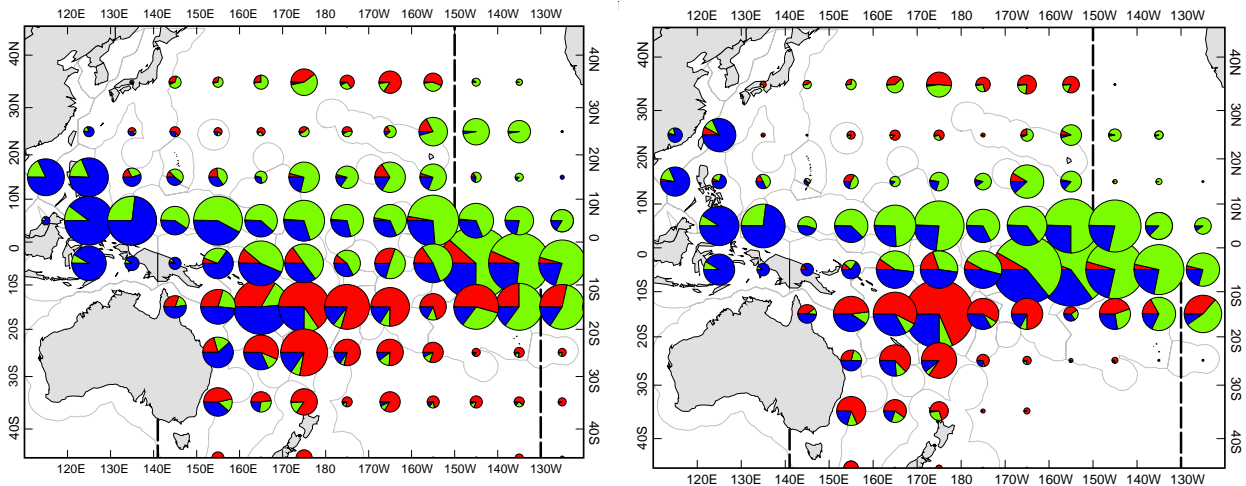


Figure 36. Distribution of longline tuna catch by species during 2003 (left) and 2004 (right)
(Blue–yellowfin; Green–bigeye; Red–albacore)

(Note that the domestic fleet effort excludes the Japanese coastal fishery and the Vietnam fishery; catches from some distant-water fleets targeting albacore in the North Pacific are not covered)

5.5 Economic overview of the longline fishery

5.5.1 Price trends – Yellowfin

In 2005, fresh yellowfin prices at 10 major Japanese wholesale markets declined 1 per cent to 993JPY/kg, while frozen yellowfin prices fell by 9 per cent to 642JPY/kg. Longline caught yellowfin prices (ex-vessel) landed at Yaizu fell by 3 per cent to 417JPY/kg, average fresh yellowfin prices (ex-vessel) at selected Japanese ports fell 8 per cent to 590JPY/kg and fresh yellowfin import prices (c.i.f.) increased marginally to 804JPY/kg. While JPY prices for imported fresh yellowfin increased marginally US\$ prices declined by 1 per cent to US\$7.30/kg. Japanese import prices for fresh yellowfin sourced from Oceania rose 4 per cent to 852JPY/kg (US\$7.74/kg).

Sales volumes at 10 major Japanese wholesale markets in 2005 declined with fresh yellowfin volumes declining by 4 per cent to 16,880Mt and frozen yellowfin volumes declined 1 per cent to 20,587Mt. Longline caught yellowfin volumes at Yaizu rose 9 per cent to 5,037Mt in 2005. After steadily increasing over the period 1997 to 2001, Japanese imports¹⁰ of fresh yellowfin fell sharply in 2002 and continued to decline though to 2005. Japanese imports of fresh yellowfin were 21,476Mt in 2005 down 12 per cent compared with 2004 and at their lowest level since at least 1990. Japanese imports of fresh yellowfin from Oceania fell sharply in 2005 down 35 per cent to 4,116Mt.

US fresh yellowfin import prices (f.a.s) continued to rise in 2005 increasing 7 per cent to US\$6.83/kg the highest annual price since at least 1995.

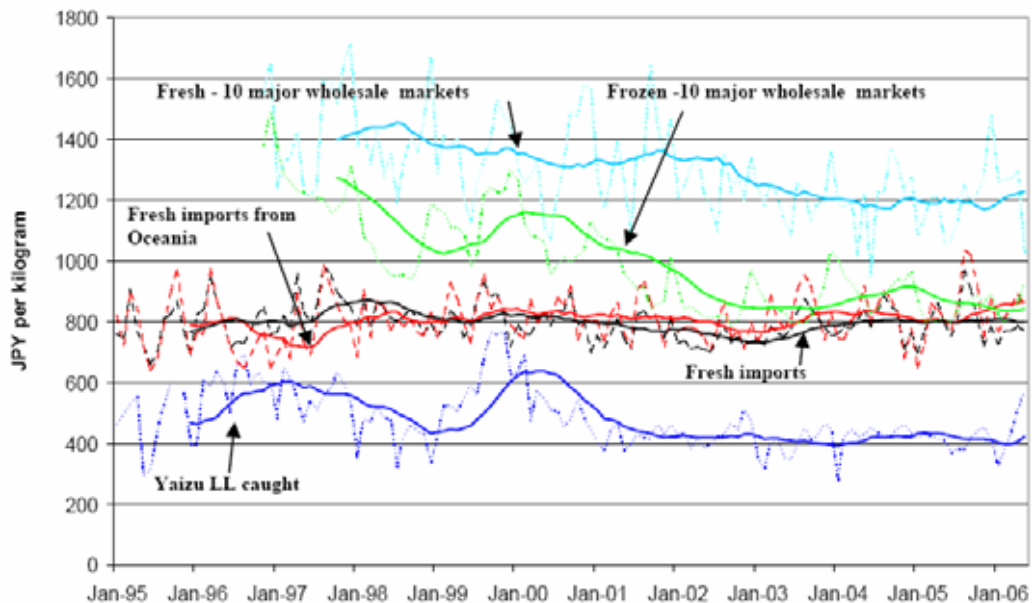


Figure 37. Yellowfin prices on Japanese markets; Fresh on 10 major wholesales markets, frozen on 10 major wholesales markets, fresh imports (c.i.f.), fresh imports from Oceania (c.i.f.) and Yaizu longline caught (ex-vessel)

(Monthly price given by dashed lines, 12 month moving average price given by solid line)

Sources: Ministry of Finance (www.customs.go.jp), FFA Tuna Industry Advisor, and US National Marine and Fisheries Service (swr.nmfs.noaa.gov)

¹⁰ Imports of tuna into Japan are defined to be tunas that are carried into Japan as imports. “That is, tuna which is caught by vessels of foreign nationality in the seas outside of territorial waters (including Japan’s and other countries’ exclusive economic zones) and carried into Japan, or tuna which is caught by vessels of Japanese nationality and first landed in other countries, and then brought into Japan. Those other than the above (i.e., tuna caught by vessels of Japanese nationality on high seas, etc.) are regard as Japanese products)”. www.mof.gov.jp

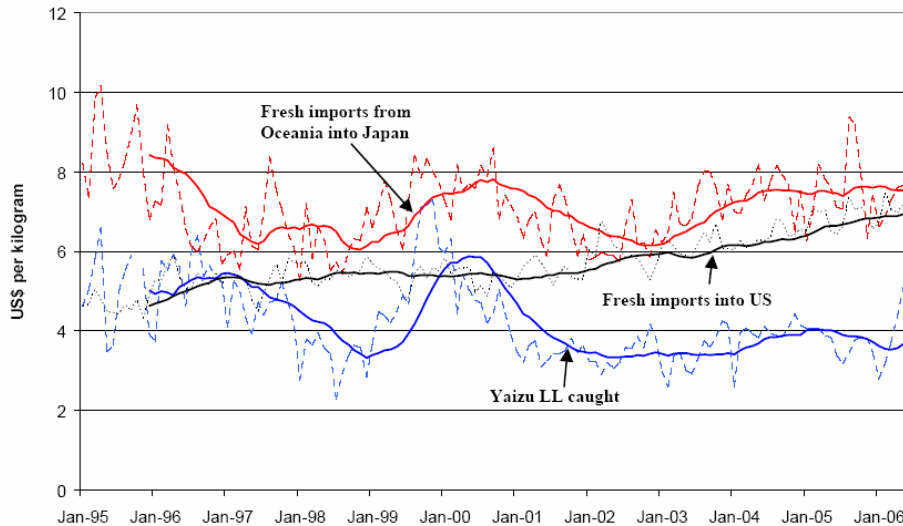


Figure 38. Yellowfin prices in US\$: US fresh imports, Japanese fresh imports from Oceania (c.i.f.) and Yaizu longline caught (ex-vessel)

(Monthly price given by dashed lines, 12 month moving average price given by solid line)

Sources: Ministry of Finance (www.customs.go.jp), FFA Tuna Industry Advisor, and US National Marine and Fisheries Service (swr.nmfs.noaa.gov)

5.5.2 Price trends – Bigeye

Prices at 10 major Japanese wholesale markets for fresh bigeye rose 1 per cent in 2005 averaging 1,210JPY/kg while for frozen bigeye they fell 8 per cent to 841JPY/kg. Fresh and frozen bigeye sales volumes both continued to decline in 2004, falling by 4 per cent to 10,229Mt and 1 per cent to 44,910Mt, respectively.

