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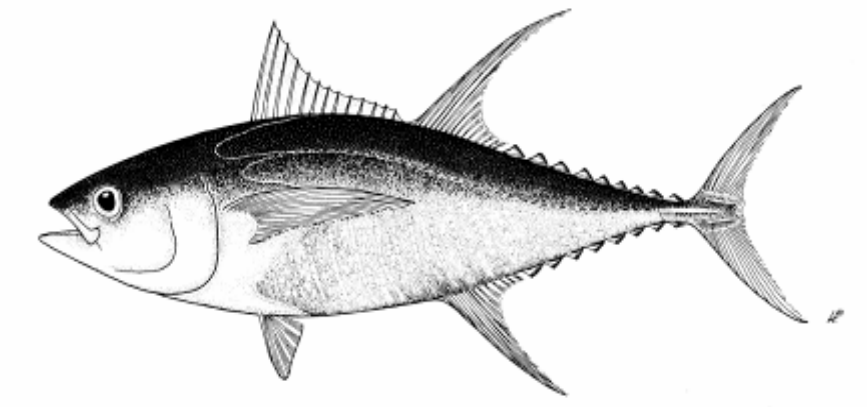
PAPUA NEW GUINEA

Tuna Fisheries Report – Papua New Guinea

(Prepared for the 4rd Science Committee Meeting Port Moresby, Papua New Guinea August, 2008)



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Summary

In 2007, the number of Fishing vessels having access to Papua New Guinea waters was Two hundred twenty-two (222). Two Hundred of these were Purse-seiners and 22 were Longliners. The number in 2007 was 16 more purse-seiners than in 2006, courtesy of the US fleet.

The catch by the PNG associated vessels in the convention are was 223,279 mt of which 3,225mt was longline catch and 220,054 mt was purse-seine. Of the 220,054 mt purse-seine catch, 142,851mt was caught in PNG waters. In terms fishing effort (days fishing & searching), the vessels did 9,900 days of which 72% was in PNG waters and 28% was outside PNG waters. Though there was an increase in effort, the overall number of sets was less by 23% compared to 2006 with the greatest reduction in associated sets (24%). The total catch was the second highest, just under the 2005 catch, however in 2007 there was a 66% reduction in the catch of Bigeye compared to 2006 catch of bigeye. There was also a 50% reduction in the catch of other species in 2007 compared to 2006.

Catch by foreign fleet in PNG waters was a record 320,132 mt. In the recent 5 years catch was dominated by Chinese Taipei (36%) and Korea (30%). The combined total catch by all fleets in the PNG waters in 2007 was again a record of 466,208. Almost all (99.99%) is purse-seine catch.

Data coverage for logsheets is very high(86% reporting) for all vessels. Good reporting is one factor for the record high catch as reported.

1. Background to the fishery

Papua New Guinea's Exclusive Economic Zone (PNG EEZ), 2.4 million km^2 in extent, is one of the largest and more productive in the Western and Central Pacific Ocean. In the most recent years, catches were around 400,000mt per annum representing about 30% of the WCPO catch which is about 10% of the global catch.. The tuna fishery is the largest of Papua New Guinea's fisheries and represents a balance of both domestic industry development and foreign Distant Water Fishing Nations (DWFN) access arrangements.

The development of the fishery is guided by a National Tuna Fishery Management Plan which establishes an overall management structure, and an application framework for the longline, purse seine, tuna Handline line and pole-and-line fisheries, including licence limits and Total Allowable Catches (TACs).

The PNG purse seine fishery operates within the guidelines of several important regional and sub-regional arrangements eg PNA, Palau, and FSM Arrangements, whose requirements are incorporated in the National Tuna management Plan. One such recent amendment is the shift in effort control from vessel numbers to limiting fishing days under the Vessel Day Scheme.

Under the present Government's export-driven economic growth strategy, onshore investment in tuna processing for export is still being actively encouraged. Foreign and domestic access by purse seine vessels is, as a result, increasingly linked to commitment to onshore investment, especially in the form of tuna processing.

2. Annual Fisheries Information

2.1 National and foreign fleet structure

2.1.1 National Fleet

Domestic longline

Papua New Guinea's longline fishery is fully domesticated, restricting the participation to only nationals or citizen companies with limited allowance for dry charter of additional foreign vessels. The longline fishery in PNG includes a distinct shark fishery which is managed under a separate management Plan from the tuna longline. The shark fishery is managed under the shark fishery management plan adopted since 2002. Effort for this fishery is limited to 9 vessels setting 1,200 hooks per day and a TAC of 2,000mt dressed weight per year including shark catches by tuna longline vessels.

The Tuna longline sector is managed under the Tuna Fishery Management Plan, which limits effort (100 vessels and 1,200 hooks per set per day) and catch limit (10,000mt per year based on the combined catch of yellowfin and bigeye) for the tuna longline fishery sector.

The total number of longline vessels has however never reached the 100 licenses allowed for but has been stable at about 50 vessels (41 tuna and 9 shark vessels) in

the last four years. The actual number of active vessels was less than 30 (27) in 2006, 22 in 2007. As of the start of 2008 only one company with 12 is operating out of the initial 6 companies. Shark vessels have been steady at 9 vessels as that is the limit in the fishery. Any change in licence numbers will most probably be a decrease in vessel numbers.

Handline fishery

After an initial trial fishing for a year involving two Philippine vessels (bancas or Pump boats) commencing in December 2002; interest in this fishing method, considered part of the longline/midwater fishery, grew. Such that this fishing method is now recognised as a fishery and is guided by a management guideline under the National Tuna Fishery Management Plan (this has being reviewed to include this fishing method). Sixteen (16) smaller vessels, less than 1 tonne (fish + ice) carrying capacity were fishing inshore waters as an artisan fishery, after an initial trial by 2 larger vessels. The operation has scaled down with only five (5) active vessels. Since the beginning of this year, there has not been any fishing due to business restructure. Operations will resume towards the end of the year.

Table 1 (a). Number of Papua New Guinea longline and handline vessels active in the WCPFC Convention Area, 2003-2008

	Longline (tuna)		**Handline (tuna)**		**Longline (shark)**		**Total**	
Year	licensed	Active	licensed	Active	licensed	Active	licensed	Active
2003	39		2		9	9	50	
2004	40		0		9	9	49	
2005	42	27	0		9	9	51	36
2006	43	27	15	10	9	9	51	46
2007	42	22	15	10	9	9	66	45
2008	42	12	16	5	9	9	67	28

Domestic purse seine

Seven (7) purse-seine vessels are PNG flagged and therefore Domestic. These vessels are smaller medium sized vessels and fish in association with Fish Aggregating Devices (Fads), transfer catch to carrier motherships at sea and take most of their catch within archipelagic waters. They are associated with the tuna canneries in PNG and are landing all their catch there.

Locally based foreign purse seine

A total of 32 vessels fish under this category. Fourteen (14) of these are associated with the tuna cannery, and land all their catch there. Most are smaller medium sized vessels fish in association with Fads, also transfer catch to carrier motherships at sea, and again take most of their catch within archipelagic waters. These vessels are Philippine flagged but are permanently based in PNG and fish only in PNG especially in the archipelagic waters and are not under the FSM arrangement. The other eighteen (18) are larger vessels, mostly flagged in Vanuatu operating widely throughout the region under FSM Arrangement licences (Figure 1), with the home party assigned to PNG. These vessels are associated with present or planned onshore processing developments. They typically take around 30% of their catch in PNG waters.

2.1.2 Foreign Fleet – foreign access purse seine

PNG currently has bilateral purse seine access agreements with China, Korea, Japan, Taiwan and Philippine companies, as well as being a signatory to the United States Multilateral Treaty (USMLT). Several Vanuatu flag vessels are also under bilateral agreement with PNG. A total of 200 purse seine vessels are currently licensed (Table 1b). One hundred fifty-six (156) of these are foreign, with fleets taking varying proportions of their regional catch in PNG waters. Vessels of other parties to the FSM Arrangement also fish in PNG waters to a limited extent. The increase in 2006 is due to the licensing of Japanese vessels and the 2007 increased is due to increased entry into PNG waters by non PNG vessels under the FSM arrangement. Further increases in 2008 is due to the increase in the number of vessels under the US fleet.

Table 1(b). Number of purse-seine vessels licensed to fish in PNG waters, 2003-2008

Year	P/seine (local)	P/seine (locally based)	P/seine (bilateral access)	P/seine (USMLT)	P/seine (FSM Non PNG)	Total
2003	4	25	80	26	16	151
2004	4	39	84	15	14	147
2005	9	39	84	14	13	159
2006	7	39	116	14	6	182
2007	7	39	117	11	12	186
2008	7	37	117	27	12	200

2.2 *Coverage categories for catch, effort and size data*

The estimated annual coverage of catch, effort and size data for PNG fleets in the WCPFC Convention Area, 2003 – 2005 is a shown in table 2b. It shows that the coverage for both purse seine and longline PNG Fleets is high as well as for longline size data coverage. PNG fleets size data coverage is between 5 – 15%, medium. This is primarily being collected through the NFA observer programme.

PNG Fleet

Data coverage for PNG longline for years 2003-2004 and 2005 is high, for both catch effort and size data (table 2b). The purse-seine fishery data coverage is however high for catch/effort, but medium for size data in the same years(table 2b). Data coverage for PNG purse-seine fleet is similar to that of the foreign fleet operating in PNG waters (table2c).

Table 2 (b). Estimated annual coverage of catch, effort and size data for Papua New Guinea fishing fleets in the WCPFC Convention Area, 2003–2005.

