Pelagic Fisheries of the Western Pacific Region

2001 Annual Report

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Prepared by the Pelagics Plan Team and Council Staff

for the

Western Pacific Regional Fishery Management Council
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Cover photo:

Two longline vessels in the CNMI moored at the Public Work's Dock in Saipan.

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Pelagic Fisheries of the Western Pacific Region — 2001 Annual Report

I. Introduction

A. Background

The Fishery Management Plan (FMP) for Pelagic Fisheries of the Western Pacific Region was implemented by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) on 23 March 1987. The Western Pacific Regional Fishery Management Council (WPRFMC, or Council) developed the FMP to manage the pelagic resources that are covered by the Magnuson Fishery Conservation and Management Act of 1976 and that occur in the US Exclusive Economic Zone (EEZ) around American Samoa, Guam, Hawaii, the Northern Mariana Islands, and the US possessions in the Western Pacific Region (Johnston Atoll, Kingman Reef and Palmyra, Jarvis, Howland, Baker, Midway, and Wake Islands).

The objectives of the Pelagics FMP were revised in 1991. The abridged objectives are to:

- Manage fisheries for Pacific pelagic management unit species (PPMUS) to achieve optimum yield (OY).
- Promote domestic harvest of and domestic fishery values associated with PPMUS[1] (e.g., by enhancing the opportunities for satisfying recreational fishing experience, continuation of traditional fishing practices and domestic commercial fishers to engage in profitable operations).
- Diminish gear conflicts in the EEZ, particularly in areas of concentrated domestic fishing. Improve the statistical base for conducting better stock assessments and fishery evaluations.
- Promote the formation of regional/international arrangements for assessing and conserving PPMUS throughout their range.
- Preclude waste of PPMUS associated with longline, purse seine, pole-and-line or other fishing operations.
- Promote domestic marketing of PPMUS in American Samoa, Guam, Hawaii and the Northern Mariana Islands.

Non-tuna PPMUS are sometimes referred to as "other PPMUS" in this report. This term is equivalent to PMUS (Pelagic Management Unit Species) used in annual reports previous to 1992, before tunas were included in the management unit.

The PPMUS are caught in the troll, longline, handline and pole-and-line (baitboat) fisheries. They are caught in oceanic as well as insular pelagic waters. Most of these species are considered

[1] The Magnuson Act was amended to allow the inclusion of tunas in US fishery management authority as of January 1992. In the Pacific, tuna management is the responsibility of the regional fishery management councils. Pacific pelagic management unit species (PPMUS) includes former pelagic management unit species (PMUS) and tunas.

to be epipelagic because they occupy the uppermost layers of the pelagic zone. All are high-level predators in the trophic sense. Pelagic fisheries for PPMUS are among the most important, if not the dominant Pacific Island fisheries.

B. <u>Report Content</u>

This report contains fishery performance data from each of the four island groups through 2001, interpretations of trends or important events occurring in the fisheries and recommendations. This report was prepared using reports submitted by the following agencies . The Hawaii report is an integration of State of Hawaii Division of Aquatic Resources and NMFS summaries.

- Territory of American Samoa, Department of Marine and Wildlife Resources
- Territory of Guam, Division of Aquatic and Wildlife Resources
- Territory of Guam, Department of Commerce
- State of Hawaii, Division of Aquatic Resources
- Commonwealth of the Northern Mariana Islands, Division of Fish and Wildlife
- NMFS, Southwest Region (including Southwest Fisheries Science Center Honolulu Laboratory, Pacific Islands Area Office and Office of Law Enforcement)
- US Coast Guard, District 14
- Pelagic Fisheries Research Program, University of Hawaii

C. <u>Report Appraisal</u>

The report content has changed over the years. More recently, in addition to the four main modules (American Samoa, Guam, Hawaii, Northern Mariana Islands), the report now contains and international module, a recreational fisheries appendix, a synopsis of landings data for the US West Coast, and a section on the value of the Western Pacific Region fisheries.

D. <u>Plan Team Members</u>

The FMP requires the Council's Pelagic Plan Team (Team) to prepare an annual report on the status of the pelagic fisheries taking place in each of the island areas served by the Council (American Samoa, Guam, Hawaii and Northern Mariana Islands), to evaluate the effectiveness of the FMP in meeting its goals and objectives, and make recommendations for future management and administrative action.

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Table 1. Names of Pacific Pelagic Management Unit Species

English Common Name	Scientific Name	Samoan or AS local	Hawaiian or HI local	Chamorroan or Guam local	S. Carolinian or NMI local	N. Carolinian or NMI local
Mahimahi (dolphinfishes)	*Coryphaena* spp.	Masimasi	Mahimahi	Botague	Sopor	Habwur
Wahoo	*Acanthocybium solandri*	Paala	Ono	Toson	Ngaal	Ngaal
Indo-Pacific blue marlin Black marlin	*Makaira mazara:* *M. indica*	Sa'ula	A'u, Kajiki	Batto'	Taghalaar	Taghalaar
Striped marlin	*Tetrapturus audax*		Nairagi			
Shortbill spearfish	*T. angustirostris*	Sa'ula	Hebi	Spearfish		
Swordfish	*Xiphias gladius*	Sa'ula malie	A'u kū, Broadbill, Shutome	Swordfish	Taghalaar	Taghalaar
Sailfish	*Istiophorus platypterus*	Sa'ula	A'u lepe	Guihan layak	Taghalaar	Taghalaar
Pelagic thresher shark Bigeye thresher shark Common thresher shark Silky shark Oceanic whitetip shark Blue shark Shortfin mako shark Longfin mako shark Salmon shark	*Alopias pelagicus* *Alopias superciliosus* *Alopias vulpinus* *Carcharhinus falciformis* *Carcharhinus longimanus* *Prionace glauca* *Isurus oxyrinchus* *Isurus paucus* *Lamna ditropis*	Malie	Mano	Halu'u	Paaw	Paaw
Albacore	*Thunnus alalunga*	Apakoa	'Ahi palaha, Tombo	Albacore	Angaraap	Hangaraap
Bigeye tuna	*T. obesus*	Asiasi, To'uo	'Ahi po'onui, Mabachi	Bigeye tuna	Toghu, Sangir	Toghu, Sangir
Yellowfin tuna	*T. albacares*	Asiasi, To'uo	'Ahi shibi	'Ahi, Shibi	Yellowfin tuna	Toghu
Northern bluefin tuna	*T. thynnus*		Maguro			
Skipjack tuna	*Katsuwonus pelamis*	Atu, Faolua, Ga'oga	Aku	Bunita	Angaraap	Hangaraap
Kawakawa	*Euthynnus affinis*	Atualo, Kavalau	Kawakawa	Kawakawa	Asilay	Hailuway
Moonfish	*Lampris* spp	Koko	Opah		Ligehrigher	Ligehrigher
Oilfish family	Gempylidae	Palu talatala	Walu, Escolar		Tekiniipek	Tekiniipek
Pomfret	family Bramidae	Manifi moana	Monchong			
Other tuna relatives	*Auxis* spp, *Scomber* spp; *Allothunus* spp	(various)	Ke'o ke'o, saba (various)	(various)	(various)	(various)

The list of Management Unit Species (MUS) managed under the Pelagic FMP has been revised to exclude dogtooth tuna (*Gymnosarda unicolor*) and all sharks except the following nine species: pelagic thresher shark (*Alopias pelagicus*), bigeye thresher shark (*Alopias superciliosus*), common thresher shark (*Alopias vulpinus*), silky shark (*Carcharhinus falciformis*), oceanic whitetip shark, (*Carcharhinus longimanus*), blue shark (*Prionace glauca*), shortfin mako shark (*Isurus oxyrinchus*), longfin mako shark (*Isurus paucus*), and salmon shark (*Lamna ditropis*).

The previous MUS shark listing used to include oceanic species of the families Alopiidae, Carcharinidae, Lamnidae, Sphynidae. However, this could be construed to mean all members of the these four shark families, which would also include nearshore and demersal sharks. The Pelagics Plan Team recommended in 1999 revising the sharks contained in the management unit when the Council had completed a Coral Reef Ecosystem FMP (CREFMP), which would include nearshore species in the management unit The Plan team also recommended removing dogtooth tuna as this is not a true pelagic fish but a nearshore reef species. The CREFMP was completed in 2001 and among other measures, amended the Pelagics FMP by removing dogtooth tuna from the management unit and listed only 9 true pelagic sharks for inclusion therein (Table1).

A summary of the total pelagic landings during 2001 in the Western Pacific and the percentage change between 2000 and 2001 is shown in Table 2.

Table 2. Total pelagic landings in lbs in the Western Pacific Region

Species	Am Samoa	% change	Guam	% change	Hawaii	% change	CNMI	% change
Swordfish	5,242	155.0 %			528,000	-91.9 %		
Blue marlin	36,011	-29.1 %	33,253	-61.8 %	1,494,000	32.8 %	1,539	-46.7 %
Striped marlin	10,780	1300.0 %			504,000	6.6 %		
Other billfish	9,235	184.7 %	25	-45.7 %	554,000	48.9 %	73	100.0 %
Mahimahi	74,855	70.5 %	184,009	116.8 %	1,180,000	23.5 %	11,384	94.3 %
Wahoo	108,410	121.2 %	119,602	65.0 %	938,000	39.4 %	3,640	11.0 %
Opah (moonfish)	8,443	30.5 %			756,000	9.1 %		
Sharks (whole wgt)	3,801	103.9 %	2,090	67.5 %	269,000	-51.1 %		
Sharks fins					62,000	-97.8 %		
Albacore	7,172,279	394.3 %			3,139,000	37.6 %		
Bigeye tuna	163,746	214.6 %			5,572,000	-10.7 %		
Bluefin tuna					2,000	-75.0 %		
Skipjack tuna	145,778	160.3 %	332,718	21.5 %	1,891,000	70.2 %	107,107	-4.6 %
Yellowfin tuna	409,080	112.8 %	58,694	-32.3 %	3,802,000	-21.3 %	11,634	-17.7 %
Other pelagics	7,834	702.7 %	3,868	-31.4 %	377,000	8.0 %	361	-93.0 %
Total	8,155,494	326.9 %	734,259	20.0 %	21,068,000	-28.7 %	135,738	-5.5 %

II. Summary [2]

A. Plan Administration

Six regulatory measures and two notices for the pelagic fisheries in the Western Pacific Region were proposed by the Council in 2001. Early in the year, two emergency rules were implemented to extend the Court-ordered (ABC) closures (figure 1). A notice announcing the requirements of a March 30, 2001 Court order which modified the earlier Court-order, and which was based on a Biological Opinion issued by NMFS, was announced on April 19, 2001, and implemented on June 12, 2001. Another regulatory measure proposed a rule that would implement a Council recommendation to prohibit vessels more than 50' in length overall from targeting PMUS within 50 miles from shore around American Samoa. A second notice in 2001 announced the availability of $3 million in direct assistance to help Hawaii longline fishermen. Council action is expected in early 2002. See Issues (p.12) and Administrative Activities (p. 15) for details. No permits were requested by any foreign nations to fish in the US EEZ of the Western Pacific Region. In addition, a ban on landing shark fins without their corresponding carcasses was implemented by the National Marine Fisheries Service, who published a proposed rule in June of 2001, stemming from the (national) Shark Finning Prohibition Act.

B. Island Areas

In **American Samoa,** total landings of all pelagic species increased 327 %, continuing an upward trend in pelagic landing that commenced in1994. An estimated 8,159,554 lb (+327%) of pelagic fish were landed in 2001, of which 7,957,546 lb were commercial landings valued at $7,817,207 (+306.4%). The average price for all pelagics was $0.98/lb (- 6.7%).

Eighty vessels reported landing pelagic species in 2001, which was up from the fifty-three vessels in 2000. Of these, 62 reported fishing with longline gear (+67.6%), and 18 reported fishing as trollers (-5.3%).

Trolling vessels made 335 trips an increase of 18% from 2000 and 51% of the long term average. Longline data are derived from both creel survey extrapolations and through submitted logbooks. Logbook data reported a total 4736 sets for 2001, or an increase of 68.5% from 2000. Creel survey extrapolation reported 4639 longline sets, a 29.1 % increase on the 2001 creel survey estimate of sets. The average duration for trolling trips in 2001 was 5.0 hr/trip, an 28% increase from 2000. The average longline set duration by calculated via logbooks was 16.8 hr/set (+29.2%) and by creel survey was 14.5hr/set (+61.1%). Since the longline fishery began in 1996, trolling trips have declined by about 60% and longline sets have increased by over 613%. Data from the troll fishery suggests that the catch per unit effort (CPUE) in 2001 decreased by 23.8% and about 33% below the long term average. The average size of albacore has remained relatively stable between 1996 and 2000, between 43-46 lb/fish. Albacore accounts for about 88% of the total longline catch. Overall longline catch rates increased about 349% between 2000 and 2001, and albacore catch rates increased tremendously (+330%).

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[2] Percentages in parentheses indicate percent change from previous year

Cannery landings at Pago Pago during 2001 comprised 117,529 t of skipjack, 31,028 t of yellowfin and 58,629 t of albacore. Most of the skipjack and yellowfin are caught in distant water fisheries, predominantly in the western tropical Pacific, while albacore landings are made by vessels operating in cooler waters to the south of American Samoa. Landings have remained relatively stable for skipjack and yellowfin, with 2001 landings for skipjack 47% and yellowfin 23% above the long term averages. Landings for albacore has been continuously increasing from the early1990s and in 2001 were 108% above the long term average. This partially reflects the increased longline fishing activity in both American Samoa and Samoa

In **Guam** landings of all pelagics amounted to 757,232 lb an increase of 23%. The total revenues increased to $639,928, or an increase of 7.5%. Tuna landings increased to 405,318 lb (+13.9%), with a 1.6% decrease in revenues to $227,870. The overall tuna landings have fluctuated around a relatively constant average for the past decade, but with a gradually increasing trend. Non-Tuna PPMUS landings increased to 337,090 lb (+38.5%), and adjusted revenues also increased to $382,772 (+9.5%). Landings in 2001 followed the 1997 trend in Guam's pelagic fisheries towards targeting other PPMUS, principally mahimahi and wahoo, rather than tuna. Tunas comprised about 54% the 2001 pelagic landings, between the previous three years where they formed between 40 and 58% of pelagic landings. Mahimahi comprised 24.3 % of the total pelagic landings, yellowfin tuna 7.8%, skipjack 43.9% blue marlin 4.4% and wahoo 15.8%.

Guam's adjusted prices for pelagic fish remained fairly stable in 2001, following a general decline since 1980. The adjusted price ($/lb) of tuna has remained static since 1996, and non-tuna PPMUS has continued to increase since 1995.

Virtually all the landings of pelagic fish are made by trolling vessels. The fleet size in 2001 was an estimated 375 vessels. The fleet size has declined in 2001 from 2000 (-9.9%), but is still above the long term average (+10.3%). The number of trips (12,016) was down in 2001 (-9%), but hours fished (57,825) and hours per trip (4.8) were up 9% and 20%, respectively.

Transhipment activity in Guam increased (+8.7%) overall in Guam during 2001, with yellowfin tuna landings increasing by 5% and bigeye by 18%.

The **Hawaii** fisheries for PPMUS produced total pelagic landings of 21 million lb in 2001, a significant decrease(-28.7%) from 2000, and the largest decline in catches since 1994. Bigeye tuna (26.45%), yellowfin tuna (18.05%), albacore tuna (14.90%), and skipjack tuna (8.98%) were the dominant species. Other major components of the pelagic fishery include mahimahi (5.60%), and wahoo (4.45%). Swordfish landings of 528,000 lb in 2001 were 91.9 % lower than in 2000. Blue marlin catches increased by about 33% from 2000 while striped marlin catches also increased (6.6%) during 2001. Apart from moonfish catches, which increased in 2000 by about 27%, sharks (-51.1%), bluefin tuna (-75%) and yellowfin tuna (-21.3%) all declined significantly in 2001. Overall tuna landings were similar to 2000, with a very small decline of about 0.5% between years. However, albacore landings increased by over 37% between years, and skipjack by about 70%. Bigeye landings decreased by about 10%, while yellowfin landings decreased by about 21%. The numbers of sharks retained for their fins decreased by over 50% in 2001, which was due to mainly to a State of Hawaii ban on shark finning in August 2000, and also related to changes in the longline fishery which resulted in almost no shallow set longline fishing for swordfish after August.

Total pelagics revenue decreased by about 32% to $ 41.3 million, with an average price per pound for pelagic in 2001 of $1.96/lb, compared to $2.08/lb in 2000. In 2001 the inflation adjusted ex-vessel revenue for the longline fishery decreased by about 35 % to $32.7 million, while the handline fishery revenues decreased by 30.3%, the troll fishery decreased by about 19% and the aku baitboats increased by 46%..

Catch rate by trollers for wahoo, blue marlin and skipjack were up in 2001 (+33.9%, +27.6% and +12.8% respectively). Catch rate by trollers for mahimahi and yellowfin were down in 2001 (-24.5% and -25.7%, respectively). Catch rates by handliners in 2001 were higher for albacore (+70%) and bigeye (+11.5%). Catch rates by handliners in 2001 were lower for mahimahi (-7.4%), and yellowfin (-18.2%).

The Hawaii longline fleet landed 15.3 million lb of fish in 2001, a 35% decrease from 2000 landings. Of the billfish landed in Hawaii, longlining accounted for most of the swordfish (91%), striped marlin (81%) and blue marlin (58%). About 30% of the longline landings (4.6 million lb) were billfish, and 10% of billfish landings were swordfish. The longline fleet also accounted for all of the bluefin tuna (100%) and moonfish (100%), most of the bigeye tuna (93%), albacore (89%), and sharks (98%) landed in Hawaii.

Fishing effort for the combined pelagic fisheries in Hawaii remained at a high level in 2001. The number of longline vessels participating in this fishery decreased from 2000 to 101 vessels active in the fishery. However, the number of trips remained stable at 1,034 trips in 2001, down by about 6%. The size of the longline fleet declined steadily between 1991 and 1996 from 141 to 103 vessels, although there are a maximum of 164 licenses available in the limited entry system. The number of trips by the troll fishery decreased in 2001 (-2.8%) to 20,281. This is higher than the 1979-2001 average of 18,817, but the fishery has been relatively static over the past ten years. The number of trips (246) taken by aku baitboats increased in 2001 by about 17% and remains well below the long term average. The present level of aku boat activity, in terms of trips, is about 35% of the long term average. The number of handline trips in 2001 (3,967) declined by about 23% and was about 73% below the long term average.

Landings of all pelagics in the **Northern Mariana Islands** (NMI) decreased slightly (-2.1%) between 2000 and 2001 to 141,221 lb and continued to be 22% below the long term average. Skipjack landings of 107,107 lb were down (-4.6%) from 2000, and continued to be below (-17.6%) the long term average. Yellowfin tuna landings declined sharply from 2000 (-17.7%) and was also below the long term average (-16.6%). Landings of mahimahi ended a five-year decline, up 94.3% from 2000 and by over 60% since 1996. Mahimahi was lower (-29%) than the long term average. Wahoo landings increased (+11%) from 2000 and was over 43% below the long term average. Blue marlin landings decreased significantly (-47%), and continued to be below the long term average (-49%).

The slight decrease in landings during 2001 were matched by a small (+3.4%) increase in total adjusted revenues ($286,488) over those in 2000. This increase in adjusted revenues was entirely due to the major increase in the revenues from PPMUS (+44.2%), particularly mahimahi and wahoo. Tuna revenues increased by about 0.3%.

The number of fishers making commercial pelagic landings increased in 2001 (+3.7%), from 107 to 111, and was still above the long term average (+26%). The number of trips landing any pelagic fish also increased by 4% in 2001 and was much higher (+39%) than the long term average. Thus the average number of trips per fisher in 2001 increased to 19.6 from 19.4 trips per fisher in 2000.

The inflation adjusted price of tunas and non-tuna PPMUS increased in 2001. The average adjusted price of tunas increased to $1.97/lb (+7.1%) and of other PPMUS to $2.12/lb (+3%). Tuna prices (+21%) was above the long term average, and prices for other PPMUS (-0.5%) were slightly below the long term average.

C. Species

Mahimahi landings (74,855 lb) in American Samoa during 2001 were the highest since the fishery began, increasing 71% from 2000, with 99% of the landings coming from the longline fishery. Guam’s 2001 mahimahi landings (118,009 lb) increased substantially (+114%) from 2000. Year 2001 landings were 3% above the long term average. Mahimahi landings in Guam have displayed wide, unexplained annual fluctuations since 1987. The trolling catch rate for mahimahi was at its highest in three years in 2001 with a CPUE of 3.2 lbs/hr. Mahimahi landings (1,180,000 lb) made up 17.7% of the 2001 non-tuna PMUS landings in Hawaii, an increase of 71.7%. The troll catch rate in Hawaii in 2001 was 24.5% lower than the 2000 rate, and 29% above the long-term average. Northern Marianas mahimahi landings (11,384 lb)increased substantially in 2001 ending a downward trend that started in 1997. As with Guam, NMI experiences annual fluctuations in the catch of mahimahi. Mahimahi accounted for 59% of the total non-tuna PPMUS landings. The trolling catch rate in 2001 in the NMI was up (+86%) after a ten year low of 2.89 lb/trip in 2000.

Blue marlin catches in American Samoa decreased (-27%) after an upward trend as a result of the expansion of the longline fishery, which took 100% of the total blue marlin catch. The decrease occurred in spite of a 68% increase in longline vessel participation. Guam landings of blue marlin (33,253 lb) was at its lowest since 1983 when there was 29,688 lb. The trollingcatch rate was also 57% lower than the long term average. Blue marlin landings (1.5 million lb) in Hawaii were up in 2001. Longliners accounted for 59% of the total Hawaii blue marlin landings. Blue marlin landings in the Northern Marianas (1,539 lb) continued a five-year decline, with 2001 landings only 22% of the 1996 level. This drop in landings is similar with most species caught in the fishery.

The catch rate of blue marlin in the American Samoa troll fishery decreased to 0.00 lb/troll-hr for the first time since 1987, while the longline fishery had a CPUE of 0.32 from the logbooks, and 0.24 from the creel surveys. In Guam, blue marlin troll catch rate in 2001 (0.6 lb/troll-hr) decreased from 2000 (1.6 lb/troll-hr). In the Hawaii longline fishery, blue marlin tends to be caught incidentally at a higher rates on mixed trips than in either tuna trips or swordfish trips. The catch rate of blue marlin decreased dramatically on swordfish trips to 0.00 in 2001. The catch rate of blue marlin in mixed and tuna trips increased (+45.8% and +47.4% respectively). The catch rate of blue marlin in the Hawaii commercial troll fishery increased 28% and was 14% lower than the long-term average. In the Northern Marianas, the 2001 catch rate decreased by about 49% from 2000, and was 63% below the long-term average.

Striped marlin landings ranked third among the billfish in Hawaii (after swordfish and blue marlin), and in 2000 it accounted for 3.1% of the commercial landings of non-tuna PPMUS. The 2001 landings of 0.5 million lb were up from 0.47 million lb in 2000, an increase of over 48%. Striped marlin is regarded as a secondary target species (after bigeye tuna) in the winter longline fishery. Landings in the Hawaii commercial troll and handline fisheries during 2001 (92,000 lb, +217.2%) were significantly up from 2000 and about 11% above the long-term average. The species rarely appears in the domestic landings from other areas, but increasing amounts of striped are being caught in American Samoa's developing longline fishery, with 10,780 lb landed in 2001, up 1300% from 2000.

Sailfish landings were insignificant in most areas. American Samoa reported landings of 4593 lb of sailfish in 2001 were an almost 97% increase on 2000 landings (2329 lb) and above the long term average of 4385 lb.

Estimated domestic landings of Hawaii **shark** increased by 26% between 1997 and 1998. The increase was due to a rise in the retention of shark fins, of which 95% are from blue sharks. Shark landings from other areas were relatively minor, although landings in Guam decreased from 2000-2001 by 89% to 2,090 lbs. Virtually the entire shark landings for Hawaii come from longline vessels. However, the Bottomfish Plan Team has also noted that Northwestern Hawaiian Islands bottom fishery also lands fins of coastal and reef sharks taken incidentally [3], although the quantity has not been estimated.

Shortbill spearfish landings were reported for the first time in American Samoa at 610 in 1999, but landings amounted to only 138 lb in 2000, and 1792 lb in 2001, a 1200% increase. No catches were reported in Guam or NMI during 200l.

The **swordfish** longline fishery in Hawaii began in 1989 with landings of 0.6 million lb, increasing to 3.4 million lb in 1990, and peaking at 13.1 million lb in 1993. Swordfish landings declined in 1994 and 1995 but may be leveling out and stabilizing at about 6-7 million lb. Landings in 2001 amounted to 0.48 million lb a decline of about 93%. The estimated average size of longline-caught swordfish was 52 lb in 2001 the smallest average size since 1987 and below the 1987-2000 average by 66%. Swordfish comprised only 2.5% of the total non-tuna landings by all fisheries in Hawaii. The longline catch rate of swordfish has remained steady since1998, and about 4% higher than the long-term average between 1991 and 1999. Other areas

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[3]. WPRFMC Bottomfish Plan Team meeting, March 27-28 , 1996, Executive Centre Hotel, Honolulu, HI.

did not report landings of swordfish, apart from a gradually increasing volume of swordfish in the American Samoa longline fishery, which landed 5,242 lb in 2001, up (+158%) from 2000.

American Samoa reported landings of 7,172,279 lb of **albacore** during 2001, a 394% increase on 2000 landings. This was the highest albacore landing recorded by the American Samoa fleet. Hawaii total landing of albacore (3.1 million lb) in 2001 was a 43.9% increase from 2000. Landings of albacore by longline vessels increased 38% in 2001. Other areas did not report landings of albacore.

Hawaii landings of **bigeye** tuna (5.5 million lb) were lower in 2001than 2000, and almost all (93%) caught by longline. No other areas reported bigeye landings apart from American Samoa, where the expanding longline fishery in 2001 caught 163,746 lb, or an increase of 215% on 2000 landings.

Skipjack tuna landings in American Samoa in 2001 (131,715 lb) increased (+161%) following a decline in 2000. The 2001 landings were almost 400% higher than the long-term average between 1982 and 2000. The largest decline in skipjack landings occurred in the troll fishery (-9.1%), compared with the increase in the longline fishery (+314%). Due to the focus on longlining, troll landings continued to be significantly below the long term average, representing only 20% of the average of troll landings between 1982 and 2000. However, trolling catch rate was only about 29% lower than the 2000 value and only 30% lower than the long-term average. Guam skipjack landings in 2001 (332,718 lb) continued to increase following a four year slide before 2000, surpassing the 2000 all time high of 267,562 lb. This represented a one year increase of about 24% on the 2000 landings, and 106% higher than the long-term average. Catch rates increased from 5.0 lb/trolling hour to 5.8 lb/trolling hour, an increase of 16% . Hawaii skipjack landings in 2001 of 1.9 million lb represented an increase of about 70%. The skipjack were caught principally by baitboats, which landed 1.2 million lb of skipjack in 2001, which was almost twice of the aku boat total for 2000. Northern Marianas Islands skipjack landings decreased by about 4% from 111,116 1b in 2000 to 107,107 lb in 2001. The catch rate also decreased by 8.7% from 2000, and was 46% below the long-term average.

Yellowfin tuna landings in American Samoa (409,080 lb) increased by 113%; the longline fleet catching 98.6% of the yellowfin which had a 47% decrease in catch rates from 2000 logbook data, but was about 24% higher in 2001 from creel survey data.

Catch rates decreased 15% in the troll fishery and was below the long term average. Guam yellowfin landings (58,694 lb) decreased 23% in 2001, continuing the decline from 2000. Catch rates were 28% lower in 2001 and 44% below the long term average. The total Hawaii commercial landings of yellowfin (3.8 million lb) were 21.3% lower than 2000.

Landings of yellowfin by commercial trollers and handliners in 2001 decreased by 7.4%, while landings by longliners decreased between 2000 and 2001 (-10.9%) The commercial trolling catch rate of yellowfin decreased by 25.7% during 2001 while the catch rate from handline fishing decreased by 18.2%. The 2001 longline CPUE of yellowfin by directed tuna trips was 19% lower than the 2000 CPUE.

Northern Mariana Islands yellowfin landings declined in 2001 to 11,634 lb, an 18% decrease from 2000 and 16% below the long term average. Catch rates decreased in 2001 (5.35 lb/hr) 21% and was 42% lower than the long-term average.

Wahoo landings in American Samoa increased dramatically in 2001, following a stabilization in 2000. This increase in landings was generated from the longline fishery as catch from trolling was about 0.5% of the total. The trolling catch rate continued a decline starting after 1996 and was the same as the 1999 catch rate, but 12% lower than the long term average at 0.42 lb/hr. Guam's wahoo landings continue to show extreme interannual variability, dropping 51% in 1999 after a 140 % increase in 1998 and a 56% decrease in 1997. Landings of wahoo in Guam (119, 602 lb) increased by about 69% in 2001 and were 38% higher than the long term average. Wahoo landings in Hawaii increased from 0.69 million lb to 0.93 million lb between 2000 and 2001. The 2001 trolling catch rate for wahoo in Hawaii was up by 34.2%. The Northern Marianas wahoo landings (3640 lb) and catch rate (1.67 lb/trip) increased from the 2000 estimates. The catch was still more than half of the long term average, while the CPUE was over a third of the 1983 to 2000 average.

D. Gear

Troll fisheries continue to dominate the domestic fisheries in Guam and the Northern Mariana Islands, in contrast to American Samoa, where the expanding longline fishery now accounts for 99.7% of PPMUS landings. Growing charter fishing businesses in Guam and the Northern Mariana Islands contributed heavily to troll fishing effort. In Hawaii, longline landings continue to dominate pelagic fisheries production and in 2001 accounted for 73% of the landed volume of PPMUS.

III. Issues

An emergency interim rule established on August 25, 2000 (65 FR 51992, August 25, 2000) and revised on November 3, 2000 (65 FR 66186, November 3, 2000), was extended in February of 2001. This action extended an emergency interim rule governing the Hawaii-based pelagic longline fishery. The rule closed certain waters to fishing; imposed fishing gear, landing and transhipment restrictions, effort limitations, and fish sale restrictions; and required increased observer coverage for the fishery. By extending the emergency interim rule that was effective through February 21, 2001, NMFS continued implementation of an order issued by the U.S. District Court for the District of Hawaii while an environmental impact statement (EIS) was being completed for the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region (FMP). The EIS included the Recommended and Prudent Alternative (RPA) of the Endangered Species Section 7 Consultation Biological Opinion on Sea Turtles issued by NMFS on March 29, 2001. NMFS issued the comprehensive Final Environmental Impact Statement (FEIS) on March 30, 2001.

A second emergency rule was issued on March 19, 2001 (66 FR 15358, March 19, 2001), in which NMFS announced that the limit on the number of longline sets specified for Hawaii longline fishing restricted Area B, from January 1, 2001, through March 14, 2001, was not reached. Therefore, NMFS allowed longline fishing to continue in Area B through March 14, 2001. Further, NMFS clarified that from March 15, 2001 through May 31, 2001, the use of longline gear by vessels registered for use under Hawaii longline limited access permits (Hawaii-based longliners) was prohibited everywhere. Closure of Hawaii's longline fishery took effect at 0001 hours local time (l.t.) on March 15, 2001, at which time all Hawaii longliners at sea must ve

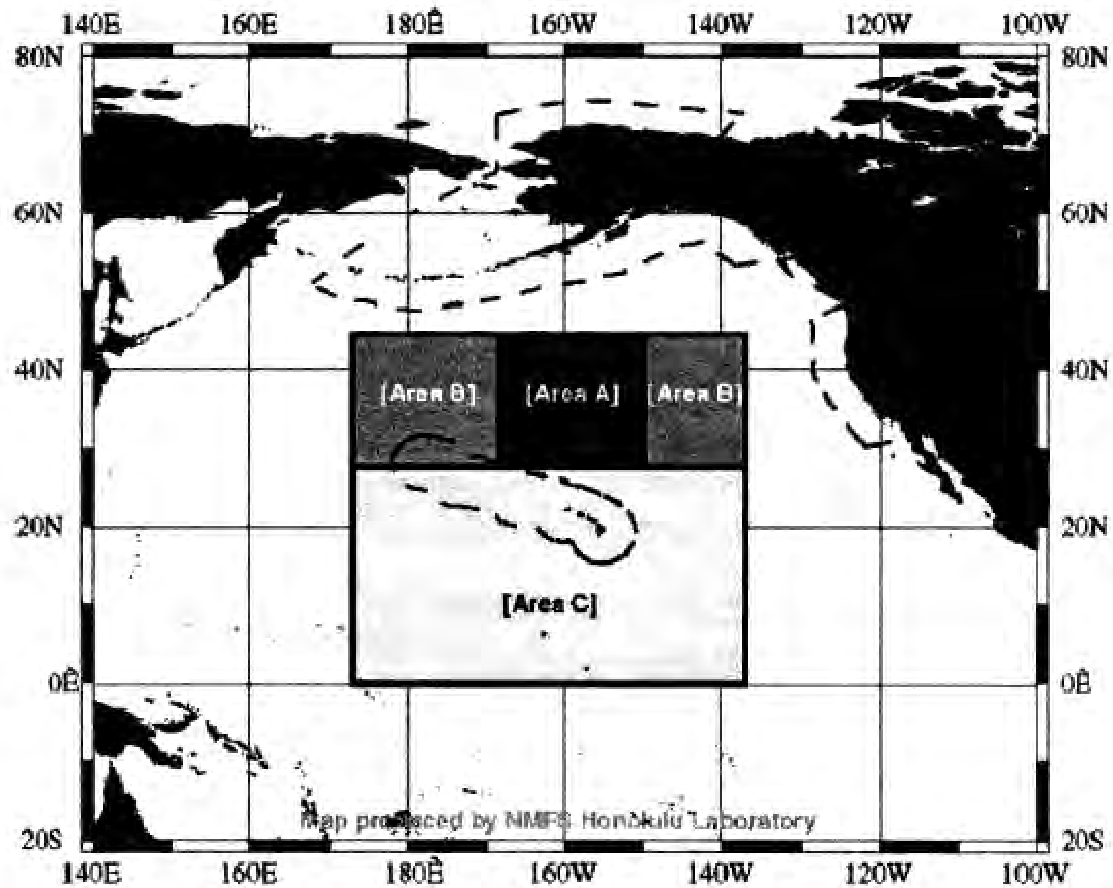

Figure 1. Longline Fishing Restricted Areas

ceased fishing operations, removed their longline gear from the water, and be in active transit to the next port of call.

On April 19, 2001, a notice in the Federal Register (66 FR 20134, April 19, 2001) announced the terms of the March 30, 2001, Order of the United States District Court for the District of Hawaii. This Order modified the Court's previous Order of August 4, 2000. The Order restricted the Hawaii based longline fishery (Hawaii longline fishery) based on ther preferred alternative of the Final Environmental Impact Statement (FEIS) governing the Hawaii longline fishery conducted under the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region (FMP). The new Hawaii longline fishery management measures were intended to protect and conserve sea turtles. The implementation of the court order came in June of 2001 with an emergency rule in the Federal Register (66 FR 31561, June 12, 2001).

NMFS issued an emergency interim rule, effective for 180 days, applicable to vessels registered for use under a Hawaii longline limited access permit (Hawaii longline vessel). This rule: Prohibits the targeting of swordfish north of the equator by Hawaii longline [[Page 31562]] vessels; prohibits longline fishing by Hawaii longline vessels in waters south of the Hawaiian Islands (from 15 deg. N. lat. to the equator, and from 145 deg. W. long. to 180 deg. long.) during the months of April and May; allows re-registration of vessels to Hawaii longline limited access permits only in October; imposes additional sea turtle handling and resuscitation measures; and requires all Hawaii longline vessel operators to attend an annual protected species workshop. This rule implements an Order issued on March 30, 2001, by the United States District Court for the District of Hawaii (Court). This Order superseded the Court's Order of August 4, 2000, and this rule supersedes the emergency rules published on August 25, 2000; November 3, 2000; February 22, 2001; and March 19, 2001. Other parts of this emergency interim rule implement the terms and conditions contained in a November 28, 2000, Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service (FWS) on the effects of the Hawaii-based longline fishery (Hawaii longline fishery) on the endangered short- tailed albatross. In December of 2001, another emergency rule was implemented to extend the June 2001 emergency rule expiration date (66 FR 63630, December 10, 2001).

Due to concerns about the status of shark populations and the effects of heavy fishing on such populations, the Congress passed and the President signed, on December 21, 2000, the Shark Finning Prohibition Act. The Act prohibits any person subject to U.S. jurisdiction from: (1) Engaging in shark finning (finning is the practice of removing the fin or fins from a shark and discarding the remainder of the shark) at sea; (2) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (3) landing shark fins without a corresponding carcass. NMFS proposed a rule that would implement the provisions of the Shark Finning Prohibition Act (Act) that prohibit any person under U.S. jurisdiction from engaging in shark finning in waters seaward of the inner boundary of the U.S. exclusive economic zone (EEZ), possessing shark fins harvested in waters seaward of the inner boundary of the U.S. EEZ on board a fishing vessel without corresponding shark carcasses, or landing shark fins harvested in waters seaward of the inner boundary of the U.S. EEZ without corresponding carcasses (66 CFR 34401, June 28, 2001). The Act requires the Secretary of Commerce to issue regulations to implement it and the intent of this action is to propose such regulations.

Federal closures and fishing restrictions began in late 1999 when vessels registered for use under Hawaii longline limited access permits (Hawaii-based longline vessels) were prohibited from engaging in fishing in certain accustomed areas and with certain gear. These restrictions were the result of injunctions issued by the U.S. District Court for the District of Hawaii (the Court) to reduce the number of sea turtles injured and killed incidental to fishing operations. A notice in the Federal Register (66 FR 58440, November 21, 2001), announced the availability of $3 million, by The Consolidated Appropriations Act of 2001, provided to the Secretary of Commerce to provide economic assistance to fishermen and fishing communities affected by Federal closures and fishing restrictions in the Hawaii longline fishery.

IV. 2001 Region-wide Annual Report Recommendations

1. **The Council should support an analysis of trends in mahimahi and ono landings and catch rates, and other incidental catches (i.e. opah pomfret rainbow runner etc), throughout the western Pacific region, including data from EEZ and distant water fisheries**

2. **Because the longline fishing is expanding in terms of ports of landings the Council should authorize NMFS to use VMS information to monitor logbook compliance. The Plan Team believes this information to be vitally important for other fishery monitoring and assessment purposes. At a minimum VMS data on noon positions should be provided to allow some approximate validation of logbook reported positions**

3. **The Plan team recommends that the Council should be included in the review of any reports drafted jointly by NMFS and USFWS on annual takes of seabirds, as specified in the recently published National Plan of Action for Seabirds.**

V. Plan Administration

A. Administrative Activities

With the longline fleet pressures increasing in American Samoa, NMFS proposed a rule which would implement a Council recommendation to prohibit vessels more than 50' in length overall from targeting PMUS within 50 miles from shore around American Samoa (66 FR 39475, July 31, 2001). This action was intended to address concerns that the entry of vessels greater than 50 ft (15.2 m) in length into the pelagic fishery around American Samoa could lead to gear conflicts and catch competition with locally based small fishing vessels. Such conflicts and competition could lead to reduced opportunities for sustained participation by residents of American Samoa in the small-scale pelagic fishery.

In May 2001, NMFS issued an advanced notice of proposed rulemaking regarding persons who enter the offshore pelagic handline fishery around the Cross Seamount, four NOAA weather buoys, and the "Bigeye Buoy" in the U.S. Exclusive Economic Zone (EEZ) around Hawaii (66 FR 27623, May 18, 2001). They announced that after February 15, 2001, persons may not be assured of continued participation in the fishery if, in the future, the Western Pacific Fishery Management Council prepares, and NMFS approves, a program limiting entry or effort. This new date (Feb. 15, 2001) supercedes the old date of July 2, 1992, but does not commit the Council to limit effort or prohibit the Council from using any other date for determining future participation in this fishery. The new date was established at the 108th meeting of the Western Pacific Regional Fishery Management Council after determining that the previous date was outdated.

B. Longline Permits

During 2001, 164 permits, the maximum allowed under the FMP, were maintained in the Hawaii longline limited entry fishery. Of the 164 issued permit holders, 39 were without vessels for those permits. PIAO also processed and issued Western Pacific general longline permits for the pelagic fisheries in American Samoa (85 permits). Permits for Guam and Northern Mariana Islands were not renewed in 2001. The number of longline permits issued in American Samoa increased dramatically for the fourth straight year.

The names of vessels registered with Hawaii limited entry and Western Pacific longline permits and permit holders are listed in Table 3.

C. Foreign Fishing Permits

No administrative actions relating to foreign fishing in the western Pacific EEZ were required because no foreign fishing permits were requested for any vessels with which the US has a Governing International Fishing Agreement.

Table 3. Hawaii longline limited entry permit holders in 2001

VESSEL NAME	HOLDER
F/V ADRAMYTTIUM	THK Fishing Inc.
F/V ANNA	MTA Corp.
F/V ARROW	David Kelly
F/V BARBARA H	Arthur/Barbara Haworth
F/V BLUE FIN	Liet An Lu/Mai Thi Do
F/V BLUE SKY	Blue Sky Fishing Producer
F/V CAPT. GREG	Aquanut Co. Inc.
F/V CAPT. MILLIONS I	Nga Van Le
F/V CAPT. MILLIONS III	Capt. Millions III Inc.
F/V CAPT. MILLIONS IV	H and M Fishery Inc.
F/V CHRIS	Kan-Do Pesca Inc.
F/V CRYSTAL	Davis B Inc.
F/V DAE IN HO	KYL Inc.
F/V DAE IN HO III	Chunha Inc.
F/V DAE IN HO IV	Wynne Inc.
F/V DASHER II	DukSung Fishing Inc.
F/V DEBORAH ANN	Amko Fishing Co. Inc.
F/V DOUBLE D	Joseph Dettling
F/V EDWARD G	Edward G. Co. Inc.
F/V EXCALIBUR	Bruce Picton
F/V FINBACK	Vessel Management Assoc.
F/V FIREBIRD	Firebird Fishing Corp.
F/V GAIL ANN	Gail Ann Co. Inc.
F/V GARDEN SUN	Konam Fishing Co., Inc.
F/V GLORY	Roy Yi
F/V GOLDEN SABLE	Golden Sable Fisheries Inc.
F/V GRACE	Sang Yeol Kim
F/V HANNAH LEE	Natali Fishing Inc.
F/V HAVANA	Thomas Webster
F/V HAWAII POWER	Intl. Quality Fishery Inc
F/V HEOLA	H & M Marine Inc.
F/V HOKUAO	White Inc.
F/V IMMIGRANT	Martin Noel Inc.
F/V INDEPENDENCE	Independence Inc.
F/V JANTHINA	Trans World Marine Inc.
F/V JENNIFER	Kil Cho Moon
F/V KAIMI	Vessel Management Assoc.
F/V KAIMI M.	Pacific Jennings Inc.
F/V KALOKE ANA	Kaloke Ana Fishing Inc.
F/V KATHERINE II	K.A. Fishing Co. Inc.
F/V KATHERINE III	K.R. Fishing Inc.
F/V KATHERINE VII	Aloha Fishing Supply
F/V KATHERINE Y	Song Fishing Corp.
F/V KATY MARY	Vessel Management Assoc.
F/V KAWIKA	Vessel Management Assoc.
F/V KAY	K.Y. Fishing Inc.
F/V KELLY ANN	Kelly Ann Corp.
F/V KEMA SUE	Kema Sue Inc.
F/V KILAUEA	Aukai Fishing Co.Ltd.
F/V KINGFISHER	Quan Do
F/V KINUE KAI	Awahnee Oceanics Inc.
F/V KOLEA	Paik Fishing Inc.
F/V KUKUS	Kuku Fishing Inc.
F/V LADY ALICE	Lady Alice Co. Inc.
F/V LADY CHUL	Jong Ik Fishing Co. Inc.
F/V LEA LEA	M.S. Honolulu Inc.