Frozen bigeye prices (ex-vessel) at selected major Japanese ports fell by 5 per cent in 2005 to 617JPY/kg while fresh bigeye prices (ex-vessel) rose 12 per cent to 989JPY/kg. Fresh bigeye import prices (c.i.f.) rose 2 per cent to 863JPY while frozen bigeye import prices (c.i.f.) rose 1 per cent to 660JPY/kg. In US\$ terms fresh bigeye import prices rose were steady at US\$7.84/kg while frozen bigeye import prices fell 1 per cent to US\$5.99/kg. Import volumes of fresh bigeye declined 11 per cent in 2005 to 16,930Mt of which 3,762Mt was sourced from the Oceania region. Average prices for fresh bigeye from Oceania rose 5 per cent to 1,023JPY/kg (US\$9.29/kg). US fresh bigeye import prices (f.a.s) rose 5 per cent to US\$7.58/kg the highest annual price since this data series began in 2001.

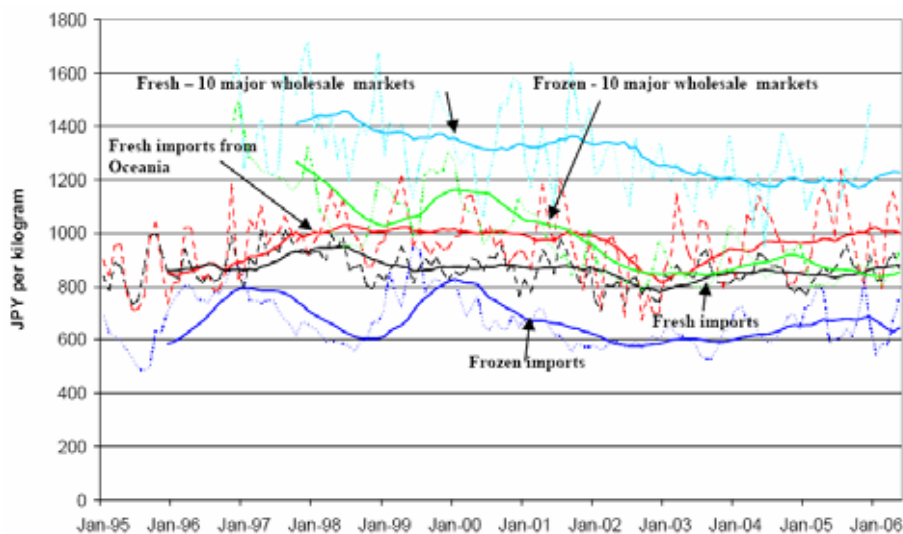


Figure 39. Bigeye prices on Japanese markets; Fresh on 10 major wholesales markets, frozen on 10 major wholesales markets, fresh imports (c.i.f.), fresh imports from Oceania (c.i.f.) and frozen imports (ex-vessel)

(Monthly price given by dashed lines, 12 month moving average price given by solid line)

Sources: Ministry of Finance (www.customs.go.jp), FFA Tuna Industry Advisor, and US National Marine and Fisheries Service (swr.nmfs.noaa.gov)

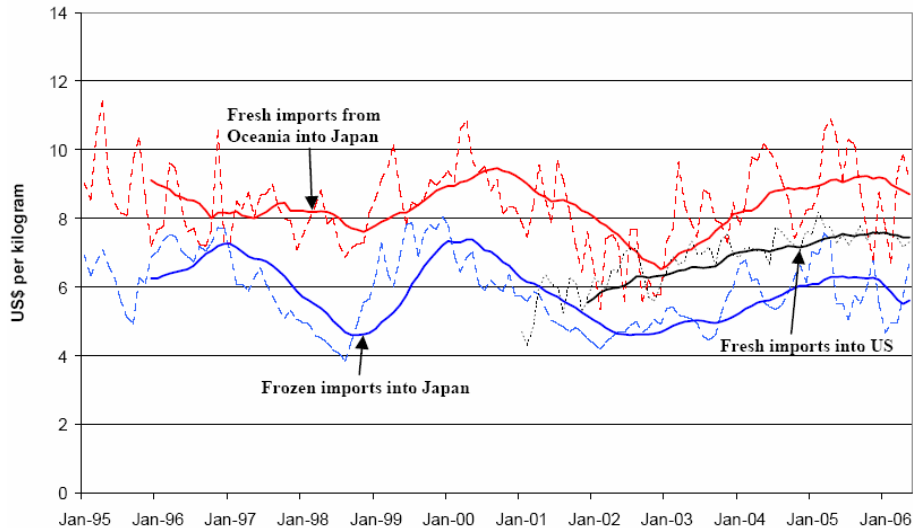


Figure 40. Bigeye prices in US\$: US fresh imports, Japanese fresh imports from Oceania (c.i.f.) and Japanese frozen imports from Oceania (c.i.f.)

(Monthly price given by dashed lines, 12 month moving average price given by solid line)

Sources: Ministry of Finance (www.customs.go.jp), FFA Tuna Industry Advisor, and US National Marine and Fisheries Service (swr.nmfs.noaa.gov)

5.5.4 Price trends – Albacore

Thai imports of frozen albacore declined 15 per cent in 2005 to 27,789Mt while prices rose 12 per cent to US\$2438/Mt (US\$2.44/kg). US import price for fresh albacore rose 8 per cent to US\$3.37/kg while prices for fresh landings at selected Japanese ports rose 21 per cent to US\$3.12/kg. Prices on these markets have continued to rise in 2006. For the 5 months to May, the price of fresh albacore landed at selected Japanese ports is up 5 per cent, while US fresh import prices are up 21 per cent and Thai frozen import prices are up 26 per cent on the equivalent period in 2005.

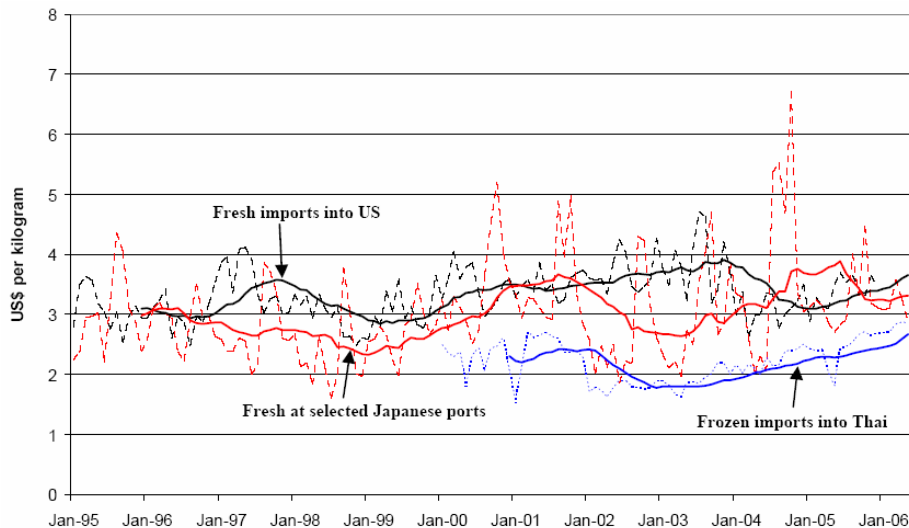


Figure 41. Albacore prices in US\$: US fresh imports (f.a.s), fresh landings at selected Japanese ports and Thai frozen imports (c.i.f.)