Gear	Fleet	Year	Catch/Effort data coverage	% coverage	Size data coverage	% coverage
LONGLINE	PAPUA NEW GUINEA	2003-2004	HIGH	>80%	HIGH	>15%
		2005	HIGH	>80%	HIGH	>15%
		2006	HIGH	>80	MEDIUM	5-15%
		2007	HIGH	>80	MEDIUM	5-15%
PURSE SEINE	PAPUA NEW GUINEA	2003-2004	HIGH	>80%	MEDIUM	5-15%
		2005	HIGH	>80%	MEDIUM	5-15%
		2006	HIGH	>80	MEDIUM	5-15%
		2007	HIGH	>80	MEDIUM	5-15%

Foreign Fleet

For all purse-seine fleets by major countries (China, Korea, Chinese Taipei and Vanuatu) the catch/effort data coverage is high for the recent years (2003 – 2007). The size data coverage for foreign fleet has medium coverage. There are no foreign longline fleets operating in PNG EEZ therefore there is no data coverage for foreign longline.

Table 2 ©. Estimated coverage of catch, effort and size data for bilateral-arrangement, foreign fleets fishing in Papua New Guinea's EEZ.

Gear	Fleet	Year	Catch/Effort data coverage	% coverage	Size data coverage	% coverage
PURSE SEINE	CHINA	2003-2004	HIGH	>80%	MEDIUM	5-15%
		2005	HIGH	>80%	MEDIUM	5-15%
		2006	HIGH	>80%	MEDIUM	5-15%
		2007	HIGH	>80%	MEDIUM	5-15%
	KOREA	2003-2004	HIGH	>80%	MEDIUM	5-15%
		2005	HIGH	>80%	MEDIUM	5-15%
		2006	HIGH	>80%	MEDIUM	5-15%
		2007	HIGH	>80%	MEDIUM	5-15%
	Chinese Taipei	2003-2004	HIGH	>80%	MEDIUM	5-15%
		2005	HIGH	>80%	MEDIUM	5-15%
		2006	HIGH	>80%	MEDIUM	5-15%
		2007	HIGH	>80%	MEDIUM	5-15%
	VANUATU	2003-2004	HIGH	>80%	MEDIUM	5-15%
		2005	HIGH	>80%	MEDIUM	5-15%
		2006	HIGH	>80%	MEDIUM	5-15%
		2007	HIGH	>80%	MEDIUM	5-15%
	JAPAN	2005	HIGH	>80%	-	-
		2006	HIGH	>80%	-	-
		2007	HIGH	>80%	-	-

.3 Annual National Fleet Catch by species in the WCPFC Convention Area, 2003 - 2007

Catch by PNG- associated vessels in the convention area exceeded 220,000mt in 2005 (table 3), having increased steadily from just over 1,000mt in 1994 (SPC Year book 2001). PNG Domestic vessel and the smaller sized vessels under locally- based foreign fish entirely in the PNG EEZ whereas the larger sized vessels under the locally-based foreign category operate widely throughout the Western and Central Pacific Ocean (WCPO), mostly under FSM Arrangement licences. Figure 1 and 2 shows the wide distribution of the WCPO effort and catch by these vessels. The high effort and catch in the PNG EEZ is attributed to PNG domestic vessels and those small sized locally-based foreign vessels not under FSM arrangement.

Tables 3. Annual catch and effort estimates for the Papua New Guinea purse-seine fleet, by species in the WCPFC Convention Area, 2003-2007. (Source : Raised logsheet data; Data for 2007 are unraised and provisional, but coverage is "HIGH")

	Effort			**Catch (metric tones)**				
Year	**Days Fishing & Searching**	**UnAss. Sets**	**Assoc. sets**	**SKJ**	**YFT**	**BET**	**OTH**	**TOTAL**
2003	6,702	2,423	4,223	118,676	37,661	289	71	156,696
2004	7,623	2,042	5,519	172,375	25,537	148	79	198,139
2005	9,819	3,658	6,077	166,341	52,014	1,454	270	220,079
2006	8,297	2,285	5,412	158,950	47560	1741	992	209,242
2007	9,900	1,646	3,357	174,957	44,324	356	417	220,054

* Total fishing days is inclusive of other unknown set types as well

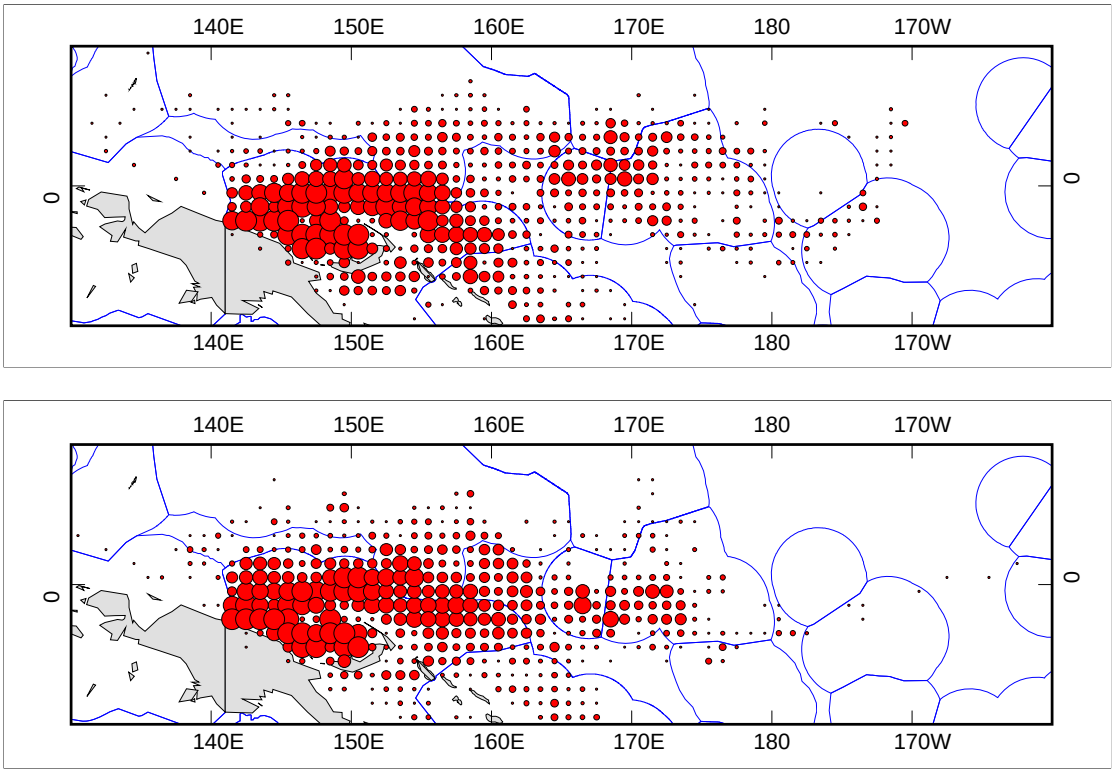


Figure 1. Distribution of effort by the PNG-associated purse seine vessels for 2006 (top) and 2007 (bottom)

In 2007, the fishing effort (days fishing & searching) by PNG associated vessels in the convention area was 9,900 days of which 72% was in PNG waters and 28% was outside PNG waters. Although there was an increase in the fishing effort, the overall number of sets was less by 23% compared to 2006 with greatest reduction in associated sets (24% reduction). The total catch was the second highest, just under the 2005 catch, however in 2007 there was a 66% reduction in the catch of bigeye tuna compared to the 2006 catch of bigeye tuna. There was also a 50% reduction in the catch of other species in 2007 compared to 2006.

The Papua New Guinea “Home-Party” FSM Arrangement purse-seine fleet’s effort varies with associated and unassociated sets. Unassociated catches verses associated catches are similar (5 year average).