F/V LEGACY	Amak River Legacy
F/V LIHAU	White Inc.
F/V MAN SEOK	KMC & PCC Inc.
F/V MANA LOA	Two Bulls Inc.
F/V MARIAH	Vessel Management Assoc.
F/V MARIE M	Viking V Inc.
F/V MARINE STAR	Viking V Inc.
F/V MIDNIGHT III	Albert K. Duarte
F/V MISS JANE	Palmer Pedersen Fisheries
F/V MISS JULIE	Quan Do
F/V MISS LISA	Miss Lisa Inc.
F/V MOKULELE	Robert Cabos
F/V MOONLIGHT	P&M Fishery Inc.
F/V PACIFIC FIN	Fishrite Inc.
F/V PACIFIC HORIZON	John Gibbs
F/V PACIFIC REFLECTION	Gunn Pacific Reflection
F/V PACIFICA	Jackson Bay Co.
F/V PAN AM II	Dongwon Marine Inc.
F/V PARADISE 2001	Dang Fishery Inc.
F/V PARADISE 2002	Nguyen Fishery Inc.
F/V PEARL HARBOR II	Gilbert DeCosta
F/V PETITE ONE	Ka'upu Ltd.
F/V PIKY	M/V Piky Inc.
F/V PRINCESS K	Princess K Fishing Corp.
F/V QUEEN DIAMOND	Santa Maria III Inc.
F/V QUYNH VY	Reagan Nguyen
F/V RED BARON	Donald Aasted
F/V RED DIAMOND	Xuan Nguyen
F/V ROBIN	Fat City Fishing
F/V ROBIN II	Robin Fishing Inc.
F/V ROBIN V	L.S. Fishing Inc.
F/V RUBY STORM	Allen C. Witbeck Sr.
F/V SANDY DORY	Highliner Inc.
F/V SAPPHIRE	H-N Fishery Inc.
F/V SAPPHIRE II	H-N Fishery Inc.
F/V SEA DIAMOND	Nancy Nguyen
F/V SEA DIAMOND II	Sea Diamond II Inc.
F/V SEA FALCON	Frank/Michelle Crabtree
F/V SEA GODDESS	Capt. Washington I Inc.
F/V SEA HAWK	Hawaii Fishing Co.
F/V SEA MOON	Sea Flower Inc.
F/V SEA MOON II	Sea Moon II Inc.
F/V SEA PEARL	Coldwater Fisheries Inc.
F/V SEA SPIDER	Paul Seaton, Trustee
F/V SEA SPRAY	Sea Spray LLC
F/V SEASPRAY	Hanson/Hanson Fishing Co.
F/V SEEKER II	Seeker Fisheries Inc.
F/V SEVEN STARS	Kwang Myong Co. Inc.
F/V SKY SUN	Kyong Dok Kim
F/V SPACER K	Hwa Deog Kim
F/V ST. MICHAEL	Tony/Lorna Franulovich
F/V SWELL RIDER	Bayshore Mgmt. Inc.
F/V SYLVIA	B-52 Inc.
F/V TUCANA	Pacific Boat Corp. Inc.
F/V TWO STAR	Gregory Au
F/V ULHEELANI	Ulheelani Corp.
F/V VICTORIA	Aegis Fishing Inc.
F/V VIRGINIA CREEPER	Sylvan Seafoods Inc.
F/V VUI VUI II	Vui Vui, A Limited Partner
F/V VUI-VUI	Santa Maria III Inc.
F/V WHITE NIGHT	Natalia/Kiril Basargin
F/V WONIYA	Sierra Fisheries Inc.

2001 Hawaii longline permit holders without vessels

Andy Hoang	
Bac Tran	
Christine Tran	2 permits
Diana Thi To	
Duoc Nguyen	
H & M Marine Inc.	
H-N Fishery Inc.	
Hong Lu	
Hong Thanh Nguyen	
James Chan Song Kim	
James Nakano	
Khanh Truong	2 permits
Kiem Goldey	
KLT Inc.	
Lady Ann Margaret Inc.	
Larry DaRosa	
Liana Do	
Lindgren-Pitman Inc.	
Long Thanh Nguyen	
Luc Q. Ngo	
My Viet Dang	2 permits
Nancy/Quynh Vy Nguyen	
Ocean Associates Corp.	
Pacific Fisheries Corp.	
Pacific Fishing & Supply	2 Permits
Pacific Seafoods Inc.	3 Permits
Quy Thanh Truong	
Quang Nguyen	
Richard Galimore	
Scotty Nguyen	
Sea Dragon II Inc.	
Shaman Partnership	
Steven Nguyen	
Tina Hoang	
Tom C.Y. Kim	
Tom The Van Le	
Tony Phan Truong	
Vessel Management Assoc.	5 permits
William Sullivan	

Western Pacific General Longline Permit Holders in 2000

American Samoa

VESSEL NAME	PERMIT HOLDER
F/V AAONE	Asaua Fuimaono
F/V ADELITA	Adelita Fishing LLC
F/V ALI-B	Harbor Refuse and Environmental Services
F/V AMERICA	Robert/Dorothy Pringle
F/V APIALOFI	Apisaloma Ala
F/V AURO	Longline Services Inc.
F/V BABY FRANCELLA	Pola Faamausili
F/V BREANA LYNN	Robert/Dorothy Pringle
F/V CAPT. CARLOS ANDRES	Afoa Lures
F/V CAPTAIN MICHAEL JOSEP	Afoa Lures
F/V CAROLYN J	Mid Pac Fisheries
F/V CASH FLOW 1	Taufuiava Vaivai
F/V CLASSIC CAT	Frank Gaisoa
F/V FA PEPA SAI	Joseph/Maria Parisi
F/V FAIVAIMOANA I	Faivaimoana Fishing Co Lt
F/V FETUOLEMOANA	Tuna Ventures Inc.
F/V FLORA	Feli Fisheries Inc.
F/V FOTOLUPE	Richard Solaita
F/V FUAO	Pili Masaniai
F/V FUAO II	Sosene Asifoa
F/V GALUEGA FOU	Floyd Scanlan
F/V GOGOSINA	Native Resources Develope
F/V GREEN PEACE I	Maselino Ioane
F/V JOHANNA	Luis Diaz
F/V JULIE IRENE	Michael Pulu
F/V K114	Peter/Margaret Betham
F/V KARLY II	Omar Shallout
F/V KATHERYN ANN	Silva Fishing Inc.
F/V KMJ	Sitala Sitala Jr.
F/V L.J. EXPRESS	Maila Alofaituli
F/V L.J. EXPRESS II	Letalitonu Alofaituli
F/V LADY ALAMAI	Faiivae Galeai
F/V LADY ALVINA	Afoa Moega Lutu
F/V LADY BARBARA	Barbara H. Inc.
F/V LADY CARMEN	Eliseo Mamani
F/V LADY ELINOR	Afoa Lures
F/V LADY FRANCELLA II	Faamausili Pola
F/V LADY HANNACHO II	Afoa Lutu
F/V LADY LEANN	Steve Vaiau
F/V LADY LEANN II	Steve Vaiau
F/V LADY LU	Lu's Fish Grotto
F/V LADY MONA LISA	Terry Chang
F/V LADY SAVANNA	Savanah Wulf
F/V LADY TAUFAGALUPE	Pesa Vee
F/V LADY TUA I	Peter/Margaret Betham
F/V LADY TUA II	Peter/Margaret Betham
F/V LAURA ANN	Crivello Fishing LLC
F/V LEONE LINERS V-1	Posu Tue
F/V MIDDLEPOINT	Island Tuna Mgmt. Inc.
F/V MONIQUE I	William Hollister
F/V MONIQUE II	William Hollister
F/V MOSI I	Fiavivini Atofau
F/V NORTHWEST	Harbor Refuse & Environm
F/V PAGO NO 1	Samoa Enterprises Inc.
F/V PAGO NO 2	Samoa Enterprises Inc.
F/V PAGO NO 3	Samoa Enterprises Inc.
F/V PENINA	Longline Services Inc.
F/V POHO NUI	Joseph/Maria Parisi
F/V POWAK	Quality Tuna Co.
F/V PRINCESS DANIELA	Afoa Lures
F/V PRINCESS MARLENE	Afoa Lures
F/V SALVATION	Tagialisi Misa
F/V SAMOAN BOY	Feli Fisheries Inc.
F/V SEA BIRD	Seawind Fisheries Group
F/V SIVAIMOANA	Tuna Ventures Inc.
F/V SKOOPY	Omar Shallout
F/V SOUTH WIND I	Elvin Mokoma
F/V SOUTH WIND II	Elvin Mokoma
F/V SOUTH WIND III	Elvin Mokoma
F/V SOUTH WIND IV	Elvin Mokoma
F/V TABITHA	Uelese Timoteo
F/V TAE SUNG	Byoung In Ki
F/V TAIMANE	Longline Services Inc.
F/V TAMARINA	Ioane Maselino
F/V TELEFONI	Telefoni Sagapolutele
F/V THE BOSS	The Boss Fishing Co.
F/V THE MARIA J	Maria J Fishing Inc.
F/V TIFAIMOANA	Longline Services Inc.
F/V TOGO AASA	Tuaifaiva Seiuli
F/V TRACEY C	Tracey C Fishing LLC
F/V TRACY CHERI II	Tracy Cheri Inc.
F/V VAAOLEFAAOLATAGA	Pele Tui
F/V VILA L	Vili & Vila Corp.
F/V ZEPHYR	Coastal & Offshore Pac. Corp.
no name	Tio Taiivao

Guam

none (did not renew)

Northern Mariana Islands

none (did not renew)

D. Protected Species Conservation

The Hawaii longline fishery targeting swordfish and tunas has been monitored under a mandatory observer program since February 1994. Beginning March 1994, branch personnel have conducted daily shoreside dock rounds in Honolulu to determine which fishing vessels are in port. These dock rounds are used to obtain an estimate of fishing effort on a real-time basis by assuming that a vessel is fishing when it is absent from the harbor. Approximately 1,035 vessels departed port between January 1, 2001, and December 31, 2001, 233 of which carried observers, representing about 22.5% observer coverage. The following table summarizes protected species interactions for all observed trips that returned during calendar year 2001. Total observed fishing effort was approximately 5,142,195 hooks and 2827 sets; 23 sea turtle and 10 marine mammal interactions were observed.

Olive ridley turtles were the species most often involved in observed interactions (Table 4) with longline gear, followed by loggerheads, then greens and leatherbacks. Of the 23 turtles observed taken, 18 were released alive or injured and 5 released dead (Table 4).

Table 4. Observed longline gear/turtle interactions, 2001

Turtle Species	Condition		
	Released Alive/Injured	Dead	Total
Loggerhead	6	0	6
Olive Ridley	6	4	10
Leatherback	2	0	2
Unidentified Hardshell	2	0	2
Green	2	1	3
Hawksbill	0	0	0
TOTAL	18	5	23

Table 5. Estimated fleet-wide turtle takes and kills in the Hawaiian longline fishery, 1994-2001								
Species	**Estimated Takes**							
	1994	1995	1996	1997	1998	1999	2000	2001*
Loggerhead	501	412	445	371	407	369	418	24
95% CL	315-669	244-543	290-594	236-482	259-527	234-466	N.A.	3-34
Olive Ridley	107	143	153	154	157	164	146	26
95% CL	70-156	90-205	103-210	103-216	102-221	111-231	N.A.	12-47
Leatherback	109	99	106	88	139	132	112	8
95% CL	68-153	62-141	69-148	55-124	79-209	76-193	N.A.	2-21
Green	37	38	40	38	42	45	40	8
95% CL	15-65	15-70	19-70	14-73	18-76	18-82	N.A.	2-21
Species	**Estimated kills**							
	1994	1995	1996	1997	1998	1999	2000	2001*
Loggerhead	88	72	78	65	71	64	73	8
95% CL	36-141	31-115	34-127	28-102	32-112	28-102	N.A.	N.A.
Olive Ridley	36	47	51	51	52	55	49	24
95% CL	8-64	7-84	11-90	8-92	11-92	11-96	N.A.	N.A.
Leatherback	9	8	9	7	12	11	9	3
95% CL	0-22	0-21	1-21	0-18	1-28	1-27	N.A.	N.A.
Green	5	5	5	5	5	6	5	7
95% CL	0-16	0-17	1-17	0-17	1-19	1-19	N.A.	N.A.

Data from SWFSC Administrative Report H-00-06

*Year 2001 data is from the pseudo year April 2001 to July 2002 and 95% CL was not available for Estimated Sea Turtle kills. The data for the year 2000 does not include 95% CL because of the new shifts in management regimes and regulations. The year 2002 data will be the first complete year of a management regime for the fishery.

Marine mammal and seabird interactions were also recorded by the observers and are summarized below in Tables 6, 7 and 7a.

Table 6. Observed longline gear/marine mammal interactions, 2001			
Marine mammal species	**Condition**		
	Released alive	**Released dead**	**Total**
Monk Seals	0	0	0
Humpback whales	1	0	1
False killer whales	3	0	3
Other whales	4	0	4
Dolphins	1	1	2
Total	9	1	10

Table 7. Observed longline gear/seabird interactions, 2001			
Seabird Species	**Condition**		
	Released alive	**Returned dead**	**Total**
Black-footed albatross	6	76	82
Laysan albatross	13	63	76
Sooty Shearwater	0	2	2
Unidentified Shearwater	0	1	1
Total	19	142	161

* In 2001, NMFS data did not differentiate between released alive and returned dead. Subsequently, all 2001 released alive seabirds were added to the Released Injured column of Table 7.

Concern for the numbers of albatross taken by the Hawaiian longline fleet has been an important concern for the NMFS Honolulu Laboratory. An observer coverage increase of over 300 percent since 1999 has increased the accuracy of the estimated takes.

Table 8. Estimated fleet-wide seabird takes in the Hawaiian longline fishery, 1994-2001								
Species	**Estimated takes**							
	1994	1995	1996	1997	1998	1999	2000	2001*
Blackfoot albatross	1830	1134	1472	1305	1283	1301	272	58
95% CI	1457-2239	899-1376	1199-1811	1077-1592	1028-1601	1021-1600	212-373	N.A.
Laysan albatross	2067	844	1154	985	981	1019	155	62
95% CI	1422-2948	617-1131	835-1600	715-1364	679-1360	688-1435	108-216	N.A.

*Year 2000 was calculated as the time period between 25 August 2000 and 31 March 2001. Year 2001 was calculated as the time period between 1 July 2001 and 30 June 2002. 95% CI not provided for year 2001.

E. USCG Enforcement Activities

The USCG conducted roughly 799 hours of fisheries patrols with C-130 aircraft in the Central and Western Pacific ocean during fiscal year 2001. This was a significant decrease from FY2000 due to operating tempo and budget reductions made during the year. They also undertook a major upgrade to the electronic sensors on their fleet of C-130s. All of the aircraft had to travel to the mainland for up to three months each, as the upgrade was accomplished. This impacted the USCG ability to deploy, and overall there was a significant reduction in the total number of C-130 hours flown in support of fisheries enforcement.

The C-130 surveillance of the eight non-contiguous EEZ s was broken down as follows: 60 hours in the Main Hawaiian Islands, 3 hours in the Northwest Hawaiian islands, 90 hours in Guam and the Northern Mariana Islands, 41 hours in American Samoa, 30 hours in Palmyra Atoll/Kingman Reef, 34 hours in Jarvis Island, and 8hours in Howland/Baker Islands.

In FY 2001, over 300 cutter days of fisheries patrol was conducted in the Central and Western Pacific ocean. There were over 500 fishing vessel boardings. The breakdown of vessels boarded is as follows: 400 were U.S and 107 were foreign.

It is estimated that 46 EEZ encroachments by foreign fishing vessels occurred in FY 2001 and only two suspected violators were intercepted by Coast Guard units. The Coast Guard responded to several significant MFCMA violations by U. S. fishing vessels cued by the NMFS Vessel Monitoring System in FY 2001, including:

FFV SHIN SHING SHENG: On 13 June, The Coast Guard was notified by U. S. fishers of a foreign fishing vessel operating in the U. S. EEZ around Palmyra Atoll/Kingman Reef. A C-130 aircraft intercepted the Belize-flagged longliner SHIN SHING SHENG and documented the encroachment. The USCGC KUKUI was dispatched from Honolulu for interdiction, but had approximately 950 nm to cover. On 16 June, a C-130 relocated the vessel outside the EEZ and running southwest at 10 kts; an interdiction was not possible. A case package including digital video footage of the vessel setting longline gear in the U. S. EEZ and aircrew statements has been developed and forwarded to Belize (the flag state) and Taiwan (the owner's nationality). During a subsequent aerial patrol on 13 July, a C-130 again sighted this vessel on the high seas. The aircrew noted that the vessel's call sign (V3KP2), which was visible during early case, had been painted over. A new name BEHARI KENCANA 66 was now painted on the stern. This vessel is suspected to be reflagging to Indonesia while underway. The Coast Guard notified the other Pacific island maritime surveillance centers and requested they relay any sighting information to the Coast Guard. The Forum Fisheries Agency notified the Coast Guard that they have removed the vessel from the FFA Regional Register, due to the fact that the vessel did not inform the FFA of the reflagging/name change.

FFV LADY MOOIA: On 30 March, the U. S. F/V TRACEY C reported a foreign fishing vessel operating in the U. S. EEZ around American Samoa. NOAA Fisheries requested Coast Guard assistance and a helicopter embarked on the USCGC POLAR SEA transported S/A Sagapoulo to the scene to document the encroachment. The Samoa longliner LADY MOOIA was directed to recover its longline gear and transit to Pago Pago. The vessel hauled its gear, but departed the EEZ without complying with the order to proceed to Pago Pago.

F. <u>NOAA Fisheries Office for Law Enforcement Southwest Enforcement Division</u>

Magnuson Act Enforcement Actions
Prominent enforcement actions proceeding from violations of the MSFCMA have resulted in significant financial penalties totaling $31,500.00 in Feb of 2001 alone. Violations included: illegal fishing within the Protected Species Zones, observer interference, and falsification of Daily Longline Fishing Logs. Five prominent enforcement actions since the June 2001 Council Meeting proceeding from violations of the MSFCMA have resulted in financial penalties totaling $96,000.000. Violations included: use of a foreign fishing vessel to engage in fishing within the exclusive economic zone near Howland and Baker Islands; fishing for pelagic management unit species with longline gear in the protected species zone around the main Hawaiian Islands; falsification of Pacific Daily Longline fishing logs, and observer harassment

Resident special agents assigned to Oahu, conducted training sessions for candidates enrolled in the Fishing Vessel Observer Program.

Marine Mammal Protection Act:
Public education, deterrence, and intervention remained the primary focus of NOAA Fisheries Office of Law Enforcement with regards to averting marine mammal harassment within Hawaii. Several marine mammal investigations were initiated during this reporting period, to include violations of the Humpback Whale approach regulations by recreational water craft in Kailua-Kona, Hawaii and Kihei, Maui, the mauling of a Hawaiian Monk Seal on the island of Kauai by a Pit Bull terrier, and harassment of spinner dolphins on the Big Island. Coordination continued with volunteer organizations and local law enforcement agencies, in order to provide a timely

response to marine mammal incidents.

In addition, several contraband investigations involving marine mammal products were initiated. Purported medicinals containing marine mammal parts were intercepted and seized prior to their introduction into local markets. Exotic medicinals containing ingredients extracted from seals were intercepted prior to their introduction into local commerce on Oahu. These purported remedies pose an additional threat to public health and safety due to the fact that they are routinely adulterated with dangerous levels of heavy metals, to include arsenic and mercury. Handbags constructed of seal skin and sperm whale teeth were also intercepted and seized prior to their introduction into local commerce in Hawaii.

A NMFS special agent stationed on Oahu conducted several enforcement workshops for members of the U.S. Coast Guard and the Hawaii Department of Conservation and Resources Enforcement Division in 2001, which concentrated on various aspects of the MMPA and ESA relative to the Humpback Whale Sanctuary on the Big Island of Hawaii.

Marine Sanctuaries Act:
Vessel based patrols resumed near American Samoa's Fagatele Bay National Marine Sanctuary in 2001. Suspected coral damage was investigated and assessed by the resident NMFS special agent. Enforcement activities have resulted in note-worthy civil penalties for violators of the MSA in American Samoa's Fagatele Bay National Marine Sanctuary.

Public education efforts in conjunction with the Humpback Whale Sanctuary Enforcement Workshops were conducted in November of 2001. Consistent with previous years, public education, deterrence, and intervention strategies were maintained throughout the 2001-2002 whale watching season. The NOAA Office for Law Enforcement was also represented on the Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council. The Assistant Special Agent in Charge was recently appointed to sit on the Council in an advisory capacity.

In order to address the unique challenges posed by the creation of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, the NOAA OLE designated a special agent to coordinate enforcement activities and public education relative to the reserve.

Endangered Species Act:
Cooperative enforcement efforts continued between the Hawaii NMFS Office of Enforcement and the Hawaii Division of Conservation and Resources Enforcement regarding the status of sea turtles at Punalu'u Beach, on the Big Island of Hawaii. Furthermore, NOAA OLE agents investigated the destruction of sea turtle nests on the island of Molokai. NMFS OLE agents also investigated the illegal take of two mature Green Sea Turtles on Kauai. Upon discovery, one turtle was dead, and the other was mortally wounded and was later euthanasized.

At the outset of March, NOAA Fisheries special agents arrested a 34 year old Kauai man pursuant to a warrant charging him with four separate counts of violations of the Endangered Species Act, to include the unlawful taking and possession of adult green sea turtles. Defendant Daniel Isobe was sentenced to a term of 6 months in federal prison on Monday, April 30th, after entering a guilty plea to Counts 1 and 5 of a Superseding Information to wit, knowingly taking 2 Green Sea Turtles, a threatened species of wildlife in violation of the Endangered Species Act, and knowingly transporting same in violation of the Lacey Act. The six month custodial term was imposed by Magistrate Judge Barry M. Kurren for the District of Hawaii.

While on assignment to the Hawaiian Islands Humpback Whale National Marine Sanctuary, NOAA Office for Law Enforcment special agents investigated 39 alleged violations and five whale collisions with recreational watercraft. In addition, public education efforts continue in conjunction with the Humpback Whale Sanctuary Enforcement Workshops. NMFS OLE agents participated in a comprehensive review of the current Hawaii's Ocean User's Handbook. Consistent with previous years, public education, deterrence, and intervention strategies was maintained throughout the 2001 whale watching season.

Forum Fisheries Agency:
The resident NMFS special agent in Guam continued to be available to conduct enforcement workshop sponsored by the Forum Fisheries Agency for member countries.. He was responsible for developing and teaching a comprehensive fisheries enforcement workshop which was held in Chuuk, FSM , with both classroom and practical field training exercises spanning two weeks, at the close of January, 2001. Similar training programs were also conducted on the island nation of Vanuatu, in November, 2000. The resident NOAA Fisheries Enforcement agent has also conducted several training sessions for personnel from the maritime unit from Guam Customs and Quarantine.

Vessel Monitoring System
Approximately 20 vessels have disconnected from their Hawaii limited entry permits as of 2/12/2001, and the VMS units remained installed on those vessels, and nearly all were active.

The transition of the Main Hawaiian Islands longline closed area from the "Winter to Summer" configuration happened on February 1st. NMFS OLE did not observe any unauthorized activity related to this change. The two remaining foreign settlement vessels (out of the original 25) continued to be active. One was based in Guam and was conducting fishing activities in Micronesia, and the other was fishing on the high seas between Hawaii and Mexico.

Throughout this reporting period, NMFS OLE continued to coordinate efforts and assist NMFS Headquarters in the development of the national VMS Program. Comprehensive planning and strategy meetings have taken place. In addition, development of a structured training curriculum for managers in the national VMS program is underway. Moreover, collaborative efforts between the NMFS and several west coast marine electronics vendors continued to focus on the establishment of protocols for supporting the Southwest VMS program.

VMS testing and evaluation continued in American Samoa, with the Argos brand transmitter units. Interest and cooperation in the ARGOS project remained at high levels among the Samoan fishing community. In retrospect, the Hawaii VMS Program has clearly demonstrated that a fishing vessel monitoring system could be an effective use of technology to improve monitoring, control and surveillance of regulated fisheries. VMS, in conjunction with air and surface patrols, promotes and supports regional strategies for conservation and management of highly migratory species in the Pacific.

The Vessel Monitoring System continued to be an integral part of the Southwest Law Enforcement's Monitoring, Control, and Surveillance (MCS) program. The system was an effective tool for measuring compliance with area and seasonal restrictions. NMFS OLE vessel monitoring system (VMS) continued to be an effective tool for monitoring compliance within closed areas in the region, and cooperation from the fishing community continued to remain at high levels. During the second quarter of 2001, the VMS cued several investigations into alleged closed area violations. Additionally, the VMS continued to be an important tool to assist the United States Coast Guard in search and rescue operations.

Southwest Enforcement continued to monitor, as part of a voluntary demonstration, a U.S. krill vessel in the CCAMLR management area of Antarctica. In addition, the VMS was used to assist in several investigations of alleged violations by foreign vessels.

The size of the VMS program is relatively stable. NMFS OLE continued to monitor the entire permitted Hawaii longline fleet. In addition, most former Hawaii-based vessels that conducted fishing operations in California and American Samoa still have the VMS units on board, and in a functioning capacity, absent the requirement.

Monitoring, Control and Surveilance

NOAA Fisheries Southwest Enforcement hosted the initial efforts to develop an international network of agencies that are involved in fisheries-related monitoring, control, and surveillance (MCS) around the world. The country participants in the International Conference on Monitoring, Control, and Surveillance indicated their intention to create this network for the coordination of fisheries-related enforcement in Santiago, Chile, in January 2000. The objectives of the "International MCS Network" are to improve the efficiency and effectiveness of MCS activities through enhanced cooperation, coordination, and information collection and exchange among national organizations and institutions.

Participation in the MCS program is voluntary, and nations will achieve the aforementioned objectives through the following activities: (a) identifying their national organizations/institutions responsible for fisheries-related MCS, and the primary contact person who shall act as the main national coordinator for the purposes of this network; (b) collecting and providing timely and accurate MCS information to other parties to the arrangement; (c) considering requests and, where appropriate and possible, cooperating in joint fisheries-related MCS activities; (d) promoting technical assistance, training, experience exchange, and institutional development, to increase MCS knowledge and capability amongst participating parties; and (e) considering the particular needs and obstacles faced by developing countries.

Miscellaneous

During the past quarter, the resident agent of American Samoa reported an increase in filing for general longline permits in American Samoa.

Appendix 1

Territory of American Samoa

Introduction

The pelagic fishery in American Samoa has historically been an important component of the traditional domestic fisheries. Prior to 1995 the pelagic fishery was largely a troll-based fishery. The horizontal method of longlining was introduced to the Territory by Western Samoan fishermen in 1995. The local fishers have found longlining to be a worthwhile venture to engage in because they land more pounds with less effort and use less gas for trips. Almost all of the vessels used are "alias". These are locally built, twin-hulled (wood with fiberglass or aluminum) boats about 30 feet long, powered by 40HP gasoline outboard engines. Navigation on the alias is visual, using landmarks with the exception of a few modernized alias which have global positioning systems (GPS) for navigation. The gear is stored on deck attached to a hand-crank reel which can hold as much as 10 miles (25 miles for the jig-boat) of monofilament mainline. The gear is set by spooling the mainline off the reel and retrieved by hand pulling and cranking the mainline back onto the reel. Trips are one day long (about 8 hours) with the exception of 2 boats which go out fishing more than one day. These boats at 40 feet or so are slightly bigger than the regular alia. Setting the equipment generally begins in the early morning. Haulback is generally in the mid-day to afternoon. The catch is stored in containers secured to the deck, or in the hulls. Albacore is the primary species caught, and is generally stored in personal freezers until a sufficient amount is accumulated to sell to the canneries. Some of the catch is also sometimes sold to stores, restaurants, local residents and donated for family functions.

In mid-1995 five alias began longlining. This number grew to 12 boats involved in longline fishing in 1996. In 1997, 33 vessels had permits to longline of which 21 of those were actively fishing on a monthly basis. Also, in 1997 the first longline vessel of 60 plus feet in length capable of making multi-day trips began operating in American Samoa. In 1998, 50 local vessels received federal permits to longline but only 25 did longline. Fifty-nine local vessels received federal permits in 1999 to longline but only 29 participated in the longline fishery. In 2000, 37 vessels were active in the longline fishery. In the last half of 2000 the number of larger multi-day longline boats operating in American Samoa grew dramatically to over a half a dozen. In 2001, the number of vessels participating in the longline fishery increased dramatically by 68%, whereas the number of vessels participating in the trolling fishery slightly decreased by 5%

Prior to 1985, only commercial landings were monitored. From October 1985 to the present, data was collected through an offshore creel survey that included subsistence and recreational fishing as well as commercial fishing. In September, 1990 a Commercial Purchase (receipt book) System was instituted in which all businesses in Samoa, except for the canneries, that buy fish commercially were required by local law to submit to DMWR a copy of their purchase receipts. In January 1996, in response to the developing longline fishery a federal longline logbook system was implemented. All longline fishermen are required to obtain a federal permit which requires them to submit logs containing detailed data on each of their sets and the resulting catch. From 1996 to 1999, the logbooks submitted by the local longliners were edited in Samoa for any missing data and were then sent to the NMFS Honolulu Lab every week for further editing and data processing. Starting with 2000, logbook data was entered and maintained in Samoa and downloaded to NMFS in Hawaii periodically.

On July of 1999, In response to a problem with delinquent longline logs, the Department of Marine and Wildlife initiated a Daily Effort Census (DEC) program to monitor the local longline fleet. Using the Daily Effort Census form, which contains all active longline vessels, data collectors go out on a daily basis, except on Sundays, Holidays, and off-duty days, to check which boats are out longlining and which boats are in port. The DEC form is returned to DMWR for data entry at the end of each working day. Federal logbooks are required to be submitted to DMWR by the following Monday after each fishing trip. If they are not, warnings are issued to the fishermen and more punitive measures are taken if these warnings are not heeded.

Toward the end of 2000 many new multi-day trip boats joined the longline fleet making it hard to tell what they were doing when they were not in port. To solve this problem the longline logbook data was compared with reports from the canneries of fish unloaded by these boats to identify which boats were delinquent in their longline logs and to take corrective action.

Newly discovered “peculiarities” in the historical data, the emergence of new, bigger boats that make multi-day trips required amending and supplementing the algorithms that expand American Samoa’s offshore creel survey data. WPacFIN staff have completed modifications to the Visual FoxPro data processing system to address these data concerns to better reflect the status of the territory’s pelagic fisheries. These changes are outlined below. The data from 1982-1985 has been left unchanged from the Dbase IV Commercial Catch Monitoring System but data from 1986-2001 in this report has been re-expanded with the new Visual FoxPro data processing system. These expansions are true annual expansions of the entire year’s interviews across the entire year’s sample days and are no longer sums of 12 monthly expansions. Note that there are some changes to the historical data due to the new re-expanded and adjusted data. As a result, the graph presentations have also changed.

Total landings data covers all fish caught and brought back to shore whether it enters the commercial market or not. Commercial Landings covers that portion of the Total Landings that was sold commercially in Samoa both to the canneries and other smaller local business that buy fish. Total landings include both the commercial and recreational/subsistence components of the fishery. Commercial Landings data from 1982-1985 was imported from the Commercial Catch Monitoring System without change. From 1986 to 1990, the estimated total landings and estimated commercial landings data was taken from the Offshore Creel Survey System expansion.

One of the problems with the offshore creel survey was that spear fishing and bottom fishing trips are usually done at night. These boats came in early in the morning before the interviewers were on duty resulting in very few interviews for these types of trips. These fishermen still had to sell their fish so starting in 1991 the Commercial Purchase System provided information on what they caught. From 1991 to present the Offshore Creel Survey landings were replaced by Commercial Purchase System landings for species where the

Commercial Purchase System landings exceeded the Offshore Creel Survey landings. This happens most often for swordfish and dogtooth tuna.

Until 1995 all trips where interviews were not obtained were put in the “unknown” fishing method category. For all of the trips where interviews were obtained a percentage of trips by fishing method was calculated. The unknown trips were then divided up by this percentage and added to the interviewed trips. Since most of these unknown trips were bottomfishing and spearfishing trips and very few real interviews for these fishing methods were obtained, these two fishing methods were under represented in the offshore creel survey expansion.

Since the vessels involved in these unknown trips was known and since certain boats only engaged in certain fishing methods, their fishing method could be changed from unknown to some known method. From 1995 and after this was done except for vessels engaging in multiple fishing methods at the same time. The fishing method for these remained unknown. The number of unknown fishing trips was greatly reduced and the bottomfishing and spearfishing trips became better represented in the offshore creel survey.

In 1997 the first vessel to make multi-day trips started operating in Samoa. It unloaded only at the canneries and if an interview could be obtained it would be hard to fit its data into the offshore creel survey system which was designed for vessels making one day trips. Toward the end of 2000 six more vessels joined this category known as non-interviewed vessels. Fortunately all of these larger non-interviewed vessels are required to submit longline logs. The longline log record of kept fish from these non-interviewed vessels was added to the longline total landings from interviewed vessels in the offshore creel survey system.

From 1997 to 2000, the entire logbook kept catch of wahoo, albacore, bigeye, skipjack and yellowfin tuna by the non-interviewed vessels was assumed to have been sold to the canneries and was added to the commercial landings at canneries prices obtained from the creel survey system. All other species of kept fish in the longline logs of non-surveyed vessels was treated as unsold and were only added to the total landings. Starting in 2001, the disposition of fish kept by the non-surveyed vessels became available from Cannery Sampling Forms. From these Cannery Sampling Forms a percentage of each species that were sold locally, sold to the canneries, or not sold could be calculated for the year and applied to the entire non-surveyed catch. This allowed the proper percentages of each species to be added to the commercial landings with either the canneries price/pound or the local price/pound.

These Cannery Sampling Forms also listed the lengths of individual fish from which their weights can be calculated. They started in 1998 listing only albacore lengths but in 2001 they listed lengths of other species as well. The weight per fish for the non-surveyed vessels was first taken as the monthly average of the cannery sampling data if there were at least 20 samples for a month. It was then taken as the annual average of the cannery sampling data if there were at least 20 samples for the year. If there wasn’t enough cannery samples for a species, the weight per fish was calculated from the offshore creel survey data on a monthly basis where there were 20 or more samples or on a yearly basis. If there weren’t 20 samples for a year a default value of weight per fish was obtained by averaging all of the offshore creel survey data or by manually entering a value.

In 1999 vessels emerged that made 3-5 day trips and could still be interviewed. Since the interview data is generally better than log data, these vessels are treated like normal interviewed vessels in the offshore creel survey system but their catch is divided by the number of sets they made during their multi-day trips.

Starting in 1999, many of the longline boats began landing their catches gilled and gutted to obtain higher prices at the canneries. The offshore creel survey system was modified to calculate appropriate round weights from the non-round weight using standard conversion factors for all species.

Starting in 2000, many interviewers started recording the length of the larger fish rather than trying to weigh them. The offshore creel survey system was modified to calculate appropriate round weights from the length measurements using a standard regression formula.

Starting in 2001 the method of determining price/pound was revised. Before 2001 price/pound was determined by averaging offshore creel survey data. This sometimes resulted in 4-5 samples, some of which were erroneous determining the price per pound for an entire species for a year. In 2001, the price per pound for fish sold locally in Tutuila was first determined by averaging the Commercial Purchase System (Receipt Book) data for each month. For months and species without any monthly data an annual average price/pound value from the receipt book data was used. If there was no annual average from the receipt book data a monthly average of the offshore creel survey data was calculated for each of three price/pound categories; Tutuila-Local, Manua_local and Cannery. Again if there was no monthly samples available for a given month, species and category an annual average of creel survey data was used. In cases where there was no creel survey data for a species and category for a year a value was entered manually. Values were also entered manually to override calculated values that were determined to be erroneous.

The “other pounds” category in Table 1 includes pelagic species not caught by longlining or trolling. Examples are as barracuda, rainbow runner and dogtooth tuna, caught with bottomfishing or spearfishing methods.

The Offshore Creel Survey System showed almost no By-Catch species during 2001 so the bycatch for longlining was assumed to be the released species in the longline logbook system. No fishing tournaments occurred during 2001.

The island of Tutuila is also a major base for the trans-shipment and processing of tuna taken by the distant-waters longliner and purse seine fleets. The domestic pelagic fishery is monitored by the Department of Marine and Wildlife Resources (DMWR), through a program established in conjunction with the Western Pacific Fishery Information Network (WPacFIN). This report was prepared by DMWR using information obtained and processed as explained above. Except for the last figure (figure 22) it does not contain data on distant-waters landings at the canneries

With the increase of the longline fishery since its development, many different-size vessel entered the fisheries, especially 2001. For this latest report (2001), the following tables have been included to better represent effort & catch, bycatch percentages, and CPUE for the different-size vessels:

- Table 3 & 4 represents longline effort and catch
- Table 5 represents longline bycatch percentages
- Table 7 represents longline catch per 1000 hooks
- Table 8 has been modified to include the cannery sampling average weight per fish.

Summary

During 2001, a significant increase of 339% in total landings of all pelagic species was recorded (Figure 1). Longline method accounted for 99% of the total landings, whereas trolling method took in only .3%. Overall, there is a slight decrease in prices for tunas and other PPMUS species (Figure 19) over the last decade, with the exception for albacore, which dropped dramatically by 8% in 2001. A noticeable increase of 349% in commercial landings was recorded this year with a total of 7,836,649 pounds sold.

During 2001, 62 boats participated in the longline fishery which is an all time record high since the development of the longline fishery, but only 18 boats, a 5% decrease from 2000, participated in the trolling fishery. Albacore continue to dominate the catch with 7,043,531 pounds landed this year. The local longline fleet deployed 4,728 sets and a total of 5,728,582 hooks. Longline catch per 1000 hooks by alias, monohull (<50ft.), and monohull (>50 ft.) are 41, 36, and 41 respectively. Trolling catch rates varied since 1982 with a steady decrease since 1999 and a significant drop of 29% in 2001. This trend may reflect the increase in effort of longline fishing method used by local fishermen during this period. Overall, the longline fishery has been growing since 1995. This year has shown remarkable increase in pounds landed for almost all pelagic species, mostly by longline method and promises to keep growing in the future.

<u>2000 Recommendations and **current status**:</u>

1. Local based fishing activity has increased substantially on Aunu'u, the small island about one mile off Tutuila's coast. Direct monitoring of this growing fishery needs to be addressed and, if appropriate, a sampler hired on Aunu'u to collect data on an on-going basis.
One data collector currently working for DMWR has been assigned to collect data from Aunu'u during sample days.

2. Develop a more focused approach for the acquisition of bycatch data in the offshore creel survey system and implement algorithms to include these data in future reports.
These data are presented in Table 5 of this report.

3. Four new alias entered the longline fishery this year and are berthed in Vatia which is not one of the Offshore Creel Survey sample area. These vessels are not covered by the Daily

Effort Census (DEC). The creel survey and DEC need to be expanded to address this problem.
This issue still needs to be addressed with the four boat owners. DMWR's director Ray Tulafono has agreed that DMWR provide these fishermen with free ice bags for chilling their fish, providing that each fishermen fill out the necessary data forms each time their boat go out fishing.

4. Collect cannery sampling data for local, large, non-interviewed vessels that lists the length of every individual fish offloaded at the canneries. This data can be used to improve the average pounds per fish values used to calculate the pounds landed by these vessels from their longline logs.
These data are been collected by an ongoing sampling program by NOAA.

5. Collect data on receiving vessels that have fish offloaded to them from other vessels out at sea and factor this into the commercial landings data.
Contact David Hamm regarding this issue.

<u>2001 Recommendations</u>:

1. The Plan Team recommended that NMFS expedites the 50 nm closed area for pelagic fishing vessels .50ft around the islands of American Samoa due to the increase in the number of large longline boats currently operating in the fishery and likely continued expansion of large longline vessels based in the territory.

2. The Plan Team encouraged the development of a limited entry program for the American Samoa longline fishery as an additional precautionary management measure.

3. The Plan Team recommended that an investigation of the spatial and temporal dynamics of longline fishing around American Samoa using existing historical data sets.

4. The Plan Team recommended the investigation of the practicalities of an observer program for the American Samoa longline fishery based on costs, vessel suitability and expected benefits.

5. The Plan Team recommended that more shore-side data collection be conducted on albacore, such as sampling gonad and collecting size frequencies.

6. The Plan Team recommended that more collaborative research and management initiatives be developed between the American Samoa DMWR and the Western Samoa Fisheries Division given that the combined landings from both longline fisheries produce 15-20% of the albacore caught in the southern Pacific Ocean, and may be representative of the stock as a whole.

7. The Plan Team recommended that a survey of the longline gear used by American Samoan fishermen be made as soon as possible, given the ban by the recent NMFS

Biological Opinion on the use of shallow set longline gear in the northern Pacific by fisheries under Council jurisdiction.

8. The Plan Team recommended that protected species workshops be conducted for American Samoa longline fishermen comparable to those held in Hawaii.

9. The Plan Team noted with approval the suggested schedule for developing Pelagics FMP amendment implementing a limited entry program for the American Samoa longline fishery.

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Table 1. American Samoa 2001 estimated total landings of pelagic species by gear type.

