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ANNUAL REPORT – PART 1
INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

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INDEPENDENT STATE OF SAMOA

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ANNUAL REPORT TO THE COMMISSION

PART 1: INFORMATION ON FISHERIES, RESEARCH AND STATISTICS.

FISHERIES DIVISION
Ministry of Agriculture and Fisheries
Government of Samoa.
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Abstract

Samoa's domestic tuna longline fishing fleet targets albacore tuna and fishes all year round in Samoa's EEZ. The fleet consists of vessels ranging from 9 m to over 20 m in length. There were about 17 vessels engaged in longline fishing in 2004 and this had increased to 54 by 2006. This is mostly attributed to the increasing number of alia[1] in the fleet. An improvements in longline catches was noted in 2006 after a dramatic decline from 5,091.6 MT in 2002 to 2,845.9 MT in 2003. Albacore tuna (*Thunnus allalunga*) is the main component of the catch and this species makes up over 77% of the total longline catch from 2002 to 2006. Yellowfin (*Thunnus albacares*) and bigeye (*Thunnus obesus*) tuna constitute around 14.8 % of the total catch as by-catch species. It is more apparent from data collected that seasonal variation in albacore catches occurs in Samoa's EEZ. Annual estimates in longline catch rates indicate a general declining trend since the fishery came into existence, although catch rates have picked up in 2005 and 2006.

A review of the current fisheries legislation has been initiated to ensure that Samoa's legal obligation under various regional and international arrangements are met.

Port sampling has continued to provide core data for estimates of Samoa's longline catch. Considering recent development in tuna fisheries data collection, the possibility of adopting the SPC designed TUFFMAN system is being investigated for compatibility with current local data collection methods.

Background

Samoa's Tuna Fishery is exclusively domestic and is principally dominated by commercial longline fishing following its rapid expansion in the mid 1990's where an increase in the number of alia longline vessels was observed. Alias before the rapid development and expansion of the commercial longline fishery, were engaged in mainly bottom-fishing for deep water snapper and surface trolling for skipjack tuna at the artisanal level. Following successful fishing trials for albacore tuna conducted by Samoa's Fisheries Division with support from the South Pacific Commission now called the Secretariat for the Pacific Community, the alia vessels were refitted with horizontal longline gear and the albacore fishery in Samoa came into existence.

Commercial longline fishing vessels of over 12.5 meters in length entered the fishery in the late 1990's and have since contributed the bulk of albacore catches over the years. By the year 2000, a number of larger longline vessels had entered the fishery, and this saw the decline in the number of alia operating within the fishery. By 2004, only 2 alia were still engaged in longline fishing.

[1] An offshore fishing craft (8.5 m catamaran) that was built under a joint FAO/DANIDA project in the 1970s. The *alia* was originally fabricated from plywood, 8.5 m in length and powered by a 25 hp outboard engine. Boat builders began to use aluminum in the late1970s for alia construction and the vessels were lengthened to 9.0 m and powered by a 40 hp outboard engine.

Over 6,000 MT of tuna and other pelagic species were caught consecutively for 1997, 1998 and 1999 from the longline fishing fleet with fishing effort of 6,623,000, 7,515,000 and 8,309,000 hooks respectively. In comparison, total longline catches for 2004, 2005 and 2006 were estimated at 1934.8, 1664.2 and 2714.0 MT with their respective effort of 4,935,274, 3,526,261 and 4,824,320 hooks.

1.1 Annual Fisheries Information

1.1.1 Annual catch by species, gear in the WCPFC Convention Area.

Samoa's longline fishing fleet operates within Samoa's EEZ of approximately 120,000 km^2. Although the fleet targets albacore tuna, a significant component of the catch is made up of yellowfin and bigeye tuna. A summary of estimated longline catches is presented in Table 1.

Table 1: Estimated weight (whole weight) in MT of tuna landed from Samoa's longline fleet.

	2002	2003	2004	2005	2006
Albacore *Thunnus alalunga*	**4,222.9**	**2,253**	**1,232.5**	**1,262.7**	**2,112.7**
Yellowfin *Thunnus albacares*	**369.0**	**292.6**	**444.2**	**198.8**	**263.8**
Bigeye *Thunnus obesus*	**137.0**	**110.0**	**103.5**	**64.2**	**128.0**
Other species	**362.7**	**190.3**	**154.6**	**138.5**	**209.6**
Est. total catch	**5091.6**	**2845.9**	**1934.8**	**1664.2**	**2714.1**

The Samoa longline fleet experienced significantly low catches of albacore in 2003 and subsequent years until 2006 where improvements in albacore catches were noted.