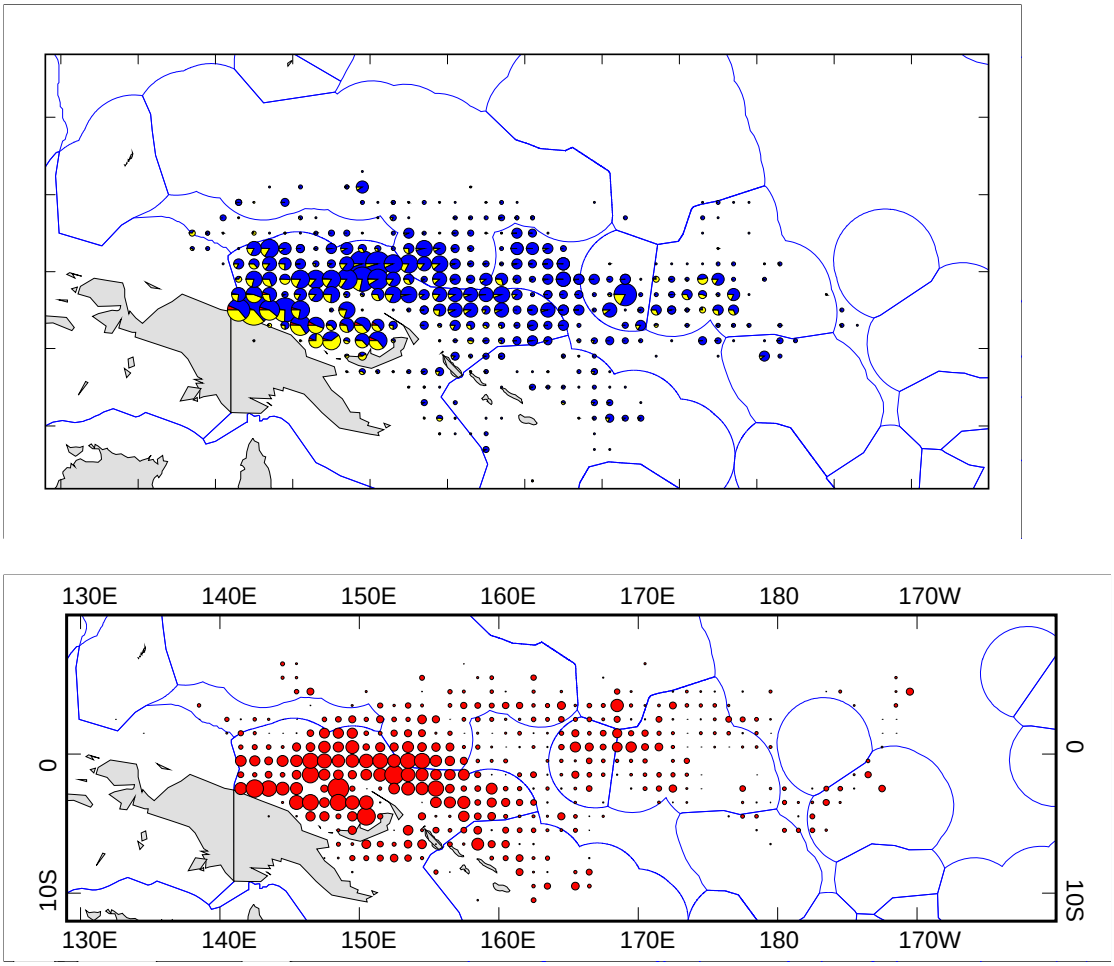


Figure 2. Distribution of total catch by the PNG-associated purse seine vessels for 2007 (top) and 2006 (bottom)
Legend: (Blue- Skipjack, Yellow-Yellowfin tuna, Red – estimated Bigeye tuna)

2.4 Annual Home EEZ Catch by gear, fleet and species, 2003 - 2007

Longline (tuna)
There has been no licensed access by DWFN longline vessels to PNG waters since 1995, with a peak historical catch of nearly 20,000t (1978) achieved by Japanese vessels during this earlier period. Domestic longline activity started in 1995, following the introduction of the domestication policy.

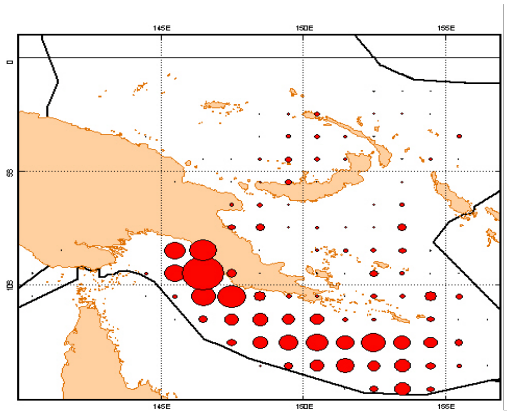
Prior to 2001, logsheet coverage of the domestic fishery was poor and catches are difficult to estimate with any confidence. Table 2 (b) shows that catch/effort coverage (logbook data) for longline for 2003 – 2008 is high therefore this situation has improved; coverage has remained to be high for the last three recent years.

Estimates of the tuna longline catch for 2007 from available logsheet data indicate a total catch of 3225 (all species) the lowest in the recent 5 years. The catch comprised 1,319 m.t yellowfin, 104 mt bigeye and 1,564mt albacore and 142 mt of other fish. There was a general decline in the catch of target species (bigeye 14%, yellowfin 12%) except for albacore that had an slight increase of 7% compared to 2006.

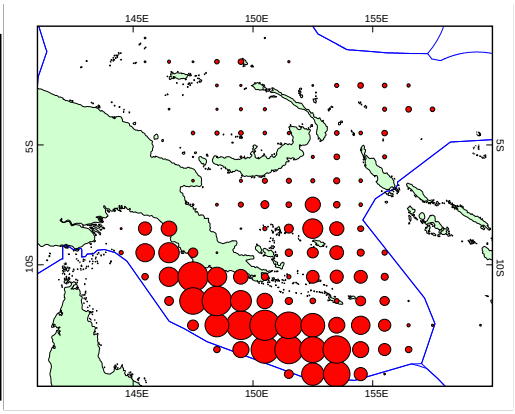
Catch in 2007 was dominated by Albacore (49% of the total catch and 52% of the tuna catch) followed by Yellowfin (41% of total catch and 44% of tuna catch) with lesser catches of bigeye. Catch of albacore has been high in recent years and this is due to a number of reasons, including favourable environmental conditions especially in the Coral Sea areas enabling albacore to be more available to the fishery plus some intentional targeting.

Tables 4. Annual catch and effort estimates for the Papua New Guinea tuna longline fleet, by species in the WCPFC Convention Area, 2003-2007 (Source : Raised logsheet data; Data for 2006 & 2007) are unraised and provisional)

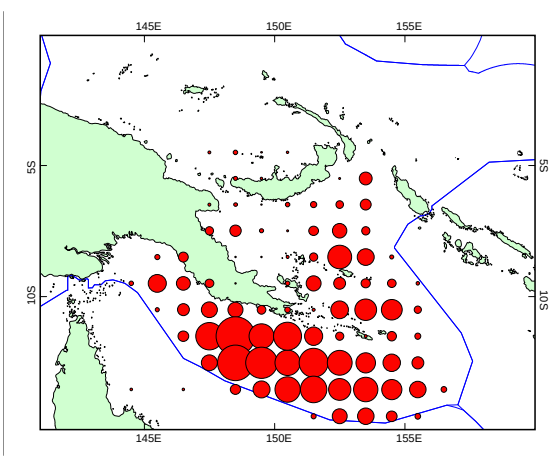
	Effort	Catch (metric tonnes)							
Year	**hhooks**	**ALB**	**BET**	**YFT**	**BLM**	**BUM**	**MLS**	**SWO**	**OTH**	**TOTAL**
2003	66,569	857	390	1,747	24	126	13	22	174	3,354
2004	93,188	1,903	392	2,267	26	81	12	26	123	4,810
2005	75,872	2,088	211	1,052	38	58	9	18	99	3,574
2006	58,872	1,365	134	1,682	20	37	13	8	98	3,356
2007	66,513	1,564	104	1,319	19	53	11	13	142	3,225



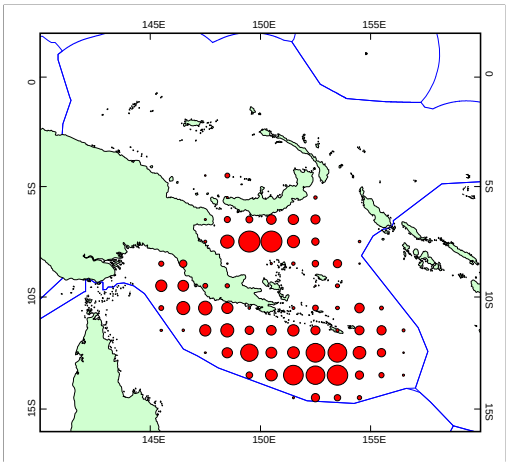
2004



2005

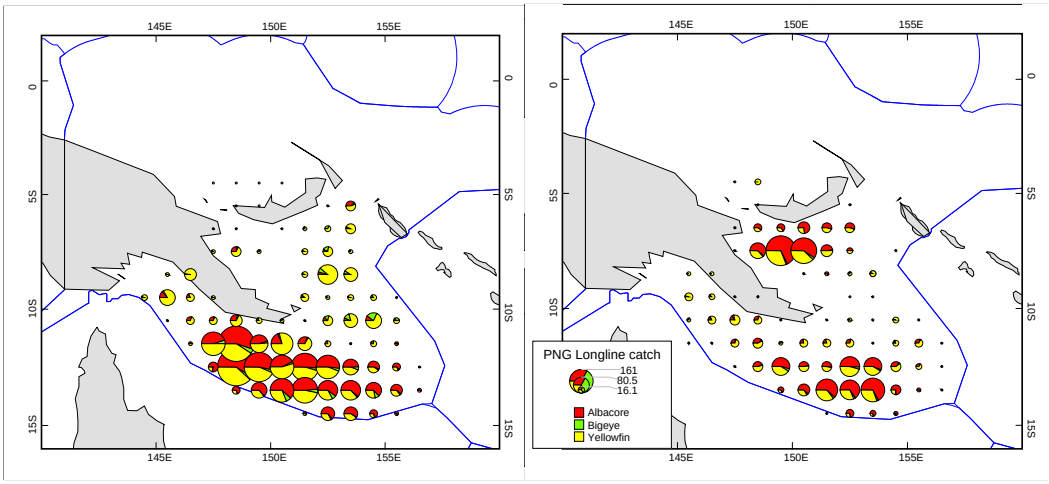


2006



2007

Figure 3 (a) Annual distribution of effort (100s of hooks) for the Papua New Guinea longline fleet throughout the WCPFC Convention Area for 2004 (top-left), 2005 (top-right), 2006 (bottom-left) and 2007 (bottom-right)



2006 2007

Figure 3(b). Distribution of catch by PNG tuna longline vessels, 2006 (left) and 2007 (right)

Longline (shark)

The fishery started on a significant scale in 1997, when vessels licensed as tuna vessels and with freezer capacity began targeting shark. This quickly expanded to over 20 vessels, although many of these did not fish for lengthy periods of time. Data coverage prior to 2002 is sparse (less than 30%) with poor facility on the existing tuna logsheets to record shark catch. A shark fishery was established that limited vessels targeting sharks to only nine vessels.
Estimates of the shark longline catch for 2007 from the available logsheet and landings data indicate a total catch (all species) of 861mt, which is 18% less than the 2006 catch of 1,234mt. Shark catch dropped from 1,123mt in 2006 to 755mt (20% decline) Overall, the shark catch component was 88% and remainder 22% was other species including Billfishes and tuna.