Species	LongLine Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack Tuna	131,715	14,063	0	145,778
Albacore	7,172,279	0	0	7,172,279
Yellowfin Tuna	403,533	5,547	0	409,080
Kawakawa	0	23	0	23
BigeyeTuna	163,746	0	0	163,746
Misc. Tunas	66	0	63	129
TUNAS SUBTOTALS	7,871,339	19,633	63	7,891,035
Mahimahi	74,073	782	0	74,855
Black marlin	2,490	0	0	2,490
Blue marlin	36,011	0	0	36,011
Striped Marlin	10,780	0	0	10,780
Wahoo	107,823	587	0	108,410
Other Sharks	2,452	692	658	3,801
Swordfish	5,242	0	0	5,242
Sailfish	4,593	0	0	4,593
Spearfish	1,792	0	0	1,792
Moonfish	8,443	0	0	8,443
Oilfish	1,416	0	0	1,416
Pomfret	2,693	119	2,444	5,257
OTHER PPMUS SUBTOTALS	257,808	2,180	3,102	263,090
Barracudas	1,049	900	838	2,787
Rainbow runner	0	39	190	229
Dogtooth tuna	104	321	978	1,403
Other Pelagic Fish	1,009	0	0	1,009
NON PPMUS SUBTOTALS	2,162	1,260	2,006	5,428
TOTAL PELAGICS	**8,131,309**	**23,073**	**5,171**	**8,159,554**

The "troll pounds" category includes the pelagic landings of combined troll/bottomfishing trips as well as the landings of purely troll trips. The "other pounds" category in Table 1 includes pelagic species not caught by longlining or trolling such as barracuda, rainbow runner and dogtooth tuna, caught with bottomfishing or spearfishing methods.

Table 2. American Samoa 2001 estimated commercial landings, value and average price of pelagic species.

Species	Pounds	$/LB	Value($)
Skipjack Tuna	121,048	$0.43	$51,475
Albacore	7,169,562	$1.00	$7,184,065
Yellowfin Tuna	382,872	$0.81	$310,040
Kawakawa	3	$1.00	$3
BigeyeTuna	145,443	$0.66	$95,293
TUNAS SUBTOTALS	7,818,928	$0.98	$7,640,877
Mahimahi	38,736	$1.58	$61,056
Black marlin	2,129	$1.00	$2,129
Blue marlin	12,722	$1.21	$15,379
Striped Marlin	5,276	$1.25	$6,595
Wahoo	67,676	$1.05	$71,043
Swordfish	1,663	$2.13	$3,542
Sailfish	1,975	$1.07	$2,113
Spearfish	597	$1.50	$896
Moonfish	2,593	$0.99	$2,557
Oilfish	197	$1.50	$296
Pomfret	2,589	$2.50	$6,472
OTHER PPMUS SUBTOTALS	136,153	$1.26	$172,078
Barracudas	984	$2.07	$2,035
Rainbow runner	199	$2.00	$398
Dogtooth tuna	1,282	$1.42	$1,820
NON PPMUS SUBTOTALS	2,464	$1.73	$4,253
TOTAL PELAGICS	**7,957,546**	**$0.98**	**$7,817,207**

Table 3. American Samoa 2001 Longline Effort, Kept and Released by the Three Sizes of Vessels

EFFORT

	Alias	Monohull < 50'	Monohull > 50 '
Boats	35	9	26
Sets	1,870	622	2,244
1000 Hooks	602	799	4,394
Lightsticks	446	403	70

KEPT (Number of Fish)

Species	Alias	Monohull < 50'	Monohull > 50 '	All Vessels
Skipjack Tuna	1,823	161	6,527	8,511
Albacore	14,006	24,552	148,792	187,350
Yellowfin Tuna	2,003	764	4,921	7,688
BigeyeTuna	354	255	3,417	4,026
Misc. Tunas	0	2	2	4
TUNAS SUBTOTALS	18,186	25,734	163,659	207,579
Mahimahi	2,168	389	1,405	3,962
Black marlin	43	1	12	56
Blue marlin	192	121	121	434
Striped Marlin	21	5	93	119
Wahoo	892	295	2,558	3,745
Other Sharks	9	4	29	42
Swordfish	67	11	87	165
Sailfish	21	15	22	58
Spearfish	1	1	38	40
Moonfish	60	19	117	196
Oilfish	20	1	51	72
Pomfret	10	37	298	345
OTHER PPMUS SUBTOTALS	3,504	899	4,831	9,234
Barracudas	11	1	68	80
Other Pelagic Fish	15	0	21	36
NON PPMUS SUBTOTALS	26	1	89	116
TOTAL PELAGICS	**21,716**	**26,634**	**168,579**	**216,929**

RELEASED (Number of Fish)

Species	Alias	Monohull < 50'	Monohull > 50 '	All Vessels
Skipjack Tuna	0	1,309	3,087	4,396
Albacore	18	8	514	540
Yellowfin Tuna	1	381	1,283	1,665
BigeyeTuna	0	140	1,148	1,288
Misc. Tunas	0	0	10	10
TUNAS SUBTOTALS	19	1,838	6,042	7,899
Mahimahi	0	72	759	831
Black marlin	0	2	92	94
Blue marlin	2	243	799	1,044
Striped Marlin	0	10	248	258
Wahoo	1	64	404	469
Other Sharks	18	862	2,765	3,645
Swordfish	0	15	48	63
Sailfish	2	10	115	127
Spearfish	2	11	123	136
Moonfish	0	60	228	288
Oilfish	0	99	909	1,008
Pomfret	1	14	112	127
OTHER PPMUS SUBTOTALS	26	1,462	6,602	8,090
Barracudas	0	0	50	50
Other Pelagic Fish	0	2	184	186
NON PPMUS SUBTOTALS	0	2	234	236
TOTAL PELAGICS	**45**	**3,302**	**12,878**	**16,225**

Interpretation: This table has been created to show the effort and catch by the three different types of longline vessels, alias, monohull <50 feet, and monohull >50 feet in length, participated in the longline fishery in American Samoa in 2001.

Calculation: These values are sums of Longline Logbook data for the three types of longline vessels in Samoa. The kept values for sharks include those that were finned. All species of sharks entered in the Longline Logs are combined in the Other Sharks species. Rays and Sunfish are included in the Other Pelagic Fish species.

Table 4. American Samoa 2001 Longline Effort and Catch
By Boats < 50' Long and > 50' Long Inside and Outside of the 50 mile restricted areas

FFORT

	Boats < 50' Inside	Boats < 50' Outside	Boats > 50' Inside	Boats > 50' Outside
Boats	41	9	23	26
Sets	1,992	500	273	1,971
1000 Hooks	747	653	539	3,854

CATCH (Number of Fish)

Species	Boats < 50' Inside	Boats < 50' Outside	Boats > 50' Inside	Boats > 50' Outside
Skipjack Tuna	1,892	1,401	654	8,960
Albacore	18,548	20,036	13,785	135,521
Yellowfin Tuna	2,260	889	797	5,407
BigeyeTuna	413	336	340	4,225
Misc. Tunas	0	2	6	6
TUNAS SUBTOTALS	23,113	22,664	15,582	154,119
Mahimahi	2,241	388	216	1,948
Black marlin	44	2	43	61
Blue marlin	256	302	161	759
Striped Marlin	23	13	42	299
Wahoo	966	286	411	2,551
Other Sharks	131	762	282	2,512
Swordfish	68	25	8	127
Sailfish	24	24	18	119
Spearfish	6	9	21	140
Moonfish	70	69	41	304
Oilfish	29	91	152	808
Pomfret	13	49	27	383
OTHER PPMUS SUBTOTALS	3,871	2,020	1,422	10,011
Barracudas	11	1	7	111
Other Pelagic Fish	16	1	29	176
NON PPMUS SUBTOTALS	27	2	36	287
TOTAL PELAGICS	**27,011**	**24,686**	**17,040**	**164,417**

Interpretation: This table has been created to show longline effort and catch by boats less than 50 feet and more than 50 feet in length inside and outside of the 50 mile restricted areas. Albacore continue to dominate the catch both inside and outside of the restricted areas regardless of boat size.

Calculation: These values are sums of Longline Logbook catch (kept + released + finned) data for longline vessels in Samoa that are less than 50 feet long and more than 50 feet long. The less than 50 foot category includes alias and monohulls less than 50 feet long. The 50 mile restricted areas include one around Tutuila bounded by the following four points

13 deg 30 min S latitude x 170 deg 49min 42 sec W longitude
13 deg 30 min S latitude x 167 deg 30min W longitude
15 deg 30 min S latitude x 167 deg 30min W longitude
15 deg 30 min S latitude x 171 deg 51min W longitude

and one around Swains's Atoll bounded by the following four points

10 deg 38 min S latitude x 170 deg 40min W longitude
11 deg 28 min S latitude x 170 deg 40min W longitude
11 deg 28 min S latitude x 171 deg 30min W longitude
10 deg 38 min S latitude x 171 deg 30min W longitude

A set is considered inside one of these areas if any of the begin set, end set, begin haul or end haul positions is inside one of these areas. All species of sharks entered in the Longline Logs are combined in the Other Sharks species. Rays and Sunfish are included in the Other Pelagic Fish species.

Table 5A. American Samoa 2001 Longline Logbook Bycatch Percentages for the Three Sizes of Longline Vessels

Species	Alias	Monohulls < 50'	Monohulls' > 50 '	All Boats
Skipjack Tuna	0.00 %	89.05 %	32.11 %	34.06 %
Albacore	0.13 %	0.03 %	0.34 %	0.29 %
Yellowfin Tuna	0.05 %	33.28 %	20.68 %	17.80 %
BigeyeTuna	0.00 %	35.44 %	25.15 %	24.24 %
Misc. Tunas	0.00 %	0.00 %	83.33 %	71.43 %
TUNAS SUBTOTALS	0.10%	6.67%	3.56%	3.67 %
Mahimahi	0.00 %	15.62 %	35.07 %	17.34 %
Black marlin	0.00 %	66.67 %	88.46 %	62.67 %
Blue marlin	1.03 %	66.76 %	86.85 %	70.64 %
Striped Marlin	0.00 %	66.67 %	72.73 %	68.44 %
Wahoo	0.11 %	17.83 %	13.64 %	11.13 %
Other Sharks	66.67 %	99.54 %	98.96 %	98.86 %
Swordfish	0.00 %	57.69 %	35.56 %	27.63 %
Sailfish	8.70 %	40.00 %	83.94 %	68.65 %
Spearfish	66.67 %	91.67 %	76.40 %	77.27 %
Moonfish	0.00 %	75.95 %	66.09 %	59.50 %
Oilfish	0.00 %	99.00 %	94.69 %	93.33 %
Pomfret	9.09 %	27.45 %	27.32 %	26.91 %
OTHER PPMUS SUBTOTALS	0.74%	61.92%	57.75%	46.70 %
Barracudas	0.00 %	0.00 %	42.37 %	38.46 %
Other Pelagic Fish	0.00 %	100.0 %	89.76 %	83.78 %
NON PPMUS SUBTOTALS	0.00%	66.67%	72.45%	67.05 %
TOTAL PELAGICS	**0.21%**	**11.03%**	**7.10%**	**6.96 %**

Table 5B. American Samoa Trolling Bycatch

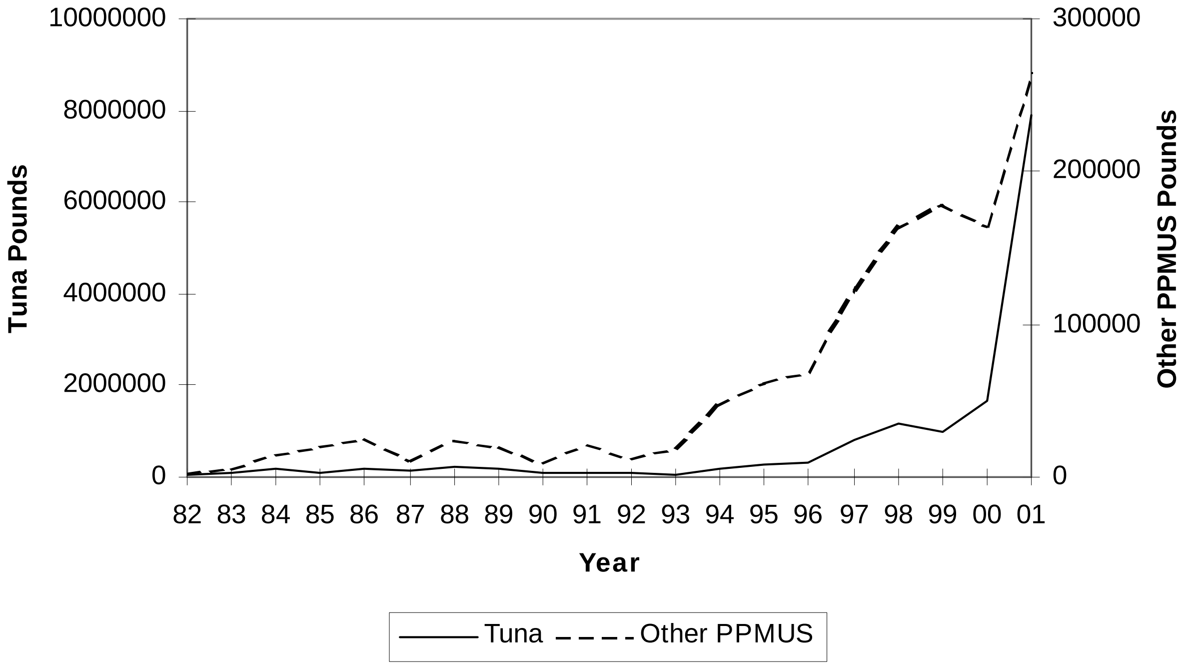
	Bycatch						Interviews		
Species	Alive	Dead Inj	Unk	Total	Catch	%BC	With BC	All	%BC
No Bycatch							0	322	0.00
All Species (Comparison)					1547	0.00			

Interpretation: This table shows longline and trolling bycatch percentages for the three different sizes of longline vessels in 2001. Table 5B shows no bycatch for the trolling method during this period.

Calculation: The percentages in Table 5A are sums of the Longline Logbook numbers of released fish divided by the sums of the numbers of kept+released released fish for each species and size of vessel. For shark species the numbers of fish kept includes those finned. The percentages for all boats is the sum of released species for all boats divided by the sum of kept plus the sum of released for all boats. The percentages in the SUBTOTALS and TOTALS row are similarly weighted percentages. All shark species in the Longline Logs are combined in the Other Sharks species. Rays and Sunfish are included in the Other Pelagic Fish species.

The Trolling Bycatch table is obtained from creel survey interviews. The Bycatch numbers are obtained by counting fish in the interviews for purely trolling trips with a disposition of bycatch. The catch for all species included for comparison is obtained by counting all species of fish caught by purely trolling interviews and the number of interviews is a count of purely trolling interviews

Figure 1. American Samoa total annual estimated landings: Tuna and Other PPMUS

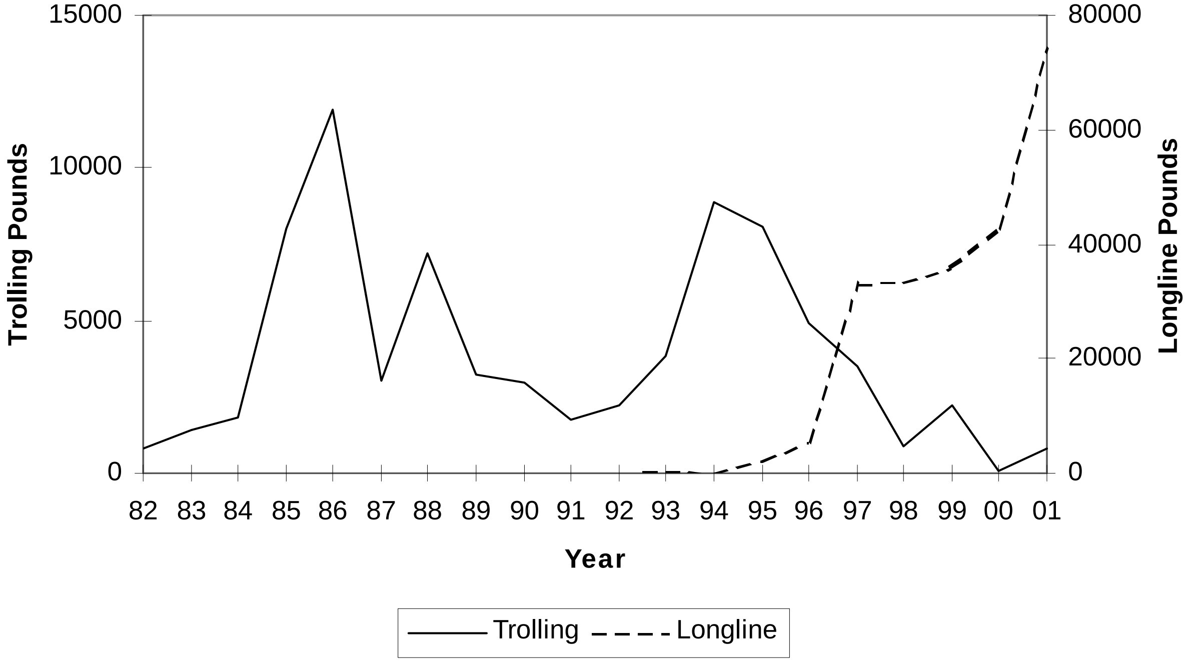


Interpretation: Estimated total landings are variable in the 1980s up to 1993. But a gradual increase in total landings from 1994 to 2000 with a significant increase of 339% this year. The pelagic species overall catch rates increased this year excluding blue marlin for longline method, whereas trolling method remained stabled for most pelagic species except blue marlin which no specie was recorded this year

Calculation: Estimated total landings for Tunas and Other PPMUS were calculated by summing the total landings for the species in these categories as defined by Table 1.

	Pounds Landed	
Year	**Tuna**	**Other PPMUS**
1982	23,042	2,106
1983	90,057	4,806
1984	198,961	15,121
1985	107,659	19,686
1986	186,204	25,136
1987	144,121	11,302
1988	205,995	23,820
1989	173,518	20,053
1990	78,827	9,848
1991	71,425	21,100
1992	92,600	11,893
1993	45,806	19,104
1994	187,459	47,418
1995	282,897	61,931
1996	315,320	67,946
1997	791,399	122,668
1998	1,160,079	163,197
1999	1,007,322	178,487
2000	1,663,550	163,457
2001	7,891,035	263,090
Average	**735,864**	**62,608**
Std. Dev.	**1,697,308**	**72,525**

Figure 2. American Samoa annual estimated landings for Mahimahi by gear.

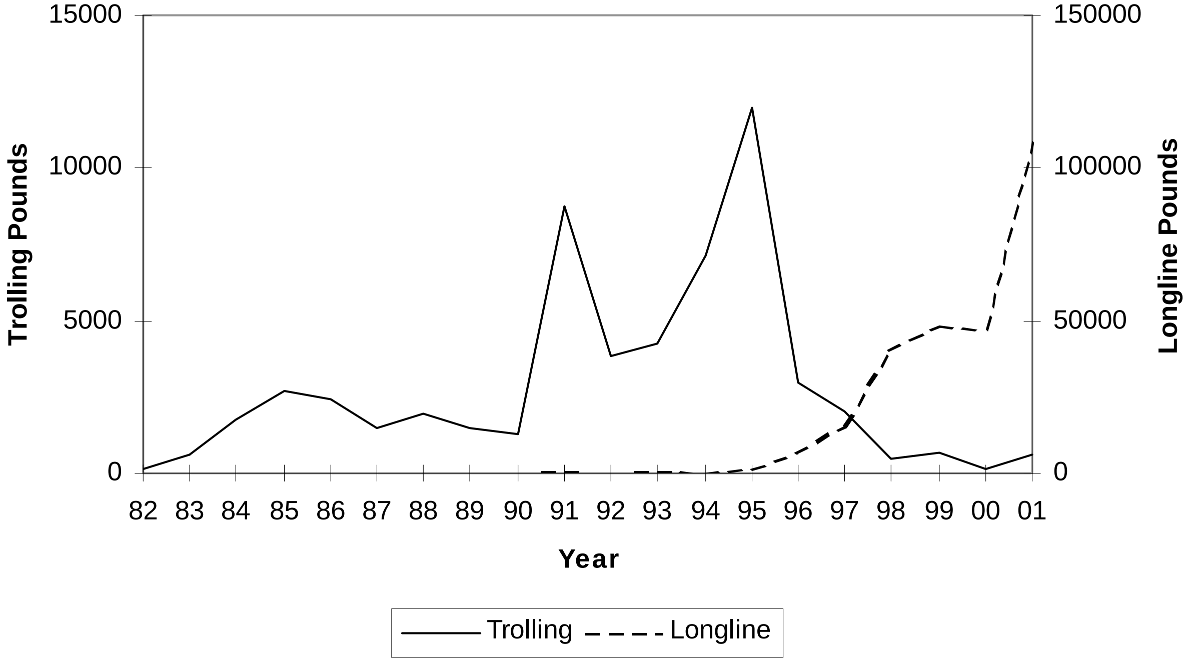


Interpretation: Mahimahi landings are variable across time, similar fluctuations occur in other WPacFIN regions. From 1984-1988 American Samoan fishermen exported mahimahi to Hawaii so landings were uniquely high and remained stabled until 1995. Mahimahi landings were the largest since 1995 to the present, due to the increase of effort in the longline fishery. This year, longliners caught virtually 99% of the mahimahi and trolling method took in only 1% .

Calculation: The estimated total annual landings of mahimahi is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when mahimahi are caught by other methods..

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	777
1983	0	1,443
1984	0	1,844
1985	0	8,011
1986	0	11,883
1987	0	3,051
1988	0	7,165
1989	0	3,201
1990	0	2,971
1991	74	1,748
1992	0	2,242
1993	215	3,809
1994	98	8,869
1995	2,301	8,052
1996	5,395	4,906
1997	33,031	3,517
1998	33,458	843
1999	35,909	2,193
2000	42,602	66
2001	74,073	782
Average	**22,716**	**3,869**
Std. Dev.	**23,825**	**3,166**

Figure 3. American Samoa annual estimated landings for Wahoo by gear.



Interpretaion: Wahoo landings have increased gradually since 1994 and continued to increase with a notable increase in 2001 by 130%. Longliners took in virtually 99% of wahoo during this period. The continuous increase in wahoo landings is primarily due to increases in longline trips and efforts.

Calculation*:* The estimated total annual landings of wahoo is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when wahoo are caught by other methods.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	114
1983	0	632
1984	0	1,777
1985	0	2,678
1986	0	2,413
1987	0	1,506
1988	84	1,956
1989	0	1,489
1990	0	1,299
1991	369	8,764
1992	0	3,848
1993	557	4,250
1994	0	7,124
1995	1,576	11,986
1996	6,931	2,945
1997	15,620	2,001
1998	40,405	487
1999	48,303	685
2000	47,243	140
2001	107,823	587
Average	**26,891**	**2,834**
Std. Dev.	**32,996**	**3,031**

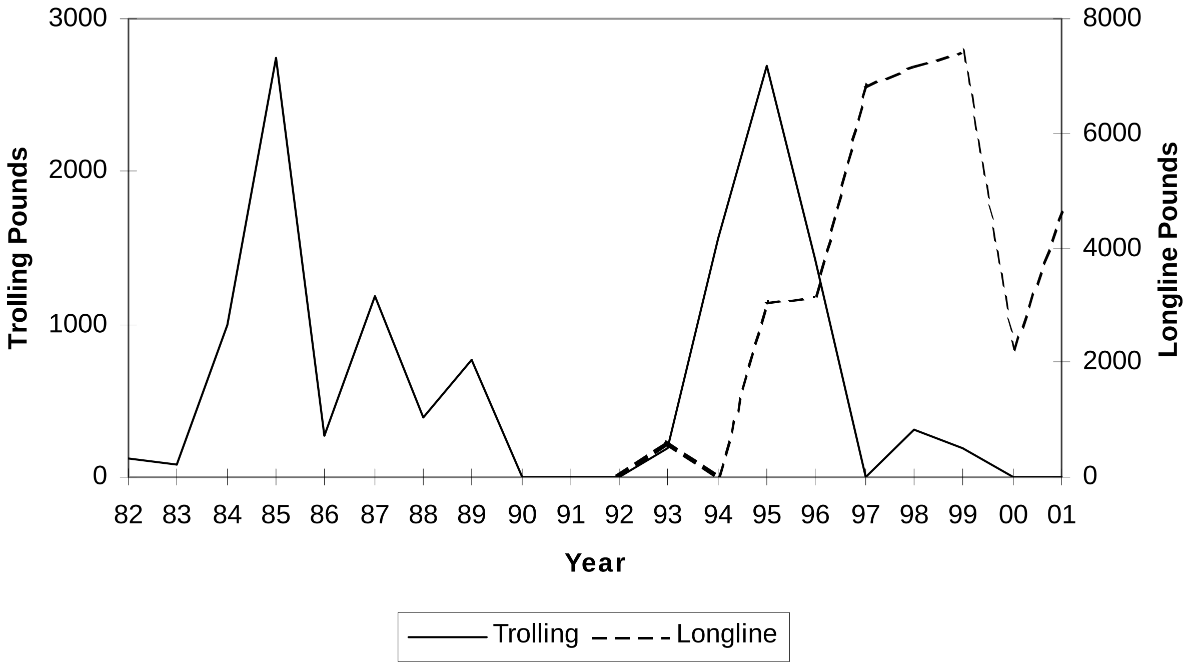
Figure 4. American Samoa annual estimated landings for Blue marlin by gear.

Interpretation: All of the blue marlin landings were caught by trolling method since 1982 until 1994, except in 1993 where blue marlin catches were recorded being caught by four vessels that were engaged in longline activities. A gradual increase in blue marlin landings by longline method since 1995 is primarily due to influx in the longline fishery by the local fishermen, whereas catches by trolling method began to decline..

Calculation: The estimated total annual landings of blue marlin is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when blue marlin are caught by other methods.

	Pounds Landed	
Year	Longline	Trolling
1982	0	315
1983	0	1,083
1984	0	6,097
1985	0	2,574
1986	0	4,171
1987	0	265
1988	0	10,175
1989	0	10,012
1990	0	4,012
1991	0	6,726
1992	0	4,524
1993	2,193	6,331
1994	0	18,538
1995	5,267	20,196
1996	21,450	7,547
1997	31,869	5,160
1998	45,440	1,592
1999	34,981	590
2000	48,404	623
2001	36,011	0
Average	**28,202**	**5,817**
Std. Dev.	**16,100**	**5,542**

Figure 5. American Samoa annual estimated landings for Sailfish by gear.



Interpretation: Sailfish landings are variable across time caught by trolling method , except from 1990 to 1992, for unknown reasons, there were no sailfish recorded. With the development of the longline fishery in 1995, there was a gradual increase in sailfish landings by longliners until 2000, where there was a 70% decrease. Sailfish again increased by 97% this year.

Calculation*:* The estimated total annual landings of sailfish is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when sailfish are caught by other methods.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	127
1983	0	74
1984	0	989
1985	0	2,744
1986	0	275
1987	0	1,188
1988	0	392
1989	0	767
1990	0	0
1991	0	0
1992	0	0
1993	626	183
1994	0	1,561
1995	3,048	2,693
1996	3,146	1,420
1997	6,822	0
1998	7,185	314
1999	7,424	184
2000	2,239	0
2001	4,593	0
Average	**4,385**	**922**
Std. Dev.	**2,375**	**875**

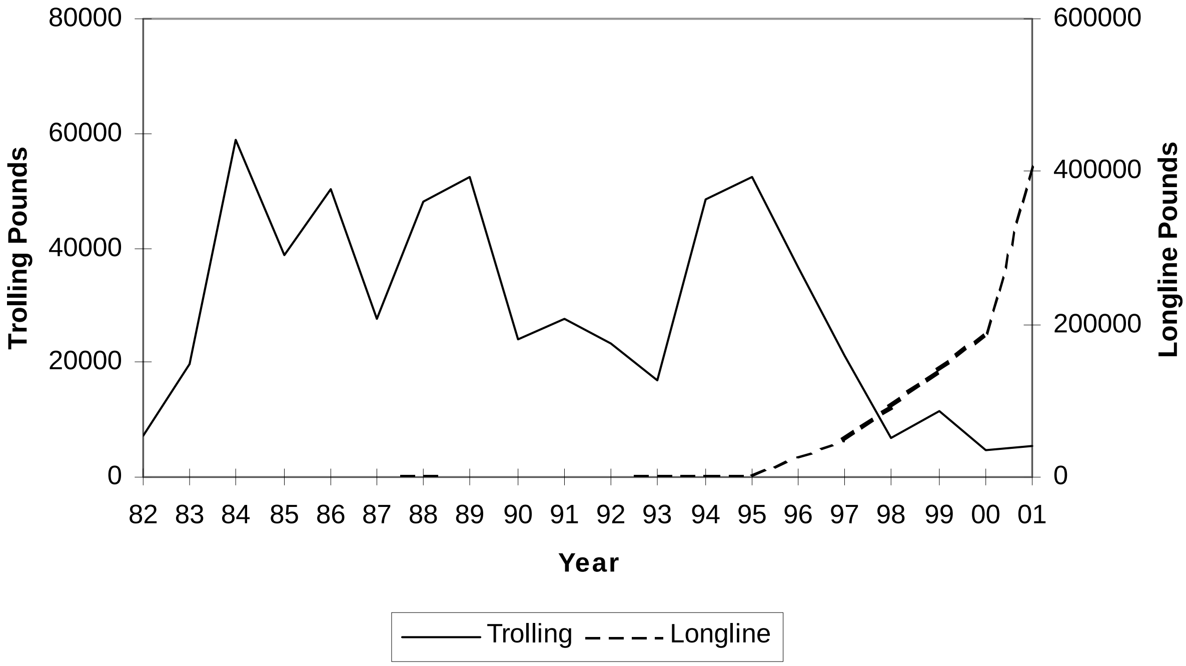
Figure 6. American Samoa annual estimated landings for Skipjack tuna by gear.

Interpretation: A gradual increase in skipjack landings for longline method since 1995, except a 43% decrease in 2000, and a notable increase of 318% this year. Trolling method began to decline since 1995 as a result of an increase in longline activities, except in 1999 where skipjack landings increased by 137%. This reflects the increase in number of boats that were involved in trolling activities before obtaining their longline permit to begin longlining.

Calculation: The estimated total annual landings of skipjack tuna is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when skipjack tuna are caught by other methods.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	15,877
1983	0	58,997
1984	0	117,693
1985	0	38,902
1986	0	135,936
1987	0	116,505
1988	0	152,803
1989	0	120,171
1990	0	51,650
1991	345	40,992
1992	0	68,977
1993	539	24,264
1994	101	134,955
1995	160	164,957
1996	434	52,562
1997	2,517	29,894
1998	40,596	14,822
1999	56,171	35,171
2000	31,822	15,477
2001	131,715	14,063
Average	**26,440**	**70,233**
Std. Dev.	**40,226**	**50,475**

Figure 7. American Samoa annual estimated landings for Yellowfin tuna by gear.

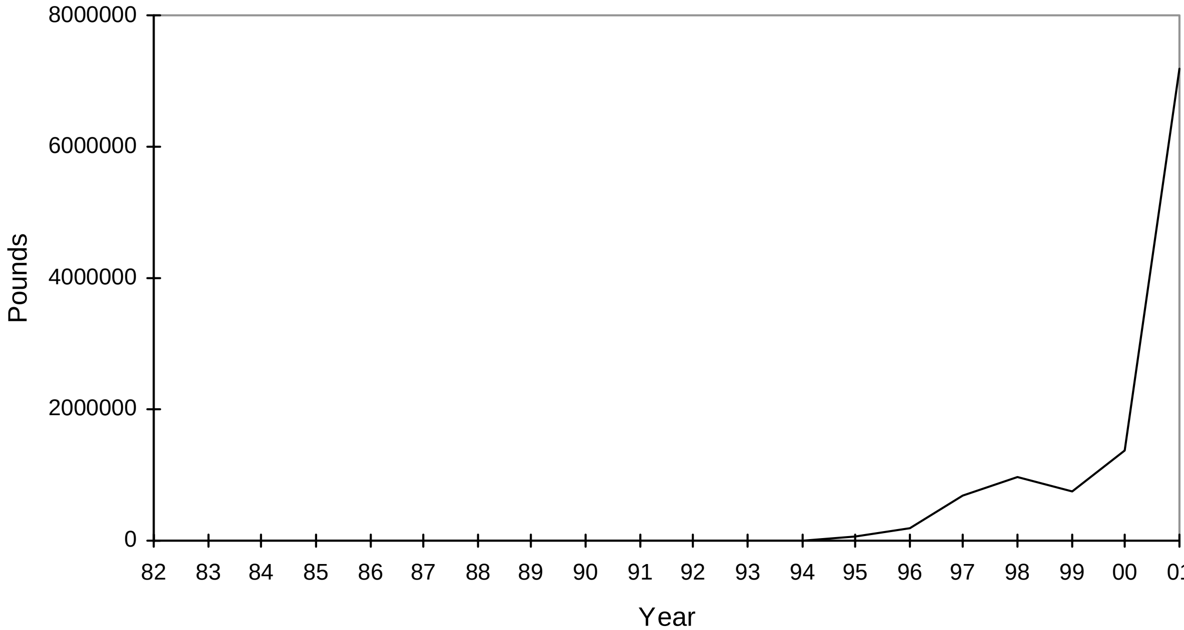


Interpretation: Yellowfin tuna landings varied throughout the 1980s until 1995 for trolling landings when trolling activities began to decline. With the increase in longline fishery in 1995, yellowfin landings began a steady increase with a significant increase of 113% this year.

Calculation: The estimated total annual landings of yellowfin tuna is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when yellowfin tuna are caught by other methods.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	7,038
1983	0	19,789
1984	0	58,704
1985	0	38,586
1986	0	50,162
1987	0	27,467
1988	1,775	48,101
1989	129	52,350
1990	0	24,152
1991	262	27,525
1992	0	23,247
1993	2,225	16,990
1994	1,637	48,548
1995	4,022	52,428
1996	25,655	36,551
1997	47,996	21,219
1998	92,462	6,763
1999	140,061	11,566
2000	188,675	4,829
2001	403,533	5,547
Average	**75,703**	**29,078**
Std. Dev.	**115,766**	**17,444**

Figure 8. American Samoa annual estimated landings for Albacore by Longlining.



Interpretation: A steady increase in albacore landings continue to rise since 1995, except in 1999 where there was a decrease of 24% even though there was an increase in number of sets made and effort in longline activities. This year marks an all time record high in albacore landings with longline taking in virtually 99.9% of the catch.

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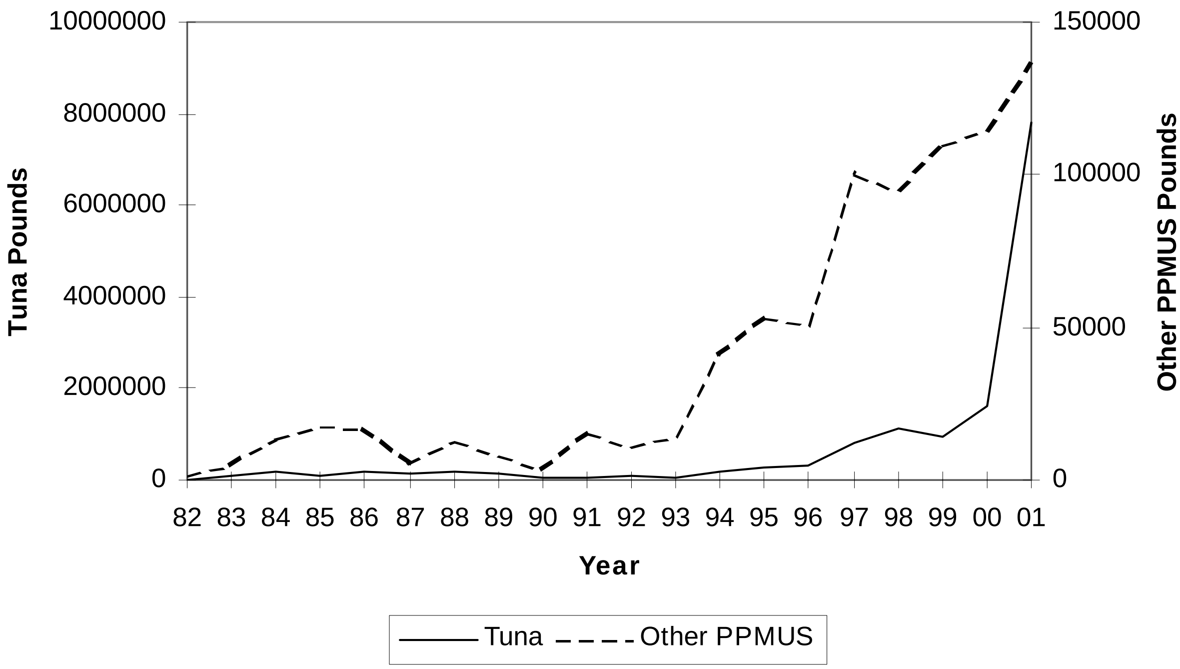
Calculation: The estimated total annual landings of albacore tuna is listed for the longline and trolling fishing methods. The All methods landings may be greater than the sum of longline and trolling landings when albacore are caught by other methods.

Year	Pounds
1982	0
1983	0
1984	0
1985	0
1986	0
1987	0
1988	1,875
1989	244
1990	0
1991	1,730
1992	0
1993	35
1994	1,572
1995	58,446
1996	189,210
1997	680,806
1998	983,017
1999	744,980
2000	1,375,777
2001	7,172,279
Average	**934,164**
Std. Dev.	**1,934,047**

Figure 9. American Samoa annual commercial landings: Tunas and Other PPMUS.

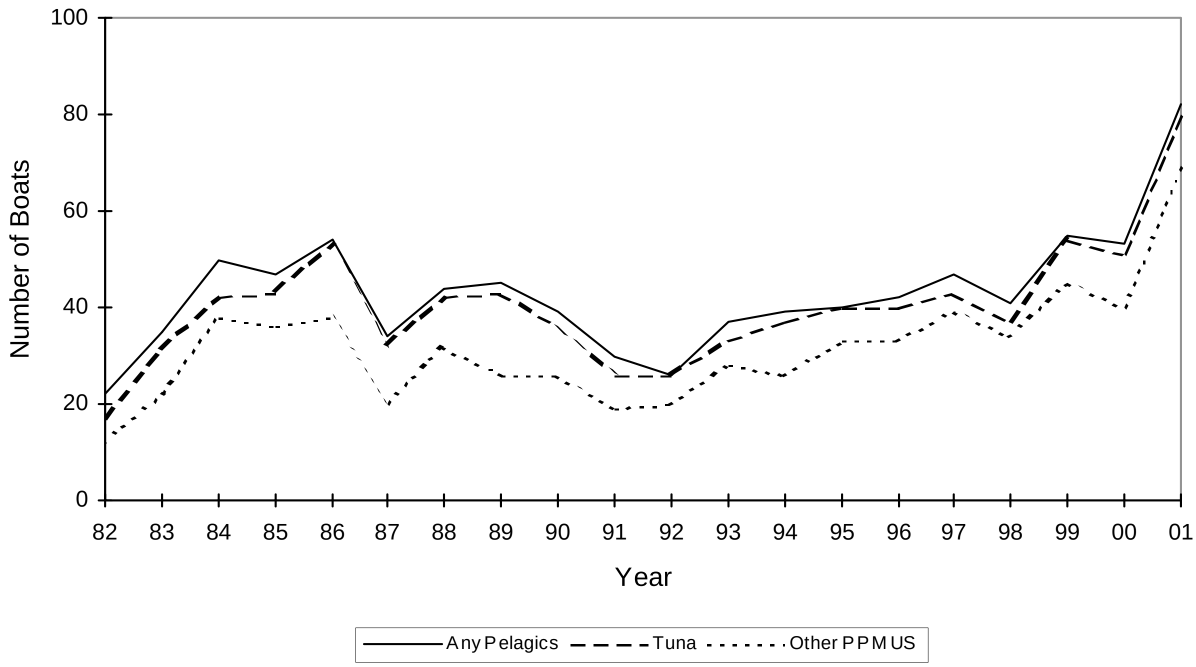


Interpretation: Commercial landings varied throughout the 1980s until 1995 where a steady increase in landings began to appear primarily due to a surge in longline effort. However, for unknown reasons, there was a 13% decrease in 1999. This year has shown a significant increase of 349% in commercial landings.

Calculation: Estimated commercial landings for Tunas and Other PPMUS were calculated by summing the commercial landings for the species these categories as defined by Table 2.

	Pounds Landed	
Year	Tuna	Other PPMUS
1982	22,065	1,515
1983	85,069	4,441
1984	196,100	13,458
1985	99,987	17,515
1986	166,339	16,792
1987	132,316	5,246
1988	171,787	12,513
1989	114,671	8,240
1990	55,420	3,564
1991	57,474	15,236
1992	88,953	10,698
1993	43,525	14,053
1994	186,199	40,708
1995	276,332	53,127
1996	309,147	50,781
1997	789,292	100,024
1998	1,114,702	94,933
1999	949,355	109,960
2000	1,625,862	114,286
2001	7,818,928	136,153
Average	**715,176**	**41,162**
Std. Dev.	**1,683,495**	**43,290**

Figure 10. Number of American Samoa boats landing any pelagic species, tunas and other PPMUS.



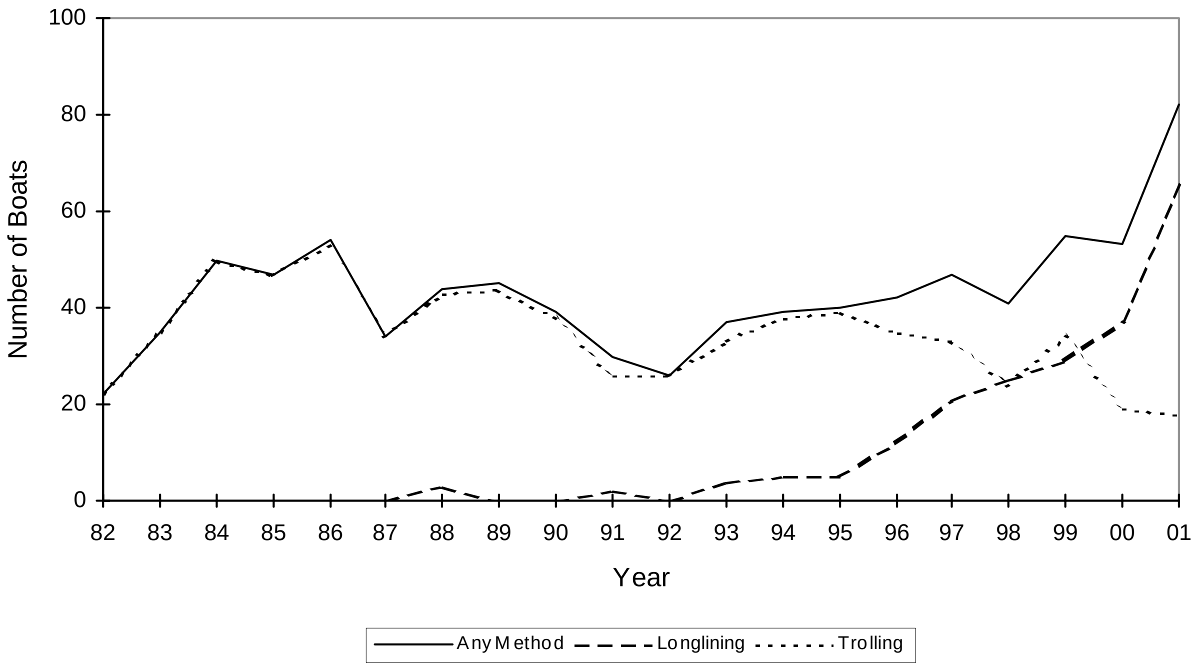
Interpretation: The number of boats that landed any pelagic species varied throughout the years with a dramatic increase of 49% this year. This is the highest number of boats ever recorded participated in the pelagic fishery since 1982.