(Monthly price given by dashed lines, 12 month moving average price given by solid line)

Sources: Thai Customs (www.customs.go.th), FFA Tuna Industry Advisor, and US National Marine and Fisheries Service (swr.nmfs.noaa.gov)

5.5.5 Value of the longline catch

As a means of examining the effect of the changes to prices and catch levels since 1995, estimates of the “delivered” value of the longline fishery tuna catch in the WCPFC Area from 1995 to 2005 are obtained (Figure 42–45). In deriving these estimates, certain assumptions were made due to data and other constraints that may or may not be valid and as such caution is urged in the use of these figures.¹¹

The estimated delivered value of the longline tuna catch in the WCPFC area for 2005 is US\$1,286 million. This represents an increase of US\$32 million or 3 per cent on the estimated value of the catch in 2004. This increase was driven by a US\$18 million (11 per cent) increase in value of the albacore catch and a US\$15 million (3 per cent) increase in the value of the yellowfin catch. The albacore catch was estimated to be worth US\$179 million in 2005 with the 11 per cent increase being driven by 12 per cent increase in the composite price which was marginally offset by a 1 per cent fall in catch. The yellowfin catch was estimated to be worth US\$474 million with the composite price and catch rising 1 and 3 per cent respectively. The delivered value of the bigeye catch was steady with a 2 per cent rise in the composite price being offset by a 2 per cent decline in catch.

Figure 46 provides an illustration of changes in the relative importance of the major tuna species targeted by longliners in terms of the estimated delivered value per 100 hooks set for selected fleets. These estimates are derived using the delivered prices outlined previously and CPUE estimates for the respective fleets provided by SPC.

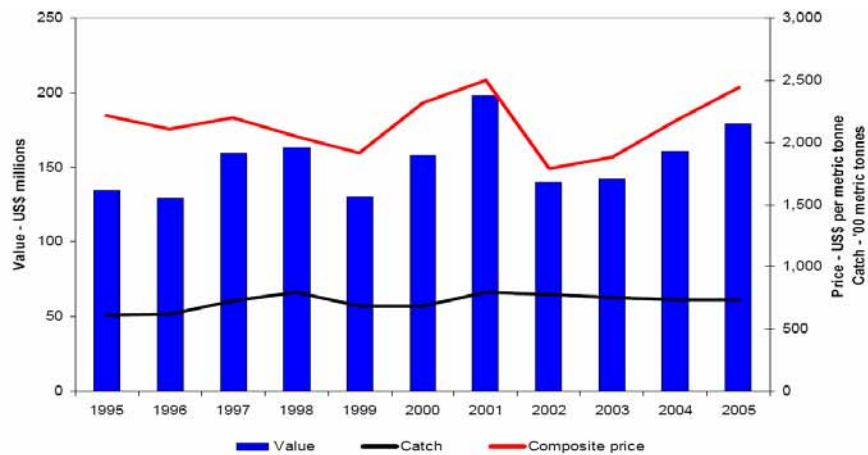


Figure 42. Albacore in the WCPFC longline fishery – Catch, delivered value of catch and composite price

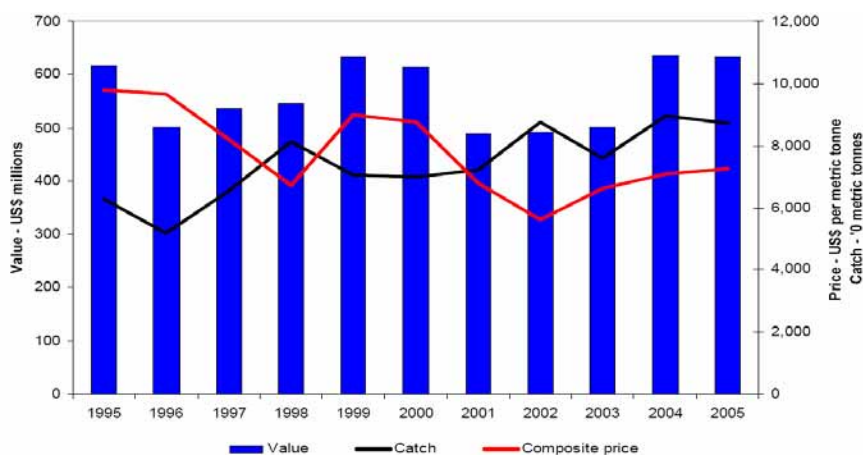


Figure 43. Bigeye in the WCPFC longline fishery – Catch, delivered value of catch and composite price

¹¹ For the yellowfin and bigeye caught by fresh longline vessels it is assumed that 80 per cent of the catch is of export quality and 20 per cent is non-export quality. For export quality the annual prices for Japanese fresh yellowfin and bigeye imports from Oceania are used, while it is simply assumed that non-export grade tuna attracted US\$1.50/kg throughout the period 1995-2005. For yellowfin caught by frozen longline vessels the delivered price is taken as the Yaizu market price for longline caught yellowfin. For bigeye caught by frozen longline vessels the delivered price is taken as the frozen bigeye price at selected major Japanese ports. For albacore caught by fresh and frozen longline vessel the delivered prices is taken as the Thai import price. The frozen longline catch is taken to be the catch from the longline fleets of Japan and Korea and the distant water longline fleet of Chinese Taipei.

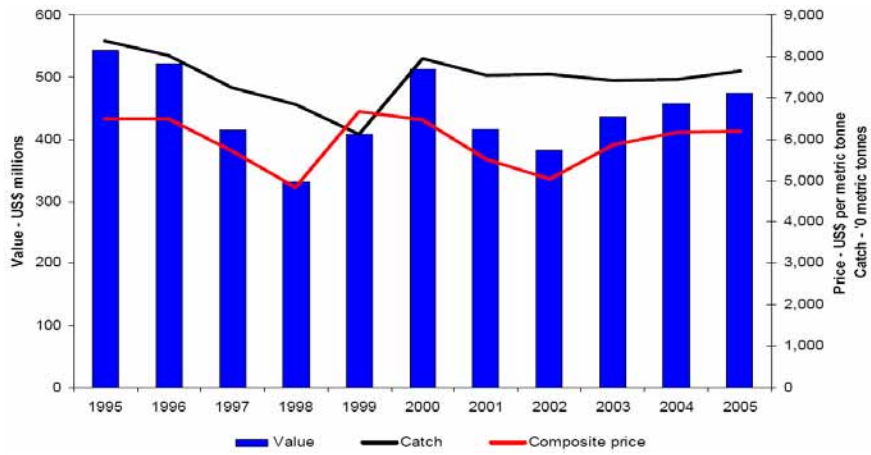


Figure 44. Yellowfin in the WCPCFC longline fishery – Catch, delivered value of catch and composite price

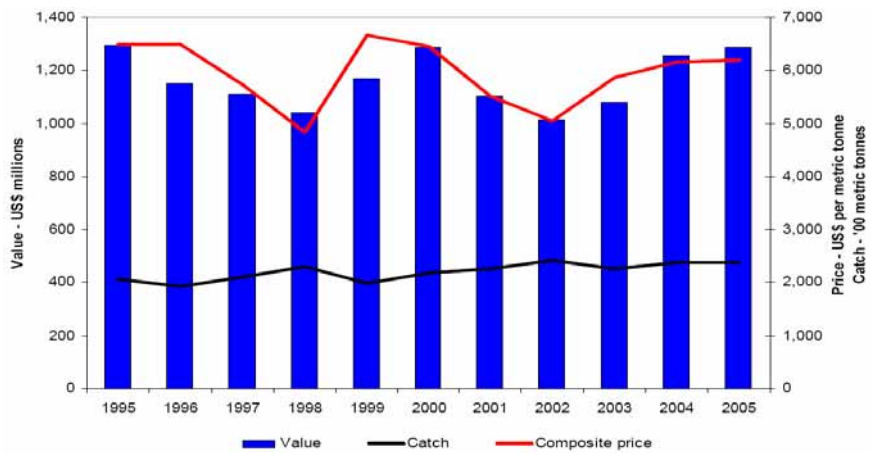


Figure 45. All tuna in the WCPCFC longline fishery – Catch, delivered value of catch and composite price