The main shark species taken, based on extensive observer data, are silky shark, silvertip, grey reef, black tip and oceanic white-tip, although species composition of the catch varies considerably by area.

Based on available export data, 1,724 mt of shark product was exported in 2007. This figure is more than twice the information from the logsheet as well as the landings data from the shark fishery. This may imply that, either theat there gloss misreporting or that, there is a lot of shark products from fisheries other than the Shark fishery.

Purse seine (local and locally based foreign)

The catch by domestic and locally based foreign vessels in PNG waters continues to increase (Table 5), reaching yet another record (>140,000mt) in 2007, 10,000mt more than in 2006. It now makes up over 30% (31%) of the total purse seine tuna catch in the EEZ. Skipjack now contributes around 76% of the declared catch by species. Yellowfin still makes up most of the remainder. The proportion of yellowfin in the declared catch has dropped to less than 25%. The catch of bigeye tuna has dropped by 51% from the 2006 catch. Catch of non-target species by PNG fleet in PNG waters has also dropped (25% less) in comparison to 2006. Most of the catch by the locally licensed vessels has been taken in association with anchored Fads; recent adoption of an FAD Management policy now see restrictions placed on FAD numbers and operations, due to resource and gear conflict concerns.

Table 5. Domestic and locally based foreign vessel purse seine catch in PNG waters by species

Year	#. vls	Skipjack	%	Yellowfin	%	Bigeye	%	Other	%	Total
2003	33	82,880	72.7	30,948	27.1	94	0.1	69	0.1	113,991
2004	37	92,328	84.3	17,101	15.6	100	0.1	47	0	109,577
2005	42	73,350	65.1	37,998	33.7	1,056	0.9	199	0.3	112,602
2006	39	100,257	74.4	33,088	24.6	721	0.5	637	0.5	134,703
2007	37	107,985	75.6	34,249	24.0	237	0.2	380	0.3	142,851

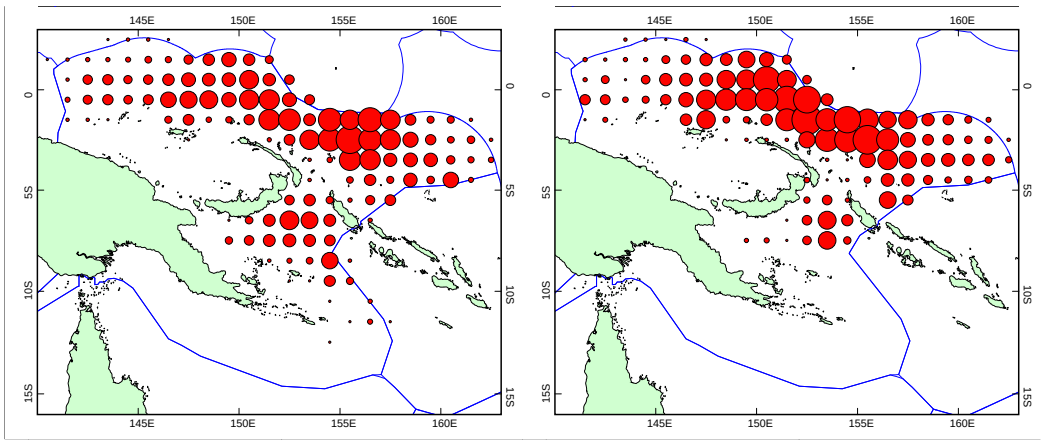
Purse seine (bilateral and multilateral)

Of the foreign access fleets, only the Philippines fleet of ten vessels (an eleventh vessels is flagged in PNG but fishes elsewhere) consistently takes virtually all of its catch in the PNG EEZ, with the other fleets (Taiwan, Korea, China, Japan and US) taking varying proportions of their catch in PNG waters, higher in La Nina years. Several of the Philippines vessels have access agreements with other Pacific Island Nations but have not fished there to any great extent.

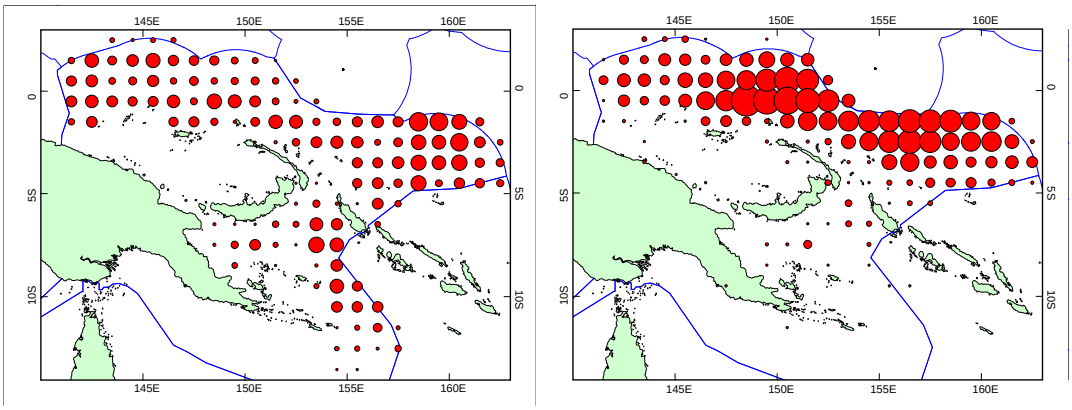
The annual catches by foreign purse seine fleets in the Papua New Guinea EEZ, by flag and species, 2003-2007 is as shown in Table 6. In the last five years catches were dominated by Chinese Taipei (36%), Korea (30%). The remaining 34% was caught by the other foreign fleets including Japan, the Philippines, the US and those fishing under the FSM arrangement. It is worth noting that the Japanese fleet made the second highest catch after Chinese Taipei in 2007 having their catch increased by 400% from 2006. Figure 4 (a) displays distribution of effort by main foreign purse seine fleets active in PNG EEZ for 2006 and 2007 respectively

Table 6: Annual catches by foreign purse seine fleets in the Papua New Guinea EEZ, by flag and species, 2003-2007 (Source : Logsheets collected by NFA)

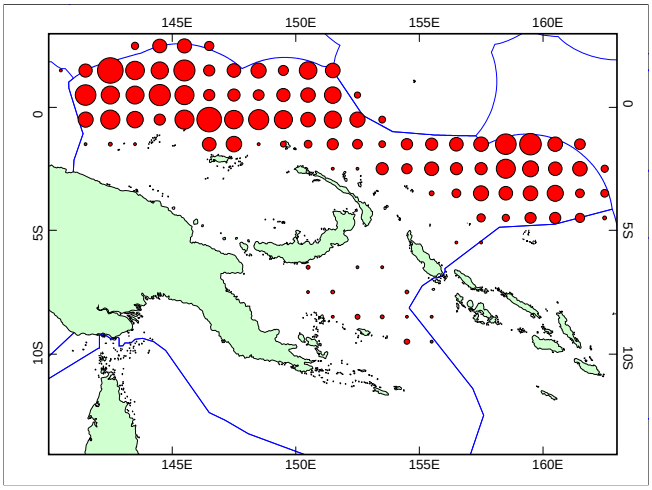
		CATCH (metric tonnes)				
Fleet	**Year**	**SKJ**	**YFT**	**BET**	**OTH**	**TOTAL**
China	2003	5,557	1,382	0	0	6,939
	2004	4,751	285	0	1	5,037
	2005	6,627	1,169	0	1	7,796
	2006	10,242	1,649	0	0	11,891
	2007	19,372	2,497	0	46	21,915
FSM Arrangement	2003	12,125	4,072	92	0	16,289
	2004	11,250	1,481	72	0	12,803
	2005	8,042	1,847	304	0	10,193
	2006	11,070	930	396	4	12,400
	2007	4,863	1,070	68	0	6,001
Japan	2003	0	0	0	0	0
	2004	0	0	0	0	0
	2005	120	10	0	0	130
	2006	16,537	3,954	314	9	20,813
	2007	70,373	13,361	1,443	96	85,273
Korea	2003	56,829	22,209	25	0	79,063
	2004	72,207	9,507	18	1	81,732
	2005	47,595	13,475	15	1	61,086
	2006	73,371	10,587	47	4	84,009
	2007	48,892	10,565	25	1	59,483
Philippines	2003	12,384	3,688	155	35	16,262
	2004	22,584	4,811	675	38	28,108
	2005	12,675	6,098	369	54	19,197
	2006	20,862	6,607	257	32	27,758
	2007	17,786	9,723	571	550	28,630
Chinese Taipei	2003	85,740	18,310	987	80	105,117
	2004	74,019	5,472	59	15	79,565
	2005	57,331	12,666	215	21	70,233
	2006	81,903	9,669	124	24	91,720
	2007	85,556	11,488	219	11	97,273
USA	2003	18,471	13,221	144	1	31,838
	2004	3,447	638	1	0	4,086
	2005	1,196	460	62	0	1,718
	2006	6,865	701	20	0	7,586
	2007	5,647	973	50	0	6,670
Vanuatu	2003	0	0	0	0	0
	2004	935	0	0	0	935
	2005	3,815	615	0	2	4,432
	2006	18,180	1,811	0	5	19,996
	2007	13,299	1,587	0	1	14,887
TOTAL EEZ	2003	191,106	62,882	1,403	116	255,507
	2004	189,193	22,194	825	54	212,265
	2005	137,401	36,340	965	79	174,785
	2006	239,030	35,908	1,158	78	276,173
	2007	**265,788**	**51,264**	**2,376**	**705**	**320,132**