Calculation: Prior to 1997, each boat counted in the Any Pelagics column made at least one landing in an offshore creel survey interview of at least one species in Table 2 in the given year. Likewise each boat counted in the other two columns made at least one landing in an offshore creel survey interview of at least one species in the corresponding subgroup of

	Number of Boats Landing		
Year	**Any Pelagics**	**Tuna**	**Other PPMUS**
1982	22	17	12
1983	35	31	22
1984	50	42	38
1985	47	43	36
1986	54	53	38
1987	34	32	20
1988	44	42	32
1989	45	43	26
1990	39	36	26
1991	30	26	19
1992	26	26	20
1993	37	33	28
1994	39	37	26
1995	40	40	33
1996	42	40	33
1997	47	43	39
1998	41	37	34
1999	55	54	45
2000	53	51	40
2001	82	79	69
Average	**43**	**40**	**32**
Std. Dev	**12**	**13**	**12**

Table 2 in the given year. In 1997 and after the count of non-interviewed boats that made at least one landing of the appropriate species in a longline log was added to the count of interviewed boats from the offshore creel survey.

Figure 11. **Number of American Samoa boats landing any Pelagic Species, by Longlining, Trolling and All Methods.**



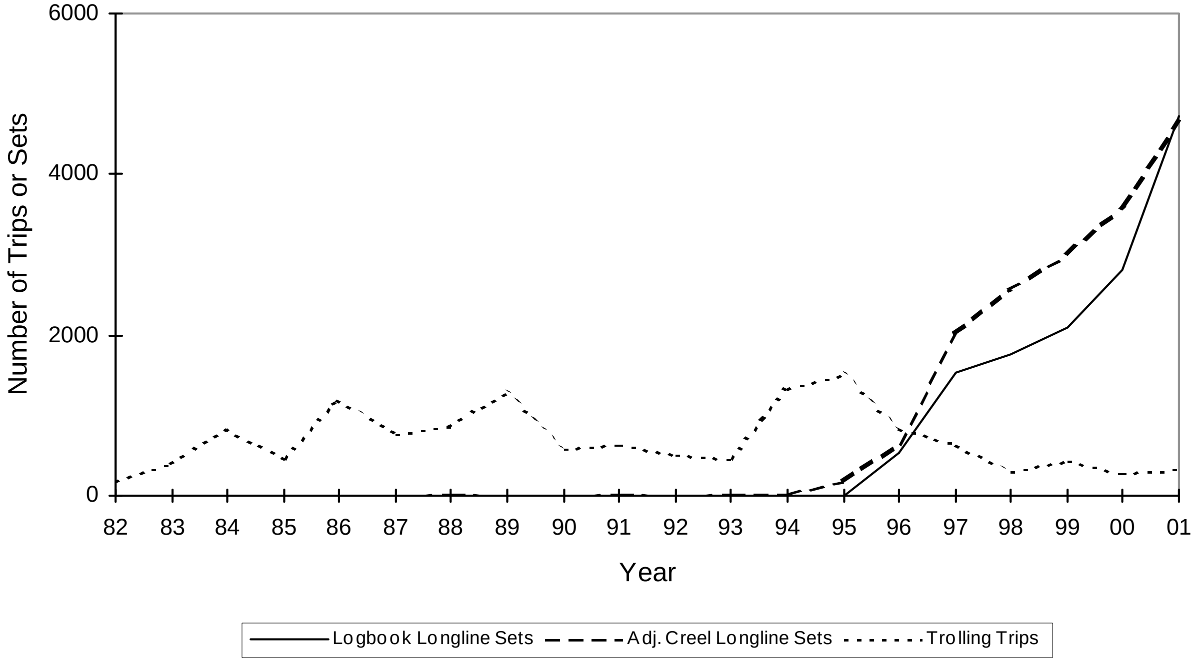
Interpretation: The number of boats using longline method has shown a steady increase since 1995 with a dramatic increase of 68% this year. This gradual increase reflects the influx of the longline fishery since 1995. Boats using trolling method has been varied since 1982 until 1995 where it began to decline, mainly due to local fishermen began exploring the newly developed longline fishery.

Calculation*:* Prior to 1997, each boat counted in the Any Method column made at least one landing in an offshore creel survey interview of at least one species in Table 2 in the given year. Each boat counted in the Longlining and

	Number of Boats Using		
Year	**Any Method**	**Longlining**	**Trolling**
1982	22	0	22
1983	35	0	35
1984	50	0	50
1985	47	0	47
1986	54	0	53
1987	34	0	34
1988	44	3	43
1989	45	0	44
1990	39	0	38
1991	30	2	26
1992	26	0	26
1993	37	4	33
1994	39	5	38
1995	40	5	39
1996	42	12	35
1997	47	21	33
1998	41	25	24
1999	55	29	34
2000	53	37	19
2001	82	65	18
Average	**43**	**19**	**35**
Std. Dev.	**12**	**19**	**10**

Trolling columns made at least one landing in an offshore creel survey interview of at least one species in Table 2, using the longline or troll or combined troll/bottom fishing methods in the given year. In 1997 and after the count of non-interviewed boats that made at least one landing of the species in Table 2 in a longline log during the given year was added to the count of interviewed boats from the offshore creel survey in the Any Method and Longlining columns.

Figure 12. American Samoa fishing trips or sets for all pelagic species by method.



Interpretation: Trolling trips varied from 1982 until 1995 when it began a continuing decline except in 1999 when a couple of boats were involved in trolling methods waiting for their longline permits to be approved, and decreased again by 34% in 2000. An increase of 18% this year is mainly due to boats switching between trolling and longling method. A steady increase since 1995 both for number of sets made by creel survey and longline logbooks submitted reflects the increase in longline activities since it began.

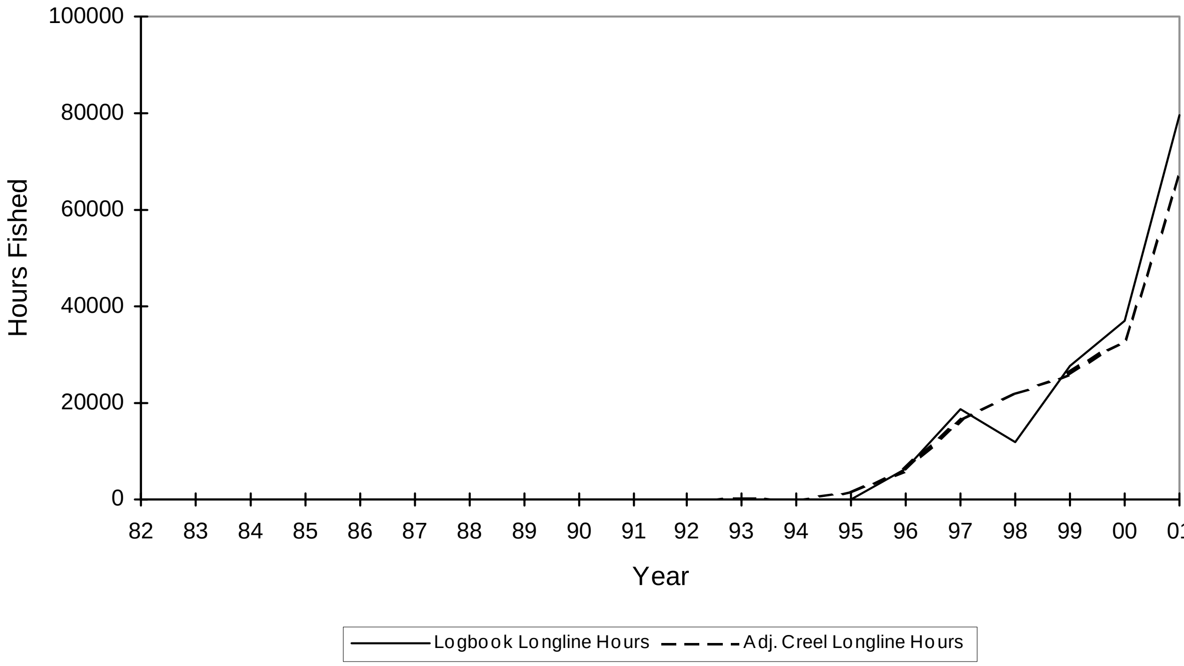
		Longline Sets	
Year	**Troll Trips**	**Logbook**	**Creel (Adj)**
1982	177	0	0
1983	406	0	0
1984	853	0	0
1985	464	0	0
1986	1,207	0	0
1987	754	0	0
1988	876	0	31
1989	1,273	0	3
1990	587	0	0
1991	634	0	21
1992	506	0	0
1993	464	0	17
1994	1,330	0	19
1995	1,504	0	184
1996	834	528	650
1997	645	1,528	2,009
1998	316	1,754	2,582
1999	428	2,100	2,978
2000	283	2,810	3,594
2001	335	4,736	4,639
Average	**694**	**2,243**	**1,394**
Std. Dev.	**372**	**1,307**	**1,611**

Calculation The number of Troll Trips is calculated by first subtracting the total longline pounds of Table 1 from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips, from the offshore creel survey system expansion, to get the number of trolling hours. The number of trolling hours is then divided by the hours per trip for a purely trolling trip from the offshore creel survey system expansion to get the number of troll trips.

The number of longline sets using logbook data is obtained by counting all of the sets entered in the longline logbook system for the given year for interviewed and non_interviewed boats.

Prior to 1997, the number of longline sets using creel survey data is the expanded number of longline fishing trips from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing trips from the offshore creel survey system for interviewed vessels plus the count of all of the sets entered in the longline logbook system for non-interviewed vessels.

Figure 13. American Samoa Hours Fished for all pelagic species by Longlining.



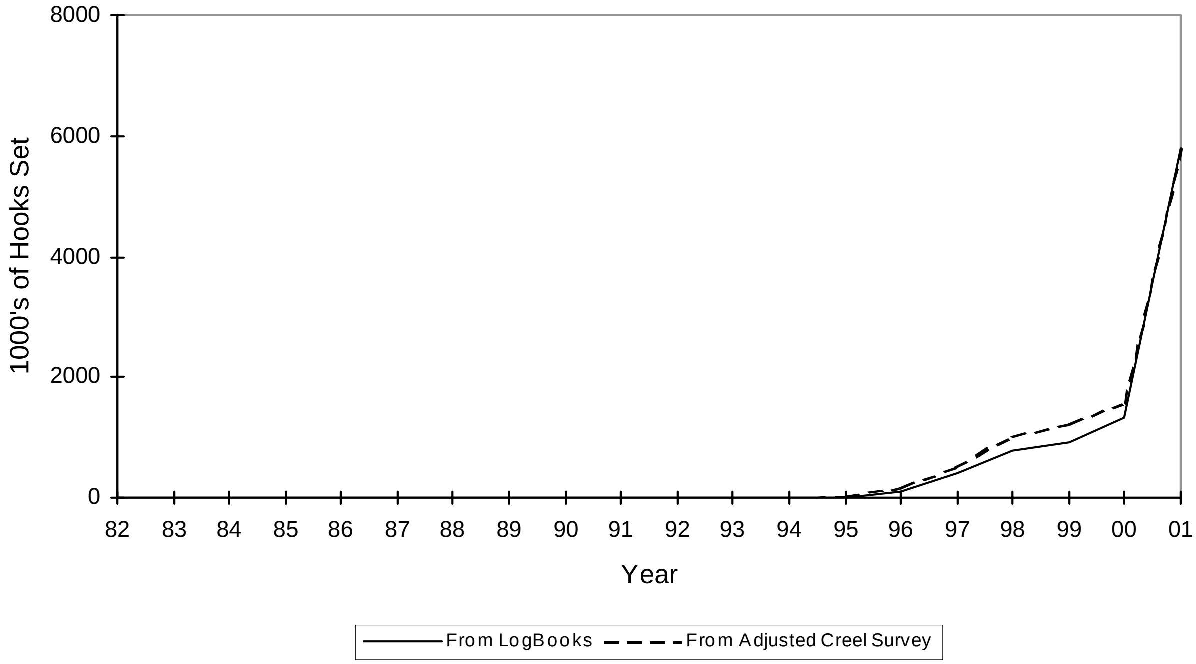
Interpretation: longline logbook hours and longline creel survey hours gradually increased since 1995 with significant increases this year.

Calculation: The number of longline trip-hours using logbook data is obtained by summing the duration all of the sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats. The duration of a set is defined as from end of set time to the beginning of haul time.

Prior to 1997, the number of longline trip-hours using creel survey data is the expanded number of longline fishing trip-hours from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing trip-hours from the offshore creel survey system for interviewed vessels plus the sum of the duration of the sets entered in the longline logbook system for non-interviewed vessels.

	Hours Fished	
Year	Longline Logbook	Longline Creel (Adj.)
1982	0	0
1983	0	0
1984	0	0
1985	0	0
1986	0	0
1987	0	0
1988	0	198
1989	0	17
1990	0	0
1991	0	164
1992	0	0
1993	0	299
1994	0	156
1995	0	1,824
1996	6,403	5,877
1997	18,753	16,754
1998	11,986	21,953
1999	27,657	25,865
2000	36,930	33,244
2001	79,400	67,368
Average	**30,188**	**14,477**
Std. Dev.	**24,157**	**19,576**

Figure 14. American Samoa number of longline hooks (x1000) set from logbook and creel survey data.



Interpretation: The number of hooks used in 2001 increased dramatically by 330% according to the logbook monitoring system and by 287% according to the offshore creel survey . A steady increase in the number of hooks set by the longline fishery has been seen since 1996. However, the rate of increase is slowing indicating that the fishery is stabilizing.

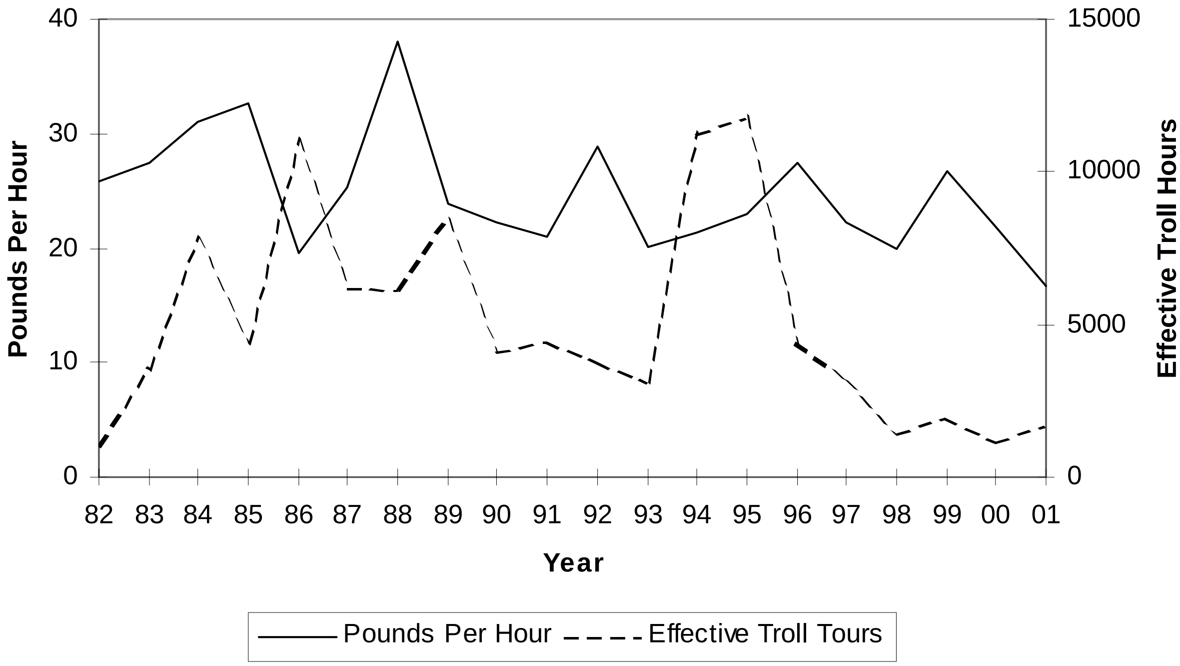
Calculation: The number of longline hooks using logbook data is obtained by summing the number of hooks for sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats and dividing by 1000.

Prior to 1997, the number of longline hooks using creel survey data is the expanded number of longline hooks from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing hooks from the offshore creel survey system for interviewed vessels plus the sum

	1000's of Hooks From	
Year	Logbook Data	Creel (Adjusted)
1982	0	0
1983	0	0
1984	0	0
1985	0	0
1986	0	0
1987	0	0
1988	0	1
1989	0	0
1990	0	0
1991	0	0
1992	0	0
1993	0	2
1994	0	0
1995	0	45
1996	99	157
1997	420	512
1998	767	1,038
1999	912	1,229
2000	1,331	1,565
2001	5,795	5,770
Average	**1,554**	**1,147**
Std. Dev.	**1,935**	**1,725**

of the number of hooks for the sets entered in the longline logbook system for non-interviewed vessels.

Figure 15. **American Samoa overall pelagic catch per hour of trolling.**



Interpretation: Total pelagic species CPUE is predominantly the combined skipjack and yellowfin CPUE shown in Figure 17, as these two species contributed about 86% of the total troll catch. 1998 CPUE was lower than 1997 probably due to decreased CPUEs for most species caught by trolling (Figure 15 and 16),

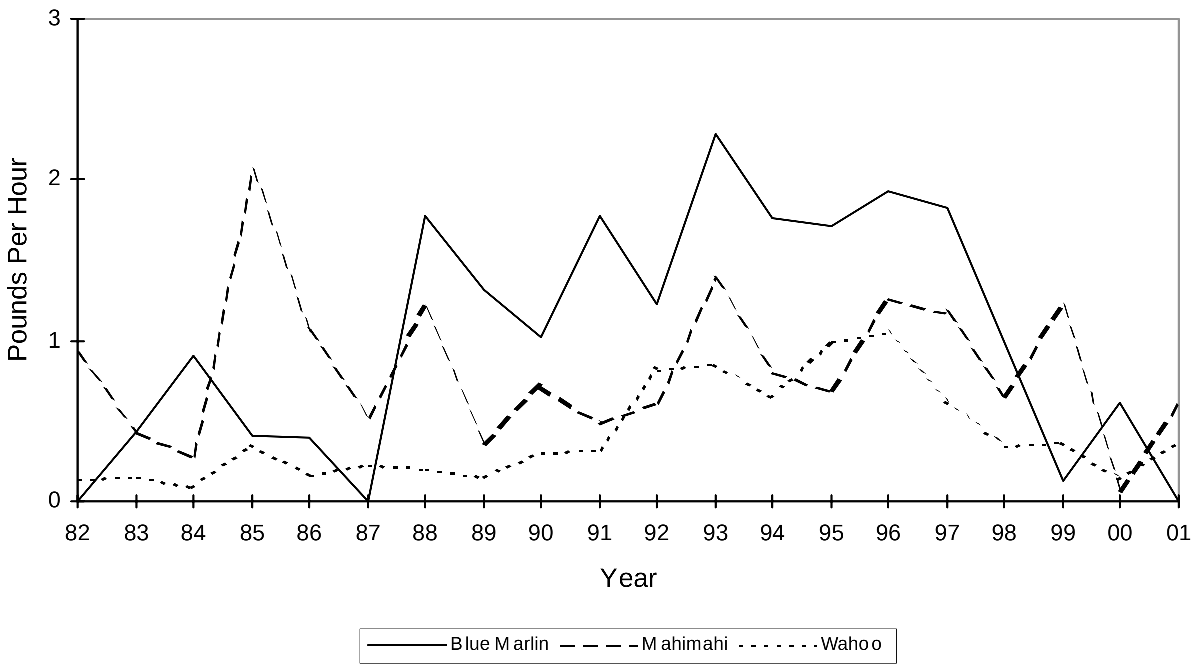
Trolling hours varied from 1982 well into 1995, when it began to decline due to influx in longline fishery, except in 1999 when a couple of new boats entered the pelagic fishery and were involved in trolling method before obtaining their longline permits. Trolling effort decreased again in 2000 and increased by 52% this year. This increase reflects the switching between longline and trolling method by the local fishermen probably due to the decrease in price per pound of albacore which is the main target species by local fishermen in 2001.

Calculation: For purely trolling trips where the number of hours was recorded, the total catch was divided by the total number of trolling hours to obtain CPUE.

Year	CPUE	Hours
1982	25.91	1,019
1983	27.41	3,513
1984	30.97	7,785
1985	32.59	4,394
1986	19.52	11,014
1987	25.34	6,198
1988	37.94	6,119
1989	23.87	8,397
1990	22.16	4,136
1991	20.93	4,407
1992	28.90	3,748
1993	20.17	3,065
1994	21.37	11,211
1995	23.01	11,781
1996	27.36	4,365
1997	22.29	3,089
1998	19.93	1,405
1999	26.81	1,977
2000	21.94	1,116
2001	16.71	1,690
Average	**24.76**	**5,021**
Std. Dev.	**4.99**	**3,314**

The number of effective Trolling Trip_Hours is calculated by first subtracting the total longline pounds of Table 1 from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips, from the offshore creel survey system expansion, to get the number of trolling trip-hours

Figure 16. American Samoa trolling catch rates: Blue marlin, Mahimahi, and Wahoo.



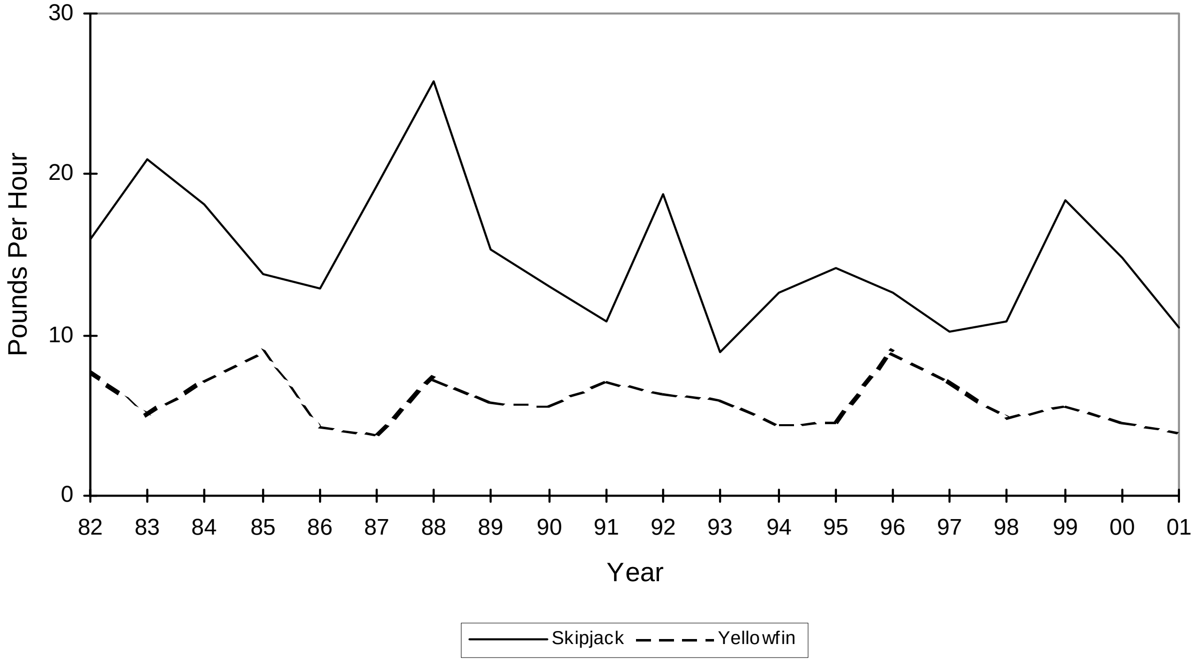
Interpretation: Blue marlin CPUE is variable but generally increased over time until about 1997 when it began to decline. It is not known if this decrease has any relationship to the huge growth in the longline fishery during this time span. Mahimahi CPUE peaked in the mid-eighties, when an exported market existed for this species. Since that time, mahimahi CPUE has been variable and dropped to a record low in 2000. Wahoo CPUE seemed fairly stable in the 1980s until 1995 probably due to the influx in the longline fishery.

	Pounds Caught Per Trolling Hour		
Year	Blue Marlin	Mahimahi	Wahoo
1982	0.00	0.92	0.14
1983	0.43	0.43	0.15
1984	0.91	0.28	0.09
1985	0.41	2.06	0.36
1986	0.39	1.06	0.17
1987	0.00	0.52	0.23
1988	1.78	1.20	0.21
1989	1.31	0.36	0.15
1990	1.02	0.72	0.31
1991	1.78	0.49	0.32
1992	1.23	0.61	0.82
1993	2.29	1.38	0.85
1994	1.76	0.80	0.65
1995	1.71	0.69	1.00
1996	1.93	1.26	1.05
1997	1.83	1.17	0.62
1998	0.99	0.65	0.35
1999	0.13	1.21	0.37
2000	0.61	0.06	0.14
2001	0.00	0.60	0.37
Average	**1.03**	**0.82**	**0.42**
Std. Dev.	**0.73**	**0.45**	**0.30**

Since 1996 wahoo catch rates have dropped similar to blue marlin, but this may not be related to the increase in longline activity. On the other hand, this could an indication of “localized over-fishing” and interactions.

Calculation: The values for each of the three species is obtained by dividing the Troll Pounds for each species in Table 1 by the expanded number of trip-hours for purely trolling trips from the offshore creel survey system.

Figure 17. American Samoa trolling catch rates: Skipjack and Yellowfin tuna

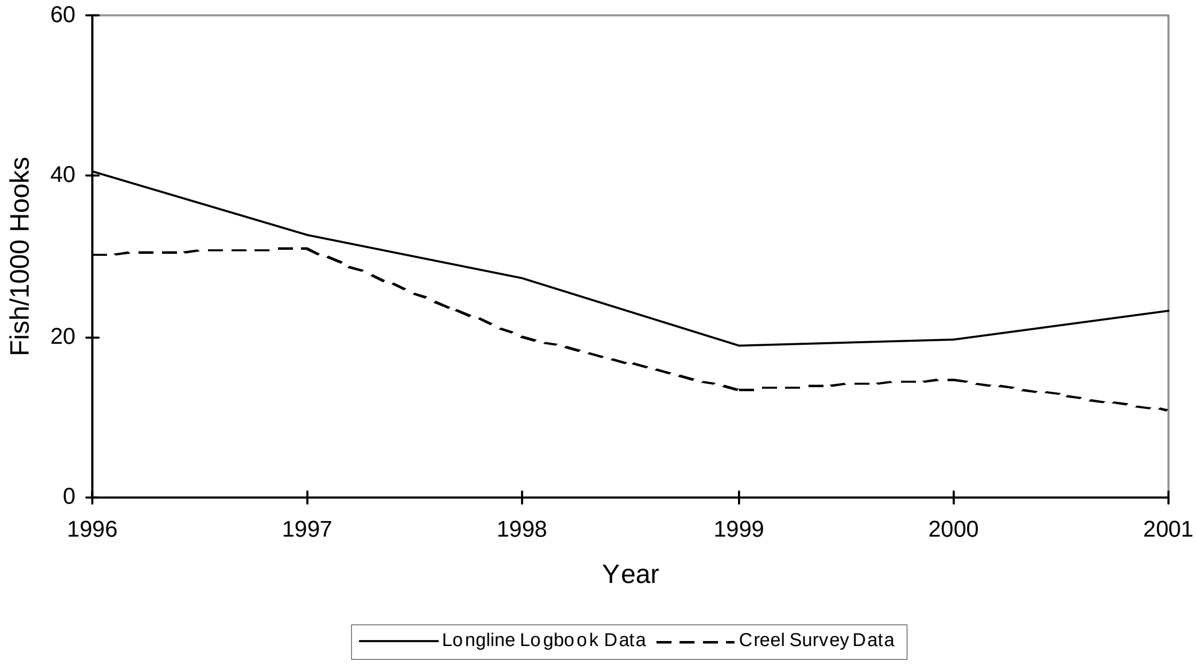


Interpretation: Skipjack and Yellowfin CPUE has been highly variable through the years with a declining trend since 1996 except in 1999. During 1999 a couple of boats did some extensive trolling before obtaining their longline permits to longline. CPUE for both species continued to decline in 2000 and 2001.

Calculation: The values for each of the two species is obtained by dividing the Troll Pounds for each species in Table 1 by the expanded number of trip-hours for purely trolling trips from the offshore creel survey system.

	Pounds Caught Per Trolling Hour	
Year	**Skipjack**	**Yellowfin**
1982	15.90	7.80
1983	21.00	5.04
1984	18.10	7.20
1985	13.80	8.90
1986	12.90	4.31
1987	19.30	3.88
1988	25.80	7.27
1989	15.30	5.91
1990	13.00	5.59
1991	10.80	7.16
1992	18.80	6.34
1993	8.94	6.03
1994	12.70	4.50
1995	14.20	4.56
1996	12.70	8.99
1997	10.20	7.21
1998	10.80	4.89
1999	18.40	5.62
2000	14.80	4.64
2001	10.50	3.96
Average	**14.90**	**5.99**
Std. Dev.	**4.15**	**1.53**

Figure 18. **American Samoa catch rates of Albacore for the Alia longline fishery Comparing Logbook and Creel Survey Data**



Interpretation: The longline fishery in American Samoa is a newly emerging fishery since 1995. A gradual increase in the number of boats participated in the longline fishery has been seen since 1995 with a notable increase of 68% this year. From 1996 to 2001 there was not a great deal of change in catch rates. However, according to both monitoring programs there has been a declining trend in the catch rate of albacore, the primary target species, for the past 6 years.

Calculation: These values compare the CPUE's of only the alias. For the longline logbook data, the total number of kept fish of each species is divided by the sum of the hooks in the sets of alias or surveyed vessels over the given year used to catch them. For the creel survey data the expanded total landings for each species given in Table 1 is divided by the pounds/fish value obtained by averaging creel survey data over the year to find the number of pieces of each species. The number of pieces for each species caught during the year is divided by the expanded number of hooks for the given year.

Table 6. American Samoa catch rates by Species for the Alia longline fishery Comparing Logbook and Creel Survey Data

	Number of Fish Per 1000 Hooks											
	1996		1997		1998		1999		2000		2001	
Species	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**
Skipjack Tuna	0.06	0.29	1.15	0.60	3.71	4.01	5.01	4.77	2.02	1.94	3.03	2.85
Albacore	40.60	30.26	32.79	31.20	27.31	20.23	18.91	13.44	19.75	14.76	23.25	10.87
Yellowfin Tuna	6.50	4.32	2.73	2.48	2.23	2.27	6.76	4.49	6.22	3.24	3.33	4.03
BigeyeTuna	1.33	1.06	0.30	0.14	0.29	0.11	0.68	0.20	0.40	0.22	0.59	0.32
Misc. Tunas					0.01							
Mahimahi	2.29	1.31	2.24	2.84	1.75	1.83	2.24	1.76	1.71	1.75	3.60	4.01
Black marlin			0.09	0.02			0.18	0.03	0.11		0.07	0.03
Blue marlin	0.93	0.90	0.65	0.61	0.55	0.49	0.50	0.38	0.46	0.52	0.32	0.24
Striped Marlin			0.02		0.03		0.02		0.06		0.03	
Wahoo	0.83	0.52	0.90	0.85	2.25	2.03	2.03	1.57	1.15	0.90	1.48	1.21
Other Sharks	0.28	0.37	0.11	0.17	0.13	0.08	0.06	0.03	0.01	0.04	0.01	0.01
Swordfish	0.03	0.01	0.06	0.01	0.04	0.02	0.03	0.01	0.02		0.11	
Sailfish	0.18	0.23	0.17	0.21	0.05	0.14	0.01	0.13	0.03	0.06	0.03	0.09
Spearfish					0.03		0.00	0.01	0.01		0.00	
Moonfish			0.10	0.15	0.07	0.07	0.07	0.13	0.07	0.20	0.10	0.07
Oilfish					0.01	0.04	0.01	0.01	0.00		0.03	0.06
Pomfret					0.00		0.01		0.02	0.03	0.02	
Barracudas		0.57		0.87		0.42		0.19		0.30	0.02	0.10
Rainbow runner				0.01		0.01		0.02	0.00			
Dogtooth tuna						0.00						0.01
Other Pelagic Fish					0.23	0.01	0.25				0.02	

Table 7. American Samoa Longline Catch/1000 Hooks for the Three Types of Longline Vessels

Species	2000 Alias	2000 Monohull	2001 Alias	2001 Monohull < 50'	2001 Monohull > 50 '
Skipjack Tuna	0.59	0.08	3.03	1.84	2.19
Albacore	16.83	3.66	23.28	30.75	33.98
Yellowfin Tuna	1.40	0.10	3.33	1.43	1.41
BigeyeTuna	0.15	0.08	0.59	0.49	1.04
TUNAS SUBTOTALS	18.97	3.92	30.22	34.52	38.62
Mahimahi	1.15	0.18	3.60	0.58	0.49
Black marlin	0.05	0.00	0.07	0.00	0.02
Blue marlin	0.34	0.03	0.32	0.46	0.21
Striped Marlin	0.02	0.00	0.03	0.02	0.08
Wahoo	0.46	0.09	1.48	0.45	0.67
Other Sharks	0.06	0.09	0.04	1.08	0.64
Swordfish	0.03	0.00	0.11	0.03	0.03
Sailfish	0.09	0.01	0.04	0.03	0.03
Spearfish	0.00	0.00	0.00	0.02	0.04
Moonfish	0.05	0.01	0.10	0.10	0.08
Oilfish	0.00	0.04	0.03	0.13	0.22
Pomfret	0.00	0.01	0.02	0.06	0.09
OTHER PPMUS SUBTOTALS	2.25	0.46	5.86	2.96	2.60
Barracudas	0.00	0.00	0.02	0.00	0.03
Other Pelagic Fish	0.00	0.00	0.02	0.00	0.05
NON PPMUS SUBTOTALS	0.00	0.00	0.04	0.00	0.07
TOTAL PELAGICS	**21.22**	**4.38**	**36.13**	**37.48**	**41.30**

Interpretation: Since the development of the longline fishery in 1995, a growing number of boats with a range of different sizes entered the fishery. These boats include alias, averaging around 28 to 30 feet, monohull less than 50 feet, and monohull greater than 50 feet in length. Table 7 has been included in this report to better represent the catch per 1000 hooks for each type of longline vessel.

Calculation: These values are sums of the Longline Logbook catch (number of fish kept+released+finned) for the three types of longline vessels in Samoa divided by the total number of hooks set by each type of vessel. In 2000 there was only one monohull < 50’ so its catch was combined with the rest of the monohulls. All species of sharks entered in the Longline Logs are combined in the Other Sharks species. Rays and Sunfish are included in the Other Pelagic Fish species.

Table 8. American Samoa Estimated average Pounds per Fish by species from the Offshore Creel Survey Interviews and from Cannery Sampling

	Creel Survey Annual Average Lbs. per Fish					
Species	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Skipjack Tuna	9.6	8.4	12.5	9.7	11.6	15.2
Albacore	39.9	44.0	45.7	42.6	45.0	44.9
Yellowfin Tuna	37.9	44.2	45.9	33.1	38.1	30.6
BigeyeTuna	52.3	82.8	79.2	57.1	61.1	69.5
Misc. Tunas						
Mahimahi	26.2	25.6	23.3	22.3	24.9	19.5
Black marlin		148.3		101.9		67.2
Blue marlin	151.8	117.7	119.9	101.9	104.8	71.1
Striped Marlin						
Wahoo	44.3	38.4	26.3	27.3	31.9	29.4
Other Sharks	112.3	96.8	69.3	38.0	39.5	68.8
Swordfish	150.0	100.0	212.6	12.0		
Sailfish	88.4	70.7	67.0	61.8	39.1	43.2
Spearfish				46.0		
Moonfish		70.3	33.5	57.7	30.0	102.5
Oilfish			12.7	10.0		23.0
Pomfret					18.3	
Barracudas	13.5	14.6	15.3	11.0	12.8	7.4
Rainbow runner		14.0	17.5	6.5		
Dogtooth tuna			10.0			15.6
Other Pelagic Fish			45.3			

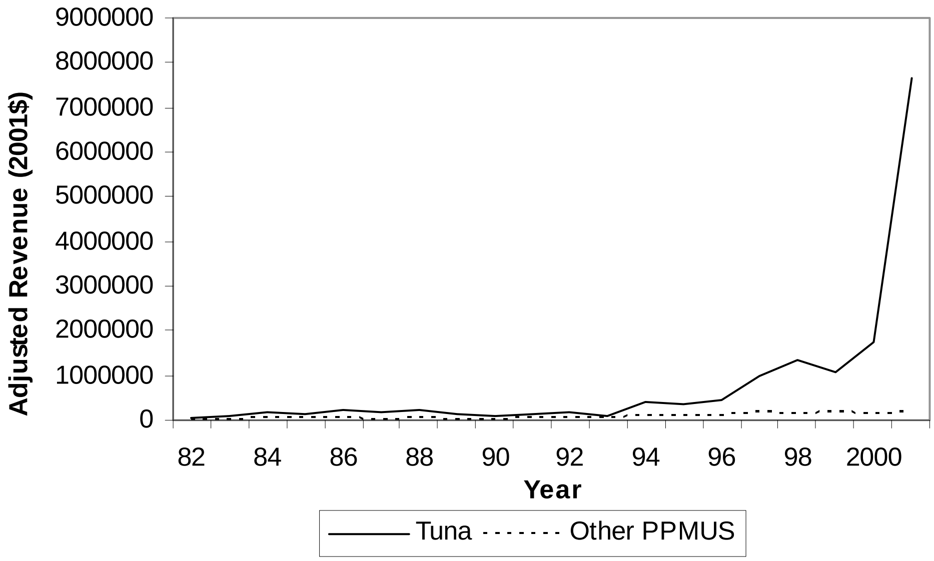
	Cannery Sampled Average Lbs. per Fish			
Species	**1998**	**1999**	**2000**	**2001**
Skipjack Tuna				15.7
Albacore	41.0	47.2	40.7	39.8
Yellowfin Tuna				57.0
BigeyeTuna				40.7
Mahimahi				16.2
Black marlin				36.3
Wahoo				30.6
Moonfish				147.6
Pomfret				2.2

Interpretation : A new table for cannery data has been added to table 8 to represent the portion of the catch unloaded by larger vessels fishing further away from Tutuila. Not a big change in average size for most of the pelagic species since 1996 according to the creel survey. Average pounds per fish from the cannery data for albacore remained relatively the same. In 1999 longline boats began landing their catches gilled and gutted to obtain higher prices at the canneries. It is possible that this new method could have an impact on size variation for the longline fishery..

Calculation: The Creel Survey Annual Average Pounds/Fish for each species was calculated from the creel survey interviews by dividing the total pounds of each species sampled during the year by the number of fish of sampled during the year. If the fish were sampled as other than whole (ie Gilled and Gutted) the sampled weight is divided by the appropriate factor (less than 1) to get the whole weight. All weights were measured directly before 2000, but after that most weights were calculated from length measurements. Since these fish are caught by alias operating close to Tutuila this represents fish sizes close to shore.

The Cannery Sampled Annual Average Pounds/Fish for each species was calculated from the length measurements made at the canneries when the fish are unloaded there. The weight of each sampled fish is calculated from the length measurements. These weights are summed over the year for each species and are then divided by the number of fish of that species sampled during the year. Since these fish are caught by larger boats operating away from Tutuila this represents fish sizes further out to sea from Tutuila

Figure 19. American Samoa annual inflation-adjusted revenue for commercially landed pelagic species.



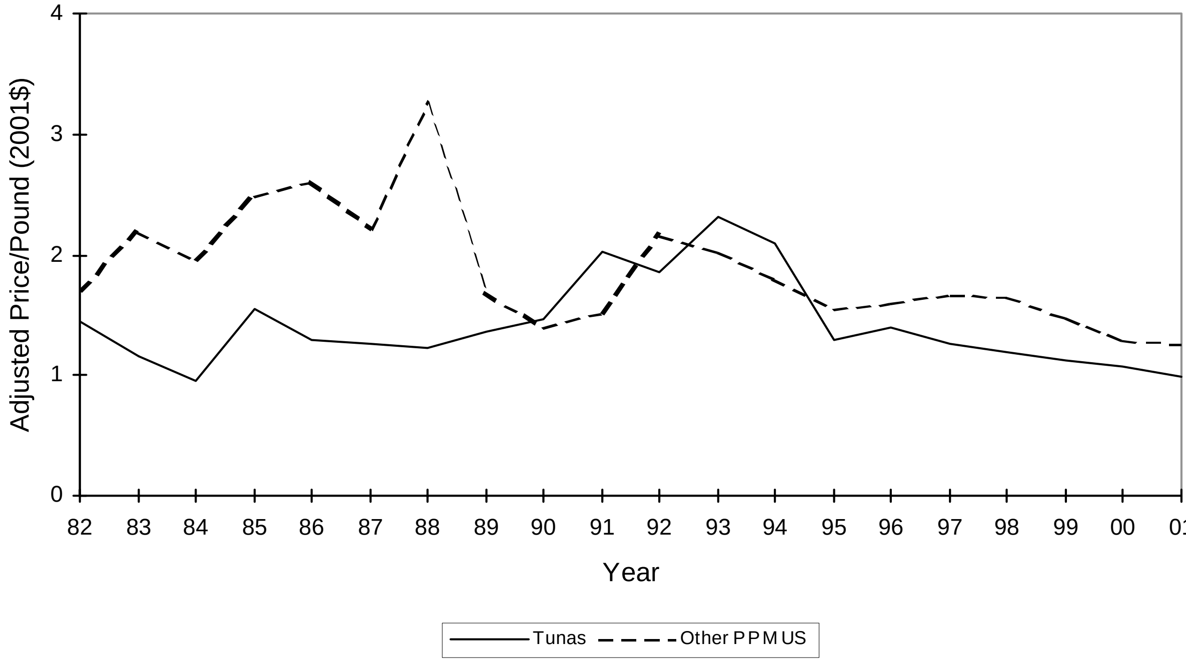
Interpretation: Revenues for commercial landings for all pelagic species has seen a gradual increase since 1995, a period of influx in longline fishery, with a significant increase of 305% in 2001. 2001 has set a new record high in commercial landings for tunas with 7,818,928 pounds landed valued at $7,640,877

Calculation: The unadjusted revenues for Tunas and Other PPMUS were calculated by summing the values for the species in these categories as defined by Table 2. The unadjusted revenue for All Pelagics is the sum of the value for the Tuna, Other PPMUS and Miscellaneous categories as defined by Table 2.