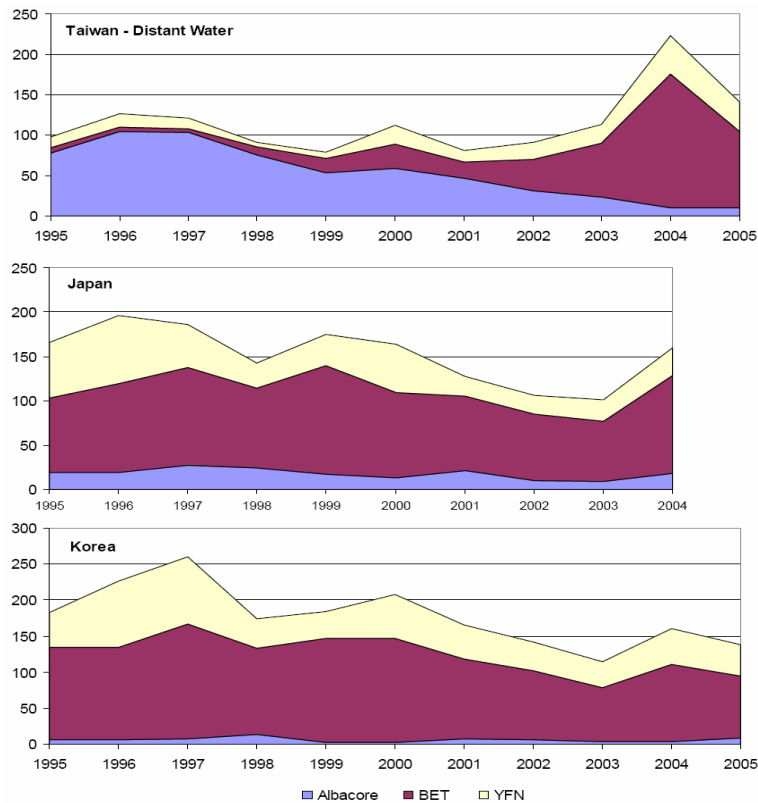


Figure 46. "Delivered" value of catch per 100 hooks set by species by fleet

6 SOUTH-PACIFIC TROLL FISHERY

6.1 Overview

The South Pacific troll fishery is based in the coastal waters of New Zealand, and along the Sub-Tropical Convergence Zone (STCZ, east of NZ waters located near 40°S). The fleets of New Zealand and United States have historically accounted for the great majority of the catch that consists almost exclusively of albacore tuna.

The fishery expanded following the development of the STCZ fishery after 1986, with the highest catch attained in 1989 (8,370 mt); since then, annual catches have gradually declined and have hovered in the range 4,500–6,000 mt over recent years. The level of effort expended by the troll fleets each year tends to reflect the price commanded for the product (albacore for canning) to some extent, and by expectations concerning likely fishing success.

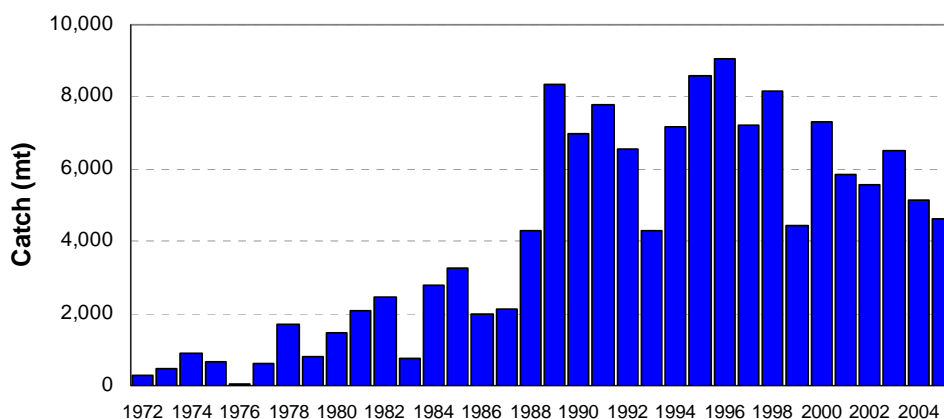


Figure 47. Troll catch (mt) of albacore in the south Pacific Ocean

6.2 The Year 2005 Fishery (provisional)

The fleets of New Zealand (2,789 mt in 2005) and USA (960 mt in 2004) typically account for most of the albacore troll catch, with minor contributions coming from the Canadian and Australian fleets. The 2005 troll albacore catch estimate is very provisional since the US troll fleet catch is not yet available. As a possible indicator of catch levels for 2005, effort in the New Zealand fishery was at a similar level to 2004, but the catch rate was slightly less than in 2004.

Figure 48 shows the distribution of effort for troll fleets for 2003 and 2004 (2005 data are incomplete), with effort primarily off the coast of New Zealand and in the Sub-tropical convergence zone (STCZ).

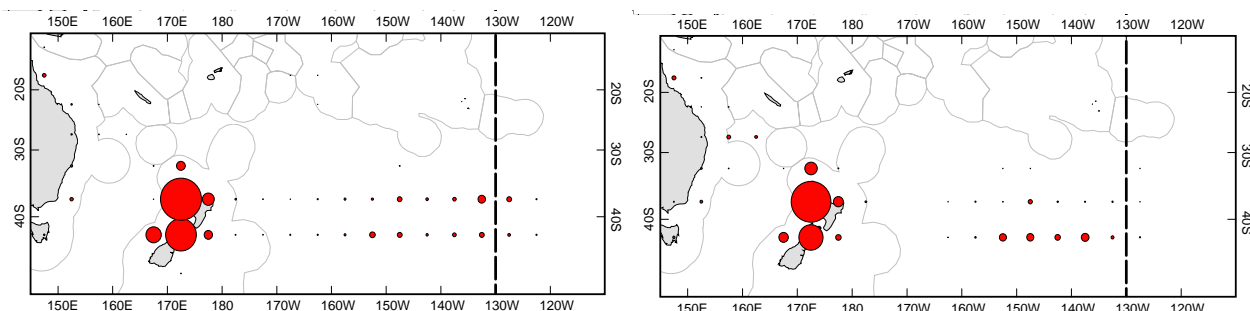


Figure 48. Distribution of South Pacific troll effort during 2003 (left) and 2004 (right)

7. SUMMARY OF CATCH BY SPECIES

7.1 SKIPJACK

Total skipjack catches in the WCP–CA have increased steadily since 1970, more than doubling during the 1980s, and continuing to increase in subsequent years. Annual catches exceeded 1.2 million mt in six of the last eight years (Figure 49). Pole-and-line fleets, primarily Japanese, initially dominated the fishery, with the catch peaking at 380,000 mt in 1984. The relative importance of this fishery, however, has declined over the years primarily due to economic constraints. The skipjack catch increased during the 1980s due to growth in the international purse seine fleet, combined with increased catches by domestic fleets from Philippines and Indonesia (which now make up 20–25% of the total skipjack catch in WCP–CA in recent years).

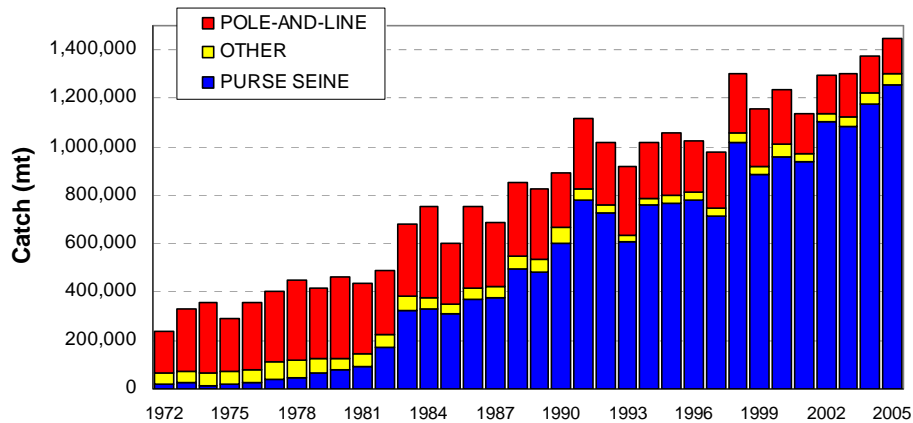


Figure 49. WCP–CA skipjack catch (mt) by gear

The 2005 WCP–CA skipjack catch of 1,443,127 mt was the highest on record and more than 5% higher than the 2004 catch (which was the previous record). This new level was attained due to another record catch taken in the **purse seine** fishery (1,249,711 mt – 87%). The balance of the catch was taken by the **pole-and-line** gear (147,500 mt – 10%) and **unclassified** gears in Indonesia, Philippines and Japan (~41,000 mt – 3%), while the **longline** fishery accounted for less than 1% of the total catch.