KOREA 2006 CHINESE TAIPEI 2006



KOREA 2007 CHINESE TAIPEI 2007



JAPAN 2007

Figure 4. Annual distribution of effort by the main foreign purse seine fleets active in the Papua New Guinea EEZ for 2006-2007

2.5 Total home EEZ catch, for all species, all gears and all fleets combined 2003 – 2007

The estimated total catch by all vessels fishing in the PNG EEZ for the past five years (2003-2007 inclusive) is shown in Table 7, and is comprised for the most part of purse seine catches (99% of the total catch). The most recent high catch (2006 & 2007) is a result of the Japanese fleet having access to PNG waters recently and also a result of better reporting due to the Vessel Monitoring System (VMS). The high increase in 2007 is mainly due to an increase in catch by the Japanese fleet. The average annual purse seine catch in the EEZ has been around 360,000mt during this recent five-year period, roughly 25% of the regional purse seine catch.

Table 7: Total catch by all vessels fishing in PNG waters
(Source: Purse seine - SPC raised data (BEST) from logsheets and landings data, 2007 data unraised-source NFA; longline - NFA logsheet data; incomplete but including catches by tuna and shark longliners; some by-catch included)

Year	2003	2004	2005	2006	2007	Historical high
Purse seine	331,995	315,788	280,630	411,314	462,983	462,983 (2007)
Longline	3,354	3,948	3,574	3,204	3,225	19,584 (1978)
Pole&line	0	0	0	0	0	74,649 (1974)
TOTAL	335,349	319,736	284,204	414,518	466,208	466,208 (2007)

The purse seine catch in the EEZ by domestic vessels, and foreign vessels based in PNG, the latter now numbering about 37 in total, has increased steadily since the establishment of the Madang cannery in 1997, and through more recent association with onshore commitments (Table 5). It is now more than 30% (31%) of the total purse seine catch in the EEZ and is expected to increase further as new onshore developments come on stream and concurrently, bilateral access arrangements are accorded lower priority.

2.5.1 Catch rates in PNG waters

Catch rates by the various Purse-seine fleets fishing in the waters of PNG is variable with Korea and Chinese Taipei) having a higher catch rate, figure 6 (a & b). The catch trends for purse-seine also shows peaks in the first two quarters of the year and this collates to high rainfall in PNG within the first two quarters yearly, therefore high biomass during these periods. Trends in catch rates by species (Yellowfin, Bigeye and Albacore) for longline fleet operating in PNG EEZ, 1993 – 2007 is shown in Figure 5). Catch trends show that yellowfin catch rate dropped sharply from 1993 (3 fish per 100 hooks) to 1999 (Less than 1 fish per 100 hooks), stabilised between 2000 and 2003 (1 fish per 100 hooks) and declined again after 2003. Albacore catch rate on the other hand has steadily increased since 2003, after an initial rise between 1996 and 1998 and than a decline and a period of stability until 2003. Catch rate trends also

show that yellowfin tuna was the main target species until 2003 when albacore took over as the main target species. The subsequent decrease in yellowfin catch rate from 2003 is a result of fishermen targeting albacore combined with area of fishing and may not necessarily be an indication of decrease in yellowfin biomass in the area.

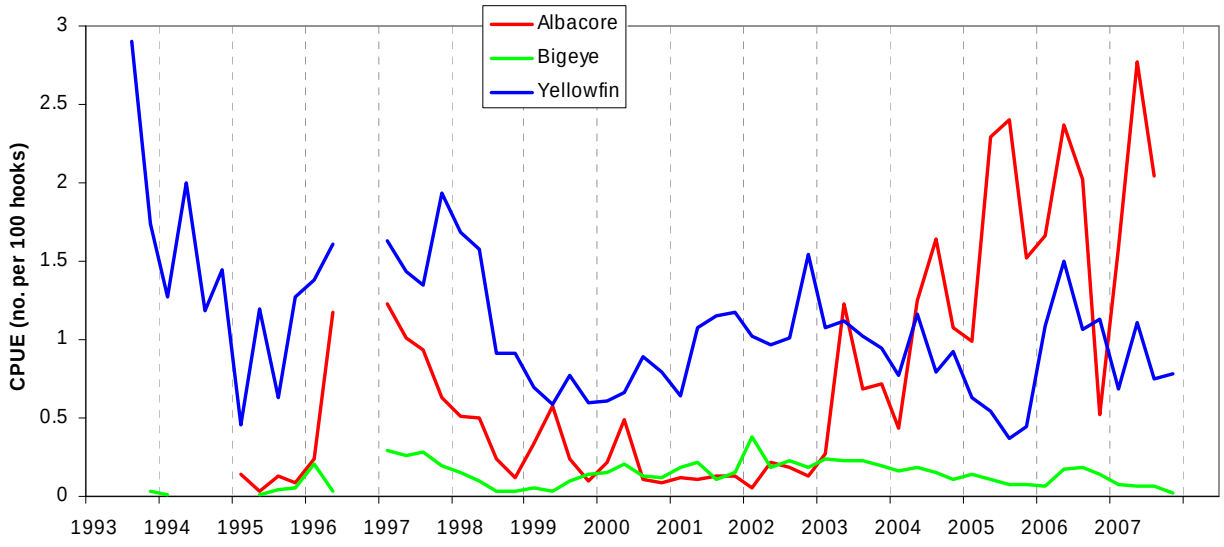


Figure 5a. Quarterly trends in nominal catch rates of Albacore, Bigeye and Yellowfin tuna taken by the PNG longline fleet, 1993-2007

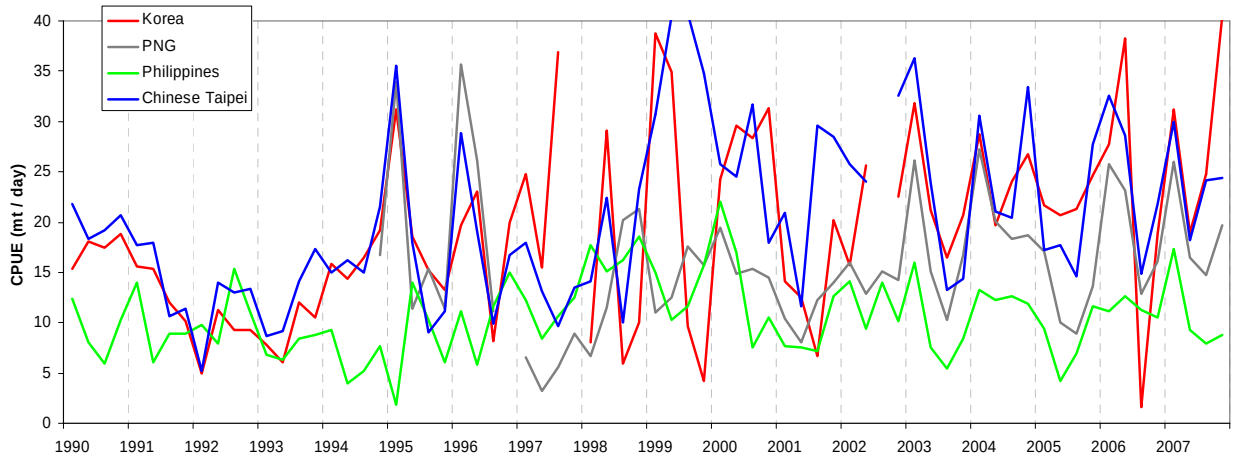


Figure 5b. Quarterly trends in nominal catch rates of Skipjack tuna taken by the purse seine fleets operating in the PNG EEZ, 1990-2007

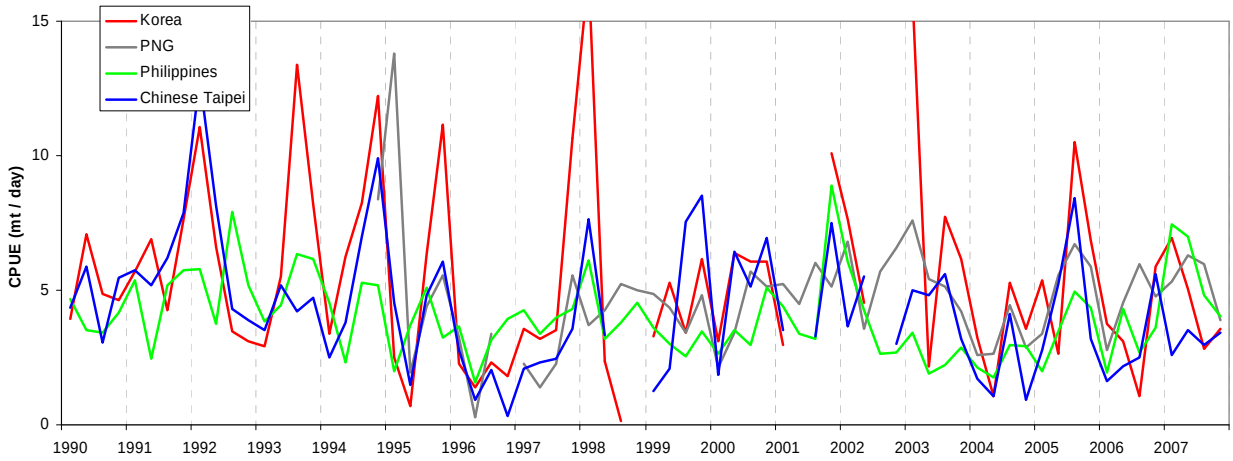


Figure 5c. Quarterly trends in nominal catch rates of Yellowfin tuna taken by the purse seine fleets operating in the PNG EEZ, 1990-2007

3. Research and Statistics

3.1 Tuna research and development

Observer programme

PNG operates a significant observer programme with monitoring and compliance functions, and funded by a combination of access agreement levies and direct cost recovery. Observers are stationed at major ports and landing points in the country, under the supervision of senior observers, and provide coverage of the purse seine fishery (domestic and foreign), the longline fishery (tuna and shark), as well as transhipment of purse seine catch to carrier vessels/mother ships, and FAD deployments. Non-tuna fisheries (prawn) and trial fishing operations also receive observer coverage.