The unadjusted revenues from commercial landings for the pelagic species subgroups above were adjusted for inflation by multiplying a given year's revenue by the 2000 consumer price index (CPI) divided by the CPI for that year.

		Revenue ($)			
		Tunas		Other PPMUS	
Year	**CPI**	**Unadjust**	**Adjusted**	**Unadjust.**	**Adjusted**
1982	100.0	$18,990	$32,055	$1,534	$2,589
1983	100.8	$58,561	$98,148	$5,828	$9,768
1984	102.7	$114,981	$188,914	$15,938	$26,186
1985	103.7	$95,157	$154,915	$26,800	$43,631
1986	107.1	$135,986	$214,314	$27,762	$43,754
1987	111.8	$110,076	$166,215	$7,675	$11,589
1988	115.3	$142,847	$209,128	$27,750	$40,626
1989	120.3	$111,425	$156,441	$9,901	$13,901
1990	129.6	$61,918	$80,679	$3,795	$4,945
1991	135.3	$93,060	$116,139	$18,525	$23,119
1992	140.9	$138,179	$165,539	$19,390	$23,229
1993	141.1	$84,341	$100,956	$23,700	$28,369
1994	143.8	$332,860	$390,778	$62,579	$73,468
1995	147.0	$312,638	$359,221	$71,891	$82,603
1996	152.5	$391,211	$433,071	$73,455	$81,314
1997	156.4	$919,569	$993,135	$154,121	$166,450
1998	158.4	$1,240,618	$1,322,499	$146,630	$156,307
1999	159.9	$1,018,884	$1,075,941	$153,750	$162,360
2000	166.7	$1,722,782	$1,745,178	$146,211	$148,112
2001	168.8	$7,640,877	$7,640,877	$172,078	$172,078
Average	**133.1**	**$737,248**	**$782,207**	**$58,466**	**$65,720**
Std. Dev.	**23.10**	**$1,649,135**	**$1,640,483**	**$59,160**	**$59,575**

Figure 20. American Samoa average inflation-adjusted price for tunas and other PPMUS.



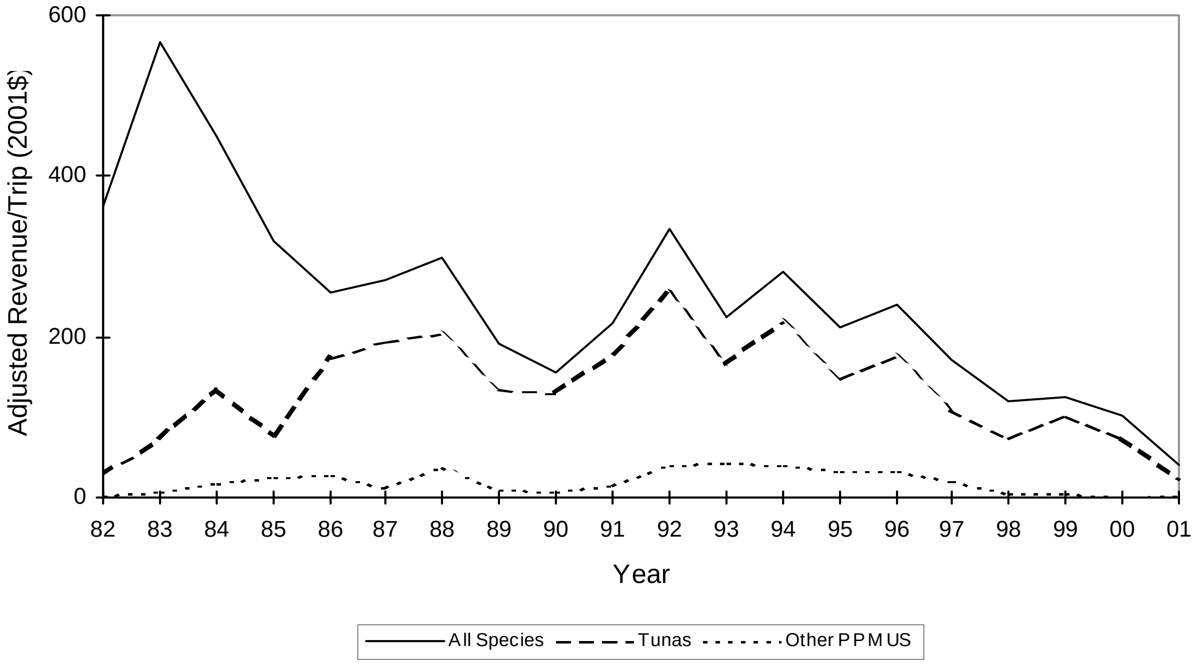
Interpretation: The average inflation-adjusted price per pound has been varied since 1982 until 1996 where a steady decrease has been seen. This gradual decrease may be due to the lower price that the canneries pay per pound of tuna than the local stores and restaurants may pay. Or likely because of competition from frozen fish purchased from foreign longline vessels moored in Pago Harbor and from fishes imported from neighboring islands. Also, the increase of longline catches, during this period, that make it to the local markets probably contribute to this decline in prices for tuna.

	Average Price/Pound ($)			
	Tunas		Other PPMUS	
Year	Unadjust.	Adjusted	Unadjust.	Adjusted
1982	$0.86	$1.45	$1.01	$1.71
1983	$0.69	$1.15	$1.31	$2.20
1984	$0.59	$0.96	$1.18	$1.95
1985	$0.95	$1.55	$1.53	$2.49
1986	$0.82	$1.29	$1.65	$2.61
1987	$0.83	$1.26	$1.46	$2.21
1988	$0.83	$1.22	$2.22	$3.25
1989	$0.97	$1.36	$1.20	$1.69
1990	$1.12	$1.46	$1.06	$1.39
1991	$1.62	$2.02	$1.22	$1.52
1992	$1.55	$1.86	$1.81	$2.17
1993	$1.94	$2.32	$1.69	$2.02
1994	$1.79	$2.10	$1.54	$1.80
1995	$1.13	$1.30	$1.35	$1.55
1996	$1.27	$1.40	$1.45	$1.60
1997	$1.17	$1.26	$1.54	$1.66
1998	$1.11	$1.19	$1.54	$1.65
1999	$1.07	$1.13	$1.40	$1.48
2000	$1.06	$1.07	$1.28	$1.30
2001	$0.98	$0.98	$1.26	$1.26
Average	**$1.12**	**$1.42**	**$1.44**	**$1.87**
Std. Dev.	**$0.35**	**$0.37**	**$0.27**	**$0.48**

Calculation: The unadjusted price/pound for Tunas and Other PPMUS were calculated by dividing the sum of the values for the species in these categories as defined by Table 2 by the sum of their commercial landings or pounds.

The unadjusted price/pound values for the pelagic species subgroups above were adjusted for inflation by multiplying the given year's price/pound by the 2000 consumer price index (CPI) divided by the CPI for that year.

Figure 21. American Samoa average inflation-adjusted revenue per trip landing Pelagic Fish for trolling and troll/bottomfishing methods.



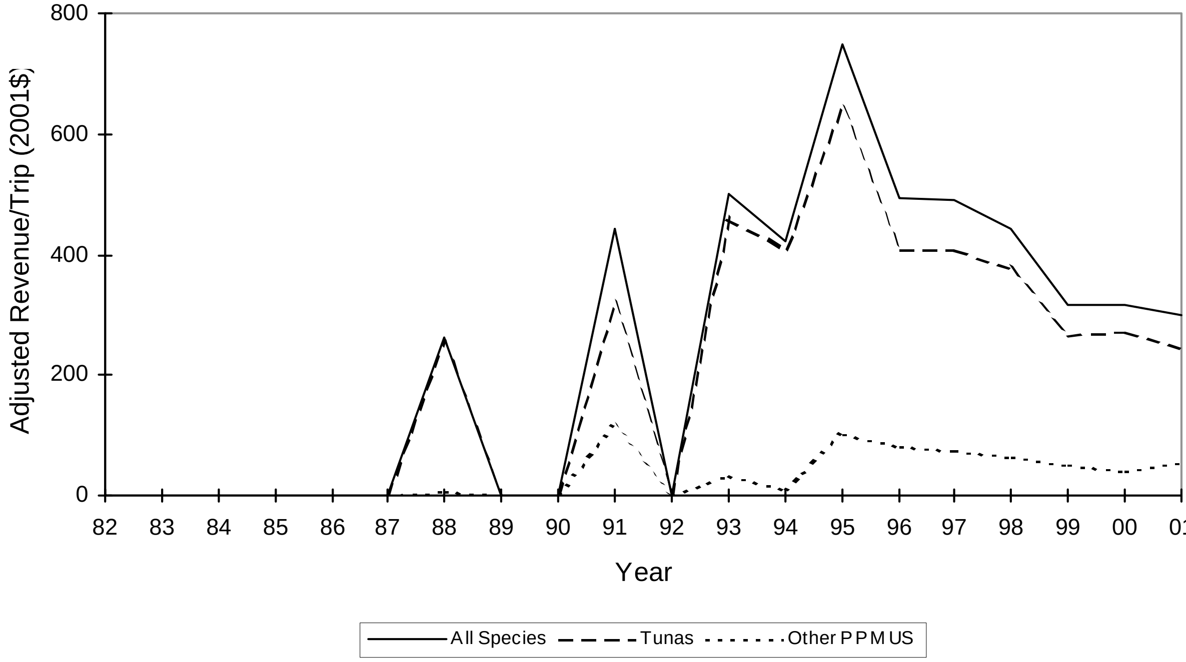
Interpretation: A gradual decrease in revenue per trip for trolling has been seen since 1994 for all species with a significant decrease 59% in 2001, setting a new record low. This gradual decrease in revenue per trip may be due to the overall decrease in price per pound for all pelagic species sold at the canneries and the local markets during this period.

Calculation: The trolling and troll/bottom interviews in the offshore creel survey system landing any of the species listed in Table 1 are first counted for the given year to get the number of trips. The unadjusted revenue/trip for Tunas and Other PPMUS is calculated by first summing the value of the species in these pelagic subgroups caught by trolling or troll/bottomfishing methods and then dividing this by the number of trips. The unadjusted revenue/trip for all species is the sum of the value of all species, pelagic or not caught by the trolling and troll/bottom trips divided by the number of such trips.

The unadjusted revenue/trip values for the pelagic species subgroups above and for all species were adjusted for inflation by multiplying the given year's revenue/trip by the 2000 consumer price index (CPI) divided by the CPI for that year.

Year	All Species		Tunas		Other PPMUS	
	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.
1982	$362	$214	$27	$16	$2.2	$1.3
1983	$566	$338	$72	$43	$8.7	$5.2
1984	$450	$274	$135	$82	$17.3	$10.5
1985	$319	$196	$76	$47	$25.7	$15.8
1986	$256	$162	$174	$111	$28.1	$17.8
1987	$270	$179	$195	$129	$11.8	$7.8
1988	$298	$203	$204	$140	$38.8	$26.5
1989	$193	$137	$136	$97	$10.4	$7.4
1990	$156	$120	$131	$100	$7.0	$5.4
1991	$216	$173	$178	$143	$16.1	$12.9
1992	$335	$279	$256	$214	$41.7	$34.8
1993	$226	$189	$166	$139	$43.8	$36.6
1994	$281	$239	$219	$186	$40.2	$34.2
1995	$212	$184	$149	$130	$32.3	$28.1
1996	$239	$216	$177	$160	$33.8	$30.5
1997	$171	$158	$109	$101	$19.2	$17.8
1998	$119	$112	$75	$70	$5.8	$5.4
1999	$125	$118	$102	$97	$4.9	$4.6
2000	$102	$101	$75	$74	$0.8	$0.8
2001	$41	$41	$24	$24	$1.9	$1.9
Average	**$247**	**$182**	**$134**	**$105**	**$19.5**	**$15.3**
Std. Dev.	**$120**	**$67**	**$62**	**$51**	**$14.4**	**$12.0**

Figure 22. American Samoa average inflation-adjusted revenue per trip landing PPMUS for Alias using the longline method.



Interpretation: The longline revenue per trip has seen a gradual decrease since 1995 and continued to decrease in 2001 by 11%. This gradual decrease in revenue per trip reflects the steady decrease in price per pound (Figure 19) during this period.

Calculation: The longlining interviews in the offshore creel survey system landing any of the species listed in Table 1 are first counted for the given year to get the number of trips. The unadjusted revenue/trip for Tunas and Other PPMUS is calculated by first summing the value of the species in these pelagic subgroups caught by longlining and then dividing this by the number of trips. The unadjusted revenue/trip for all species is the sum of the value of all species, pelagic or not , caught by the longlining trips divided by the number of such trips.

The unadjusted revenue/trip values for the pelagic species subgroups above and for all species were adjusted for inflation by multiplying the given year's revenue/trip by the 2000 consumer price index (CPI) divided by the CPI for that year.

	All Species		Tunas		Other PPMUS	
Year	**Adj.**	**Unadj.**	**Adj.**	**Unadj.**	**Adj.**	**Unadj.**
1982	$0	$0	$0	$0	$0.0	$0.0
1983	$0	$0	$0	$0	$0.0	$0.0
1984	$0	$0	$0	$0	$0.0	$0.0
1985	$0	$0	$0	$0	$0.0	$0.0
1986	$0	$0	$0	$0	$0.0	$0.0
1987	$0	$0	$0	$0	$0.0	$0.0
1988	$261	$178	$254	$173	$6.9	$4.7
1989	$0	$0	$0	$0	$0.0	$0.0
1990	$0	$0	$0	$0	$0.0	$0.0
1991	$441	$354	$320	$257	$115	$91.8
1992	$0	$0	$0	$0	$0.0	$0.0
1993	$502	$419	$461	$385	$33.4	$27.9
1994	$421	$359	$410	$349	$10.8	$9.2
1995	$751	$653	$642	$559	$104	$90.1
1996	$494	$446	$410	$371	$81.4	$73.5
1997	$489	$453	$407	$377	$76.1	$70.5
1998	$442	$415	$377	$354	$64.2	$60.2
1999	$317	$301	$265	$251	$52.2	$49.4
2000	$316	$312	$274	$270	$42.3	$41.8
2001	$298	$298	$245	$245	$52.8	$52.8
Average	**$430**	**$381**	**$370**	**$326**	**$58.0**	**$52.0**
Std. Dev.	**$131**	**$115**	**$112**	**$99**	**$32.9**	**$28.1**

Appendix 2

Territory of Guam

Introduction and Summary

Pelagic fishing vessels based on Guam fall into two broad categories: 1) distant -water purse seiners and longliners that fish primarily outside Guam's EEZ and transship through Guam and 2) small primarily recreational trolling boats that are either towed to boat launch sites or berthed in marinas and fish only local waters, either within Guam's EEZ or occasionally in the adjacent EEZ of the Northern Mariana Islands. This report covers primarily the local small boat pelagic fishery.

The number of boats participating in Guam's pelagic fishery steadily increased from 193 in 1983 to 469 in 1998 and has decreased thereafter. Most fishing boats are less than 10 meters (33 feet) in length and are typically owner-operated by persons who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another, and it is impossible to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of the pelagic fleet consists of marina-berthed charter vessels that are operated primarily by full-time captains and crews. Data and graphs for non-charters, charters, and bycatch are represented in this report. Nc will be used to define non-charters while c will be used to define charters.

Estimated pelagic annual landings have varied widely, ranging between 322,000 and 937,000 pounds. Total pelagic landings in 2001 was approximately 757,000 pounds, an increase of 23% compared with 2000. Landings in 2001 consist almost entirely of five major species: mahimahi (Coryphaena hippurus), wahoo (Acanthocybium solandri), skipjack tuna (Katsuwonus pelamis), yellowfin tuna (Thunnus albacares), and Pacific blue marlin (Makaira mazara). Minor components include rainbow runner (Elagatis bipinnulatus), great barracuda (Sphyraena barracuda), kawakawa (Euthynnus affinis), sailfish (Istiophorus platypterus), dogtooth tuna (Gymnosarda unicolor), and sharks. Approximately a dozen additional species are landed incidentally each year.

There are wide year to year fluctuations in the tuna, marlin, and wahoo landings. Yellowfin tuna landings increased from 1983 to 1985, declined from 1985 to 1987, increased from 1987 to 1998, then decreased after 1999. Skipjack tuna landings declined until 1987, show a general increase until 1996, generally declines until 1999, then reached a record high of approximately 333,000 in 2001. Blue marlin landings show a general increase from 1983 to 1990, decrease from 1990 to 1993, increased from 1993 to 1997, then fluctuates. Wahoo landings have fluctuated over the past 18 years.

Aggregate landings of all pelagics, tuna, non-tuna PPMUS fluctuate greatly, but appear to be increasing. Non-tuna PPMUS, primarily mahimahi, make up the bulk of the pelagic catch. The commercial landings of all pelagics also show a similar trend.

The average troll trips decreased compared with 2000 while trolling hours and trolling effort in terms of total hours fished per total trolling trips increased compared with 2000. Charter boat activity decreased for the fifth year in a row, due to a drop in tourism as a result of the Asian economic crisis. Charter trolling trips decreased 10% in 1999, 7% in 2000, and 20% in 2001. Charter boats, which make up less than 10% of the pelagic fleet, account for 20% of all trolling trips, 10% of the pelagic catch, and 13% of hours spent trolling. Charter boats caught 14% of the mahimahi landings, 33% of the blue marlin landings, 6% of the skipjack landings, 6% of the yellowfin landings, and 10% of the wahoo landings.

Trolling catch rates vary widely for all pelagic species. Trolling 2000 catch rate decreased for yellowfin and blue marlin while increased for mahimahi, wahoo, and and skipjack tuna. CPUE for non-charter boats increased 14% while charters decreased 2% from 2000.

Commercial landings and commercial revenues of all pelagics and non-tuna PPMUS increased in 2001 while tuna decreased in 2001. Inflation-adjusted revenues per trolling trip show a general decline, although in 2001 there is a decrease in inflation-adjusted revenues. Since the vast majority of boaters in the pelagic fishery do not rely on catching or selling fish for a living, effort continues to occur despite decreasing revenues. The average price of tuna and non-tuna PPMUS also show a general decline, although the price of non-tuna PPMUS has increased since 1995.

Actual bycatch was approximately 528 pounds or 1% of the actual pelagic catch (36,772 pounds). The species caught as bycatch were the silky shark, a jack, wahoo, yellowfin tuna, mahimahi, blue marlin, and shortbill spearfish. The percent bycatch of these species were 100% (silky shark), 100% (jack), .5% (wahoo), 5% (yellowfin tuna), .5% (mahimahi), 20% (blue marlin), and 100% (shortbill spearfish), respectively. Bycatch for non-charters is 57% (303 pounds)of the actual bycatch while the bycatch for charters is 43% (226 pounds). Bycatch species for non-charters consist of the silky shark, a jack, wahoo, and yellowfin tuna while the bycatch species for charters consist of mahimahi, blue marlin, and shortbill spearfish. Approximately, 50% of the bycatch species that non-charters caught were released alive while 100% were released alive by charters.

2000 Recommendations and Current Status

1. Obtain software to deal with summarization of bycatch data.

   Software has been obtained and bycatch data has been summarized.

2001 Recommendations

1. Convert current commercial fisheries DOS program to Visual Foxpro program.

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Table 1. Guam 2001 creel survey - pelagic species composition

Species	2001 Pounds Landed	2001 Charter	2001 Non charter
Sharks	2,090	0	2,090
Mahimahi	184,009	25,601	158,408
Wahoo	119,602	12,417	107,185
Blue Marlin	33,253	10,979	22,274
Striped Marlin	0	0	0
Sailfish	25	0	25
Shortbill Spearfish	0	0	0
Dogtooth Tuna	10,038	173	9,865
Double-lined Mackerel	976	0	976
Subtotal PPMUS	**349,993**	**49,170**	**300,823**
Skipjack Tuna	332,718	19,545	313,173
Yellowfin Tuna	58,694	3,486	55,207
Bigeye Tuna	0	0	0
Kawakawa	3,868	560	3,308
Other Tuna	0	0	0
Subtotal Tunas	**395,279**	**23,591**	**371,688**
Rainbow Runner	4,765	104	4,661
Barracudas	10,059	995	9,064
Other	0	0	0
Subtotal Misc.	**14,824**	**1,099**	**13,725**
Assorted Troll Fish	0	0	0
Total Pelagics	**760,096**	**73,860**	**686,236**

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Table 2. Guam 2001 Annual Commercial Average Price of Pelagic Species

Species	2001 Average Price ($/lb.)
Troll fish	1.98
Barracuda	2.15
Dolphin (mahimahi)	1.90
Marlin	1.15
Spearfish	1.25
Sailfish	1.17
Rainbow runner	2.15
Monchong	2.40
Wahoo	2.19

Skipjack tuna	1.25
Dogtooth tuna	1.30
Yellowfin tuna	2.01
Kawakawa	1.25
Pelagic:	1.66
Tunas:	1.40
Other PPMUS:	1.83

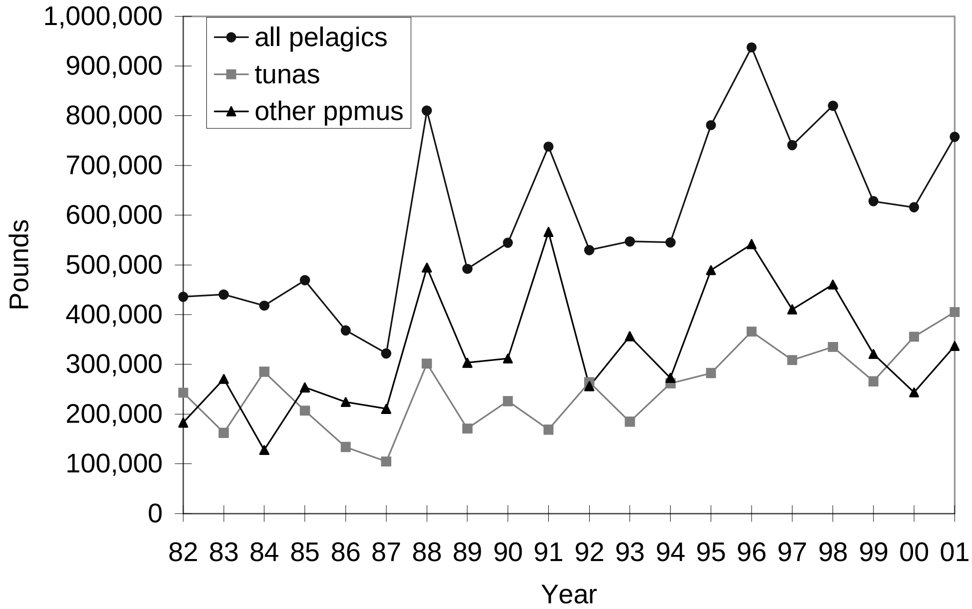
Source: The WPacFIN-sponsored commercial landings system.

Table 3. For reference only. Annual consumer price indexes and CPI adjustment factors.

Year	CPI	CPI_Adjustment Factor
1980	134	3.73
1981	161.4	3.09
1982	169.7	2.94
1983	175.6	2.84
1984	190.9	2.62
1985	198.3	2.52
1986	203.7	2.45
1987	212.7	2.35
1988	223.8	2.23
1989	248.2	2.01
1990	283.5	1.76
1991	312.5	1.60
1992	344.2	1.45
1993	372.9	1.34
1994	436	1.15
1995	459.2	1.09
1996	482	1.04
1997	489.7	1.02
1998	487.1	1.03
1999	496	1.01
2000	505.9	0.99
2001	499.4	1.00

Source: The Guam Department of Commerce.

Figure 1a. Guam annual estimated total landings: all pelagics, tunas, and other PPMUS



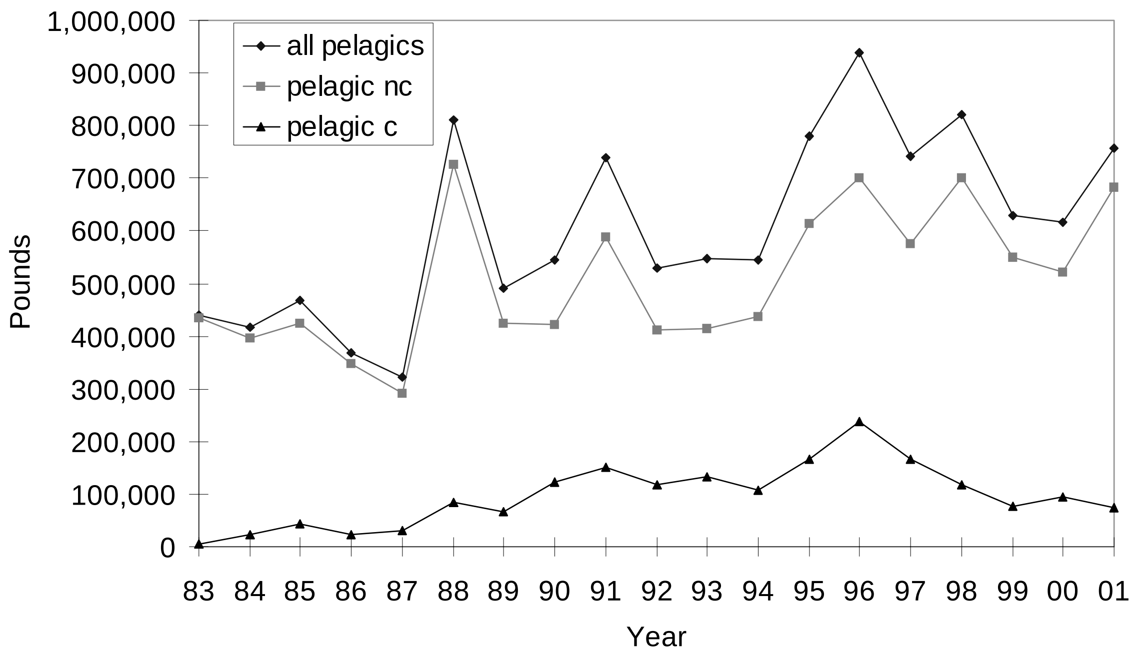
Interpretation: The general trend of the estimated total landings has increased over the past 14 years with an increase in trolling boat activity although a general decrease is observed from 1996. Tunas and other PPMUS consist of 54% and 45% of the total pelagic landings in 2001. The total pelagic landings, tuna landings, and other PPMUS landings increased 23%, 14%, and 39% from 2000. The increase in pelagic landings, tuna landings, and other PPMUS landings is due to an increase in the total CPUE.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365 day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PPMUS separately are summed across all methods to obtain the numbers plotted above.

	Pounds Landed		
Year	all pelagics	tunas	other ppmus
82	435,648	243,184	182,782
83	440,319	162,334	270,536
84	418,038	284,899	127,711
85	468,917	207,027	253,551
86	368,355	133,570	224,390
87	321,846	104,534	210,663
88	810,303	301,785	494,864
89	491,694	170,722	303,357
90	544,457	225,926	311,622
91	737,898	168,800	566,353
92	529,634	264,392	256,282
93	547,240	184,532	356,682
94	544,922	261,665	272,697
95	780,727	282,587	489,614
96	937,450	365,855	541,991
97	740,790	308,538	410,487
98	820,007	334,991	460,380
99	627,928	265,941	320,802
00	615,724	355,710	243,470
01	757,232	405,318	337,090
Average	596,956	251,616	331,766
Std. deviation	172,136	81,730	124,042

Figure 1b. Guam annual estimated total pelagics landings: all pelagics, pelagic nc, and pelagic c



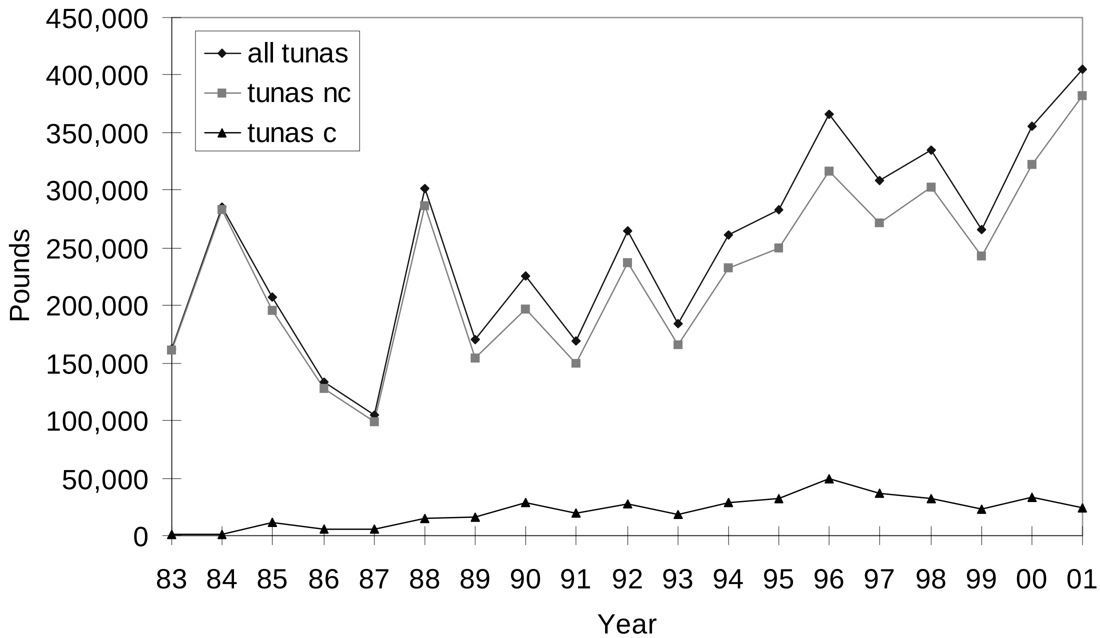
Interpretation: Nc will be used to define non-charters while c will be used to define charters. The general trend of the estimated total landings has increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the pelagic catch. Prior to 1988, non-charters accounted for over 90% of the catch. Beginning in 1988, this percentage decreased due to an increase in charter boat activity. From 1996, a general decrease in charter landings is observed while no trend is apparent for non-charters. For 2001, pelagic non-charters accounted for 90% of the total pelagic catch while pelagic charters accounted for 10%. Pelagic non-charter increased 31% and pelagic charter decreased 22% from 2000. This year's increase in non-charter landings could be due to a increase in non-charter trolling effort while the decrease in charter landings could be due to an decrease in charter trolling effort along with a decrease in charter troll trips.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365 day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PPMUS separately are summed across all methods to obtain the numbers plotted above.

	Pounds Landed		
Year	all pelagics	pelagic nc	pelagic c
82	435,648	426,939	8,709
83	440,319	434,664	5,655
84	418,038	395,678	22,361
85	468,917	424,389	44,528
86	368,355	346,616	21,740
87	321,846	291,913	29,933
88	810,303	726,274	84,029
89	491,694	424,043	67,651
90	544,457	421,797	122,660
91	737,898	587,400	150,498
92	529,634	410,966	118,667
93	547,240	415,432	131,809
94	544,922	437,735	107,187
95	780,727	613,379	167,347
96	937,450	700,709	236,741
97	740,790	574,977	165,812
98	820,007	701,672	118,335
99	627,928	550,613	77,314
00	615,724	520,734	94,990
01	757,232	683,370	73,861
Average	596,956	504,465	92,491
Std. deviation	172,136	129,445	61,193

Figure 1c. Guam annual estimated tuna landings: all tunas, tunas nc, and tunas c



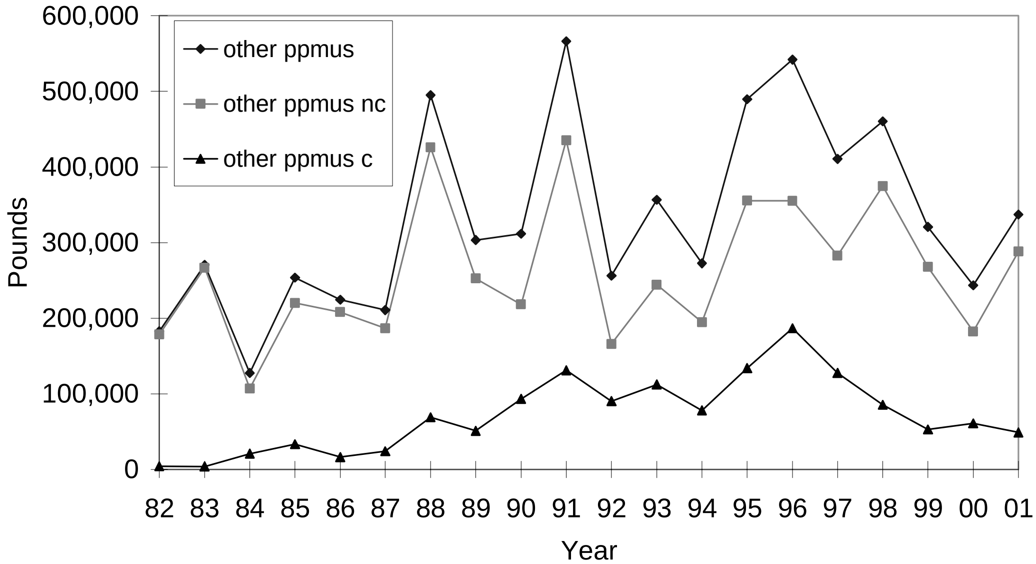
Interpretation: The general trend of the estimated total tuna landings has increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the tuna catch. In the 1980's, non-charters accounted for over 95% of the catch. This percentage decreased due to an increase in charter boat activity in the late 1980's. From 1996, a general decrease in non-charter and charter landings is observed while from 1999 a general increase is observed. For 2001, tuna non-charters account for 94% of the total tuna catch while tuna charters account for 6%. Tuna non-charter increased 18% and tuna charter decreased 29% from 2000. This year's increase in tuna non-charter could be due to an increase in non-charter trolling effort while the decrease in tuna charter landings could be due to a decrease in charter troll trips.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365 day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PPMUS separately are summed across all methods to obtain the numbers plotted above.

	Pounds Landed		
Year	all tunas	tunas nc	tunas c
82	243,184	239,082	4,102
83	162,334	160,613	1,721
84	284,899	283,340	1,559
85	207,027	196,020	11,007
86	133,570	128,201	5,369
87	104,534	98,820	5,714
88	301,785	286,974	14,811
89	170,722	154,355	16,366
90	225,926	197,255	28,672
91	168,800	149,735	19,065
92	264,392	237,257	27,135
93	184,532	165,705	18,827
94	261,665	232,747	28,918
95	282,587	249,901	32,686
96	365,855	316,394	49,462
97	308,538	271,288	37,250
98	334,991	302,903	32,089
99	265,941	242,440	23,501
00	355,710	322,057	33,652
01	405,318	381,553	23,765
Average	251,616	230,832	20,784
Std. deviation	81,730	73,845	13,273

Figure 1d. Guam annual estimated total other PPMUS landings: other PPMUS, other PPMUS nc, and other PPMUS c



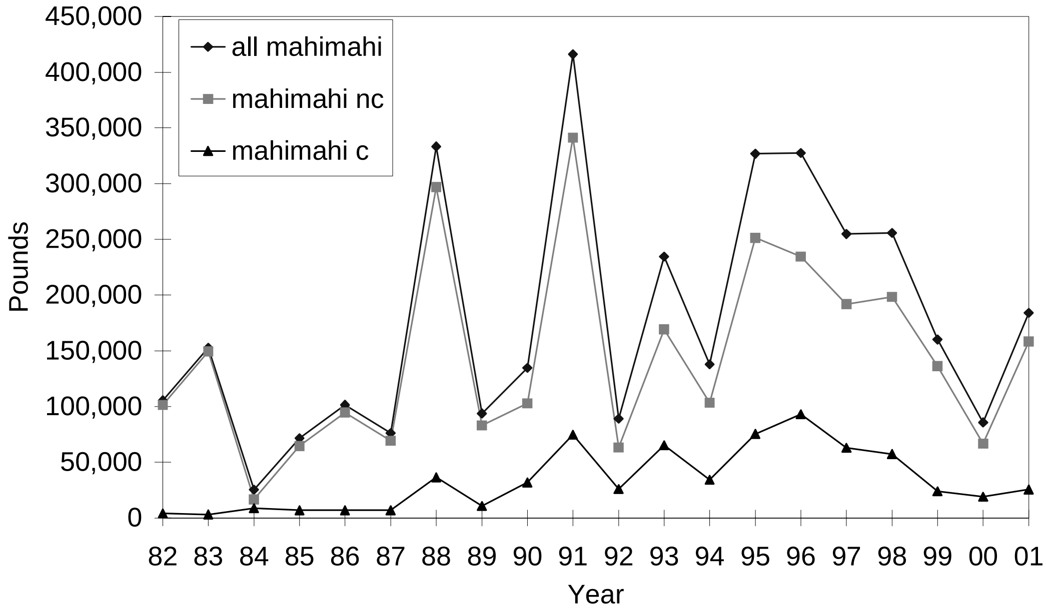
Interpretation: The general trend of the estimated total other PPMUS landings has generally increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the other PPMUS catch. In the 1980's, other PPMUS non-charters accounted for over 87% of the catch. This percentage decreased due to an increase in charter boat activity in the late 1980's. From 1996, a substantial decrease in other PPMUS charter landings is observed while no trend is apparent for other PPMUS non-charters. For 2001, other PPMUS non-charters accounted for 85% of the total other PPMUS catch while other PPMUS charters accounted for 15%. Other PPMUS non-charters decreased 35% and other PPMUS charters increased 15% from 2000. The increase in other PPMUS non-charter could be due to an increase in non-charter trolling effort while the decrease in other PPMUS charter landings could be due to an decrease in charter troll trips and an interest in targeting other species such as blue marlin, mahimahi, and wahoo.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365 day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PPMUS separately are summed across all methods to obtain the numbers plotted above.

	Pounds Landed		
Year	other ppmus	other ppmus nc	other ppmus c
82	182,782	178,551	4,231
83	270,536	266,602	3,934
84	127,711	106,910	20,802
85	253,551	220,043	33,508
86	224,390	208,111	16,279
87	210,663	186,706	23,957
88	494,864	425,850	69,015
89	303,357	252,395	50,961
90	311,622	218,154	93,468
91	566,353	435,148	131,205
92	256,282	165,882	90,400
93	356,682	244,215	112,467
94	272,697	194,674	78,022
95	489,614	355,532	134,082
96	541,991	355,315	186,675
97	410,487	282,828	127,659
98	460,380	374,650	85,730
99	320,802	267,823	52,979
00	243,470	182,533	60,937
01	337,090	288,092	48,998
Average	331,766	260,501	71,265
Std. deviation	124,042	89,403	49,452

Figure 2a. Guam annual estimated total mahimahi landings: all mahimahi, mahimahi nc, and mahimahi c



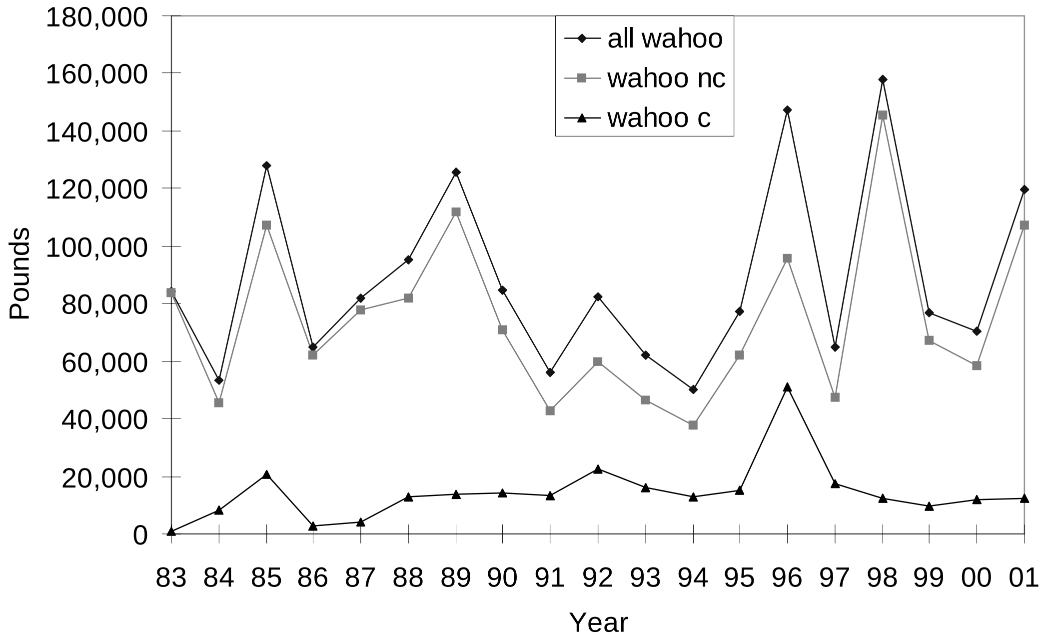
Interpretations: The general trend of the estimated mahimahi landings has increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the mahimahi catch. Prior to 1988, mahimahi non-charters accounted for over 90% of the catch. Beginning in 1988, this percentage decreased due to an increase in charter boat activity. From 1995, a general decrease in mahimahi non-charter landings is observed. A similar decrease is observed from 1996 in mahimahi charter landings. For 2001, mahimahi non-charters accounted for 86% of the total mahimahi catch while mahimahi charters accounted for 14%. Mahimahi non-charters increased 137% and mahimahi charters increased 35% from 2000. This year's increase in non-charter and charter landings could be due to an increase interest in targeting mahimahi this season.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 1a to 1d.