The vast majority of the skipjack catch is taken in equatorial areas, and most of the remainder is taken in the seasonal home-water fishery of Japan (Figure 50). The domestic fisheries in Indonesia (purse-seine, pole-and-line and unclassified gears) and the Philippines (e.g. ring-net and purse seine) account for the majority of the skipjack catch in the western equatorial portion of the WCP–CA. As mentioned in Section 3, the spatial distribution of skipjack catch by purse-seine vessels in equatorial areas to the east of the Philippines is influenced by the prevailing ENSO conditions.

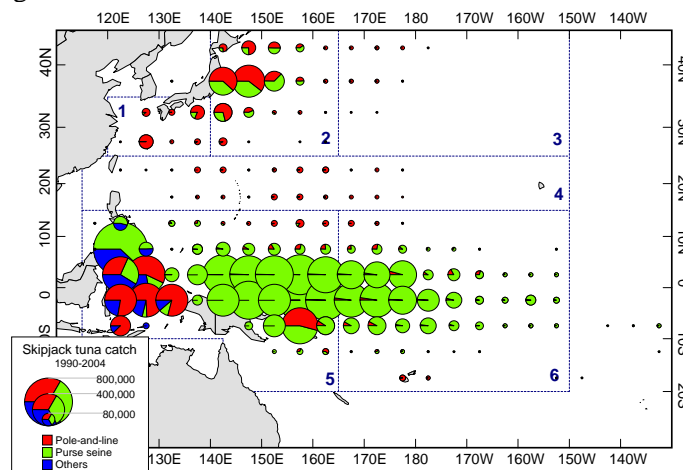


Figure 50. Distribution of skipjack tuna catch, 1990–2004.

The six-region spatial stratification used in stock assessment is shown.

The dominant mode of the WCP-CA skipjack catch (by weight) typically falls in the size range 40–60 cm, corresponding to 1–2+ year-old fish (Figure 51). Unassociated (free swimming school) sets by purse seine vessels usually account for most of the large skipjack (i.e. fish over 70cm), while the Philippines and Indonesian domestic fisheries account for most of catch in 20–40 cm size range. In comparison to other years, there was a greater proportion of medium-large (60–70 cm) skipjack caught in the purse seine fishery during 2002, and the skipjack catch in 2004 was, in general, made up of younger fish, mainly from associated schools.

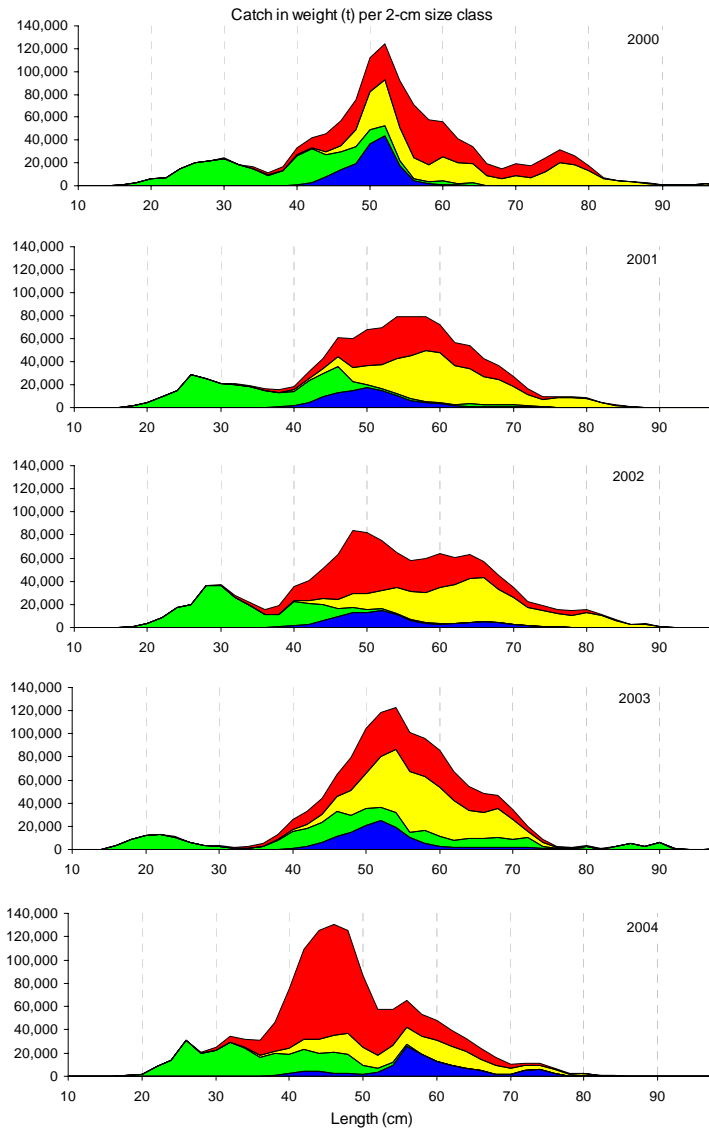


Figure 51. Annual catches of skipjack tuna in the WCPO by size and gear type, 2000–2004. (blue–Pole-and-line; green–Phil-Indo fisheries; red–purse seine associated; yellow–purse seine unassociated)

7.2 YELLOWFIN

Since 1997, the total yellowfin catch in the WCP-CA has been relatively stable at between 410,000–470,000 mt ([Figure 52](#)). The 1998 catch was the largest on record (466,468 mt) and followed two years after an unusually low catch in 1996, primarily due to poor catches in the purse seine fishery. Catches in recent years have been relatively stable, with the 2004 catch (414,869 mt) the lowest for several years, again due to a relatively low purse seine catch. The 2005 catch (423,468 mt) was only a slight improvement on 2004, although the purse seine catch for 2005 (231,241 mt – 54% of the total WCP-CA yellowfin catch) was the highest for this fishery in seven years. In recent years, the yellowfin longline catch has ranged 61,000–80,000 mt, which is well below catches taken in the late 1970s to early 1980s (90,000–120,000 mt), presumably related to changes in targeting practices by some of the large fleets and the gradual reduction in the number of distant-water vessels. The WCP-CA **longline** catch for 2005 was 76,521 mt (18% of the total WCP-CA yellowfin catch).

The high catches of yellowfin experienced recently in the EPO (annual catches of over 400,000 mt for 2001–2003) were not sustained in 2004 and 2005, as catches returned to their pre-2001 level (the 2005 yellowfin catch in the EPO was 294,240 mt).