1.1.2 Number of vessels by gear type, size (fleet structure)

Fishing vessels comprising up the Samoa's commercial fishing fleet are all locally based and all their catches are landed in Samoa ports. Commercial fishing vessels are licensed according to length under the 2005-2009 Samoa Tuna Management and Development Plan. This has seen fishing vessels categorised under five classes - Class A (≤11m) Class B (>11m -≤12.5m) Class C (>12.5 -≤15m) Class D (>15m-≤20.5m) and Class E (>15m).

Table 2: Number of longline vessels fishing for albacore tuna in Samoa's EEZ

	Class A (alia)	Class B	Class C	Class D&E[2]	Total
2002	31	15	8	14	**68**
2003	6	4	5	9	**24**
2004	2	1	5	9	**17**
2005	17	3	3	9	**32**
2006	37	2	2	13	**54**

[2] The two Classes combined given that there were less than 4 vessels in Class E and all poses the same fishing capacity as with vessels in Class D.

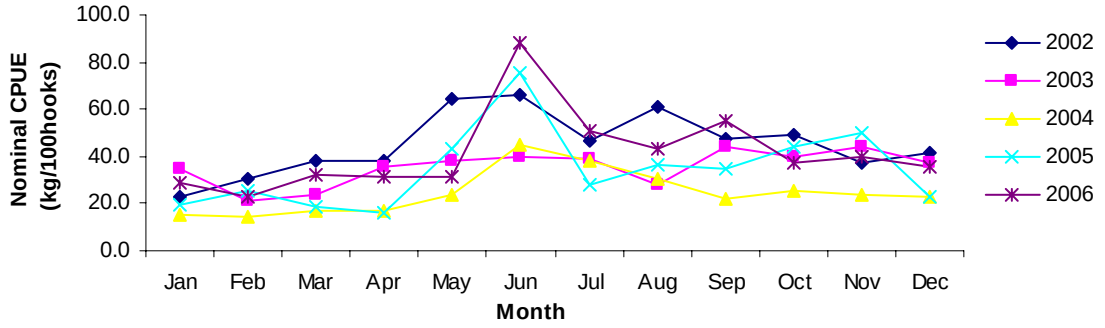
Horizontal longline fishing is the principal method of harvesting tuna in Samoa's EEZ however vessels in Class A could be easily refitted for troll fishing. Although alia were the pioneers of the albacore longline fishery in Samoa, bigger vessels particularly in Class C, D and E since their introduction into the fleet in 2000 have contributed to the bulk of annual catches from the fishery. This is due to their much bigger capacity and longer range as opposed to alia longline vessels.

1.1.3 Fishing patterns (catch by time/area)

Samoa's horizontal longline fleet operates within the country's EEZ which is in the WCPFC statistical area south of the Equator and lies between 10^{o} - 15^{o} S and 170^{o} – 175^{o} W.

The fleet targets albacore tuna and fishes all year round particularly vessels in Class B, C, D and E. Observed nominal catch per unit effort for albacore (CPUE)[3] (kg/100hooks) shows an almost consistent annual pattern of albacore catch rates over the past 5 years. As shown in Figure 1, except for 2003, all other years have distinctive trends in albacore catch rates. General observation indicates that annual variations in albacore catch rates is evident in Samoa's EEZ with low catch rates experienced from January-April and relatively high catch rates experienced from May-December. June has been consistent in recording the highest albacore catch rate for each year.

Figure 1: Nominal CPUE (kg/100hooks) trends for albacore tuna caught from the tuna longline fishing fleet in Samoa's EEZ.



Patterns in nominal CPUE (2002-2006) for yellowfin and bigeye tuna are shown in Figure 2 and Figure 3. Although yellowfin and bigeye tuna forms a significant component of the catch, both are considered as by catch because the deployment method was designed to catch albacore tuna. There are no distinct trends or seasonal variation in catch rates observed for either yellowfin or bigeye tuna.

[3] The catch per unit effort (CPUE) for albacore tuna is calculated from the estimated total albacore catch landed and the estimated total effort in the number of hooks deployed by the longline fishing fleet. Port sampling data provides the raw data for the estimation of albacore CPUE for Samoa's tuna longline fishing fleet. The CPUE for yellowfin and bigeye tuna are also calculated in the same manner.

Figure 2: Nominal CPUE (kg/100hooks) for Yellowfin tuna caught from the tuna longline fishing fleet in Samoa's EEZ.