Trained observers (now numbering 144) are currently available for deployment. The number will be increased to 150 by end of this year with a target of 200 observers by 2009. Table 8 summarizes details of the observer coverage achieved during 2005-2007. Early in 2002, the decision was taken to reduce observer coverage on mothership operations and alternatively target 100% coverage of purse seine vessels involved in the mothership operations. The implementation of this decision began in late 2003. Most of the coverage is on purse-seine vessels both foreign and PNG associated including 100% coverage on domestic, Foreign locally based and few under bilateral arrangements operating exclusively in PNG waters on FADs

Incident reports are filed by observers where compliance infractions occur and may lead to enforcement action. The biological data collected are sent to SPC/OFP for entry and verification for incorporation into regional databases. Biannual summaries for national application will be produced in the near future with SPC assistance.

Observer coverage

In the recent past, the amount of observer coverage for both Purse-seine and longline has increased and is certain to increase yet for the purse-seine fleet. Most coverage has been on the PNG flag vessels followed by Philippine flagged vessels. This is a reflection of the emphasis put on covering these purse-seine vessels due to the nature of their operation, which is FAD based and operating only within PNG waters.

Coverage on longline vessels is expected to be lower this year due to the decline in fishing effort by the tuna longline vessels.

Table 8a. Coverage on purse-seine vessels by fleet 2005-2008 (2008 1st quarter)

	2005		2006		2007		2008 (first quarter)	
Fleet	Trips	Seadays	Trips	Seadays	Trips	Seadays	Trips	Seadays
UST	2	101	2	84	0	0	0	0
FSM	0	0	0	0				
Japan	7	116	6	114	0	0	0	0
China	1	31	2	64	5	193	0	0
Korea	3	58	12	302	4	106	0	0
Taiwan	7	210	9	274	17	605	2	48
Philippine	32	1557	43	1821	54	2152	4	178
PNG	38	2145	17	552	103	3327	5	199
Total	90	4218	91	3211	183	6383	11	425

Table 8b. Coverage on Domestic Shark and Tuna Longline vessels 2005-2008 (1st quarter)

	2005		2006		2007		2008 (first quarter)	
Fleet	Trips	Seadays	Trips	Seadays	Trips	Seadays	Trips	Seadays
PNG (Shark)	9	489	6	287	6	288	0	0
PNG (Tuna)	15	295	14	418	16	457	1	29
Total	24	784	20	705	22	745	1	29

Incident reports

The incidents as stated below are those reported during the period 2007- 1st quarter of 2008.

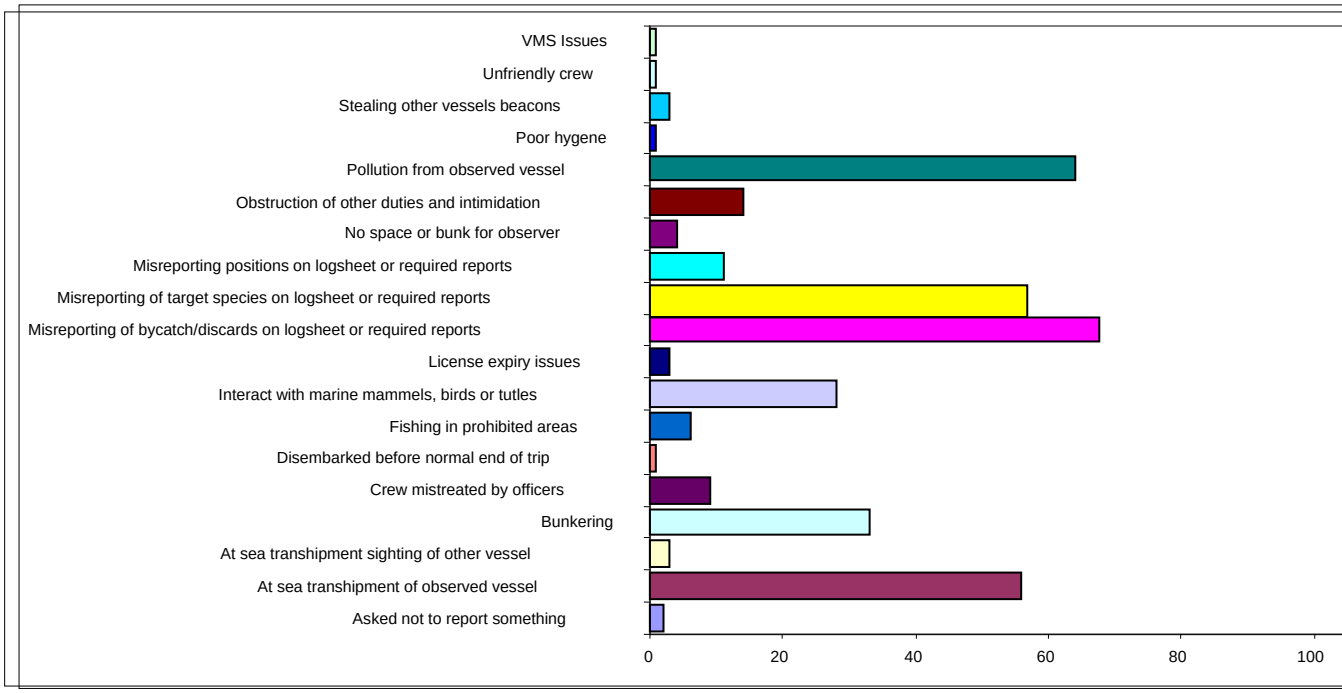


Figure 6. Frequency of all incidences reported by observers during 2007-1st quarter 2008

The most common observed incidents are;

- misreporting of bycatch/discards on logsheets or other required reports,
- pollution from the observed vessels,
- misreporting of target species on logsheets or other required reports,
- at sea transshipment of observed vessels
- bunkering.
- Interaction with marine mammals, birds or turtles

These incidents were observed to be common in all years.

Distribution of the observer effort.

The figures below, show areas where PNG observers were engaged in 2006 (2007 data not available). The observers were engaged in both longline and purse-seine duties and covered most of the fleet that have access to PNG waters. PNG observers are also heavily engaged in duties on FSM arrangement and US Treaty vessels administered by the FFA under the FFA sub-regional Observer programme (effort distribution not included).

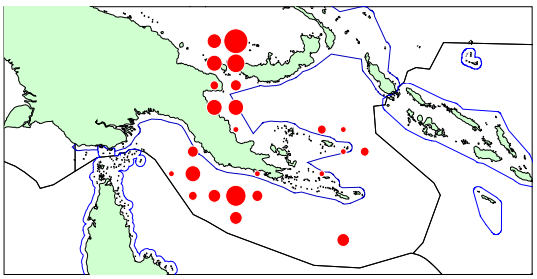


Figure 7a. Tuna-target longline, 2006

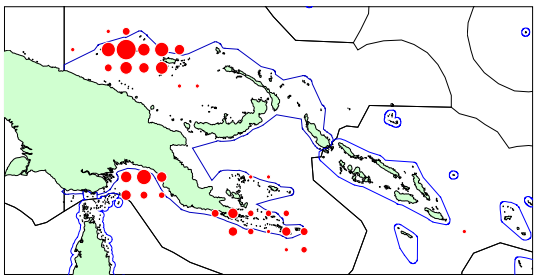


Figure7b. Shark-target longline, 2006

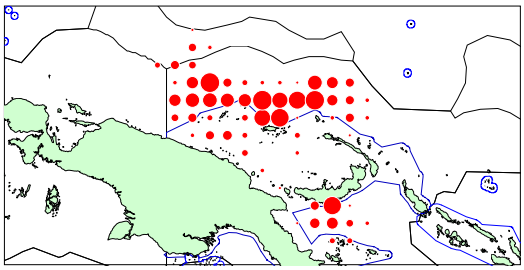


Figure 7c. Purse-seine, Philippine, 2006

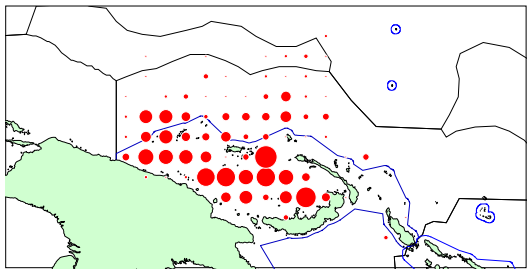


Figure7d. Purse-seine, PNG, 2006

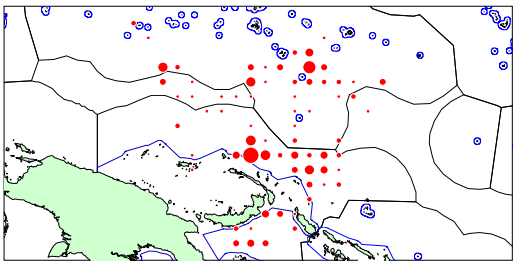


Figure7e. Purse-seine, Korea , 2006

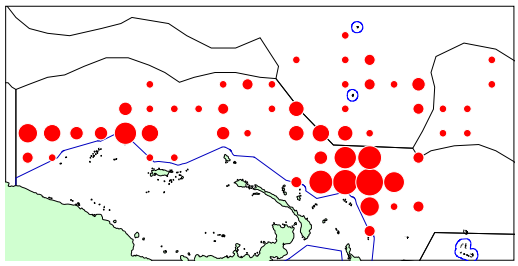
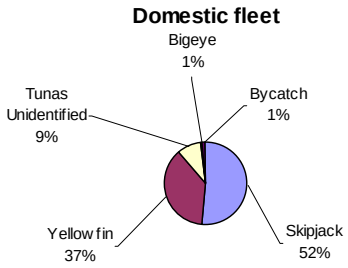