	Pounds Landed		
Year	all mahimahi	mahimahi nc	mahimahi c
82	105,503	101,348	4,155
83	152,678	149,531	3,147
84	25,420	16,739	8,681
85	71,569	64,619	6,951
86	101,487	94,646	6,841
87	76,129	69,326	6,803
88	333,393	296,937	36,456
89	93,709	83,069	10,640
90	134,747	102,838	31,910
91	416,053	341,358	74,695
92	89,115	63,259	25,856
93	234,522	169,200	65,322
94	137,768	103,448	34,320
95	326,868	251,367	75,501
96	327,635	234,575	93,060
97	254,806	191,864	62,942
98	255,814	198,425	57,389
99	160,150	136,229	23,921
00	85,827	66,798	19,029
01	184,009	158,408	25,601
Average	178,360	144,699	33,661
Std. deviation	108,724	85,872	28,043

Figure 2b. Guam annual estimated total wahoo landings: all wahoo, wahoo nc, and wahoo c



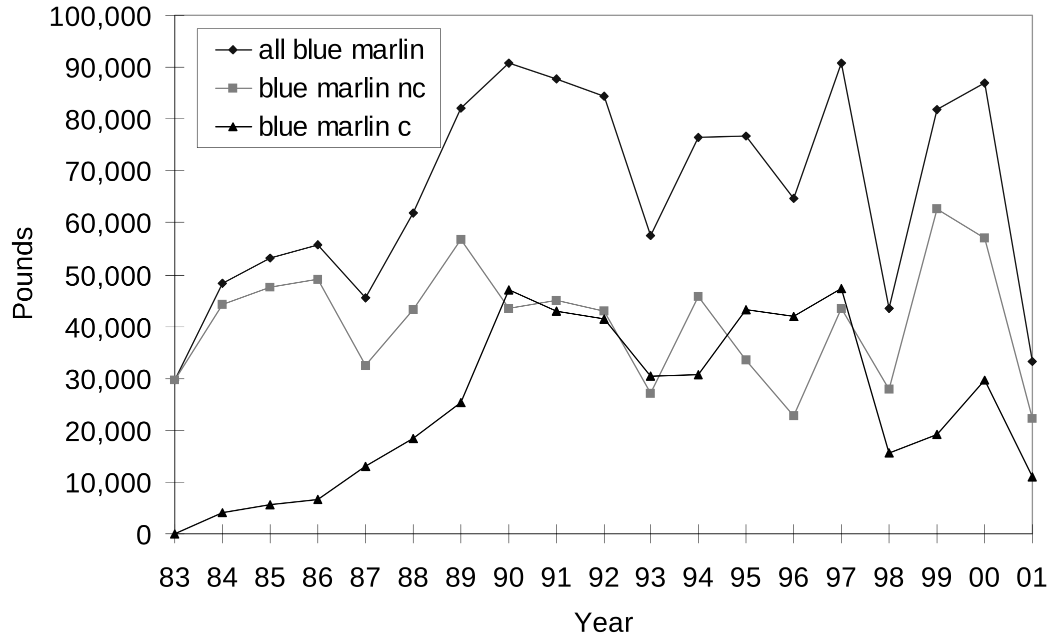
Interpretations: The general trend of wahoo non-charter landings slightly decreased over the past 14 years. Until 1987, most wahoo non-charter landings accounted for over 95% of the total catch. Beginning in 1988, this percentage decreased due to an increase in charter boat activity. From 1988 to 1998, wahoo non-charter landings have fluctuated accounting for 65% up to 92% of the total catch. The general trend of wahoo charter landings has slightly increased since 1985. In 1996, wahoo charter landings reached a high accounting for 35% of the total catch and has steadily decreased from then. For 2001, wahoo non-charters accounted for 90% of the total catch while charters accounted for 10%. Wahoo non-charter landings increased 83% and charter landings increased 2% from 2000. This year's increase in wahoo non-charter landings could be due to an increase in trolling effort and trip length while the increase in charter landings could be due to an increased interest in targeting wahoo this season.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 1a to 1d.

	Pounds Landed		
Year	all wahoo	wahoo nc	wahoo c
82	54,976	54,900	75
83	84,349	83,562	786
84	53,490	45,424	8,066
85	128,209	107,275	20,934
86	64,756	61,985	2,771
87	82,024	78,000	4,024
88	95,180	82,107	13,073
89	125,720	112,006	13,714
90	84,873	70,698	14,176
91	55,952	42,681	13,270
92	82,238	59,675	22,563
93	62,373	46,318	16,055
94	50,390	37,712	12,677
95	77,325	62,224	15,102
96	147,181	95,884	51,297
97	64,956	47,538	17,418
98	157,947	145,524	12,424
99	76,958	67,170	9,788
00	70,614	58,436	12,178
01	119,602	107,185	12,417
Average	86,956	73,315	13,640
Std. deviation	32,073	28,233	10,725

Figure 3a. Guam annual estimated total blue marlin landings: blue marlin, blue marlin nc, and blue marlin c



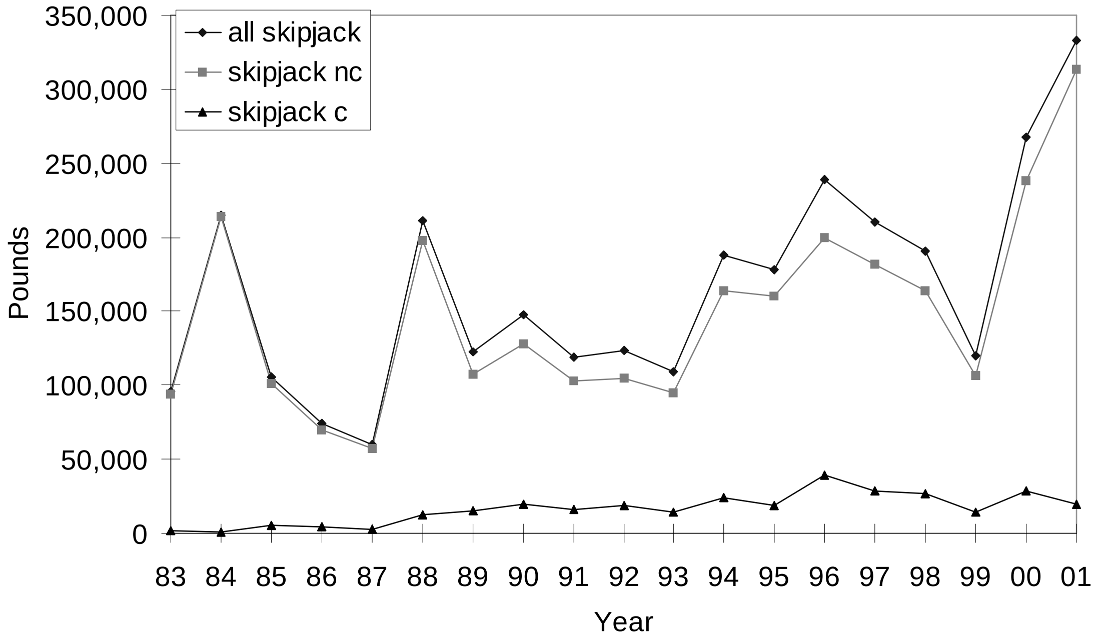
Interpretations: The general trend of blue marlin non-charter landings has decreased over the past 14 years while blue marlin charter landings has increased with the increase in trolling boat activity. During the 1980's, non-charters accounted for the bulk of the marlin catch. In the early 1990's, charters began to account for about 50% of the total catch. In the middle 1990's, charters began to account for most of the catch. These increases are due to the increase in charter boat activity. The decrease in charter landings after 1997 is due to the decrease in charter trips. In 2001, non-charters accounted for 67% of the total marlin catch while charters accounted for 33%. Non-charter landings and charter landings decreased 61% and 171% from 2000. The decrease in blue marlin non-charter and charter landings in 2001 could be due to a decrease in troll trips.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 1a to 1d.

	Pounds Landed		
Year	all blue marlin	blue marlin nc	blue marlin c
82	20,086	20,086	0
83	29,688	29,688	0
84	48,239	44,185	4,055
85	53,117	47,494	5,623
86	55,766	49,099	6,667
87	45,620	32,490	13,130
88	61,816	43,342	18,474
89	82,120	56,721	25,399
90	90,749	43,600	47,148
91	87,838	44,941	42,897
92	84,356	42,937	41,419
93	57,530	27,046	30,484
94	76,514	45,889	30,625
95	76,637	33,451	43,186
96	64,677	22,742	41,935
97	90,726	43,427	47,299
98	43,511	27,886	15,625
99	81,888	62,724	19,164
00	86,891	57,161	29,730
01	33,253	22,274	10,979
Average	63,551	39,859	23,692
Std. deviation	21,990	12,309	16,460

Figure 4a. Guam annual estimated total skipjack landings: skipjack, skipjack nc, and skipjack c



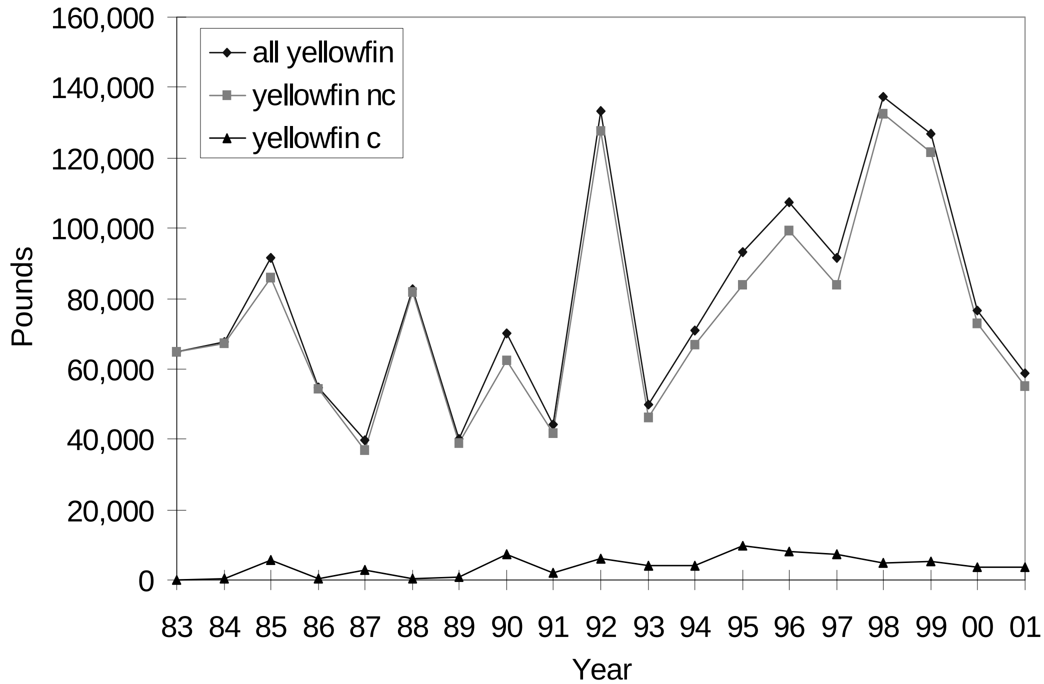
Interpretations: The estimated total landings has increased from 1987 to 1996 with an increase in trolling boat activity although a general decrease is observed from 1996. Prior to 1988, non-charter trolling trips accounted for over 90% of the pelagic catch. Because of an increase in charter activity in 1988, charters began to account for up to 16% of the skipjack tuna landings. In 2001, non-charters accounted for 94% of the total catch while charters accounted for 6%. Non-charter landings increased 31% and charter landings decreased 33% from 2000. The increase in non-charter landings in 2000 could be due to an increase in non-charter trolling effort while the decrease in charter landings could be due to a decrease in charter trolling effort and trips.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 1a to 1d.

	Pounds Landed		
Year	all skipjack	skipjack nc	skipjack c
82	125,472	123,247	2,225
83	95,449	93,796	1,652
84	215,102	213,937	1,165
85	105,754	100,732	5,022
86	74,450	69,642	4,808
87	59,569	56,908	2,661
88	211,014	198,085	12,929
89	122,588	107,678	14,910
90	147,702	127,870	19,832
91	118,799	102,967	15,832
92	123,731	104,504	19,227
93	109,244	94,713	14,532
94	188,408	163,937	24,471
95	178,404	160,052	18,353
96	239,006	199,958	39,048
97	210,535	181,605	28,930
98	190,466	163,858	26,609
99	120,137	106,199	13,938
00	267,562	238,529	29,033
01	332,718	313,173	19,545
Average	161,806	146,070	15,736
Std. deviation	69,691	63,866	10,640

Figure 4b. Guam annual estimated total yellowfin landings: yellowfin, yellowfin nc, and yellowfin c



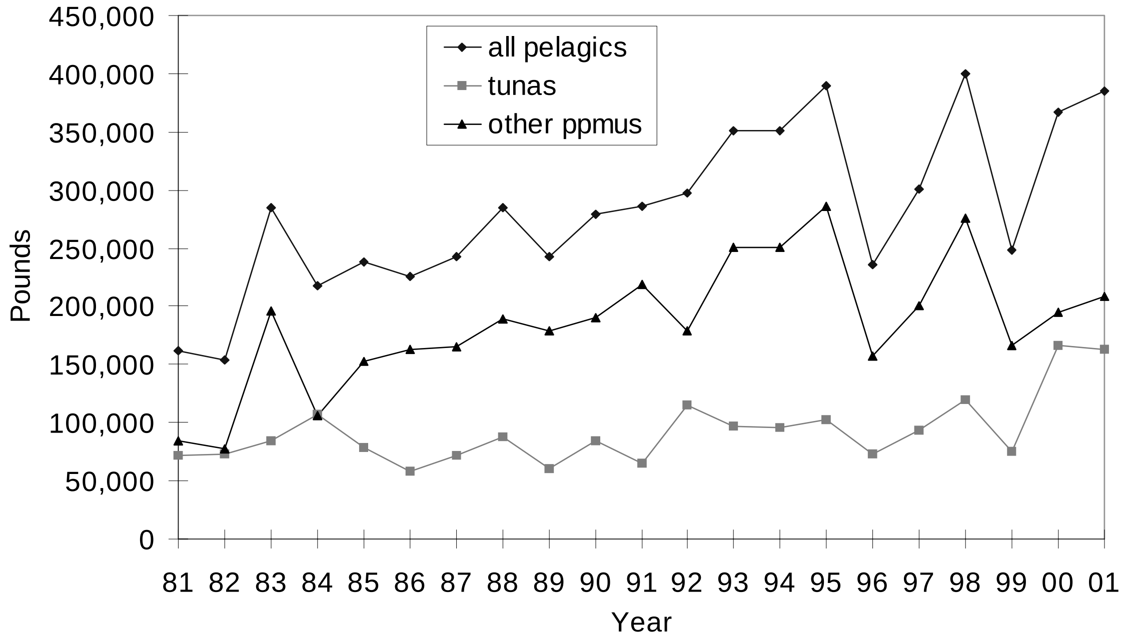
Interpretations: The estimated total landings of non-charters have increased from 1987 to 1999 while charters have only slightly increased with the increase in trolling boat activity. Non-charter trolling trips account for the bulk of the yellowfin catch. In 2001, non-charters accounted for 94% of the total yellowfin catch while charters accounted for 6%. Non-charter yellowfin and charter yellowfin landings decreased 24% and 6% from 2000. Charters have a small percentage of the yellowfin catch because they fish close to the island where there are not many yellowfins as compared to non-charters who fish farther from the island.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods for all years except 1992-93 as described in Figure 1.

	Pounds Landed		
Year	all yellowfin	yellowfin nc	yellowfin c
82	112,287	110,410	1,877
83	64,684	64,684	0
84	67,463	67,207	256
85	91,560	85,813	5,748
86	54,781	54,297	485
87	39,766	37,061	2,705
88	82,549	81,985	565
89	39,967	39,048	920
90	69,952	62,519	7,433
91	44,073	41,865	2,208
92	133,397	127,508	5,889
93	49,973	46,053	3,920
94	71,081	66,899	4,183
95	93,329	83,703	9,626
96	107,244	99,343	7,901
97	91,455	83,982	7,474
98	137,395	132,388	5,008
99	126,858	121,398	5,460
00	76,528	72,828	3,700
01	58,694	55,207	3,486
Average	80,652	76,710	3,942
Std. deviation	30,482	29,195	2,846

Figure 5. Guam annual estimated commercial landings: all pelagics, tunas, and other PPMUS



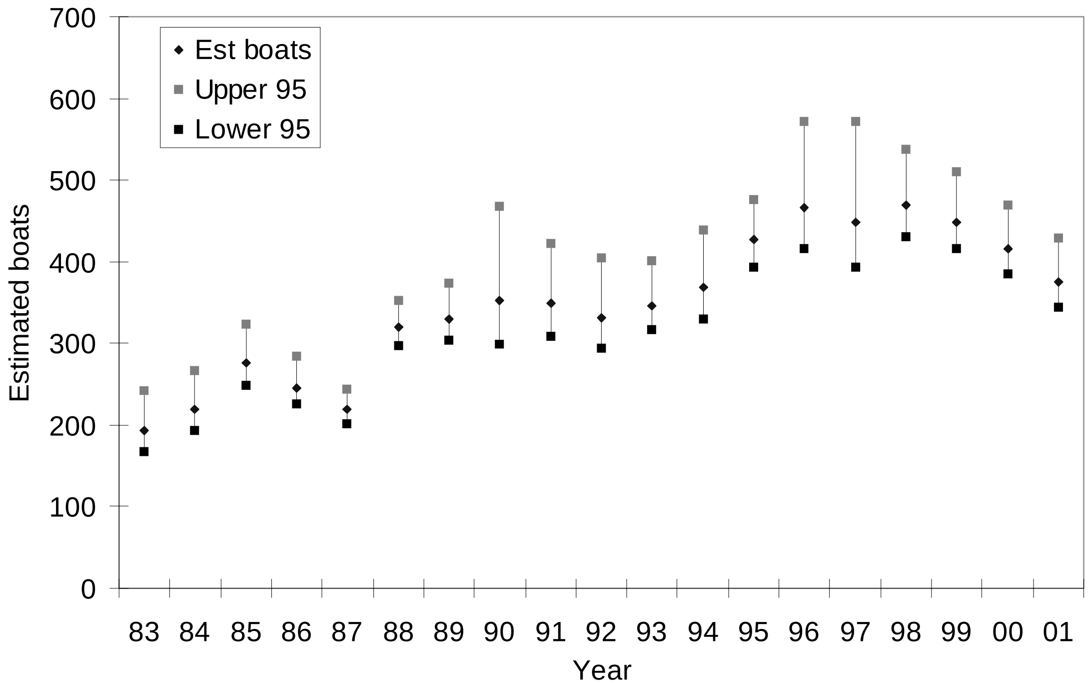
Interpretations: Commercial pelagic fishery landings appear to have increased steadily for the last 19 years, especially with the growth of the charter boat industry. In 2001, tunas accounted for 42% of the total pelagic landings while other PPMUS accounted for 54%. Commercial landings increased 5% for all pelagics and 8% for other PPMUS while for tunas decreased 2%. Because most vendors do not obtain the number of hours fished from fishermen, it is impossible to determine if trolling effort is responsible for yearly increases or decreases in commercial landings.

Source: The WPacFIN-sponsored commercial landings system.

Calculation: The total estimated commercial landings for each year were calculated by summing the weight fields in the commercial landings data base from the principle fish wholesalers on Guam, and then multiplying by an estimated percent coverage expansion factor. The annual expansion factor was subjectively created based on as much information as possible depending on the year, including: an analysis of the "disposition of catch" data available from the DAWR offshore creel survey; an evaluation of the fishermen in the fishery and their entry/exit patterns; general "dock side" knowledge of the fishery and the status of the marketing conditions and structure; the overall number of records in the data base; and a certain measure of best guesses.

	Pounds Landed		
Year	all pelagics	tunas	other ppmus
80	118,275	45,043	70,319
81	162,186	72,229	84,371
82	153,577	72,347	77,602
83	285,118	83,764	196,182
84	218,028	107,568	106,218
85	237,695	79,028	153,076
86	226,138	57,689	163,291
87	242,444	72,004	164,809
88	284,408	88,093	189,455
89	242,554	59,825	178,424
90	279,121	84,176	190,201
91	285,696	64,694	218,588
92	296,809	114,765	178,307
93	351,201	96,289	250,211
94	351,187	95,321	250,348
95	389,849	102,236	285,481
96	235,270	73,394	157,196
97	300,457	93,825	200,151
98	400,200	120,186	275,168
99	248,472	75,346	166,699
00	367,143	165,898	194,261
01	385,510	162,903	208,938
Average	275,515	90,301	179,968
Std.deviation	77,482	30,389	58,754

Figure 6. Guam estimated number of trolling boats



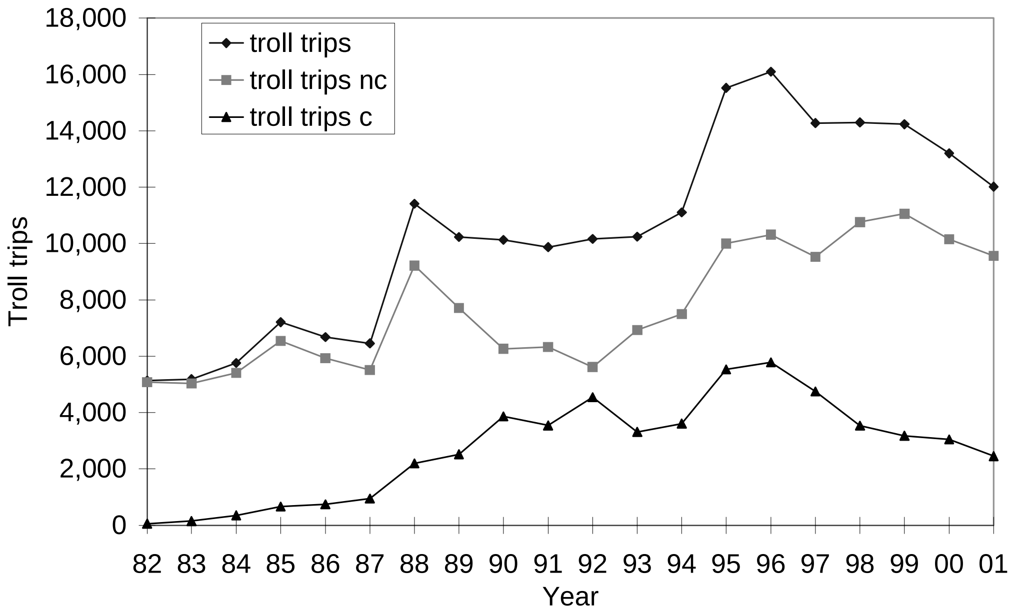
Interpretations: The number of trolling boats on Guam has been steadily increasing, especially since the addition of two marinas to the offshore sampling program. There appears to be a general increase in the number of small boats participating in Guam's pelagic fishery, while the number of charter vessels has remained fairly constant for several years. The number of trolling boats decreased slightly in 2001, approximately 10%. The estimated number of boats was 375 with an upper 95% non-parametric confidence limit of 429 and a lower of 345.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Since only a fraction of the days of the year are sampled, it is not possible to know the exact number of boats participating in the fishery. The 1998 trolling boat log was converted and processed through a boat estimator model 1,000 times. There were 1,315 logged trolling trips made by 383 different vessels, counted on 91 sample days.

Year	Estimated Number of Boats Est_boats	Upper 95	Lower 95
82	199	280	165
83	193	242	168
84	219	267	193
85	276	323	249
86	246	284	226
87	219	244	201
88	320	353	297
89	329	374	303
90	352	467	299
91	349	422	309
92	332	405	294
93	346	401	316
94	369	439	329
95	427	476	393
96	466	572	415
97	449	572	393
98	469	537	430
99	449	510	415
00	416	470	385
01	375	429	345
Average	340	403	306
Std. deviation	91	106	84

Figure 7a. Guam annual estimated number of troll trips, troll trips nc, and troll trips c



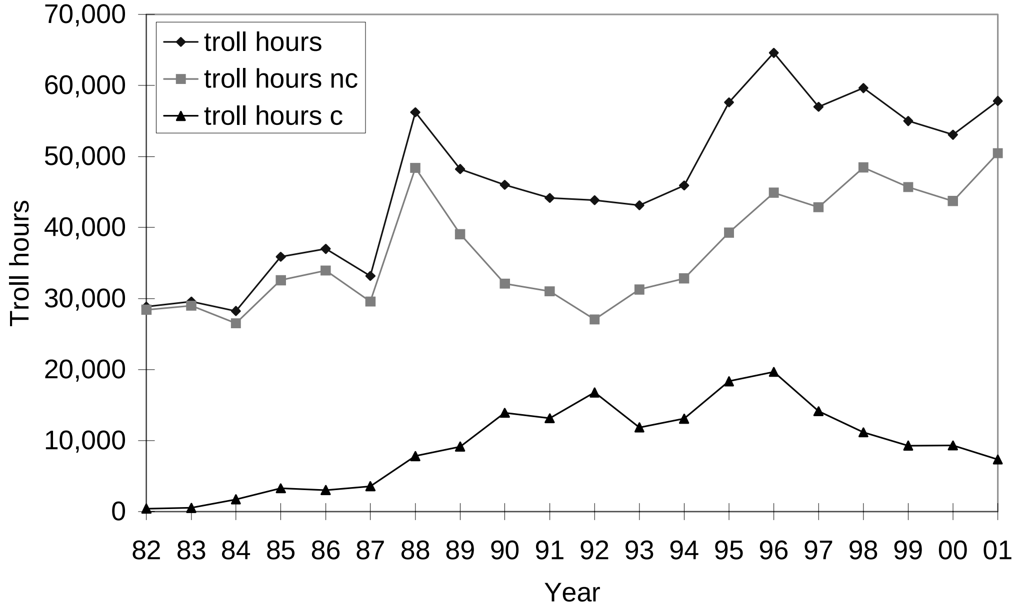
Interpretations: Non-charter and charter troll trips have increased over the past 17 years. Charter boat trips decreased over the past four years due to a decrease in charter activity resulting from a significant drop in tourism. Compared with 2000, non-charter troll trips and charter troll trips decreased 6% and 20%. Charter trolling trips made up 80% of all trolling trips while charters made up 20%.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated number of trips for the trolling method as taken directly from creel survey expansion system printouts.

Year	troll trips	troll trips nc	troll trips c
82	5,138	5,078	60
83	5,187	5,039	148
84	5,763	5,411	353
85	7,209	6,544	665
86	6,677	5,932	744
87	6,458	5,513	945
88	11,412	9,221	2,192
89	10,230	7,714	2,515
90	10,130	6,264	3,865
91	9,870	6,325	3,545
92	10,165	5,614	4,551
93	10,247	6,931	3,316
94	11,103	7,497	3,606
95	15,528	10,000	5,528
96	16,098	10,317	5,781
97	14,279	9,528	4,751
98	14,295	10,758	3,537
99	14,233	11,053	3,180
00	13,204	10,152	3,052
01	12,016	9,563	2,453
Average	10,462	7,723	2,739
Std. deviation	3,494	2,118	1,774

Figure 7b. Guam annual estimated number of troll hours, troll hours nc, and troll hours c



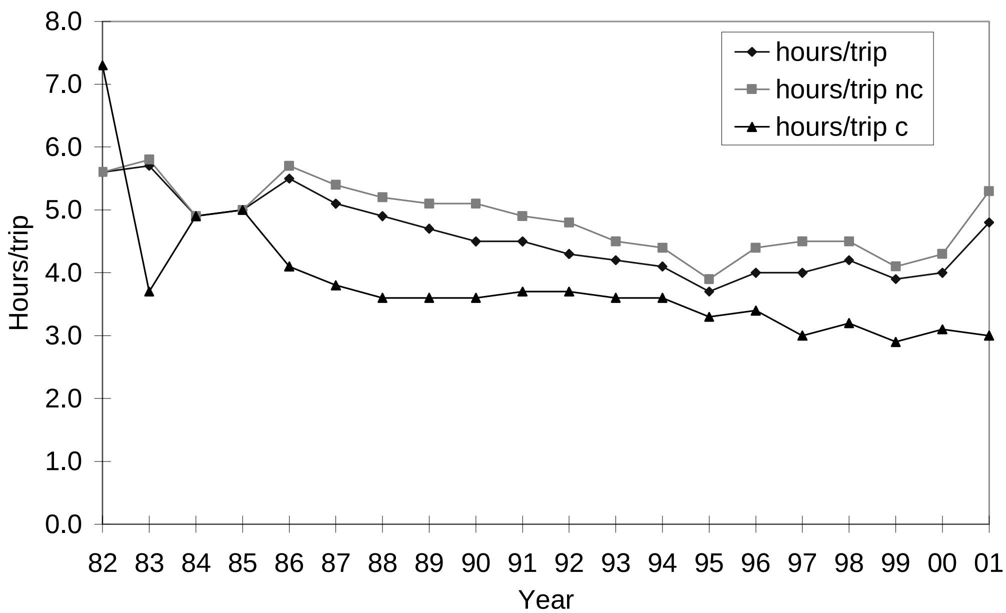
Interpretations: Trolling hours for non-charters and charters have increased over the past 17 years. From 1996, charter troll hours decreased due to a decrease in charter trolling activity, which also contributed to the decrease in total troll hours. Compared with 2000, non-charter troll hours increased 15% while charter troll hours decreased 21%. Non-charters accounted for 87% of the total troll hours while charters accounted for 13%.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated boat hours spent fishing for the trolling method as taken directly from creel survey expansion system printouts.

Year	troll hours	troll hours nc	troll hours c
82	28,857	28,419	438
83	29,555	29,009	546
84	28,256	26,528	1,727
85	35,895	32,593	3,302
86	36,997	33,940	3,057
87	33,187	29,605	3,582
88	56,224	48,398	7,826
89	48,226	39,063	9,163
90	46,021	32,096	13,925
91	44,151	31,016	13,135
92	43,855	27,070	16,785
93	43,131	31,274	11,857
94	45,931	32,829	13,102
95	57,626	39,284	18,342
96	64,603	44,916	19,687
97	56,994	42,856	14,137
98	59,645	48,453	11,192
99	54,991	45,685	9,305
00	53,066	43,731	9,335
01	57,825	50,489	7,336
Average	46,252	36,863	9,389
Std. deviation	11,262	7,977	5,875

Figure 7c. Guam annual estimated hours/trip, hours/trip nc, and hours/trip c



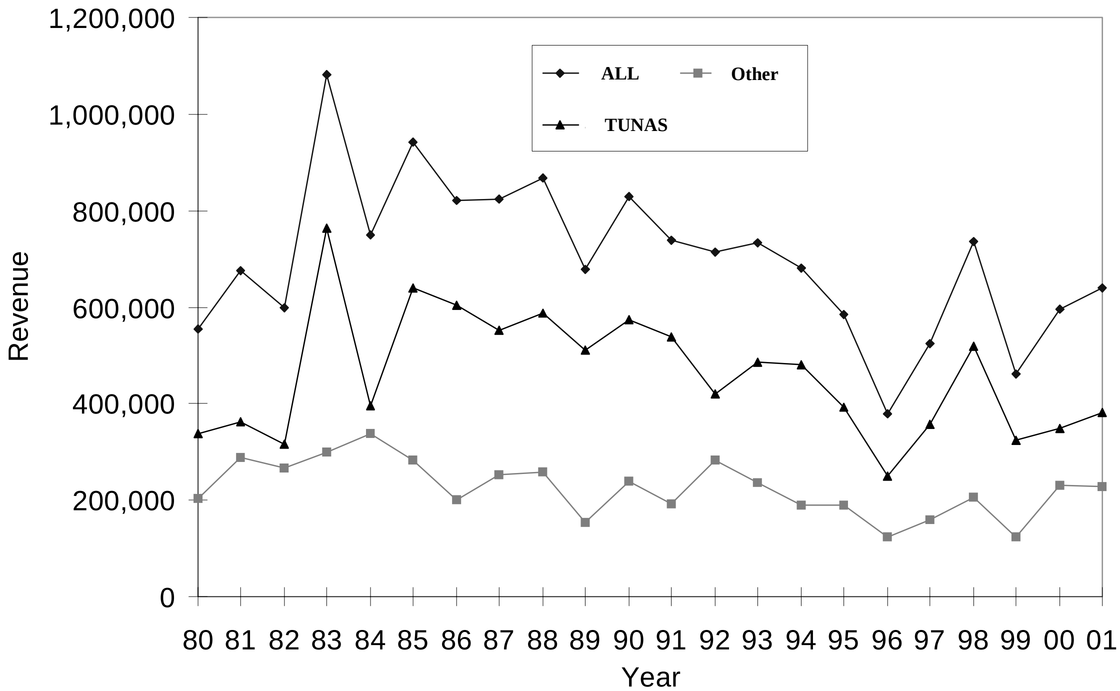
Interpretations: Hours per trip for non-charters and charters have decreased over the past 15 years from 1986 to 2001. Compared with 2000, non-charter hours per trip increased 23% while charter hours per trip decreased 3%, respectively.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated boat hours spent fishing and number of trips for the trolling method as taken directly from creel survey expansion system printouts.

Year	hours/trip	hours/trip nc	hours/trip c
82	5.6	5.6	7.3
83	5.7	5.8	3.7
84	4.9	4.9	4.9
85	5.0	5.0	5.0
86	5.5	5.7	4.1
87	5.1	5.4	3.8
88	4.9	5.2	3.6
89	4.7	5.1	3.6
90	4.5	5.1	3.6
91	4.5	4.9	3.7
92	4.3	4.8	3.7
93	4.2	4.5	3.6
94	4.1	4.4	3.6
95	3.7	3.9	3.3
96	4.0	4.4	3.4
97	4.0	4.5	3.0
98	4.2	4.5	3.2
99	3.9	4.1	2.9
00	4.0	4.3	3.1
01	4.8	5.3	3.0
Average	4.6	4.9	3.8
Std. deviation	0.6	0.5	1.0

Figure 8. Guam annual estimated commercial inflation adjusted total revenues: all pelagics, tunas, and other PPMUS



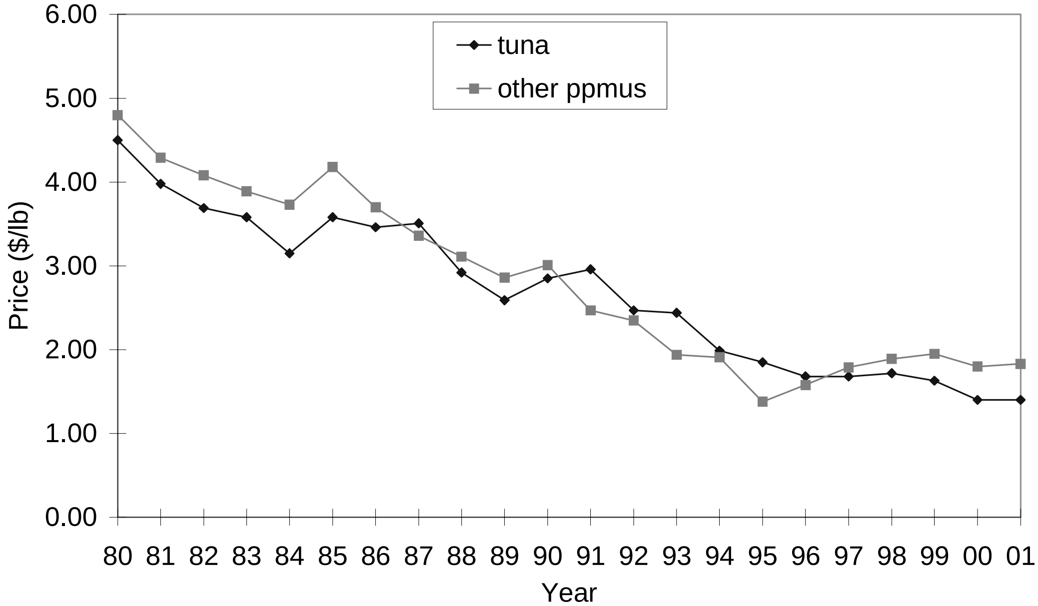
Interpretations: Adjusted revenues in 2001 increased for all pelagics and other PPMUS while decreasing for tunas. Revenues increased 7% for all pelagics, decreased 2% for tunas, and increased 10% for other PPMUS.

Source: The WPACFIN-sponsored commercial landings system.

Calculation: The total estimated revenue for each year was calculated by summing the revenue fields in the commercial landings data base from the principle fish wholesalers on Guam, and then multiplying by the same percent coverage expansion factor as were the landings in figure 5. Inflation-adjusted total revenue per trip is derived from the Guam Annual Consumer Price Index (CPI).

	Revenues($)					
	All pelagics		Tunas		Other ppmus	
Year	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.
1980	149,160	555,919	54,353	202,572	90,623	337,752
1981	218,384	675,681	92,914	287,477	117,052	362,160
1982	203,847	599,923	90,719	266,986	107,573	316,588
1983	380,231	1,081,376	105,308	299,496	268,201	762,763
1984	286,490	749,458	129,389	338,482	151,371	395,986
1985	373,796	941,217	112,286	282,735	253,815	639,106
1986	334,955	821,310	81,299	199,346	246,087	603,407
1987	350,828	823,744	107,642	252,744	235,603	553,195
1988	388,630	867,033	115,243	257,108	263,730	588,383
1989	337,586	679,223	76,865	154,653	253,932	510,911
1990	471,241	830,328	136,321	240,197	325,372	573,305
1991	462,191	738,580	119,640	191,185	337,328	539,050
1992	492,707	714,918	195,547	283,738	289,129	419,526
1993	547,835	733,552	175,360	234,808	362,728	485,692
1994	593,838	679,945	165,296	189,264	418,612	479,311
1995	537,889	585,223	173,629	188,909	361,363	393,163
1996	366,280	379,466	118,883	123,163	239,901	248,537
1997	515,007	525,307	154,819	157,915	351,304	358,330
1998	718,169	736,123	201,639	206,680	506,460	519,122
1999	458,638	461,848	122,023	122,878	323,088	325,350
2000	603,370	595,526	234,735	231,684	354,173	349,569
2001	639,928	639,928	227,870	227,870	382,772	382,772
	Average	700,710		224,540		461,090
	Std. Deviation	159,612		57,122		127,669

Figure 9. Guam average price of tunas and other PPMUS



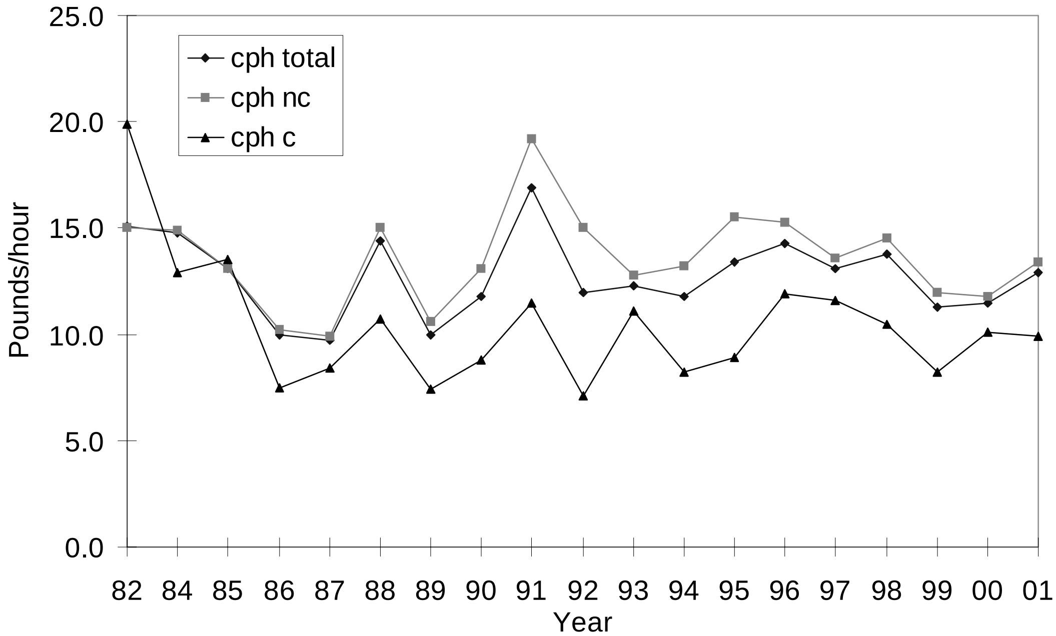
Interpretations: The inflation-adjusted price of tunas and other PPMUS shows a general decline during the past 20 years. Compared with 2000, the adjusted price for tuna remained the same while for other PPMUS increased 2%. The rate of drop has flattened and stabilized due to less inflation rate.

Source: The WPACFIN-sponsored commercial landings system.

Calculation: The average price of the Tunas and other PPMUS groups are calculated by dividing the total revenue for each by the sold weight. The inflation adjustment is made by using the Consumer Price Index (CPI) for Guam and establishing the current year figure as the base from which to calculate expansion factors for all previous years (e.g., divide the current year CPI by the CPI of any given year), and then multiplying that factor by the unadjusted average price for the given year.

	Price/lb			
		Tuna		Other PPMUS
Year	Unadj.	Adj.	Unadj.	Adj
1980	1.21	4.50	1.29	4.80
1981	1.29	3.98	1.39	4.29
1982	1.25	3.69	1.39	4.08
1983	1.26	3.58	1.37	3.89
1984	1.20	3.15	1.43	3.73
1985	1.42	3.58	1.66	4.18
1986	1.41	3.46	1.51	3.70
1987	1.49	3.51	1.43	3.36
1988	1.31	2.92	1.39	3.11
1989	1.28	2.59	1.42	2.86
1990	1.62	2.85	1.71	3.01
1991	1.85	2.96	1.54	2.47
1992	1.70	2.47	1.62	2.35
1993	1.82	2.44	1.45	1.94
1994	1.73	1.99	1.67	1.91
1995	1.70	1.85	1.27	1.38
1996	1.62	1.68	1.53	1.58
1997	1.65	1.68	1.76	1.79
1998	1.68	1.72	1.84	1.89
1999	1.62	1.63	1.94	1.95
2000	1.41	1.40	1.82	1.80
2001	1.40	1.40	1.83	1.83
	Average	2.68		2.81
	Std. Deviation	0.92		1.05

Figure 10a. Guam trolling catch rates: cph total, cph nc, and cph c



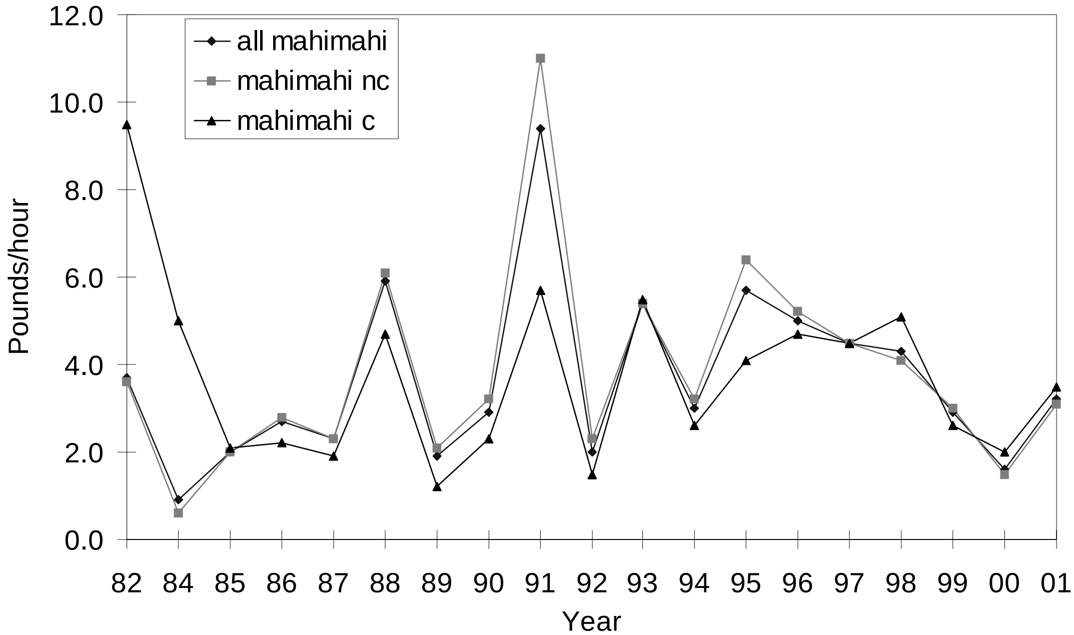
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. In 2001, total catch rate and non-charter catch rate increased 12 % and 14%, respectively, while charter catch rate decreased 2%. No general trend in CPUE is apparent. The total CPUE has been pretty stable over the past 15 years.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of all troll catch, divided by the total number of hours spent fishing (gear in use).