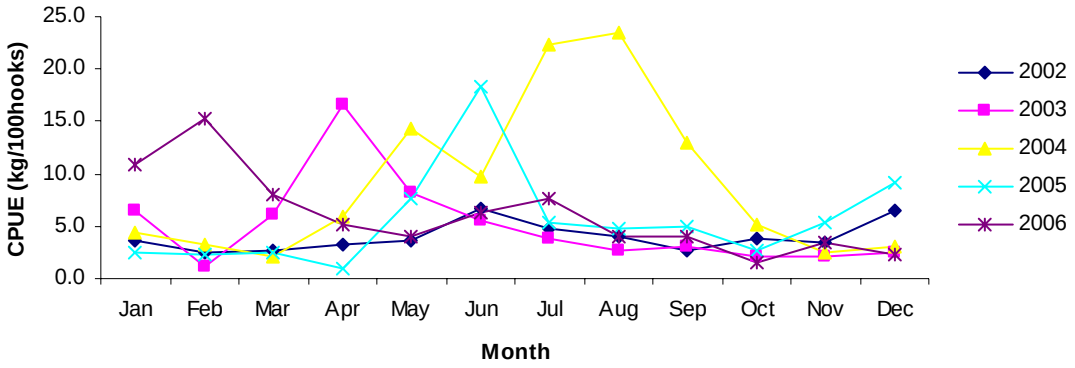
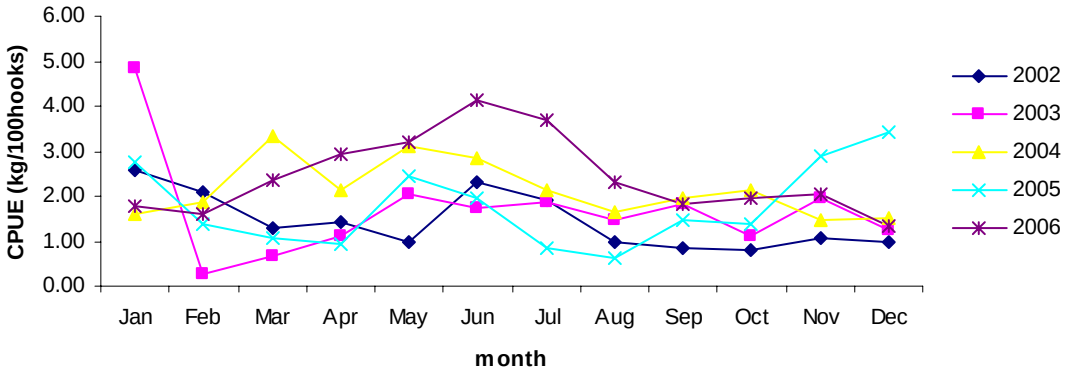


Figure 3: Monthly CPUE (kg/100hooks) for Bigeye tuna caught from the tuna longline fishing fleet in Samoa's EEZ.



Like albacore tuna, both yellowfin and bigeye tuna occur all year round. However, there is very little information available for the two species from the fishery to determine whether seasonal variation in both their catch rates follows that observed with albacore tuna.

Trends in estimated total catch, fishing effort and CPUE from the longline fleet from 1994 to 2006 are presented in Figure 4 and Figure 5. Data collected from the fishery indicates that annual trends on landed catch and fishing effort resemble each other very closely. Generally it is more plausible that catch landed is highly dependent on the effort deployed as illustrated in Figure 4. However, further increase in effort from 1999 to 2002 did not result in an increase in catch. This increase in effort is attributed to the increasing number of vessels over 15 m in length entering the tuna longline fishing fleet. A

noticeable decline in both effort and catch occurs from 2002 to 2005, with a slow recovery in the 2006 recorded catches.

Figure 4: A plot of total catch and effort trends 1994 to 2006 for Samoa's domestic tuna longline fleet.