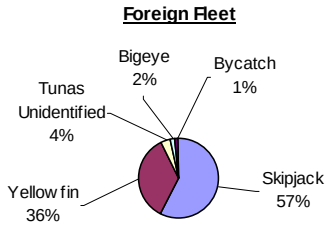
Figure7f. Purse-seine, Taiwan, 2006

Figure 7: (a-f) show the distribution of the PNG observer effort in 2006

Catch composition

Observers as part of their duty collect information on species composition. The figures below show the catch composition by the different fleets for the purse-seine fishery as observed in PNG waters in year 2007.





In both purse seine fleets the catch composition is similar show about 1% bycatch. The proportion of Bigeye is slightly higher in Foreign fleet catch (2%) compared to the domestic fleet catch (1%). Skipjack catches were higher by Foreign fleet as well. Details of species composition both target and non-target from PNG vessels as per information collected by PNG observers is given in appendix 2 (table 9).

In general;

- Blue Marlin and Black Marlin are primary billfish species taken by purse-seine fleet in PNG waters.
- Silky shark is by far the most common shark species taken by purse-seine fleet in PNG waters
- Rainbow runner, mackerel scad, ocean triggerfish, mahi mahi are usually the most common bycatch species encountered in the purse-seine fishery.
- Amount of shark catch from purse-seine vessels declined in 2007 as compared to 2005 and 2006 (Appendix 2, Figure 8).

In the longline fishery, observer data show that;

- Blue marlin is the primary billfish taken by longline fleet in PNG waters,
- Silky shark is by far the most common shark species taken by longline fleet in PNG waters,
- The most common bycatch species encountered were Wahoo, barracudas and opah, and
- Bycatch is also retained as commercially important species in the fishery (Appendix2, table 10 and figures 9 & 10).

Port sampling
Papua New Guinea has a number of trained Port samplers who are also Observers. Port Sampling in the most recent 2-3 years has not been very active due to the fact that most vessels operating in PNG waters have observers on board most of the time.

PNG has however throught the National Fisheries Authority, started its own port sampling which will cover all purse-seine vessels off-loading or transhipping in PNG ports. The sampling is currently conducted in Wewak, Madang, lae and Rabaul. Both Domestic and Foreign purse-seine vessels are been sampled.

Tuna tagging project
PNG is still involved in the tuna tagging programme through man power contribution, funding and logistics support where necessary.

4. Final market destination of catches/disposal of catch

Domestic longline (tuna)
The majority of the fresh chilled tuna catch (yellowfin and bigeye) is exported by airfreight to markets in Japan and Australia. Exports have increased steadily since 1994 and based on available records, exceeded 2,000t dressed weight (est. 2,400t whole weight), valued at over USD 8 million, for the first time in 2002. Exports of fresh chilled tuna has since decline such that in 2007 only 844mt was exported.
Frozen tuna (mostly albacore, now increased to more than 1,000t in last 2 years) is also exported.
Smaller amounts of lower grade tuna and by-catch species (Wahoo, mahimahi, some shark) are sold on local markets, and some sharkfin is (mostly frozen) exported.

Domestic longline (shark)
Shark meat has been exported since the fishery moved to a significant scale in 1998, with over 2,000t whole weight equivalent exported each year since then. During 2004, increasing amounts of shark meat were processed in PNG for sale to local food outlets. This has resulted in less export.
Frozen sharkfin export has been in excess of 100t since 2000 but has dropped to less than 100t in the most recent two years.
Tuna caught by the shark longline vessels (approx. 6% of the catch by weight) is also exported frozen (approximately 24 metric tonnes in2006).

Local licensed purse seine
In each of 2001, 2002 and 2003, over 30,000t of frozen tuna was exported by the three local companies, representing around 50% of the total catch taken by these vessels. Figures for frozen tuna have dropped as more tuna is now being processed in country. In 2004 only 10,000t was exported. In 2005, less than 10,000mt was exported and it can be seen that figures will further drop as the other plants come into production.
Limited quantities of by-catch species and small fish are sold locally.
The local market for canned tuna, in addition to exports, has expanded rapidly.

Locally based foreign purse seine catch
The 200mt/day loin plant in Wewak is in operation as of March 2003, and currently operating at a capacity of 100mt/day. It is hoped that the out put will increase further sometimes this year. All of the catch by these vessels is currently transhipped and exported, apart from small quantities unloaded to the RD cannery from time to time (< 1,000t in 2002). Much of the transhipment occurs in non-PNG ports.

Foreign purse seine vessels
All of the catch taken by foreign bilateral and multilateral access vessels is transhipped, some from PNG designated ports, and exported.
Unloading of by-catch during transhipment is encouraged.

4.1 Exports

Table 11 lists tuna fishery exports by main category and value for the period 2002-2006. The total value of tuna fishery related exports has increased in the last three years peaking at USD 66 million in 2005, but dropping by about 12% in 2006 but these figures may still be incomplete. The export figures do not include the value of tuna transhipped by PNG-based vessels.

Chilled tuna, as noted, is mostly exported to Japan and Australia, frozen tuna to Philippines, Japan and Taiwan, canned tuna mainly to the European markets (Germany, Great Britain), with small quantities to Pacific Island countries, tuna loins to Europe and US and fish meal to Australia and Japan. Shark products are mostly exported to Taiwan.

Table 11. Tuna fishery product exports by volume and value
(Source: NFA records; values in USD; frozen shark and frozen tuna weights are dressed; the 2007 figures may be incomplete; dried shark fins are not included)

	Chilled tuna		Frozen tuna		Canned tuna		Loins tuna		Fish meal		Shark meat (frozen)		Shark fins (frozen)		TOTAL (USD Million)
Year	Mt	value	Mt	Value	Mt	Value	Mt	Value	Mt	Value	Mt	Value	Mt	Value	
2003	2,092	9.3	31, 294	16.5	13,753	28	-	-	1,791	0.7	1, 312	0.5	86	0.5	55.5
2004	2,309	13.1	15,754	10.6	16,052	37.3	1, 749	1	3,174	1.5	1,317	0.5	135	0.7	64.7
2005	954	3.9	31,551	27.4	15,495	40.9	14,657	8.3	3,944	1.5	1, 4i8	0.5	179	0.8	83.3
2006	1,596	7.2	22,430	21.0	16.380	42.3	11,499	8.9	6,11	3.0	1,868	0.7	143	.8	83.9
2007	0.844	3.9	20,266	27.1	14,574	40.7	11,436	12.3	5,347	2.7	1593	0.7	112	0.7	88.1

5. Onshore developments

Infrastructure

Processing

There are currently three processing facilities operating in PNG and two are under progress. Each of these facilities is supported by Cold storage facilities with RD proposing to go into can making.

Table 12: Processing plants, both operating and proposed

Name	Facility type	Capacity-input (mt/day)	status	Date of start operation
SSTC	Tuna loins	100	Operating	2004
RD	Tuna Canning	150	Operating	1997
Frabelle/Frescomer	cannig/loins	100	operating	2006
Thai union/century canning/Frabelle	Canning/loins	350	Under progress	-
RD/Fairwell	Canning/loins	200	Under progress	-

6. Future prospects and developments

Under the Government's export driven economic growth and recovery strategy, further onshore development is being encouraged, as a condition of access.

Proximity to and availability of the resource plus change in policy as relates to rights to access resource seems to be becoming a major factor influencing investment in onshore processing facilities in PNG, along with the prospect of improved access to key markets.
Should all of these plants come to fruition, up to 900mt of Raw material will be will be required per day. If each plant operates for 250 days per year, then a total of

225,000 mt of raw material per annum would be required. Assuming that at least one third of this might be sourced outside PNG waters, and with the locally sourced material of 300,000t on average per annum, it would mean that there is room for further expansion in the processing sector. Further development of the longline fishery is currently constrained by logistical factors, particularly freight availability, high freight costs and high fuel cost, and growth in this industry is now stagnant and in fact declining. The development of the handline fishery (which has attracted considerable interest) is being closely monitored and regulated, whereas artisanal tuna fishery development is being encouraged under forthcoming projects and as an adjunct to onshore developments.
Other opportunities for value-adding to tuna products exist, and landing of by-catch by all vessels landing or transhipping is being encouraged.