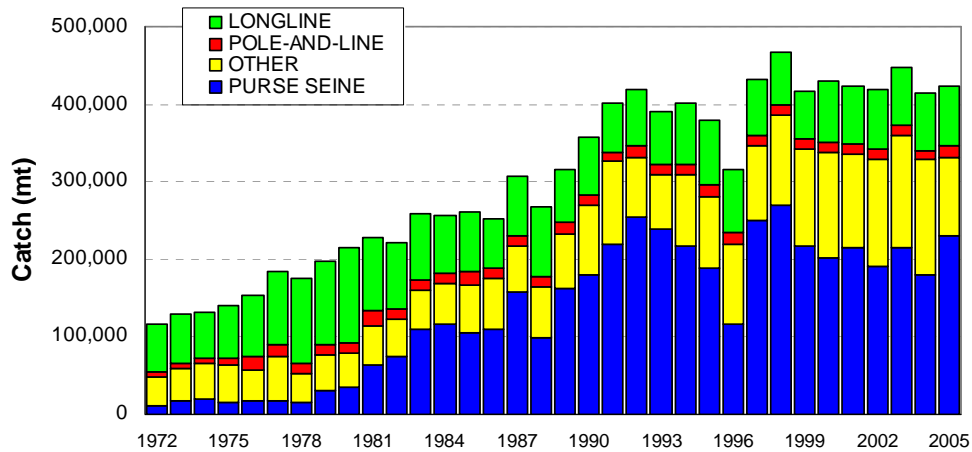


Figure 52. WCP-CA yellowfin catch (mt) by gear

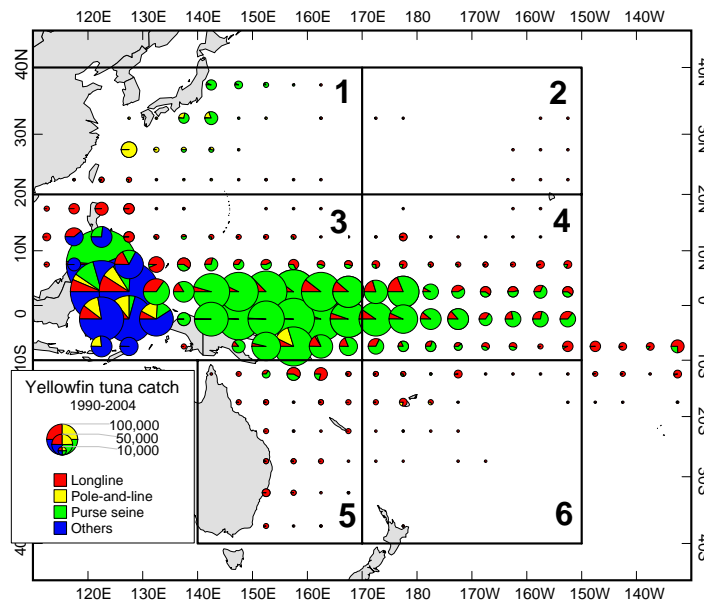


Figure 53. Distribution of yellowfin tuna catch, 1990–2004.
The six-region spatial stratification used in stock assessment is shown.

The **pole-and-line** fisheries took 14,841 mt (4% of the total yellowfin catch) during 2005, and 'other' category accounted for ~100,000 mt (which was 24% of the total catch for all gears). Catches in the 'other' category are largely composed of yellowfin taken by various assorted gears (e.g. ring net, bagnet, gillnet, handline and seine net) in the domestic fisheries of the Philippines and eastern Indonesia¹². [Figure 53](#) shows the distribution of yellowfin catch by gear type for the period 1990–2004 (data for 2005 are incomplete). As with skipjack, the great majority of the catch is taken in equatorial areas by large purse seine vessels, and a variety of gears in the Indonesian and Philippine fisheries.

The domestic surface fisheries of the Philippines and Indonesia take large quantities of small yellowfin in the range 20–50 cm ([Figure 54](#)). In the purse seine fishery, smaller yellowfin are caught in log and FAD sets than in unassociated sets. A major portion of the purse seine catch is adult (> 100 cm) yellowfin tuna, to the extent that the purse-seine catch of adult yellowfin tuna is usually higher than the longline catch. Inter-annual variability in the size of yellowfin taken exists in all fisheries. The relatively high proportion of yellowfin taken from associated purse-seine sets during 2000 corresponds to a strong recruitment (also seen in the previous year), with the age class of fish taken in these years present as larger fish taken in the purse seine and longline fisheries in the following years. Note the strong mode of large (130–150cm) yellowfin from (purse-seine) unassociated-sets in 2002, which corresponds to the good catches experienced in the extreme east of the tropical WCPO ([Figure 15–right](#)). The purse seine fishery experienced poor catches of yellowfin during 2004 and this appears to be due more to lower than normal catches of large fish from unassociated schools than catches of small fish from associated set types.

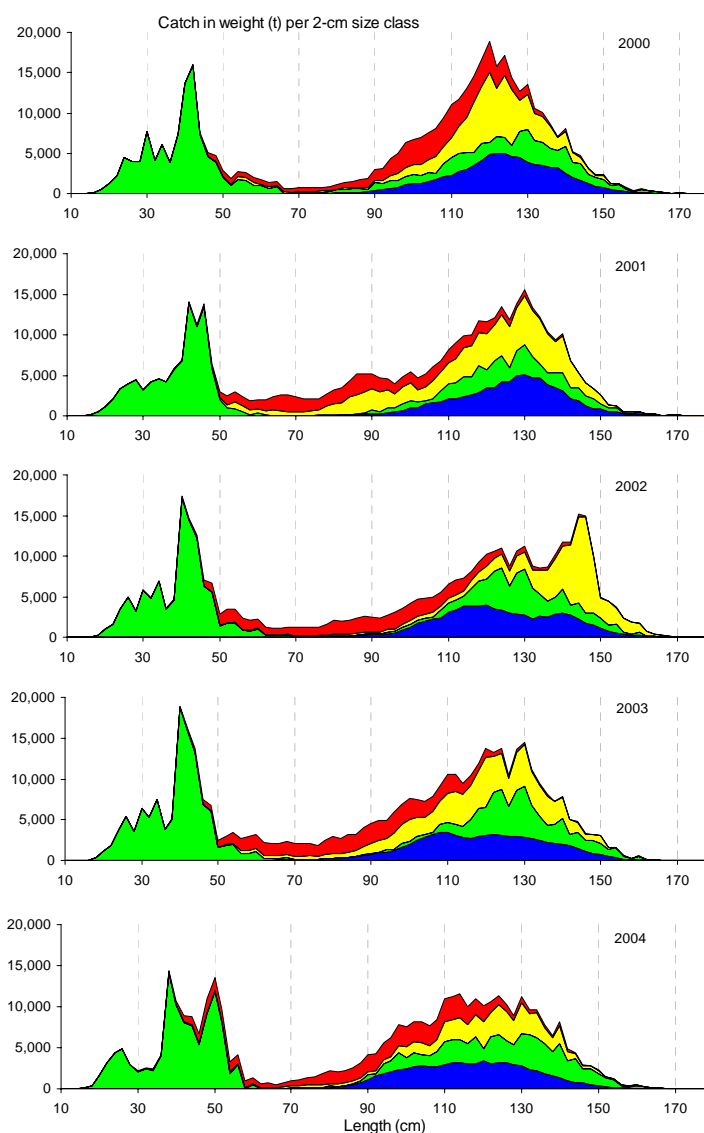


Figure 54. Annual catches of yellowfin tuna in the WCPO by size and gear type, 2000–2004. (blue–Longline; green–Phil-Indo fisheries; red–purse seine associated; yellow–purse seine unassociated)

¹² Indonesia has recently revised the proportion of catch by species for their domestic fisheries which has resulted in differences in species composition by gear type for 2005 compared to what has been reported in previous years.

7.3 BIGEYE

Since 1980, the Pacific-wide total catch of bigeye (all gears) has varied between 120,000 and 255,000 mt ([Figure 55](#)), with Japanese longline vessels generally contributing over 80% of the catch until the early 1990s. The 2005 bigeye catch for the Pacific Ocean (259,478 mt) was the highest on record, due to record catches in the WCP–CA fisheries (163,419 mt).

The **purse-seine** catch in the **EPO** (70,294 mt in 2005) continues to account for a significant proportion (69%) of the total EPO bigeye catch, although the 2005 EPO longline bigeye catch (32,082 mt) was the lowest since 1965. In contrast, the **WCP–CA longline** bigeye catches over the past four years have been the highest on record and the **WCP–CA purse seine** bigeye catch for 2005 was estimated to be 41,502 mt, a clear record for this fishery ([Figure 56](#)). The **WCP–CA pole-and-line** fishery has generally accounted for between 2,000–4,000 mt of bigeye catch annually over the past decade, and the "other" category, representing various gears in the Philippine, Indonesian¹³ and Japanese domestic fisheries, has accounted for about 12,000–15,000 mt in recent years.