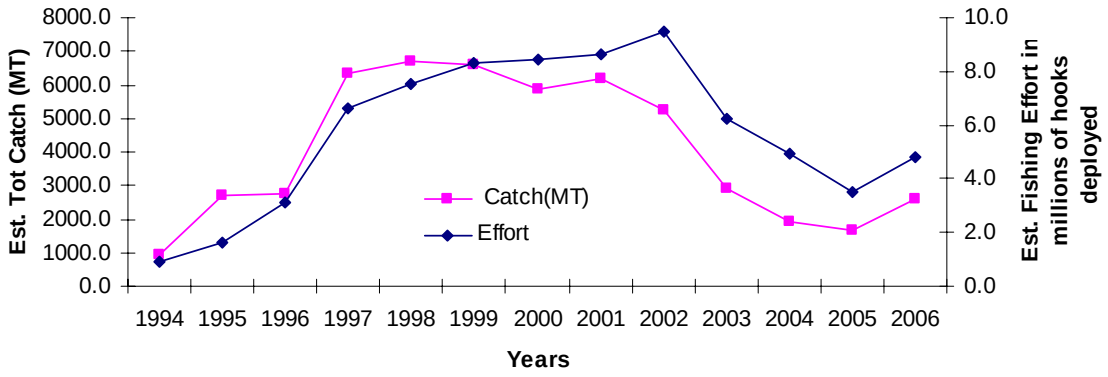
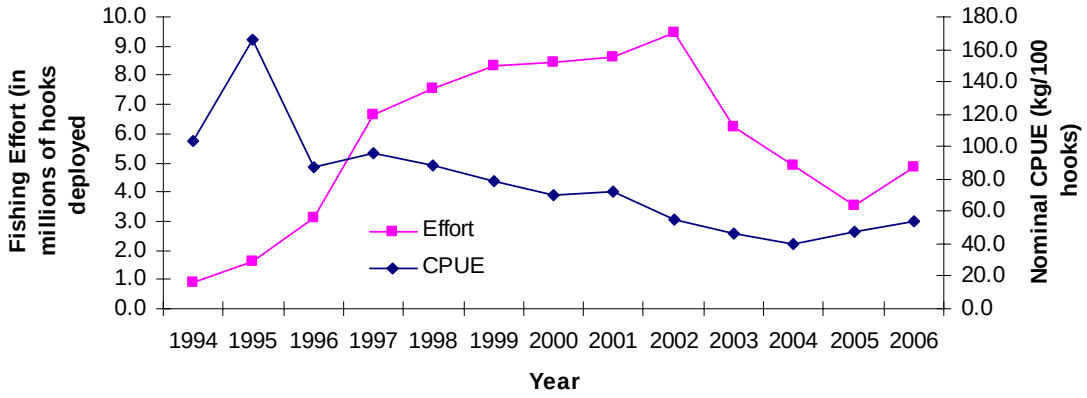


Figure 5: A plot of fishing effort and CPUE trends from 1994 to 2006 for Samoa's domestic tuna longline fleet.



A general decline in CPUE in the fishery is observed over time despite rapid increases and high levels of effort maintained by the fleet up until 2002. CPUE shows improvements in 2005 and 2006.

1.1.4 Estimated catches on non target species.

Table 3 shows non-target species caught from Samoa's Tuna longline fishery. Like yellowfin and bigeye tuna, some of the non target species including dolphinfish (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), swordfish (*Xiphias gladius*), moonfish (*Lampris guttatus*) and striped marlin (*Tetrapturus audax*) caught from the

fishery made up an important component of the fresh chilled fish export for recent years. Very rarely, Southern Bluefin tuna appears in the catch.

Table 3: Non target species caught from Samoa's tuna longline fishing fleet targeting albacore. The fleet operates inside Samoa's EEZ, lies within the WCPFC statistical area south of the equator.

Non Target Species	2002	2003	2004	2005	2006
BIGEYE THRESHER SHARK (*Alopias superciliosus*)	0.18	0.00			
BLACK MARLIN (*Makira indica*)	15.80	2.61	2.25	6.81	3.25
BLACKTIP REEF SHARK (*Carcharhinus melanopterus*)			0.02		
BLUE MARLIN (*Makaira nigricans*)	40.64	18.90	8.98	14.68	19.65
BROADBILL SWORDFISH (*Xiphias gladius*)	13.67	12.23	3.73	1.30	3.00
DOGTOOTH TUNA (*Gymnosarda unicolor*)	1.29				0.37
DOLPHINFISH (*Coryphaena hippurs*)	91.99	43.78	28.99	26.50	64.97
ESCOLAR (*Lepidocybium flavobrunneum*)	0.66		0.07	0.13	0.09
GALAPAGOS SHARK (*Carcharhinus galapagensis*)	0.05				
GREAT BARRACUDA (*Sphyraena barracuda*)	10.78	1222	9.76	3.78	5.75
LONGNOSE LANCET FISH (*Alepisaurus ferox*)	0.22		0.10		0.11
MARLIN[4]	28.32		1.62	17.77	2.58
MOONFISH (*Lampris guttatus*)	5.11	3.81	0.32	2.71	1.92
OILFISH (*Ruvettus pretiosus*)	5.32	2.08	0.50		0.04
POMFRET[5]	10.92	4.24	6.52	2.78	3.21
RAINBOW RUNNER (*Elagatis bipinnulata*)	0.02	0.09	0.05	0.02	
SAILFISH (*Istiophorus platypterus*)	14.76	6.78	2.06	2.79	2.32
SHARK[6]	2.80	1.57	1.88	2.38	3.45
SHORTBILL SPEARFISH (*Tetrapturus angustirostris*)	11.73	1.42	3.38	1.53	4.21
SILKY SHARK *(Carcharhinus falciformis*)	0.48				
SKIPJACK TUNA (*Katsuwonus pelamis*)	115.76	57.51	37.20	14.87	31.50
SOUTHERN BLUEFIN TUNA (Thunnus maccoyii)	0.18			0.23	0.03
STRIPED MARLIN (*Tetrapturus audax*)	5.02	24.32	5.25	4.41	7.48
SUNFISH (*Ranzania laevis*)		0.51	0.11	0.10	
TUNA[7]			0.46	0.51	0.71
WAHOO (*Acanthocybium solandri*)	78.97	60.60	48.43	35.30	54.99
Total	**454.67**	**252.67**	**161.66**	**138.57**	**209.62**