Year	cph total	cph nc	cph c
82	15.1	15.0	19.9
83	14.8	14.9	10.4
84	14.8	14.9	12.9
85	13.1	13.1	13.5
86	10.0	10.2	7.5
87	9.7	9.9	8.4
88	14.4	15.0	10.7
89	10.0	10.6	7.4
90	11.8	13.1	8.8
91	16.9	19.2	11.5
92	12.0	15.0	7.1
93	12.3	12.8	11.1
94	11.8	13.2	8.2
95	13.4	15.5	8.9
96	14.3	15.3	11.9
97	13.1	13.6	11.6
98	13.8	14.5	10.5
99	11.3	12.0	8.2
00	11.5	11.8	10.1
01	12.9	13.4	9.9
Average	12.9	13.7	10.4
Std. deviation	1.9	2.2	2.9

Figure 10b. Guam trolling catch rates: all mahimahi, mahimahi nc, mahimahi c



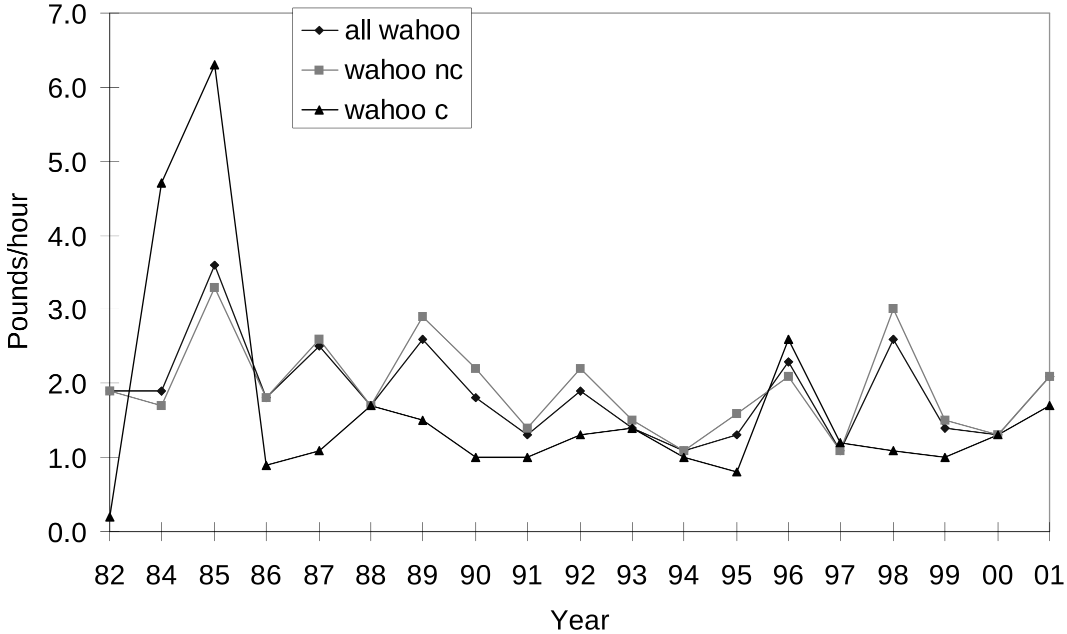
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. In 2001, the catch rate for mahimahi non-charters and mahimahi charters increased 106% and 75%.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of mahimahi divided by the total number of hours spent fishing (gear in use).

Year	all mahimahi	mahimahi nc	mahimahi c
82	3.7	3.6	9.5
83	5.0	5.0	5.8
84	0.9	0.6	5.0
85	2.0	2.0	2.1
86	2.7	2.8	2.2
87	2.3	2.3	1.9
88	5.9	6.1	4.7
89	1.9	2.1	1.2
90	2.9	3.2	2.3
91	9.4	11.0	5.7
92	2.0	2.3	1.5
93	5.4	5.4	5.5
94	3.0	3.2	2.6
95	5.7	6.4	4.1
96	5.0	5.2	4.7
97	4.5	4.5	4.5
98	4.3	4.1	5.1
99	2.9	3.0	2.6
00	1.6	1.5	2.0
01	3.2	3.1	3.5
Average	3.7	3.9	3.8
Std. deviation	2.0	2.3	2.0

Figure 10c. Guam trolling catch rates: all wahoo, wahoo nc, and wahoo c



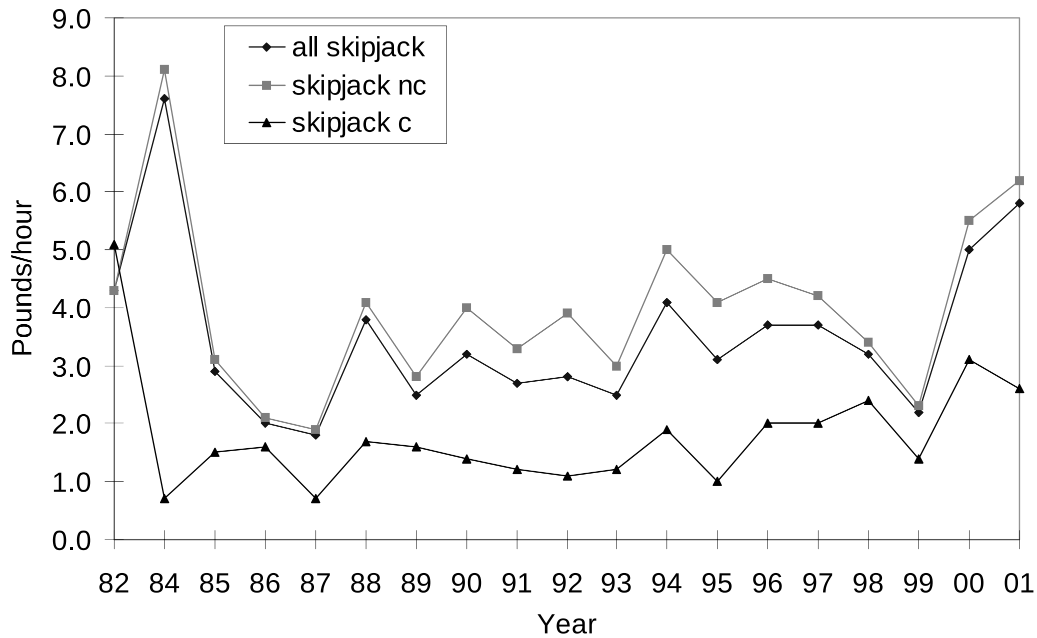
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. In 2001, the catch rate for wahoo non-charter and wahoo charter increased 62% and 31%, respectively.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of wahoo divided by the total number of hours spent fishing (gear in use).

Year	all wahoo	wahoo nc	wahoo c
82	1.9	1.9	0.2
83	2.9	2.9	1.4
84	1.9	1.7	4.7
85	3.6	3.3	6.3
86	1.8	1.8	0.9
87	2.5	2.6	1.1
88	1.7	1.7	1.7
89	2.6	2.9	1.5
90	1.8	2.2	1.0
91	1.3	1.4	1.0
92	1.9	2.2	1.3
93	1.4	1.5	1.4
94	1.1	1.1	1.0
95	1.3	1.6	0.8
96	2.3	2.1	2.6
97	1.1	1.1	1.2
98	2.6	3.0	1.1
99	1.4	1.5	1.0
00	1.3	1.3	1.3
01	2.1	2.1	1.7
Average	1.9	2.0	1.7
Std. deviation	0.7	0.7	1.4

Figure 11a. Guam trolling catch rates: all skipjack, skipjack nc, and skipjack c



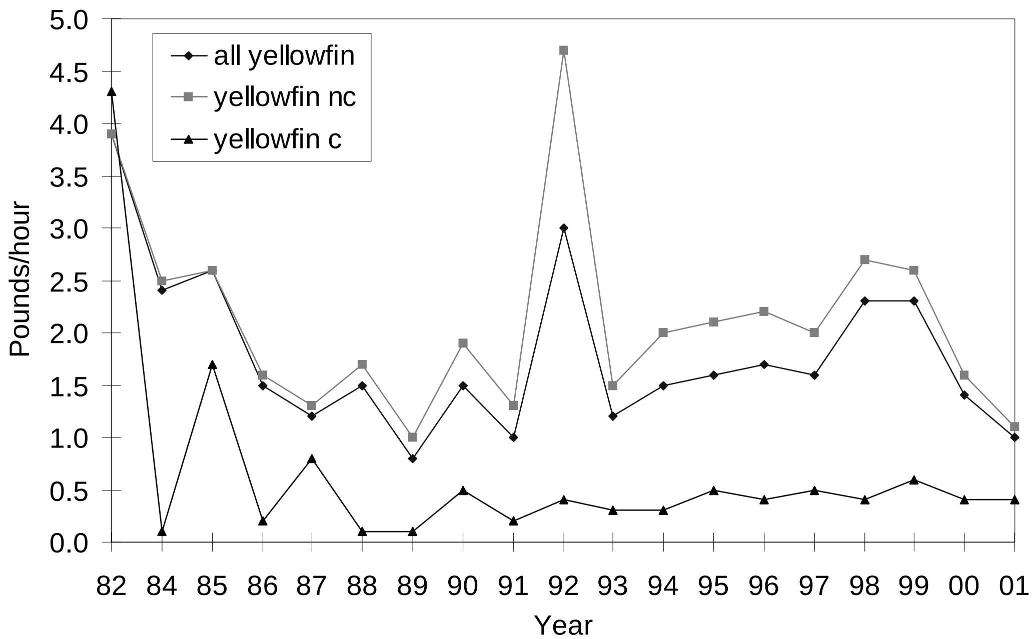
Interpretations: The wide fluctuations in CPUE for skipjack tunas are probably due to the high variability in the year to year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. Compared with 2000, the catch rate for skipjack non-charter CPUE increased 13% while skipjack charter CPUE decreased 16%.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of skipjack divided by the total number of hours spent fishing (gear in use).

Year	all skipjack	skipjack nc	skipjack c
82	4.3	4.3	5.1
83	3.1	3.1	3.0
84	7.6	8.1	0.7
85	2.9	3.1	1.5
86	2.0	2.1	1.6
87	1.8	1.9	0.7
88	3.8	4.1	1.7
89	2.5	2.8	1.6
90	3.2	4.0	1.4
91	2.7	3.3	1.2
92	2.8	3.9	1.1
93	2.5	3.0	1.2
94	4.1	5.0	1.9
95	3.1	4.1	1.0
96	3.7	4.5	2.0
97	3.7	4.2	2.0
98	3.2	3.4	2.4
99	2.2	2.3	1.4
00	5.0	5.5	3.1
01	5.8	6.2	2.6
Average	3.5	3.9	1.9
Std. deviation	1.4	1.5	1.0

Figure 11b. Guam trolling catch rates: all yellowfin, yellowfin nc, yellowfin c



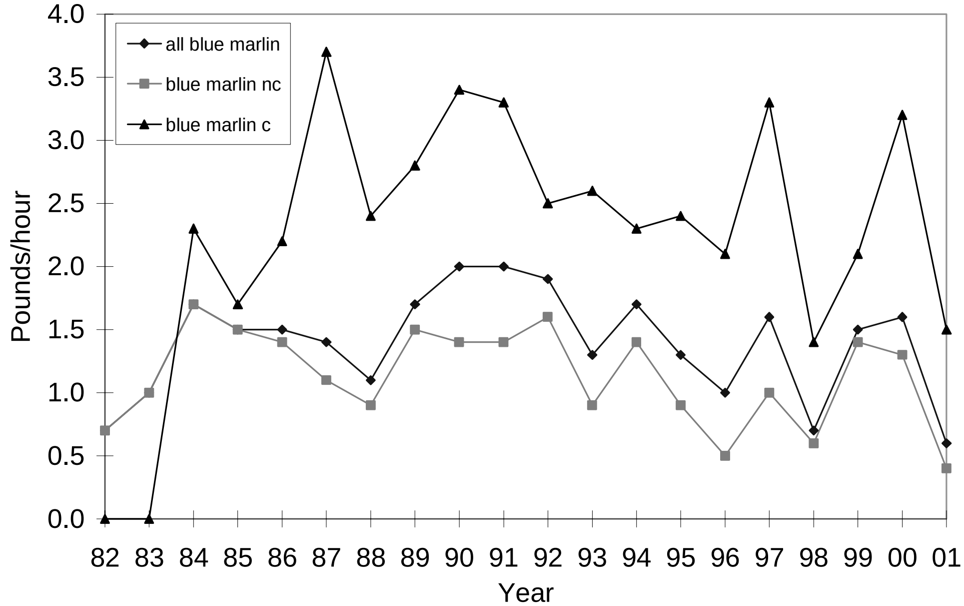
Interpretations: The wide fluctuations in CPUE for yellowfin tunas are probably due to the high variability in the year to year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. Compared with 2000, the catch rate for non-charter yellowfin tuna decreased 31% while charter yellowfin tuna remained the same.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of yellowfin divided by the total number of hours spent fishing (gear in use).

Year	all yellowfin	yellowfin nc	yellowfin c
82	3.9	3.9	4.3
83	2.2	2.2	0.0
84	2.4	2.5	0.1
85	2.6	2.6	1.7
86	1.5	1.6	0.2
87	1.2	1.3	0.8
88	1.5	1.7	0.1
89	0.8	1.0	0.1
90	1.5	1.9	0.5
91	1.0	1.3	0.2
92	3.0	4.7	0.4
93	1.2	1.5	0.3
94	1.5	2.0	0.3
95	1.6	2.1	0.5
96	1.7	2.2	0.4
97	1.6	2.0	0.5
98	2.3	2.7	0.4
99	2.3	2.6	0.6
00	1.4	1.6	0.4
01	1.0	1.1	0.4
Average	1.8	2.1	0.6
Std. deviation	0.8	0.9	0.9

Figure 11c. Guam trolling catch rates: all blue marlin, blue marlin nc, and blue marlin c



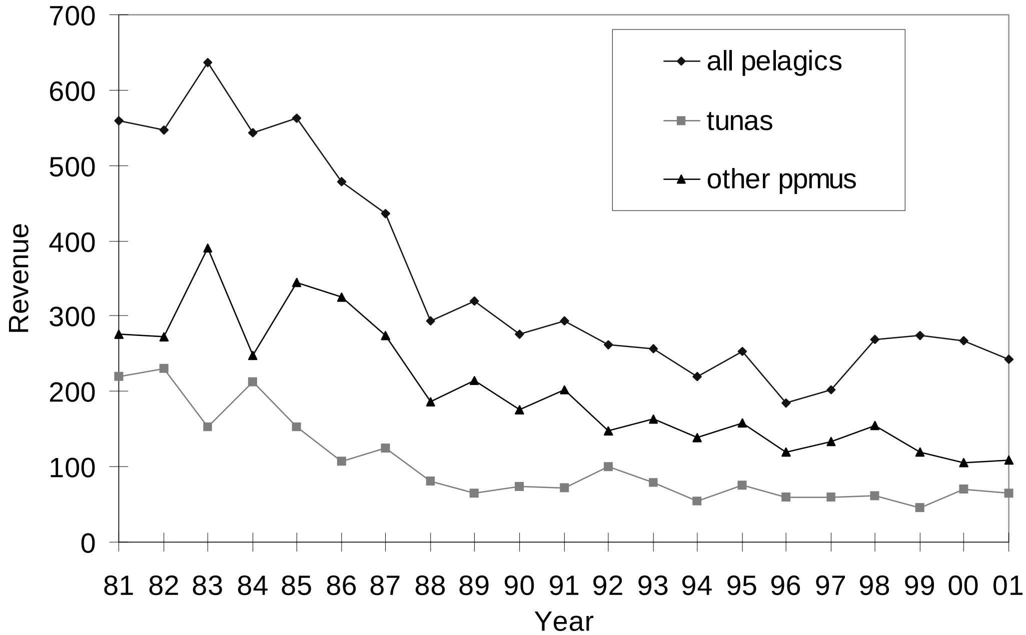
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. The high CPUE of charters is probably due to the increase in targeting this species during marlin season. The overall decline of charter CPUE since the early 1990's is probably due to the influence of the longline fisheries. Compared with 2000, blue marlin non-charter catch rate and blue marlin charter catch rate decreased 69% and 53%, respectively.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of marlin divided by the total number of hours spent fishing (gear in use).

Year	all blue marlin	blue marlin nc	blue marlin c
82	0.7	0.7	0.0
83	1.0	1.0	0.0
84	1.7	1.7	2.3
85	1.5	1.5	1.7
86	1.5	1.4	2.2
87	1.4	1.1	3.7
88	1.1	0.9	2.4
89	1.7	1.5	2.8
90	2.0	1.4	3.4
91	2.0	1.4	3.3
92	1.9	1.6	2.5
93	1.3	0.9	2.6
94	1.7	1.4	2.3
95	1.3	0.9	2.4
96	1.0	0.5	2.1
97	1.6	1.0	3.3
98	0.7	0.6	1.4
99	1.5	1.4	2.1
00	1.6	1.3	3.2
01	0.6	0.4	1.5
Average	1.4	1.2	2.3
Std. deviation	0.4	0.4	1.0

Figure 12. Guam inflation-adjusted revenues per trolling trip: all pelagics, tunas, and other PPMUS



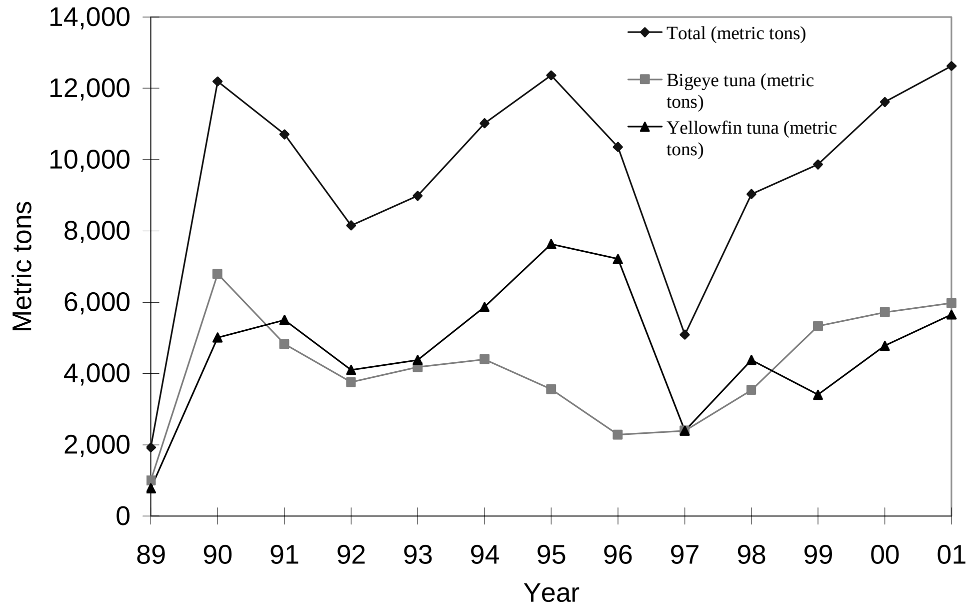
Interpretation: There has been a general decrease in the adjusted revenue per trip for all pelagics, tunas and other PPMUS over the past 20 years. In 2001, adjusted revenue per trip decreased 10% and 7% for all pelagics and for other tunas while increasing 4% for other PPMUS. Care must be taken in interpreting this data, since the Guam fishery is subject to biases created by marketing problems and the market structure upon which the data collecting system is based. During 1988, 1991, and 1993, record highs in the abundance and landings of mahimahi did not result in high revenues per trolling trip for those years. A glut in the market and other marketing problems during those years resulted in low revenues per trolling trip. Beginning in 1997, though, several major fish vendors began competing for pelagic fish, with one placing no limit on fish sold to it by its members. Despite revenues increasing or decreasing, effort still occurs since most charter and non-charter trolling boats do not rely on selling their fish for a living.

Source: The WPacFIN-sponsored commercial landings system.

Calculation: The average revenue per trip was calculated by summing the revenue of all species sold then dividing by the number of trips, and summing the revenue of tunas and other PPMUS sold, and then dividing each by the number of trips, respectively, for any trip which landed PPMUS. Adjusted revenue per trip was derived from the Guam Annual Consumer Price Index (CPI).

Revenues per trip ($)						
	All pelagics		Tunas		Other ppmus	
Year	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.
1980	144	538	50	187	84	311
1981	181	559	71	219	89	276
1982	186	547	78	231	93	273
1983	224	636	54	153	137	390
1984	208	544	81	212	95	248
1985	223	562	61	153	137	345
1986	195	478	44	107	133	325
1987	186	437	53	125	117	275
1988	131	293	37	81	84	186
1989	159	320	32	65	107	214
1990	157	277	42	73	99	175
1991	183	293	45	72	127	203
1992	181	262	69	100	102	148
1993	192	257	59	79	122	164
1994	192	220	48	55	121	139
1995	234	254	70	76	146	159
1996	179	185	57	59	115	119
1997	199	203	58	59	131	133
1998	262	269	60	61	151	154
1999	273	275	45	45	118	119
2000	272	268	71	70	106	105
2001	242	242	65	65	109	109
Average		360		107		208
Std. deviation		145		59		85

Figure 13. Annual Guam longline landings from primarily foreign longliners fishing outside the Guam EEZ



Interpretation: Annual landings from a primarily foreign longline fishing fleet have ranged up to 13,851 tons since the fishery began in the late 1980's. These vessels fish primarily outside Guam's EEZ, yet tranship their catch from Guam. Compared with 1999, total longline landings, bigeye landings and yellowfin tuna landings increased 9%, 5%, and 18%.

Source: The Guam Department of Commerce.

Calculation: Pre-1990 data was extracted directly from transshipment agents' files. Beginning in 1990, a mandatory data submission program was implemented.

Foreign Longline Landings

Year	Total (metric tons)	Bigeye tuna (metric tons)	Yellowfin tuna (metric tons)
89	1,925	999	777
90	12,198	6,793	5,011
91	10,707	4,824	5,505
92	8,157	3,754	4,104
93	8,981	4,178	4,379
94	11,023	4,400	5,867
95	12,366	3,560	7,635
96	10,356	2,280	7,214
97	5,093	2,395	2,392
98	9,032	3,533	4,379
99	9,865	5,328	3,404
00	11,618	5,718	4,778
01	12,627	5,977	5,650
Average	9,534	4,134	4,700
Standard Deviation	3,075	1,635	1,846

Table 4. Offshore Creel Survey Bycatch Weight Summary - Trolling

		Weight Released (Pounds)						Interviews		
Non-charter	Species	Alive	Dead/Inj	Both	All	BC %		With BC	All	BC %
	Carcharhinus falciformis	169.5		169.5	169.5	100				
	Carangidae	1.1		1.1	1.1	100				
	Acanthocybium solandri		15	15	3355.3	0.45				
	Thunnus albacares	2.5	114.6	117.1	2521.4	4.64				
	Total	**173.1**	**129.6**	**302.7**	**6041.3**	**5.01**		**6**	**326**	**1.84**
	Compare with all Species				**31214.1**	**0.97**				
Charter	Coryphaena hippurus	10.5		10.5	1980.9	0.53				
	Makaira mazara	190		190	698.5	19.62				
	Tetrapterus angustirostris	25		25	25	100				
	Total	**225.5**		**225.5**	**2974.3**	**7.58**		**4**	**135**	**2.96**
	Compare with all Species				**5558**	**4.06**				
	Total in Trolling	**398.6**	**129.6**	**528.2**	**9021.6**	**5.85**		**10**	**461**	**2.17**
	Compare with all Species				**36772.1**	**1.44**				

Interpretation: Total actual weight of bycatch is 528 pounds or 6 % of the total in trolling. Bycatch consist of 7 species: silky shark (Carcharhinus falciformis), a jack (Carangidae), wahoo (Acanthocybium solandri), yellowfin tuna (Thunnus albacares), mahimahi Caryphaena hippurus), blue marlin Makaira mazara), and shortbill spearfish (Tetrapterus angustirostris). Approximately, 76% or 398.6 pounds of the total actual bycatch (weight) was released alive. Non-charters released approximately 57% or 173.1 pounds of their bycatch alive while charters released 100% or 225.5 pounds of their bycatch alive. Approximately, 2% or 6 of the 326 non-charter interviews had bycatch while 3% or 4 of the 135 charter interviews had bycatch.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365 day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PPMUS separately are summed across all methods to obtain the numbers plotted above.

Table 5. Offshore Creel Survey Bycatch Number Summary - Trolling

		Number Released						Interviews		
Non-charter	Species	Alive	Dead/Inj	Both	All	BC %		With BC	All	BC %
	Carcharhinus falciformis	1		1	1	100				
	Carangidae	1		1	1	100				
	Acanthocybium solandri		1	1	359	0.28				
	Thunnus albacares	1	2	3	268	1.12				
	Total	**3**	**3**	**6**	**629**	**0.95**		**6**	**326**	**1.84**
	Compare with all Species				**4607**	**0.13**				
Charter	Coryphaena hippurus	1		1	167	0.60				
	Makaira mazara	2		2	9	22.22				
	Tetrapterus angustirostris	1		1	1	100				
	Total	**4**		**4**	**177**	**2.26**		**4**	**135**	**2.96**
	Compare with all Species				**682**	**0.59**				
	Total in Trolling	**7**	**3**	**10**	**806**	**1.24**		**10**	**461**	**2.17**
	Compare with all Species				**5289**	**0.19**				

Interpretation: Total actual number of bycatch is 10 or 1 % of the total in trolling. Bycatch consist of 7 species: silky shark (Carcharhinus falciformis), a jack (Carangidae), wahoo (Acanthocybium solandri), yellowfin tuna (Thunnus albacares), mahimahi Caryphaena hippurus), blue marlin Makaira mazara), and shortbill spearfish (Tetrapterus angustirostris). Approximately, 70% or 7 of the total bycatch (number) was released alive. Non-charters released approximately 50% or 3 of their bycatch alive while charters released 100% or 4 of their bycatch alive. Approximately, 2% or 6 of the 326 non-charter interviews had bycatch while 3% or 4 of the 135 charter interviews had bycatch.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365 day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PPMUS separately are summed across all methods to obtain the numbers plotted above.

Appendix 3

Hawaii

Introduction and Summary

The commercial pelagic fisheries in Hawaii went through three major phases during the period 1987-2001. The first occurred in the late 1980s with the discovery and exploitation of swordfish, which led to considerable increases in both catch and revenue. Commercial pelagic catch[1] more than doubled from 1987 to 1993. Catch dropped in 1994 but grew slowly throughout the rest of the 1990s. This phase was characterized by increased shark catches, primarily for fins, and a gradual pattern of increase in tuna catches that led to a peak of 36 million pounds in 1999. During the third phase, catch decreased substantially in the following two years due to regulatory actions.

Total ex-vessel revenue followed the same pattern as catch; i.e., it increased rapidly in the late 1980s, grew slowly up to 2000, and decreased by 33% in 2001. The primary reason behind this decrease was the loss in swordfish revenue.

The Hawaii-based longline fishery was the largest fishery in Hawaii even though catch decreased by 33% in 2001. This decrease is due to a significantly lower swordfish catch. Nonetheless, longline catch represented almost three-fourths of the total commercial pelagic catch in Hawaii.

The number of active Hawaii-based longline vessels grew from 37 vessels in 1987 to 141 in 1991, but then decreased to 103 in 1996 as vessels left for the U.S. mainland (primarily California) and Fiji. The number of vessels gradually increased back to 125 vessels in 2000 with the return of boats had that migrated to the mainland, along with a few new participants from the U.S. west coast and Alaska.

The most significant fishery management issue in 2001 was the prohibition on targeting swordfish by the Hawaii-based longline fishery. The regulatory measures resulted from a suit filed by the Center for Marine Conservation and the Turtle Island Restoration Network against the National Marine Fisheries Service (NMFS) in February 1999, which alleged that the Hawaii-based longline fishery threatened the survival of the Pacific leatherback and loggerhead turtle populations. A series of Court injunctions gave rise to area closures and a limit on swordfish directed effort. In response to the Court, NMFS prepared, completed, and approved an Environmental Impact Statement for Pelagic Fisheries of the Western Pacific Region and

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[1] This module reports "catch", as opposed to "landings" in most cases. Catch is that identified as *Pounds Caught* on HDAR commercial catch reports or the volume estimated from the longline logbook's number caught (x estimated round weight of fish kept). In some cases *Pounds Sold* are used in a market sense (i.e., number kept x estimated round weight).

implemented the Preferred Alternative in April 2001. At the same time, NMFS issued an Endangered Species Act Section 7 consultation on longline-turtle interactions and implemented follow-up regulations on an emergency basis. Final action regarding these follow-up regulations to reduce sea turtle interactions was passed in 2002. The Court-ordered regulations limiting swordfish effort implemented in late 2000 either forced vessels targeting swordfish to convert to targeting tunas or leave Hawaii and fish elsewhere. The effect of the regulations became apparent as the active fleet size dropped to 101 vessels in 2001. Thirty-six vessels operated out of California in 2001, nearly all which had fished in Hawaii before the Court-ordered regulations. It was noteworthy that almost all the longline vessels participating in the California-based longline fishery continued to target swordfish.

The total number of longline trips remained fairly constant over the past ten years, although effort patterns changed considerably. The longline fishery shifted its effort from swordfish to tunas throughout the 1990s into 2000 and 2001. The number of swordfish-directed trips declined from 319 in 1993 to 4 in 2001, while tuna-directed trips more than doubled between 1992 and 2001.

The practice of finning sharks and discarding the carcass out at sea by the longline fishery grew rapidly in the early 1990s. This practice was viewed as “cruel and wasteful” and led to the passage of a State of Hawaii law to pass a law which prohibited landing shark fins without the associated carcass in mid-2000. A similar Federal law was passed later in 2000. Shark catch, which was predominantly blue sharks retained for their fins only, decreased by 6 million pounds in 2 years after the implementation of this regulation. Small catches of longline caught mako and thresher sharks continued to be landed and sold since the meat for these species have a market value.

Considerable research effort is being directed toward the interactions problem by NMFS and the Council. Another amendment written by the Council outlines mandatory and optional mitigation measures to reduce seabird interactions with the longline fleet. Final action to reduce sea bird interactions was passed in 2002.

Pelagic catch by the main Hawaiian Island troll and handline fisheries has been on a 30 year upward trend growing by an average of 12% per annum since 1970. Catch from these fisheries was relatively stable in the 1990s. Catch by other gear for pelagics were at a record high and greater than those identified for MHI handline. In contrast, catch by the aku boat fleet (pole-and-line for skipjack tuna) showed a declining trend down to a historic low in 2000.

Information & Sources

This report contains the most recently available information on Hawaii's commercial pelagic fishery. Commercial fisheries data are compiled from three sources: The State of Hawaii's Division of Aquatic Resources (HDAR) commercial catch reports, and the NMFS Honolulu

Laboratory longline logbooks and joint NMFS and HDAR marketing monitoring.[2]

The Council's annual report module for Hawaii was prepared using "final" 2000 and 2001 NMFS data and preliminary 2001 HDAR data. Preliminary HDAR commercial catch reports for 2001 was used in this report and will be updated with final 2001 reports in the next year's report. Total catch in the troll, handline, and other gears used in the CPUE analyses do not necessarily equal overall catch tables by gear type presented earlier in the report due to distinct compilations based on separate versions of the HDAR data sets.

Explicit data on the recreational pelagic fisheries are not available since recreational fishers are not required to file catch reports (if they sell no fish during the year) and there is no comprehensive creel survey of recreational anglers in Hawaii. Several recent University of Hawaii, Joint Institute for Marine and Atmospheric Research (JIMAR) research reports give some idea of the relationship between commercial and recreational pelagic fishing, but accurate estimates of total recreational participation, effort, catch, and CPUE remain unavailable.[3] The NMFS Marine Recreational Fisheries Statistical Survey (MRFSS) was reinitiated in 2001 following a 20 year gap with the first complete year of surveys expected in 2002. The combined telephone-creel intercept survey is being conducted in conjunction with the HDAR. In the interim, a summary of what is known about recreational fisheries, including preliminary estimates of recreational catch are included in Appendix 6 of this report.

This module was prepared by Sam Pooley, NMFS, and Walter Ikehara, HDAR. Information on longline catch and logbooks was provided by Russell Ito and Frederick Dowdell NMFS. Information on HDAR Commercial Marine Licenses (CMLs) was provided by Reginald Kokubun, HDAR. HDAR commercial catch data used in the NMFS time-series were compiled by Frank Cabacungan, NMFS. William Walsh also conducted a thorough review of this module.

Hawaii commercial marine license information[4]

Any fisherman who takes marine species for commercial purposes is required by the State of Hawaii to have a Commercial Marine License (CML) and submit a monthly catch report to HDAR. An exception to this rule is that only one person per vessel is required to submit a catch report. This person is usually, but not necessarily, the captain. Crew members do not ordinarily

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[2] Ito, Russell Y. and Machado, Walter A. 2001. Annual report of the Hawaii-based longline fishery for 2000. Southwest Fisheries Science Center Administrative Report H-01-07.

[3] Hamilton, Marcia S and Stephen W. Huffman, 1997. Cost-earnings study of Hawaii's small boat fishery, 1995-96. University of Hawaii SOEST 97-06/JIMAR 97-314. 102 p.
McConnell, Kenneth E. and Timothy C. Haab, 2001. Small boat fishing in Hawaii: choice and economic values. University of Hawaii SOEST 01-01, JIMAR 01-336, 62 p.

[4] Information provided by the Hawaii Division of Aquatic Resources (HDAR).

submit catch reports. HDAR asks fishermen to identify their primary fishing gear or method on the Commercial Marine License at time of licensing. This does not preclude fishermen from using other gears or methods, but does indicate the primary fishing method.

A total of 3,401 fishermen were licensed in 2001, including 2,121 who indicated that their primary fishing method would use fishing gear intended to catch pelagic fish. Most licenses that indicated pelagic fishing as their primary method were issued to trollers (68%) and longline fishermen (22%). The remainder were issued to ika shibi and palu ahi (handline) (8%) and aku boat fishers (2%). The total number of licenses issued and licenses indicating pelagic fishing decreased 6% from the previous year.

Primary fishing method	**Number of licenses required to report**	
	2000	**2001**
Trolling	1,464	1,449
Longline	553	465
Ika shibi & palu ahi	190	163
Aku boat (pole and line)	41	44
Total pelagic	2,248	2,121
Total all methods	3,609	3,401

2001 Recommendations:

1. The Plan Team recommended that HDAR should continue to improve the collection of Hawaii fisheries data so that the data provides useful data on fishing effort.

2. The Plan Team recommended that HDAR develop identification sheets to assist fishermen in separating juvenile bigeye and yellowfin tunas. These i.d. sheets could be part of a fishermen’s handbook which included other fish identification guides, information on State of Hawaii fishery regulations, and instructions on catch data forms.

3. The Plan Team recommended that the Council seek an opinion on the legality of the “private” FAD moorings from the US Corps of Engineers and the USCG. Further, the Council should seek the advice of NOAA General Counsel on whether FADs can be categorized as a “fishing gear.”

4. The Plan Team recommended that separation of offshore and inshore handline fishery data be generated for years prior to 1997 to establish a longer time series for the offshore fishery.

5. The Plan Team recommended that resources be provided to WpacFIN for processing 1999 auction data to assess how well dealer data can be used to replace the fish sales portion of the fishery catch reports.

6. The Plan Team recommended that NMFS should supply logbook data to the State of Hawaii for uses as a substitute for state longline catch reports in the interest of reducing duplication of effort in reporting by fishermen.

7. The Plan Team recommended that the Council should seek funding to conduct the RFDTF proposed survey of Hawaii's small scale fisheries.

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Table 1. Hawaii domestic commercial pelagic catch, revenue and prices[5], 2000-2001.

	2000			2001		
Species	**Pounds Caught (x 1,000)**	**Ex-vessel Revenue (x $1,000)**	**Average Price ($/lb)**	**Pounds Caught (x 1,000)**	**Ex-vessel Revenue (x $1,000)**	**Average Price ($/lb)**
Swordfish	6,520	12,789	1.96	528	1,219	2.31
Blue marlin	1,125	1,252	1.11	1,494	1,053	0.71
Striped marlin	473	832	1.76	504	532	1.06
Other billfish	372	450	1.21	554	474	0.86
Mahimahi	1,543	2,987	1.94	1,180	1,897	1.61
Ono (wahoo)	673	1,549	2.30	938	1,582	1.69
Opah (moonfish)	693	1,109	1.60	756	930	1.23
Sharks (whole wt)	550	229	0.42	269	107	0.40
Finned sharks (whole wt)	2,756	634	0.23	62	14	0.23
Other pelagics	349	605	1.73	377	528	1.40
Non-Tuna PMUS Subtotal	**15,054**	**22,436**	**1.49**	**6,662**	**8,336**	**1.25**
Albacore	2,282	3,336	1.46	3,139	3,486	1.11
Bigeye tuna	6,240	21,611	3.46	5,572	18,656	3.35
Bluefin tuna	8	86	10.75	2	10	5.00
Skipjack tuna	1,111	1,471	1.32	1,891	2,113	1.12
Yellowfin tuna	4,833	12,343	2.55	3,802	8,716	2.29
Tuna PMUS Subtotal	**14,474**	**38,847**	**2.68**	**14,406**	**32,981**	**2.29**
TOTAL all pelagic species	**29,528**	**61,283**	**2.08**	**21,068**	**41,317**	**1.96**

[Data Source: Imported from P8701b.xls (11/29/02) and P8701axN.xls (5/10/2002) as compiled by NMFS].

Interpretation: The total commercial pelagic catch in 2001 was 21.1 million pounds worth $41.3 million. Total catch declined by 8.5 million pounds (29%) while revenue decreased $20.0 million compared to 2000. Bigeye tuna was the largest component of the pelagic catch in 2001, followed by yellowfin tuna, and albacore. Swordfish, the largest component of the catch in 2000, was only a minor component of the catch in 2001.

Total Hawaii commercial pelagic catch decreased by 29% in 2001. Dramatically lower catches of swordfish (-6.0 million pounds) and shark (-3.0 million pounds) were the primary reasons for

[5] Average price is calculated as (*Ex vessel revenue / Pounds Sold)* and was recompiled to this format consistently for this year's module.

the overall decline. Total tuna catch was about the same although bigeye tuna and yellowfin tuna catch dropped by 0.7 million and 1.0 million, respectively, whereas, catches of albacore and skipjack tuna both rose by 0.8 million pounds each to sustain the overall tuna catch.

Total Hawaii ex-vessel revenue decreased by 38% in 2001. Lower revenue from swordfish catch (down $11.6 million) was the primary reason for this decline in total revenue. Lower revenue from yellowfin tuna (down $3.6 million) and bigeye tuna (down $3.0 million) also contributed to the decline.

Average prices for all species but swordfish declined in 2001. A downturn in the economy in Japan resulted in lower prices for high grade bigeye tuna. Also, a slowdown in the national and local economy, along with post 9/11 effects, were probable causes for lower average prices in 2001.

Data: Data are combined from NMFS longline estimates and HDAR commercial catch reports for other pelagic gears. (See subsequent tables for details.) Due to rounding, totals between tables may differ.

Table 2. Hawaii domestic commercial pelagic catch and revenue by gear, 2000-2001

Gear	Pounds Caught (x 1,000)	Pounds Sold (x 1,000)	Ex-vessel Revenue (x $1,000)	Average Price ($/lb)
2000				
Longline	23,800	23,800	50,200	2.11
Aku boat	700	700	1,100	1.55
MHI Trolling[6]	2,500	2,100	4,700	1.92
MHI Handline[7]	1,400	1,400	3,300	2.35
Other gear[8]	1,200	1,100	2,000	1.80
TOTAL	**29,600**	**29,100**	**61,300**	**2.08**
2001				
Longline	15,600	15,600	33,000	2.12
Aku boat	1,200	1,200	1,600	1.37
MHI Trolling	2,600	2,000	3,800	1.48
MHI Handline	1,320	1,300	2,300	1.74
Other gear	600	500	900	1.62
TOTAL	**21,320**	**20,600**	**41,600**	**1.96**

[Data Source: Imported from GAS01b (11/13/02) and P8701b.xls (11/29/02).]

Interpretation: The longline fishery is the largest commercial fishery in Hawaii. Longline catch and revenue was 15.6 million pounds worth $33.0 million in 2001. Landings and revenue decreased by 8.4 million and $17.5 million, respectively, from 2000. Average prices for the longline fishery was about the same in 2001 but average prices for the aku boat, MHI troll and handline, and other pelagic gears.

The Main Hawaiian Island troll fishery is the second largest commercial fishery. It produced 2.6 million pounds worth $3.8 million in 2001. Landings were the same as the previous year but revenue dropped by $0.9 million. Average price fell by $0.44 per pound in 2001.

The Main Hawaiian Island handline fishery produced 1.3 million pounds of pelagic catch worth $2.3 million in 2001. Landings were slightly lower 2001 while revenue dropped by $1.0 million. Average price fell by $0.61 per pound in 2001.

The aku boat fishery produced 1.2 million pounds of fish valued at $1.6 million in 2001. This represented increases of 0.5 million pounds and $0.5 million in comparison to the previous year. Average price fell by $0.18 per pound for this fishery in 2001.

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6 Main Hawaiian Islands (MHI) trolling only, excluding distant water trolling

7 MHI pelagic handline only, excluding seamount and NWHI handline.

8 Other includes all other pelagic gears as well as troll and handline outside the main Hawaiian Islands.

Data: Data are from HDAR commercial catch reports for the non-longline pelagic gears and NMFS estimates for longline. HDAR commercial catch reports are categorized into Aku bait boat (pole-and-line targeting skipjack tuna); MHI handline (ika shibi, palu ahi, and miscellaneous handline techniques) targeting tunas; MHI trolling (targeting tunas, billfish, mahimahi, and ono); and Other -- troll and handline landings from other fishing locations (e.g., off-shore buoys, NWHI, and distant water) and various other pelagic gears. Due to rounding, totals between tables may differ. Time-series data is included later in the module.

Table 3a. Hawaii longline catch and revenue, 2000-2001.