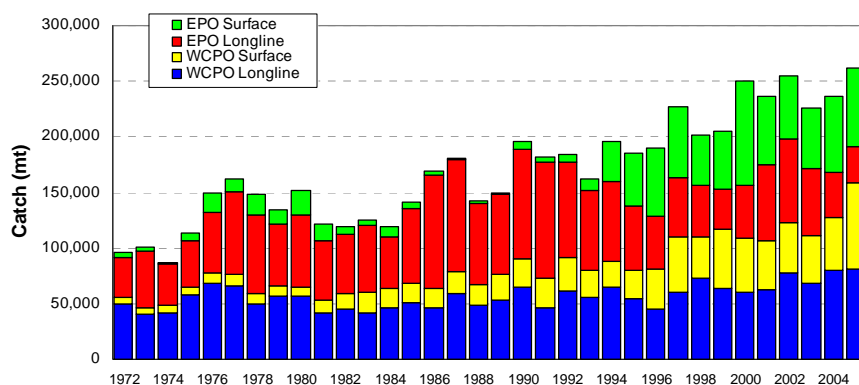


Figure 55. Pacific bigeye catch (mt) by gear
(excludes catches by "other" gears)

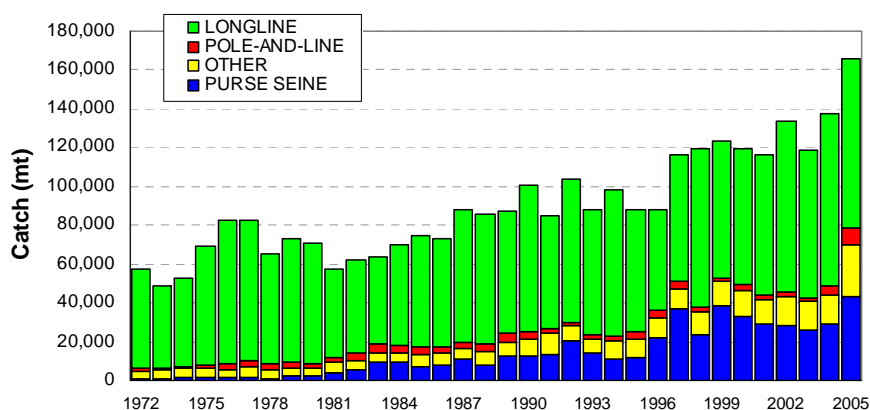


Figure 56. WCP–CA bigeye catch (mt) by gear

[Figure 57](#) shows the spatial distribution of bigeye catch in the Pacific for the period 1990–2004 (2005 data are incomplete). The majority of the WCP–CA catch is taken in equatorial areas, both by purse seine and longline, but with some longline catch in sub-tropical areas (e.g. east of Japan and off the east coast of Australia). In the equatorial areas, much of the longline catch is taken in the central Pacific, continuous with the important traditional bigeye longline area in the eastern Pacific.

¹³ Indonesia has recently revised the proportion of catch by species for their domestic fisheries which has resulted in differences in species composition by gear type for 2005 compared to what has been reported in previous years.

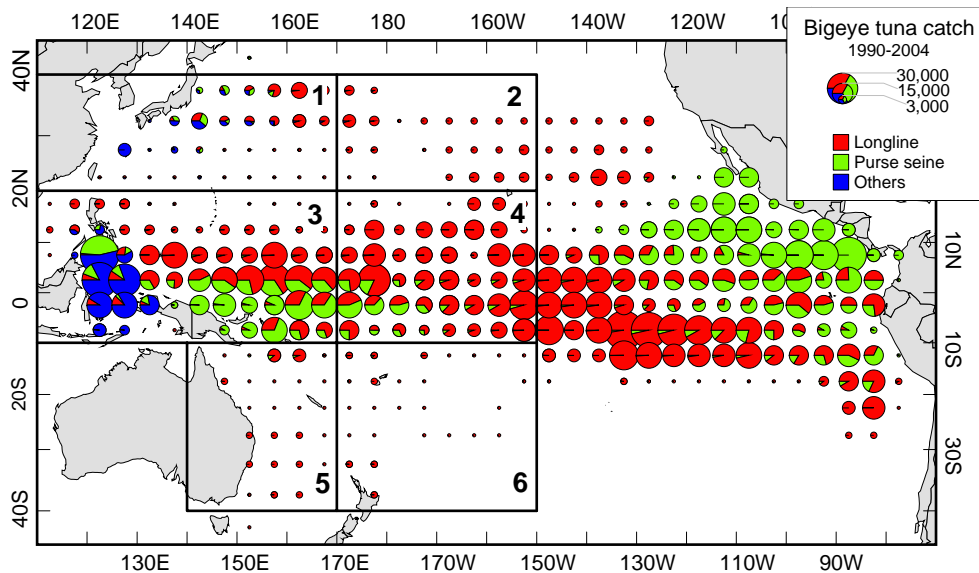


Figure 57. Distribution of bigeye tuna catch, 1990–2004.
The six-region spatial stratification used in stock assessment for the WCP–CA is shown.

The longline fishery clearly accounts for most of the catch of large bigeye in the WCP–CA (Figure 58). This is in contrast to large yellowfin tuna, which (in addition to the longline gear) are also taken in significant amounts from unassociated (free-swimming) schools in the purse seine fishery and in the Philippines handline fishery. Large bigeye are very rarely taken in the WCPO purse seine fishery and only a relatively small amount come from the handline fishery in the Philippines. Bigeye sampled in the longline fishery are predominantly adult fish with a mean size of ~130 cm FL (range 80–160 cm FL), while the domestic surface fisheries of the Philippines and Indonesia take small bigeye in the range 20–60 cm. Associated sets account for nearly all the bigeye catch in the WCP–CA purse seine fishery with considerable variation in the sizes from year to year. The age class of bigeye taken by associated purse seine sets in the size range 60–70 cm during 2003 are probably represented as the clear mode of fish at size 95–100 cm in the longline fishery in 2004.

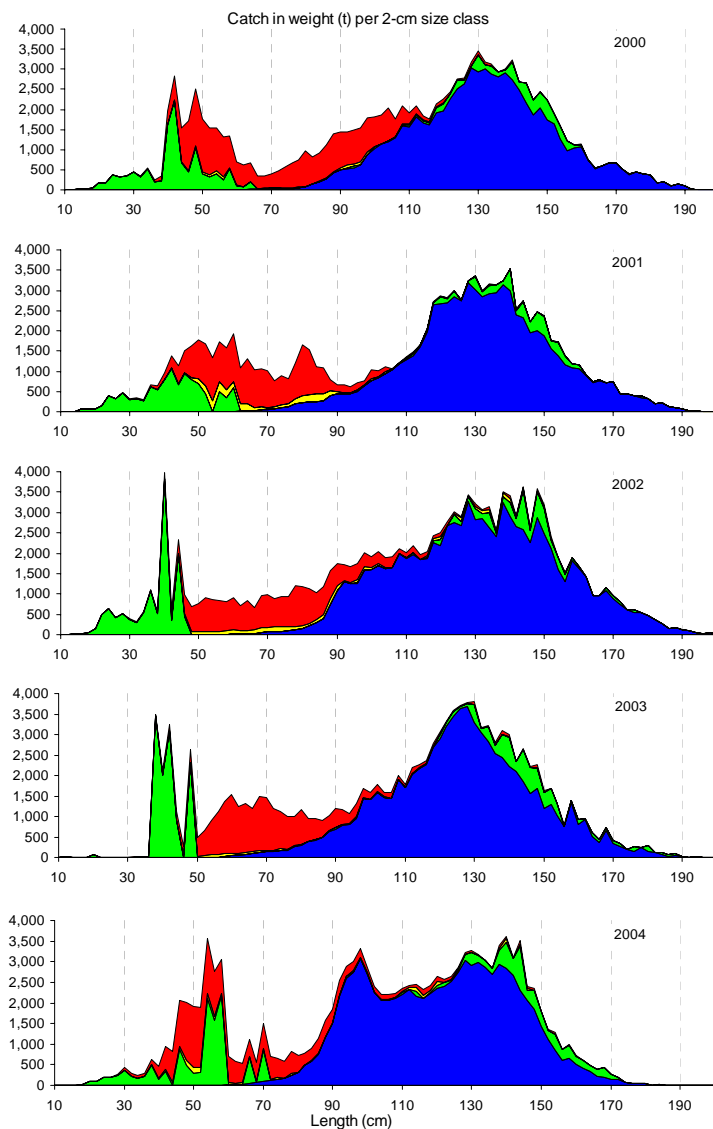


Figure 58. Annual catches of bigeye tuna in the WCPO by size and gear type, 2000–2004. (blue–longline; green–Phil-Indo fisheries; red–purse seine associated; yellow–purse seine unassociated)

7.4 ALBACORE

Prior to 2001, south Pacific albacore catches have been in the range 25,000–40,000 mt, although a significant peak was attained in 1989 (48,562 mt), when driftnet fishing was in existence. Since 2001, catches have exceeded this range, primarily as a result of the growth in several Pacific Islands domestic longline fisheries. The 2002 south Pacific albacore catch of 65,471 mt was the highest on record, with the 2004 catch of 64,952 mt not far behind. The south Pacific albacore catch in 2005 dropped to 53,692 mt, with a reduction in catches in all fisheries.