1.1.5 Useful Information

The initial phase of a review of the current fisheries legislations is in process. This is one of the key projects in the Samoa Tuna Management and Development Plan 2005 – 2006. The review is to ensure that domestic fisheries management processes are supported by a legal framework and that legal obligations under various international and regional arrangements are met.

[4] This could be a combination of Blue, Black or Striped Marlin as it was difficult to identified during port sampling due to 1) it was already processed on board (sliced into pieces), 2) came out frozen and discolored.

[5] This includes *Brama brama, Eumegistus illustris, Taractichthys steindachneri* and all other pomfrets coded BRZ

[6] Sharks unloaded from longline vessels without fins and tails.

[7] Tuna unloaded from longline vessels covered with sheets to be exported fresh chilled

Despite improvements in albacore catch rates over the past two years, longline vessel operators (particularly those operating longline vessels over 15 m in length) have been incurred with financial hardship as a result of increasing operational costs. Discussions with the operators have revealed that longline vessels need at least double the current albacore catch rates for their operations to be economically viable. Persistent low catch rates couple with increasing operational cost has put a number of longline vessels out of operation and directly resulted in the rapid decline in longline fishing effort in 2003. (Fig 3 and 4)

Table 4 shows a summary of Samoa's fish exports from 2002 to 2006. Frozen (gilled and gutted) albacore tuna is Samoa main fish export. The two canneries in American Samoa continue to be the only markets for Samoa's frozen albacore exports which constitute over 80% of the total fish export . Yellowfin and bigeye tuna over 25kg in weight constitute the bulk of fresh chilled fish exports targeting markets in the United States, New Zealand and occasionally Japan.

Table 4: Volume in (MT) of Samoa's frozen and fresh chilled fish exports from 2002 to 2006

Year	Frozen	Fresh chilled	Total Exports
2002	3116	671	3787
2003	1580	474	2054
2004	1339	534	1837
2005	1101	230	1331
2006	1436	139	1575

1.2 Research and Statistics

Port sampling began in Samoa in the late 1990's with the assistance from SPC and aims at surveying at least 50% of weekly landings for all vessel Classes.

With the exception of a few alia, all longline vessels unload at the Fisheries Wharf. Daily boat counts at the Fisheries wharf was designed to provide data for the purpose of raising catch estimates from port sampling.

Samoa's observer programme started in 2006. Due to some issues concerning the characteristic of Samoa's domestic fleet and the widely supported approach in which observer placement are done, only three placements were carried out. Two were successful and one failed.

Samoa's Fisheries Division has been collecting and analyzing data and information on cetacean interaction with longline gear from surveys forms attached to log sheets given out to fishermen. This is an attempt by the Fisheries Division to investigate the impact of cetacean depredation on the economics of tuna longline fishing operations.

In the mid 1990's Fisheries Division with the assistance from the AusAID-sponsored Samoa Fisheries Project, developed an offshore fishery database system that uses length measurements to estimate weight of each offshore species caught from the domestic longline fishing fleet. Over the years it was developed with assistance from SPC to

include reports on CPUE for each offshore species caught, as well as the volume of fish exported.

The following surveys provide data that feeds the offshore fishery database.

- Port Sampling
- Daily boat counts
- fishing vessel log sheets
- Provisional fish export forms
- Fish export certificates.

Port sampling has continued to provide the most reliable data to estimate total catch of the domestic longline fleet. Log sheet coverage is hundred percent for all vessels classes except for alia as they do not carry log sheets.

Samoa is in the process of reviewing its fisheries data collection system and its looking at adopting the TUFFMAN system, taking into consideration the alia component of Samoa's longline fleet.