PNG is pushing the idea of setting up a Marine Industrial Park to carter for the fishing industry. Work is under way to bring this idea to fruition.

Appendix 1.

Coverage of catch, effort and size data can now be categorized into three categories. They can either be high, medium or low. Where there is no data, it would be stated as "no data". For the catch/effort data coverage "high" represents coverage of greater than 80%, "medium" between 50-80% while "low"0-50%. For the size data coverage "high" is represented greater than15%, "medium" 5-15% and "low" 0-15% (see Table 2 (a)).

The percentage representation of the latter data coverage is so because the actual size data collection is not extensive (i.e. a sample representation is required only) and in many cases can only be partially carried out.

Table 2 (a). Categories of coverage for catch, effort and size data.

Category	**Catch/Effort data coverage**	**Size data coverage**
HIGH	> 80%	> 15%
MEDIUM	50-80%	5-15%
LOW	0-50%	0-5%
–	No data	No data

LEGEND :

- "**Catch/Effort data coverage**" is determined by comparing the annual catch from operational (logsheet) data to the **total** annual catch, as determined by unloadings or other types of data/information.
- "**Size data coverage**" is determined by comparing the number of trips covered by port sampling and observers (collecting size data) with the estimated number of **actual** trips undertaken by this fleet during that year.

Appendix 2

Table 9. Estimated Annual total catches of non-target species and species groups, by Papua New Guinea purse seine fleets, 2003-2005. (Source of data : Data collected under the Papua New Guinea Observer Programme (managed by NFA) and the FSM Arrangement Observer Programme (managed by FFA); Coverage of observer data : 2003– 23.7%; 2004–35.3%; 2005–18.1%; Coverage has been estimated by comparing observer-recorded target species catch to annual catch estimates for this fleet; '%' represents percentage of total catch which includes target tuna species catch)

		Catch estimates and species composition					
		2005		2006		2007	
Category	Species	MT	%	MT	%	MT	%
Target Tuna	Skipjack	56,133	47.40%	81,604	56.28%	77,944	57.81%
	Yellowfin	54,132	45.71%	56,059	38.67%	52,509	38.95%
	Bigeye	6,996	5.91%	6,176	4.26%	3,991	2.96%
Billfish	Blue marlin	37.2	0.03%	70.1	0.05%	8.3	0.01%
	Black marlin	15.0	0.01%	22.3	0.02%	8.2	0.01%
	Other Billfish	10.1	0.01%	12.0	0.01%	2.6	0.00%
Sharks and Rays	Blue shark	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Mako sharks	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Oceanic whitetip shark	1.1	0.00%	0.3	0.00%	0.0	0.00%
	Silky shark	104.5	0.09%	182.8	0.13%	17.5	0.01%
	Other sharks and rays	35.8	0.03%	19.6	0.01%	3.4	0.00%
Other finfish	Bullet/Frigate tunas	255.3	0.22%	29.2	0.02%	79.1	0.06%
	Kawakawa	4.9	0.00%	12.6	0.01%	107.9	0.08%
	Rainbow Runner	341.7	0.29%	507.2	0.35%	42.1	0.03%
	Wahoo	7.9	0.01%	23.6	0.02%	3.4	0.00%
	Common dolphinfish	35.6	0.03%	87.6	0.06%	33.1	0.02%
	Triggerfish	75.1	0.06%	81.8	0.06%	2.0	0.00%
	Barracudas	13.7	0.01%	21.5	0.01%	2.3	0.00%
	Escolars	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Lanctfishes	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Ocean sunfish	0.2	0.00%	0.7	0.00%	0.0	0.00%
	Oilfish	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Opah	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Pomfrets	4.3	0.00%	1.5	0.00%	0.0	0.00%
	Small baitfish	130.1	0.11%	48.3	0.03%	2.6	0.00%
	Other fish	80.1	0.07%	24.4	0.02%	68.6	0.05%
Total Target tuna		117,261	99.03%	143,839	99.21%	134,444	99.72%
Total billfish		62	0.05%	104	0.07%	19	0.01%
Total sharks and rays		141	0.12%	203	0.14%	21	0.02%
Total finfish		949	0.80%	839	0.58%	341	0.25%
Total non-target		1,153	0.97%	1,146	0.79%	381	0.28%

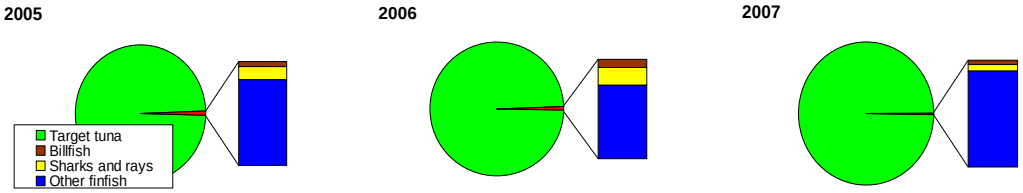


Figure 8. Proportion of non-target species groups in the catch of Papua New Guinea purse seine vessels, by year, 2005–2007. (Source of data : Data collected under Papua New Guinea observer programme Managed by NFA)

Table 10. Estimated Annual total catches of non-target species and species groups, by Papua New Guinea longline fleet, 2003-2005. (Source of data : Data collected under the Papua New Guinea Observer Programme (managed by NFA); Coverage of observer data : 2003–1.5%; 2004–1.5%; 2005–0.5%; Coverage has been estimated by comparing observer-recorded target species catch to annual catch estimates for this fleet; '%' represents percentage of total catch which includes target tuna species catch)

		Species Composition					
		2004		2005		2006	
Category	Species	MT	%	MT	%	MT	%
Target Tuna	Albacore	1,285	24.28%	1,055	26.35%	1,068	22.29%
	Yellowfin	2,853	53.91%	2,110	52.69%	2,743	57.24%
	Bigeye	425	8.03%	185	4.62%	190	3.96%
Billfish	Blue marlin	30.1	0.57%	153.2	3.82%	117.9	2.46%
	Black marlin	19.4	0.37%	43.6	1.09%	26.4	0.55%
	Striped marlin	26.6	0.50%	18.0	0.45%	44.0	0.92%
	Swordfish	37.9	0.72%	43.0	1.07%	11.7	0.24%
	Other Billfish	42.8	0.81%	24.4	0.61%	29.7	0.62%
Sharks and Rays	Blue shark	36.4	0.69%	9.6	0.24%	24.7	0.52%
	Mako sharks	21.3	0.40%	0.0	0.00%	11.8	0.25%
	Oceanic whitetip shark	9.9	0.19%	18.7	0.47%	3.4	0.07%
	Silky shark	112.9	2.13%	43.5	1.09%	86.6	1.81%
	Other sharks and rays	69.3	1.31%	3.5	0.09%	138.9	2.90%
Other finfish	Bullet/Frigate tunas	0.2	0.00%	0.0	0.00%	0.0	0.00%
	Kawakawa	0.0	0.00%	0.0	0.00%	0.0	0.00%
	Rainbow Runner	0.3	0.01%	0.0	0.00%	0.0	0.00%
	Wahoo	17.5	0.33%	114.9	2.87%	98.0	2.04%
	Common	10.3	0.20%	6.2	0.15%	11.4	0.24%

dolphinfish						
Triggerfish	0.0	0.00%	0.0	0.00%	0.0	0.00%
Barracudas	23.9	0.45%	88.6	2.21%	38.5	0.80%
Escolars	0.6	0.01%	3.9	0.10%	30.6	0.64%
Lanctfishes	9.4	0.18%	0.0	0.00%	10.3	0.21%
Ocean sunfish	0.0	0.00%	0.0	0.00%	5.8	0.12%
Oilfish	25.2	0.48%	12.0	0.30%	24.6	0.51%
Opah	145.3	2.75%	28.8	0.72%	21.7	0.45%
Pomfrets	7.0	0.13%	1.1	0.03%	0.3	0.01%
Small baitfish	0.0	0.00%	0.0	0.00%	0.0	0.00%
Other fish	82.7	1.56%	41.6	1.04%	55.2	1.15%
Tuna	4,562	86.22%	3,351	83.66%	4,000	83.48%
Billfish	157	2.96%	282	7.05%	230	4.79%
Sharks and rays	250	4.72%	75	1.88%	265	5.54%
Other finfish	322	6.09%	297	7.42%	296	6.18%
Total non-target	729	13.78%	655	16.34%	791	16.52%
Billfish (non-Swordfish)		2.25%		5.97%		4.55%

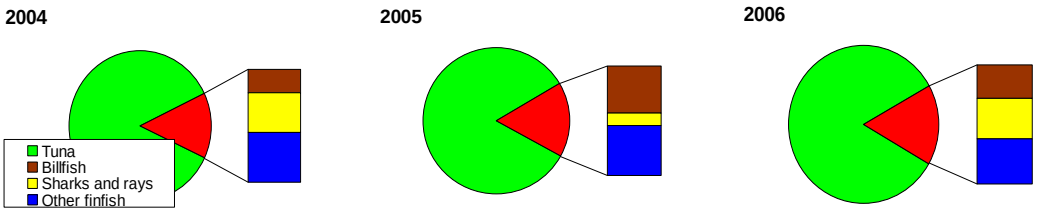


Figure 9. Proportion of non-target species groups in the catch of Papua New Guinea tuna longline vessels, by year, 2003–2005. (Source of data : Data collected under the Papua New Guinea Observer Programme managed by NFA