In the post-driftent era, **longline** has accounted for most (> 75%) of the South Pacific Albacore catch, while the **troll** catch, for a season spanning November – April has been in the range 3,000–8,000 mt (Figure 59). The WCP–CA albacore catch (115,353 mt in 2005) includes north Pacific catches (from the longline, pole-and-line and troll fisheries) and typically contributes around 80–90% of the Pacific catch of albacore.

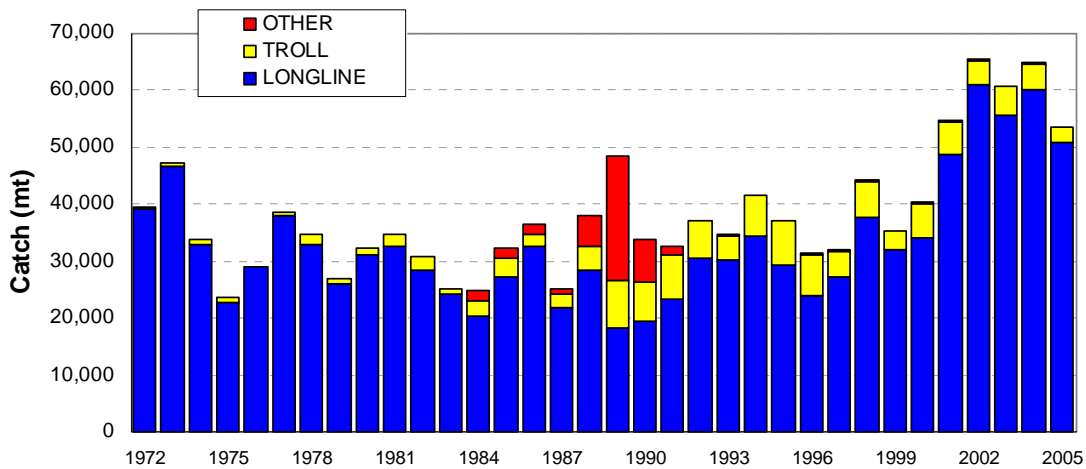


Figure 59. South Pacific albacore catch (mt) by gear ("Other" is primarily catch by the driftnet fishery.)

The longline catch is widely distributed in the south Pacific (Figure 60), but with catches concentrated in the western part of the region. The Chinese-Taipei distant-water longline fleet catch is taken in all three regions, while the Pacific Island domestic longline fleet catch is restricted to the latitudes 10°–25°S. Troll catches are distributed in New Zealand's coastal waters, mainly off the South Island, and along the SCTZ. Less than 20% of the overall south Pacific albacore catch is usually taken east of 150°W.

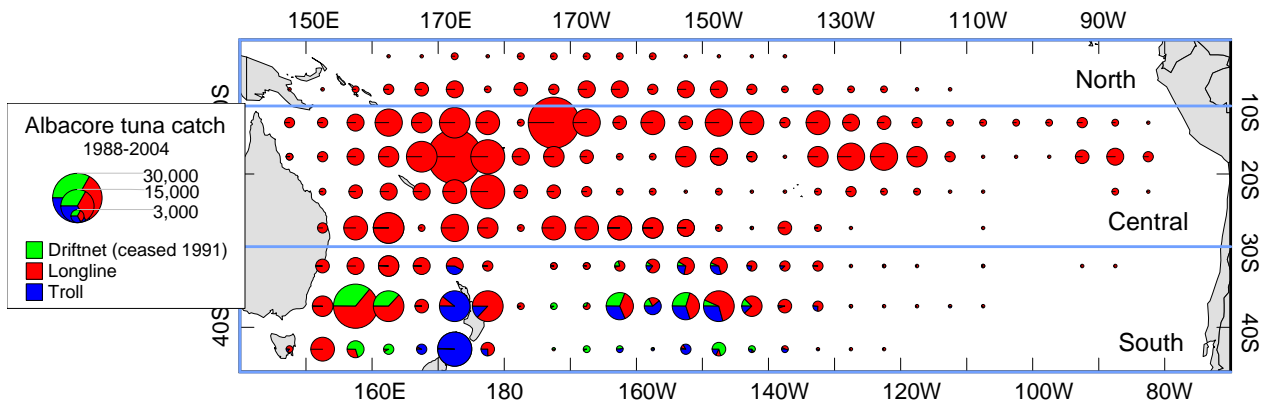


Figure 60. Distribution of South Pacific albacore tuna catch, 1988–2004.
The three-region spatial stratification used in stock assessment is shown.

The longline fishery take adult albacore generally in the size range 90–105cm and the troll fishery take juvenile fish in the range 50–80cm (Figure 61).

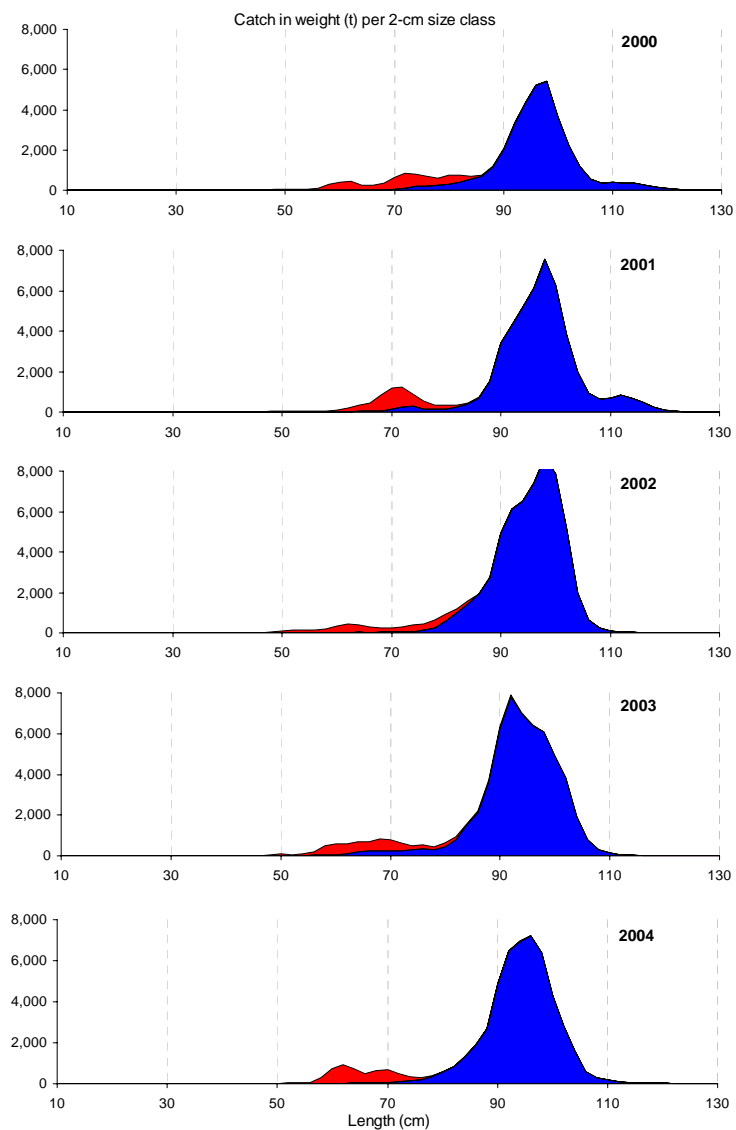


Figure 61. Annual catches of albacore tuna in the South Pacific Ocean by size and gear type, 2000–2004. (blue–longline; red–troll)

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