Species	2000 Catch (x 1,000 lb)	2000 Revenue (x $1,000)	2001 Catch (x 1,000 lb)	2001 Revenue (x $1,000)
Blue marlin	692	872	879	730
Striped marlin	441	793	775	845
Swordfish (round weight)	6,502	12,744	485	1,193
Other billfishes	335	418	299	242
Mahimahi	721	1,233	530	662
Ono (wahoo)	246	528	388	563
Opah (moonfish)	693	1,109	756	930
Sharks (round weight)	3,297	849	327	119
Other	352	605	395	529
Non-Tuna PMUS Subtotal	**13,279**	**19,151**	**4,834**	**5,813**
Albacore	2,026	2,999	2,802	3,222
Bigeye	5,788	20,779	5,217	18,208
Bluefin	8	86	2	10
Skipjack	206	122	466	238
Yellowfin	2,506	7,016	2,233	5,516
Tuna PMUS Subtotal	**10,534**	**31,002**	**10,720**	**27,194**
TOTAL	**23,813**	**50,153**	**15,554**	**33,007**

[Data Source: Imported from P8701b.xls (11/29/2002)]

Interpretation: The total longline catch and revenue in 2001 was 15.6 million pounds worth $33.0 million. Longline catch and ex-vessel revenue in 2001 decreased by 8.3 million pounds and $17.1 million, respectively. Substantially lower catches of swordfish (-6 million pounds) and sharks (-3 million pounds) are the primary reasons for the decline in landings. Swordfish revenue declined by $11.6 million and accounted for majority the loss in longline revenue in 2001. Bigeye tuna and yellowfin tuna revenue in 2001 declined by $2.6 million, and $ 1.5 million, respectively.

Court-ordered regulatory measures to reduce sea turtle interactions prohibited “shallow” or swordfish directed longline effort. Therefore, almost all of the Hawaii-based longline fishing effort in 2001 targeted tunas. Bigeye tuna, albacore, and yellowfin tuna were the largest components of the longline catch in 2001. Swordfish, which was the largest component of the longline catch in 2000, represented only a small component of the catch in 2001. Shark catch also dropped due to state and federal regulations prohibiting finning sharks unless the carcass was also retained.

Data: Data are from NMFS Honolulu Laboratory compilations based on Federal logbooks filed by domestic longliners operating out of Hawaii.

Catch is estimated by number of fish recorded as caught in the Federal longline logbooks, multiplied by the average weight per species from NMFS market monitoring in Honolulu. Data for 2001 are from preliminary average weights.

Revenue is based on whole weight prices. Swordfish and shark are adjusted to whole-weight estimates.

Table 3b. Hawaii longline catch-per-unit-effort by trip type[9], 2000-2001

	2000				2001			
Species	**All Trips**	**Swordfish Trips**	**Mixed Trips**	**Tuna Trips**	**All Trips**	**Swordfish Trips**	**Mixed Trips**	**Tuna Trips**
Albacore	1.96	2.21	1.56	2.02	2.30	0.94	3.57	2.28
Bigeye tuna	3.68	2.13	3.30	3.78	3.52	0.75	4.08	3.51
Yellowfin tuna	1.89	0.51	1.03	2.07	1.66	0.00	1.88	1.66
Blue marlin	0.22	0.17	0.48	0.19	0.29	0.00	0.70	0.28
Striped marlin	0.39	0.53	0.75	0.32	0.74	0.09	0.91	0.73
Swordfish	1.83	14.46	11.03	0.11	0.19	11.74	3.42	0.11
Mahimahi	2.85	8.45	11.95	1.30	2.01	0.00	7.53	1.90
Moonfish	0.35	0.01	0.09	0.40	0.35	0.00	0.26	0.35
Ono (wahoo)	0.38	0.08	0.13	0.43	0.60	0.00	0.42	0.60
Sharks	3.92	13.85	10.65	2.66	2.10	8.23	4.47	2.04
Number of trips	**1,103**	**37**	**252**	**814**	**1,034**	**4**	**43**	**987**
Number of hooks set	**20,270,000**	**420,000**	**2,670,000**	**17,010,000**	**22,350,000**	**20,000**	**470,000**	**21,860,000**
Number of lightsticks	**716,000**	**145,000**	**563,000**	**18,000**	**27,000**	**9,000**	**15,000**	**3,000**

Data Source: NMFS longline logbook summaries (LLCS 5/10/2002).

[9] Trip type refers to the primary species target for each trip. (See *Data* description below).

Interpretation: This table shows a substantial difference in CPUE (fish per 1000 hooks) between the different trip targets. For example, swordfish CPUE on swordfish trips was 3.4 times higher than mixed trips and over 100 times higher than tuna trips. Therefore, thw within-trip type mean CPUE is the more accurate description of the trends. Seasonal difference in CPUE is also not apparent when summarizing data on a annual basis. The predominance of trips and hooks set by tuna trip effort relative to swordfish and mixed trip effort is apparent in 2000 and 2001.

Albacore, bigeye tuna, and yellowfin tuna CPUE for mixed trips was highest of all trip types in 2001. Also, CPUE for all three tuna species increased for mixed trips. In contrast, CPUE for tunas on swordfish trips was lower in 2001. Only albacore CPUE increased for tuna trips. CPUE for bigeye tuna was the highest of the three major tuna species.

The number of swordfish and mixed trips has declined markedly due to the prohibition of “shallow” longline fishing. Swordfish CPUE for swordfish trips (11.74 fish) and mixed trips (3.42 fish) dropped 29% and 69%, respectively in 2001. Swordfish CPUE for tuna trips (0.11 fish) remained unchanged in 2001 and remained well below those for swordfish and mixed trips.

CPUEs for blue and striped marlin were below 1.0 fish per 1000 hooks for all three trip types in 2000 and 2001. Mahimahi CPUE for mixed trips (7.53 fish) was 37% lower in 2001. Ono (wahoo) and moonfish CPUE was below 1.0 fish per 1000 hooks in both years. CPUE of sharks (primarily blue shark) declined for all trip types in 2001.

Data: Data are from NMFS Honolulu Laboratory compilations based on Federal logbooks filed by domestic longliners operating out of Hawaii. ***CPUE*** is the number of fish caught per 1,000 longline hooks; this includes the number retained (including the number of sharks finned) and the number released. *Trip Type* refers to the identification of the primary target species for a particular trip, either as indicated by the vessel captain to NMFS logbook collection staff or designated by NMFS in the absence of a captain's designation.

Table 3c. Hawaii-based longline catch (number of fish caught) by area fished, 2000-2001.

Species	2000 All Locations	2000 MHI EEZ	2000 NWHI EEZ	2000 Outside of U.S. EEZs	2000 U.S. Possessions	2001 All Locations	2001 MHI EEZ	2001 NWHI EEZ	2001 Outside of U.S. EEZs	2001 U.S. Possessions
Albacore	39,775	5,952	2,969	22,088	8,766	51,430	10,448	3,648	27,841	9,493
Bigeye tuna	74,493	21,546	7,660	37,804	7,483	78,724	36,928	8,521	27,712	5,563
Yellowfin tuna	38,379	5,240	1,395	9,956	21,788	37,077	5,671	1,169	9,460	20,777
Blue marlin	4,509	1,557	418	1,772	762	6,424	2,151	761	2,440	1,072
Striped marlin	7,939	2,438	2,309	2,459	733	16,435	7,651	2,528	5,209	1,047
Swordfish	37,023	2,510	6,679	27,600	234	4,169	1,027	373	2,545	224
Mahimahi	57,775	17,586	6,458	32,529	1,202	44,951	21,608	3,923	17,715	1,705
Moonfish	7,036	2,759	750	3,079	448	7,779	3,404	1,030	3,068	277
Ono (wahoo)	7,751	1,201	224	4,410	1,916	13,381	3,223	783	7,225	2,150
Sharks	79,363	16,561	11,446	43,049	8,307	46,911	16,086	5,478	20,152	5,195
Trips[10]	**1,134**	**586**	**211**	**750**	**52**	**1,077**	**720**	**213**	**644**	**67**
Hooks (1,000s)	**20,268**	**5,736**	**2,049**	**9,467**	**3,015**	**22,347**	**8,809**	**2,041**	**8,608**	**2,889**
Lightsticks (1,000s)	**716**	**41**	**126**	**548**	**1**	**27**	**-**	**-**	**25**	**1**

MHI: Main Hawaiian Islands
NWHI: Northwestern Hawaiian Islands
EEZ: Exclusive Economic Zone (200-mile zone)

[Data Source: NMFS longline logbook summaries (LLCS 5/10/2002)]

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10 Total trips are not additive across areas because some trips may intersect more than one area. Totals may also differ between tables because of different data compilation dates.

Interpretation: Longline fishing effort (as measured by number of hooks set) reached a record high 22.3 million hooks in 2001, a 10% increase over 2000. The increase is related to a greater amount of tuna-directed effort because they set the highest number of hooks per day of the three trip types. Most fishing effort in 2001 was expended in the areas of the MHI EEZ and outside the U.S. EEZ (200-mile zone). Fishing effort in the NWHI EEZ and the EEZ of U.S. possessions was about the same as last year.

Bigeye tuna catch increased 6% in 2001 with the highest catches in the areas of the MHI EEZ and outside the U.S. EEZ. These two areas combined accounted for 82% of the total bigeye tuna catch. Catches of albacore increased 29% with more than half of those caught outside the U.S. EEZ. Yellowfin tuna catch was 3% below 2000 with highest catch in the EEZ of the U.S. possessions.

Most swordfish was caught outside the EEZs in 2000 and 2001, however, swordfish catch fell by 88% in 2001 due to the court-ordered restrictions on targeting swordfish. Blue marlin catch increased in all areas with the highest catches outside of the EEZ. Striped marlin catch doubled in 2001 with the highest catches originating the the MHI EEZ. Proper species identification of marlins in logbook data is a concern.

Moonfish and ono catch increased 11% and 73%, respectively in 2001. The areas with the highest moonfish catches were the MHI EEZ and outside of the EEZ while ono catches were highest outside of the EEZ. Mahimahi catch (down 22%) was highest in the MHI EEZ while shark catch (down 41%) better outside of the EEZ.

Data: Catch is *Number Caught* based on Federal logbooks filed by domestic longliners operating out of Hawaii. The Main Hawaiian Islands (MHI) EEZ (Exclusive Economic Zone) represents all longline catch within 200 miles of the eight main islands of Hawaii, except for the overlap with the Northwestern Hawaiian Islands (NWHI). Catch in other U.S. EEZ areas, aka the *remote island areas*, includes the EEZs of the U.S. possessions in the central and western Pacific (e.g., Wake Island, Johnston Atoll, Palmyra, etc.).

Table 4a. Average estimated round weight (in pounds) of fish by longline, 1987-2001.

	Non-Tuna PMUS					Tunas			
Year	**Swordfish**	**Blue marlin**	**Striped marlin**	**Mahimahi**	**Wahoo (ono)**	**Albacore**	**Bigeye tuna**	**Skipjack tuna (aku)**	**Yellowfin tuna**
1987	129	161	66	21	33	62	76	18	82
1988	119	157	57	20	32	60	83	19	103
1989	131	165	62	23	35	62	77	19	104
1990	148	198	62	19	36	61	80	21	122
1991	155	175	59	15	32	52	85	20	118
1992	178	175	66	11	35	45	77	17	99
1993	172	157	64	13	33	44	88	17	92
1994	163	171	64	12	34	41	81	18	97
1995	171	157	58	10	31	50	79	18	95
1996	157	154	58	17	31	53	64	17	80
1997	163	134	66	13	30	54	71	20	89
1998	176	164	60	16	32	55	74	20	76
1999	188	164	55	16	34	52	75	20	62
2000	185	158	59	14	32	55	80	17	67
2001	**133**	**139**	**48**	**12**	**29**	**55**	**69**	**18**	**63**
Average	158	162	60	15	33	53	77	19	90
Standard Deviation	21.7	15.1	4.9	3.9	1.9	6.5	6.2	1.4	18.4

[Data source and Interpretation on following page]

[Data source: Imported from P8701b.xls (11/29/2002)+GAS (10/21/2002)]

Interpretation: Average weight was expressed as round (whole) weight. Processed fish (e.g., headed and gutted, gilled and gutted) were raised to an estimated round weight. Fish released alive or discarded were not represented in the size summaries. The average weights show long-term changes and inter-annual variability.

Longline fishing can occur over a large area within a trip and data on individual fish were not directly linked to the exact area of capture. Therefore, average weight summaries by specific area was not produced though subsequent changes in mean weight over time by location was referenced in general terms.

Swordfish caught on tuna target trips are biased towards small swordfish in comparison to swordfish target trips. Average weight for swordfish was lowest in the late 1980s when the longline fishery was targeting tunas. The average weight increased in the early 1990s as swordfish targeted more heavily. Average weight peaked at 188 pounds in 1999 but then dropped to 133 pounds in 2001. This dramatic drop in average weight was due to regulations prohibiting targeting swordfish and a near complete shift to targeting tunas by this fleet in 2001. Swordfish average weight was close to the average weight observed in the 1980s when tunas were targeted almost exclusively.

Average weight for both blue marlin and striped marlin below long-term mean in 2001. Blue marlin was 139 pounds which was 23 pounds below the long-term average. Blue marlin average weight declined for the past three years. Striped marlin average weight was at a record low 48 pounds or 12 pounds below the long-term average.

The three main tuna species did not exhibit uniform changes throughout 1987-2001. The average weight of albacore about 60 pounds up to 1990 then declined to less than 50 pounds during 1992-94. This decline is related to increasing incidental catches of small albacore north of the Hawaiian Islands by longliners targeting swordfish. The average weight of albacore then increased as a greater proportion of longline effort shifted back to tuna target. The average weight of albacore was 55 pounds in 2001. The average weight of bigeye tuna showed the least amount of change of the three main tuna species ranging from 64 pounds to 88 pounds. Bigeye tuna average weight was 69 pounds or 8 pounds below its long term average in 2001. In contrast, yellowfin tuna average weight showed the most variation in average weight ranging from 62 pounds to 118 pounds. The average weight of yellowfin tuna was more than 100 pounds during 1988-91 and has decreased to less than 70 pounds from 1999 with the average weight at 63 ppunds in 2001. This probably reflects a trend of increasing effort in the EEZ of Kingman Reef and Palmyra Atoll where relatively small yellowfin tuna are caught.

Data: Longline data are from NMFS Honolulu Laboratory and HDAR market monitoring. Where fish are presented in less than whole form, conversion factors are applied to convert to whole weight. This is not frequent for longline catch (except for swordfish). Sharks are not included in this average weight table because of inadequate samples (most shark is "landed" only as a finned product.)

Table 4b. Average estimated round weight (in pounds) of fish for troll-handline-other gears, 1987-2001.

	Non-Tuna PMUS					Tunas			
Year	**Swordfish**	**Blue marlin**	**Striped marlin**	**Mahimahi**	**Ono (wahoo)**	**Albacore**	**Bigeye**	**Skipjack (aku)**	**Yellowfin**
1987	126	215	66	21	24	33	14	7	32
1987	124	181	64	18	25	64	34	7	32
1988	107	188	68	21	25	55	24	11	44
1989	97	248	76	20	25	58	25	7	41
1990	122	197	63	15	23	53	29	9	34
1992	75	215	70	14	26	53	28	6	27
1993	139	182	67	14	24	55	22	7	44
1994	95	233	67	14	27	53	30	9	37
1995	110	204	61	16	24	22	18	7	30
1996	86	195	65	16	23	42	24	12	42
1997	96	175	68	16	21	40	19	11	34
1998	85	201	58	18	25	21	21	5	28
1999	88	211	55	18	27	48	24	7	31
2000	91	244	53	15	26	47	25	7	43
2001	**42**	**180**	**51**	**16**	**24**	**47**	**21**	**8**	**34**
Average	99	205	63	17	25	46	24	8	36
Standard Deviation	24.0	23.1	6.8	2.4	1.6	12.6	5.1	2.0	5.9

[Data source: annual GASyr.dbf (10/21/2002)]

Interpretation: Average weight for most species caught by troll-handline-other gear were within their 13-year ranges, however, swordfish, and striped marlin appear to be on a trend towards smaller fish.

Swordfish was at a record low of 42 pounds in 2001. Blue marlin average weight was 180 pounds and declined for the first time in four years. In contrast, average weight of striped marlin has declined for the fifth straight year and was at a record low of 51 pounds in 2001.

Albacore average weight (47 pounds in 2001) has been steady for the past three years. The average weight for bigeye tuna and yellowfin tuna was close to its long term average.

Data: Troll-handline-other gear data are from HDAR commercial catch reports (*pounds caught* divided by *number caught* where *number caught > 0*). Correction cannot be made for weights of processed fish (e.g., headed and gutted) which might have been recorded in processed form. Average weight is calculated as Pounds Caught *divided by* Number Caught. *Other* gear represents all other gears except troll, handline, longline, and bait boat.

Table 5a. Hawaii longline vessel activity (trips), 1991-2001.

Year	Vessels	Total Trips	Tuna Trips	Mixed Trips	Swordfish Trips
1991	141	1,671	556	823	292
1992	123	1,266	458	531	277
1993	122	1,192	542	331	319
1994	125	1,106	568	228	310
1995	110	1,125	682	307	136
1996	103	1,100	657	351	92
1997	105	1,125	745	302	78
1998	114	1,140	760	296	84
1999	119	1,137	776	296	65
2000	125	1,103	814	252	37
2001	**101**	**1,034**	**987**	**43**	**4**
Average	117	1,182	686	342	154
Standard Deviation	12	172	151	196	120

[Data Source: NMFS longline logbook summaries (LLCS 5/10/02)]

Interpretation: This table shows a steep decline in the number of longline vessels and trips due to a moratorium on new entry implemented in 1991. Longline vessel activity and trip effort stabilized thereafter. The table also shows the dramatic shift in effort from swordfish and mixed target trips toward tuna targeted trips.

Swordfish trips peaked at 319 in 1993, remained at a high level in 1994, but then decreased substantially in 1995 and continued to declined to a low of 4 trips in 2001. Mixed trips declined from a high in 1991 to 1994 and stabilized at about 300 trips from 1995 through 1999. Only 43 mixed trips and 4 swordfish trips were made in that year. In contrast, tuna trips increased from a low of 458 trips in 1992 to a record 987 trips made in 2001.

Data: Data compiled by the NMFS Honolulu Laboratory's Fishery Monitoring & Economics Program from NMFS Federal logbooks. The trip type of trip is determined by an interview with the vessel captain, but is occasionally assigned by FMEP staff on the basis of gear characteristics, fishing techniques and locations, and catch composition. Detailed longline effort data is only available beginning in the 1991 calendar year when Federal logbooks went into effect.

Table 5b. Hawaii longline vessel activity (miles to first set and days fishing), 1991-2001[11]

	All Trips			
	Average		Maximum	
Year	Miles to first set	Days fishing	Miles to first set	Days fishing
1991	318	7.6	1,792	22
1992	424	9.1	1,871	26
1993	465	10.3	2,122	29
1994	430	10.0	2,814	26
1995	441	10.3	2,097	27
1996	367	10.5	2,037	30
1997	332	10.5	1,973	36
1998	422	10.9	1,611	24
1999	388	11.4	1,791	26
2000	557	11.7	1,949	29
2001	**353**	**11.7**	**1,546**	**20**
Average	409	10.4	1,964	27
Standard Deviation	68	1.2	337	4

[11]Data not corrected for vessels starting trips in California and ending in Hawaii.

	Average					
	Tuna Trips		Mixed Trips		Swordfish Trips	
Year	**Miles to first set**	**Days fishing**	**Miles to first set**	**Days fishing**	**Miles to first set**	**Days fishing**
1991	240	7.7	276	6.3	585	10.7
1992	260	8.4	404	7.8	733	12.7
1993	222	8.8	522	9.6	820	13.7
1994	252	8.9	323	8.0	833	13.4
1995	273	10.0	397	9.3	884	13.2
1996	284	10.3	410	10.3	790	12.7
1997	288	10.1	365	10.6	623	14.1
1998	384	10.3	439	11.9	708	14.5
1999	313	11.1	490	11.7	821	12.5
2000	472	11.0	674	13.3	879	15.5
2001	**345**	**11.8**	**408**	**10.7**	**1,295**	**10.0**
Average	303	9.9	428	10.0	816	13.0
Standard Deviation	73	1.3	107	2.0	187	1.6

	Maximum					
	Tuna Trips		**Mixed Trips**		**Swordfish Trips**	
Year	**Miles to first set**	**Days fishing**	**Miles to first set**	**Days fishing**	**Miles to first set**	**Days fishing**
1991	1,508	18	1,408	22	1,792	26
1992	1,156	14	1,543	21	1,871	26
1993	1,432	14	1,616	23	2,122	29
1994	945	16	1,298	19	2,814	26
1995	945	20	1,609	26	2,097	27
1996	1,866	28	1,547	30	2,037	28
1997	1,002	19	1,323	36	1,973	27
1998	1,154	17	1,611	24	1,522	24
1999	1,160	19	1,723	26	1,791	22
2000	1,461	19	1,747	29	1,945	25
2001	**1,357**	**20**	**1,451**	**19**	**1,546**	**18**
Average	1,271	18.5	1,534	25.0	1,955	25.3
Standard Deviation	284	3.8	149	5.2	348	3.1

[Data Source: NMFS Honolulu Laboratory FMEP programming (1/16/03)]

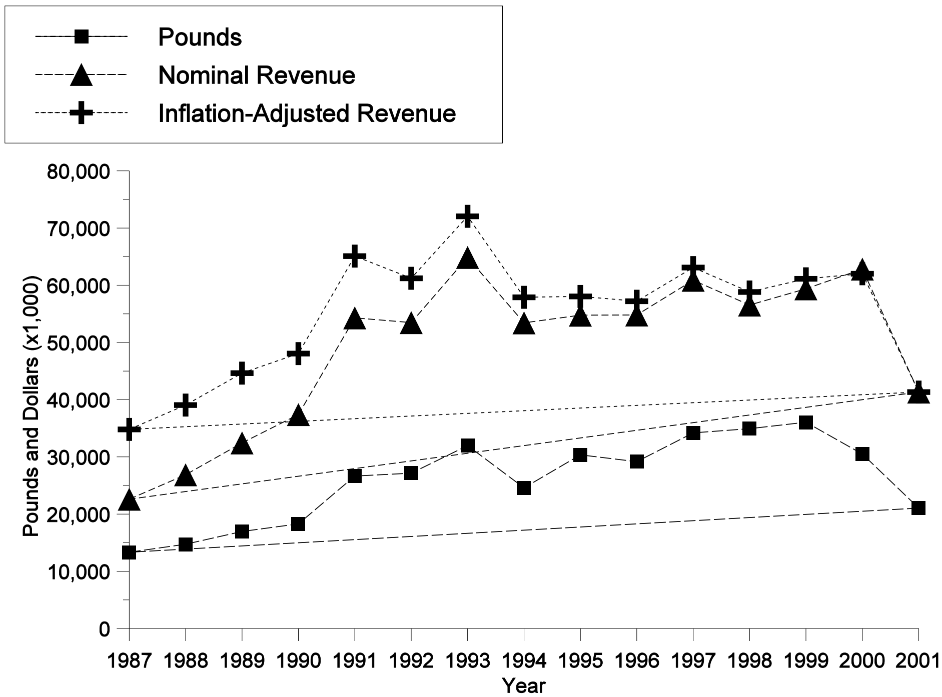
Interpretation: Days fishing is a summary of actual fishing days on a trip and does not include days transiting to and from the fishing ground as well as days when no fishing occurred between the first and last set. The average miles to first set and average days fishing for all trips must be interpreted with caution because they may include atypical operations such as vessels that left California and landed in Hawaii. In contrast, trips initiated in Hawaii but landed in California are not included in the Hawaii-based longline fishery data set. All swordfish trips in 2001 began and ended their trip from Hawaii.

Most summaries of miles traveled to first set and days fished per trip decreased in 2001. Two exceptions to this pattern was the average days fished on tuna trips, which reached a record 11.8 days and miles to first set for swordfish trips (1,295 miles from Honolulu).

Data: Data compiled by the NMFS Honolulu Laboratory's Fishery Monitoring & Economics Program from NMFS Federal logbooks. Type of trip is determined by FMEP staff through interviews with vessel captains or categorization of fishing operations.

Miles to first set is determined as the distance from Honolulu to the first set as recorded on the logbook. Average days fishing is determined by the number of days on which sets and hauls occurred on an individual trip.

Figure 1. Hawaii commercial pelagic landings and revenue (all gears and pelagic species), 1987 - present.



Interpretation: Total pelagic landings (bottom line) and revenue (top lines) data show the effect of the dramatic increase in longline landings from the late 1980s to 1993. In general, landings and revenue remained stable from 1994-2000 bu then dropped by 31% and 33%, respectively in 2001. Gear and species-specific changes are considered in later figures.

Data information is on the following page.

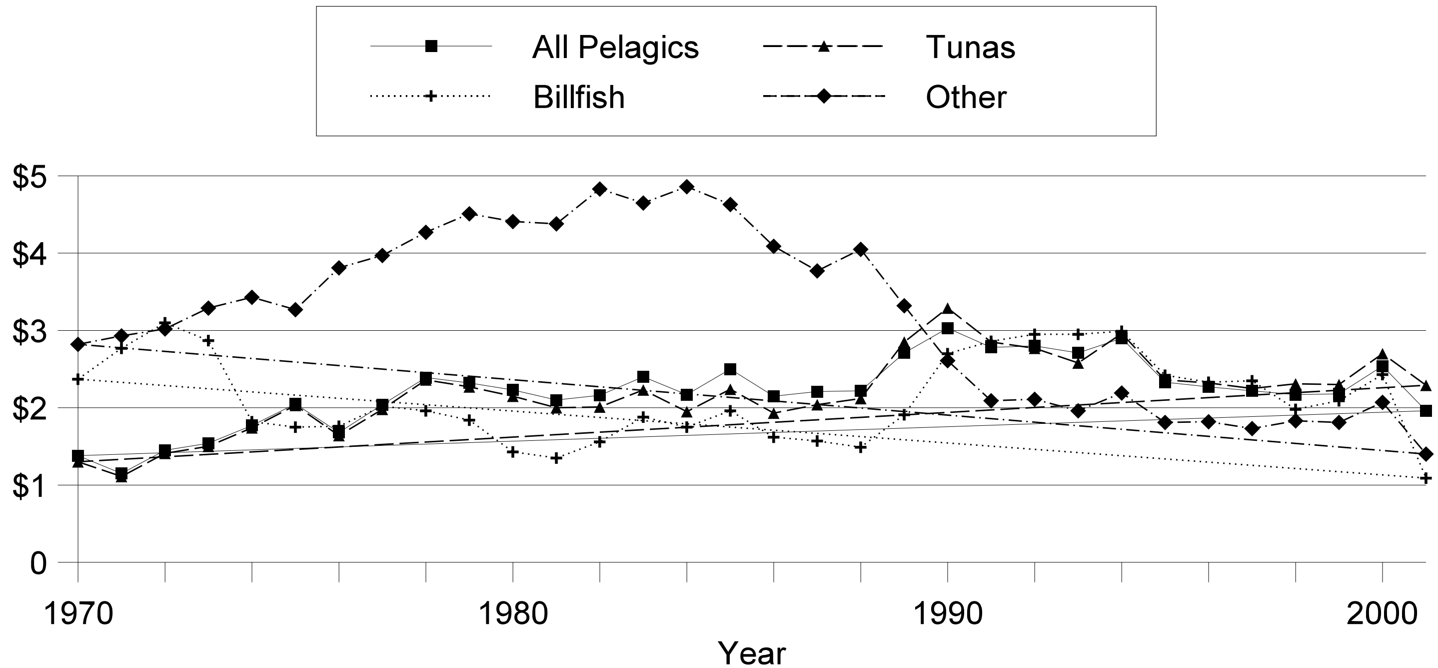
Hawaii commercial pelagic landings and revenue (all gears and species).

Year	Pounds (x 1,000)	Nominal Revenue (x$1,000)	Adjusted Revenue (x $1,000)	Honolulu Consumer Price Index (U)
1987	13,337	$22,597	$34,802	115.90
1988	14,733	$26,873	$39,062	122.80
1989	16,960	$32,442	$44,648	129.70
1990	18,291	$37,399	$48,061	138.90
1991	26,648	$54,306	$65,101	148.90
1992	27,156	$53,478	$61,230	155.90
1993	31,970	$64,863	$72,048	160.70
1994	24,584	$53,422	$57,901	164.70
1995	30,359	$54,773	$58,058	168.40
1996	29,157	$54,807	$57,211	171.00
1997	34,196	$60,879	$63,107	172.20
1998	34,930	$56,549	$58,822	171.60
1999	35,965	$59,386	$61,133	173.40
2000	30,485	$61,295	$62,024	176.40
2001	**21,044**	**$41,329**	**$41,329**	**178.50**
Average	26,000	$49,000	$55,000	
Standard Deviation	7,200	$12,900	$10,400	

Data: Data are compiled from Hawaii Division of Aquatic Resources (HDAR) commercial catch reports for non-longline landings and from NMFS estimates of longline landings. Inflation-adjusted revenue (Adjusted Revenue) is computed from the Honolulu Consumer Price Index (HCPI) as: (Current year HCPI / data year HCPI) X (data year nominal ex-vessel revenue). Prices can be adjusted using the same formula.

Data Source: P8701b.xls (11/29/2002)

Figure 2. Hawaii commercial ex-vessel prices for pelagic species groups, inflation-adjusted, 1970 - present.



Interpretation: Inflation-adjusted ex-vessel prices for pelagic species groups have declined for all major species groups over the past five years from peaks in the early 1990s through 1999 but each rose substantially in 2000. The market for tuna has weakened due to the decline in tourists arriving from Japan and due to a weak export demand. Swordfish prices also fell substantially on the U.S. East coast in 1998 due to a widespread boycott of swordfish by restaurants. The recovery of tourism and Hawaii's economy and increased demand fo Hawaii's fresh pelagics in 2000 was short-lived as the U.S. economy slowed in 2001 and was worsened by the effects of 9/11.

Hawaii commercial pelagic prices, inflation-adjusted [12].

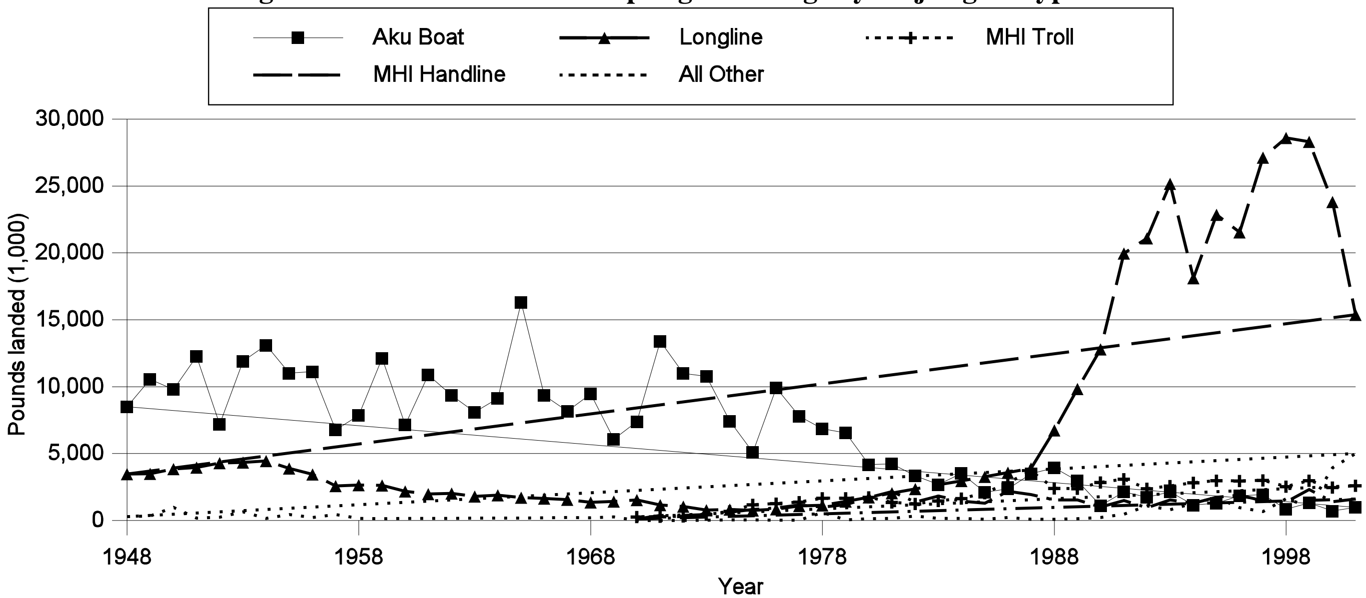
Year	All Pelagics	Tuna	Billfish	Other	HCPI
1970	$1.38	$1.30	$2.37	$2.82	40.90
1971	$1.15	$1.11	$2.77	$2.93	42.60
1972	$1.45	$1.41	$3.10	$3.02	44.00
1973	$1.54	$1.50	$2.87	$3.29	45.90
1974	$1.77	$1.74	$1.82	$3.43	50.80
1975	$2.05	$2.03	$1.75	$3.27	55.50
1976	$1.68	$1.64	$1.76	$3.81	58.30
1977	$2.04	$1.98	$2.02	$3.97	61.20
1978	$2.39	$2.36	$1.96	$4.27	65.90
1979	$2.32	$2.27	$1.84	$4.51	73.20
1980	$2.23	$2.15	$1.43	$4.41	81.90
1981	$2.10	$2.00	$1.35	$4.38	90.50
1982	$2.16	$2.01	$1.56	$4.83	96.00
1983	$2.40	$2.23	$1.88	$4.65	99.80
1984	$2.17	$1.95	$1.75	$4.86	104.30
1985	$2.50	$2.24	$1.96	$4.63	107.90
1986	$2.15	$1.93	$1.62	$4.09	110.30
1987	$2.21	$2.04	$1.57	$3.77	115.90
1988	$2.22	$2.12	$1.49	$4.05	122.80
1989	$2.71	$2.85	$1.91	$3.32	129.70
1990	$3.03	$3.29	$2.70	$2.61	138.90
1991	$2.78	$2.85	$2.86	$2.09	148.90
1992	$2.80	$2.77	$2.95	$2.11	155.90
1993	$2.71	$2.58	$2.95	$1.96	160.70
1994	$2.90	$2.96	$2.99	$2.19	164.70
1995	$2.33	$2.36	$2.42	$1.81	168.40
1996	$2.27	$2.32	$2.33	$1.82	171.00
1997	$2.22	$2.25	$2.35	$1.73	172.20
1998	$2.17	$2.31	$1.98	$1.83	171.60
1999	$2.18	$2.30	$2.09	$1.81	173.40
2000	$2.54	$2.70	$2.43	$2.07	176.40
2001	**$1.96**	**$2.29**	**$1.09**	**$1.40**	**178.50**
Average	2.20	2.18	2.12	3.18	
Std Deviation	0.43	0.48	0.54	1.09	

Data: Data are compiled from Hawaii Division of Aquatic Resources (HDAR) commercial catch reports. Nominal price is calculated as (ex vessel) revenue / pounds sold. Inflation-adjusted price is calculated from the Honolulu Consumer Price Index (HCPI) as: (Current year CPI / data year CPI) * data year nominal price. No adjustments are made in this table for product form (e.g., most swordfish prices in HDAR are reported as headed, gilled, and gutted, not raised to whole weights. This increases the reported average billfish price.) or for under-reporting by some gear types (e.g., longline in the early 1980s.)

Data source: P8701b.xls (11/29/2002)

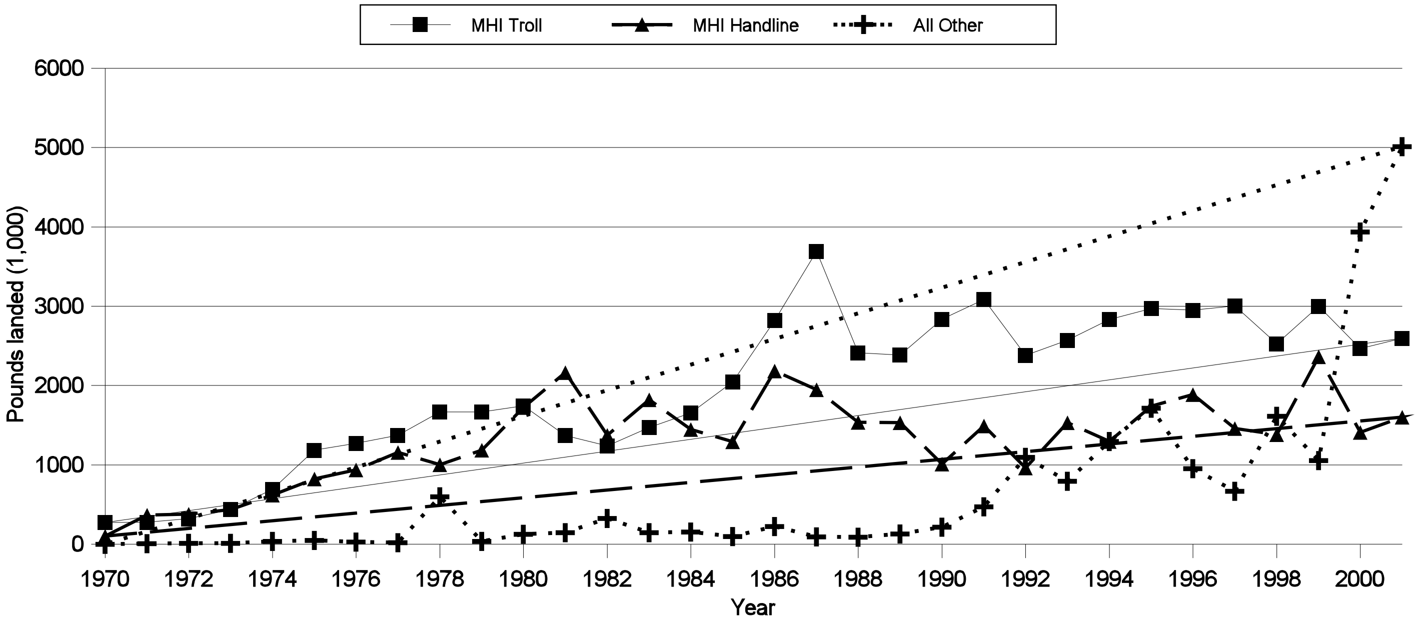
[12] Each years' inflation-adjusted price data must be updated annually.

Figure 3a. Hawaii commercial pelagic landings by major gear types.



Interpretation: This figure shows the long-term decline of the aku boat (pole-and-line skipjack tuna) fishery from its peak in the mid-1960s through the closure of the Hawaiian Tuna Packers (Bumble Bee Tuna) cannery in 1984. The aku boat fishery declined for a variety of reasons, primarily economic. The figure also shows the rise of the troll-handline fishery in the mid-1970s (see following figure) and the rapid rise of the longline fishery in the late 1980s. The longline fishery peaked in 1998 and has experienced two years of significant decline. Even with these recent declines, this fishery still dominates pelagic landings in Hawaii.

Figure 3b. Troll-Handline-Other Gears Pelagic Landings, 1970 - present.



Interpretation: This figure provides a finer resolution for landings by the troll, handline, and other pelagic gear types in Hawaii. Landings by both the main Hawaiian Island commercial troll and handline fisheries grew from 1970. Landings from these fisheries parallel each other from the mid-1980s up to 2001. Landings by the troll and handline fisheries show a slight increase 2001 to 2.6 million and 1.6 million pounds, respectively.

Landings by other pelagic gear types grew to be the largest of the three fisheries with a record 5 million pounds landed by this gear type in 2001. This increase was probably due to distant-water albacore trollers that fished on the high seas but landed their catch here in Honolul

Table 6. Hawaii commercial fishing landings, pelagics by gear type, 1948 - present. HDAR figures and NMFS estimates (all species).

	Pounds Caught		
Year	Aku boat	Longline	Total Troll-Handline-Other
1948	8,496	3,476	297
1949	10,541	3,491	332
1950	9,788	3,859	976
1951	12,264	3,970	183
1952	7,181	4,290	247
1953	11,914	4,332	646
1954	13,104	4,448	161
1955	11,020	3,898	449
1956	11,120	3,443	217
1957	6,765	2,571	453
1958	7,856	2,645	156
1959	12,122	2,636	132
1960	7,138	2,173	150
1961	10,878	1,972	148
1962	9,349	2,022	154
1963	8,096	1,811	171
1964	9,134	1,883	167
1965	16,295	1,707	170
1966	9,339	1,655	198
1967	8,164	1,563	226
1968	9,463	1,353	195
1969	6,072	1,416	273

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(continued)

Year	Aku Boat	Longline	MHI Troll	MHI Handline	Other	Total Troll-Handline-Other
	Pounds Caught					
1970	7,386	1,541	275	102	2	379
1971	13,393	1,151	279	368	7	654
1972	11,001	1,055	321	378	11	710
1973	10,766	778	436	437	12	885
1974	7,427	830	692	619	36	1,347
1975	5,088	746	1,188	825	47	2,060
1976	9,896	838	1,273	938	30	2,241
1977	7,780	1,101	1,372	1,156	20	2,548
1978	6,849	1,125	1,669	1,002	600	3,272
1979	6,549	1,432	1,667	1,186	35	2,889
1980	4,194	1,740	1,743	1,723	126	3,592
1981	4,229	2,047	1,368	2,164	145	3,947
1982	3,342	2,355	1,238	1,374	328	2,941
1983	2,683	2,663	1,473	1,823	145	3,442
1984	3,527	2,970	1,655	1,449	153	3,257
1985	2,114	3,278	2,046	1,294	99	3,439
1986	2,351	3,585	2,820	2,186	226	5,232
1987	3,503	3,893	3,693	1,947	94	5,737
1988	3,943	6,733	2,414	1,537	91	4,038
1989	2,962	9,844	2,386	1,531	132	4,046

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Year	Aku Boat	Longline	MHI Troll	MHI Handline	Other	Total Troll-Handline-Other
1990	1,180	12,790	2,838	1,009	214	4,128
1991	2,146	19,970	3,087	1,490	474	5,054
1992	1,735	21,090	2,381	961	1,098	4,439
1993	2,137	25,160	2,572	1,533	793	4,896
1994	1,159	18,110	2,833	1,297	1,298	5,428
1995	1,291	22,850	2,973	1,742	1,716	6,433
1996	1,844	21,540	2,951	1,888	953	5,792
1997	1,947	27,120	3,003	1,460	668	5,131
1998	845	28,560	2,526	1,382	1,616	5,524
1999	1,309	28,320	3,002	2,363	1,055	6,425
2000	706	23,803	2,466	1,412	3,939	5,028
2001	**990**	**15,379**	**2,598**	**1,603**	**5,013**	**5,017**
Average 1948-present	**6,744**	**6,030**	-	-	-	**2,231**
Average 1970-present	**4,238**	**9,965**	**2,031**	**1,357**	**683**	**3,806**
Standard Deviation	**3,392**	**10,141**	**909**	**515**	**1,135**	**1,639**
Average 1990-present	**1,482**	**22,665**	**2,785**	**1,503**	**1,257**	**5,298**
Standard Deviation	**505**	**4,727**	**251**	**394**	**998**	**728**

[Data Source: P8701b.xls (11/29/2002)+ GAS (10/21/2002)]

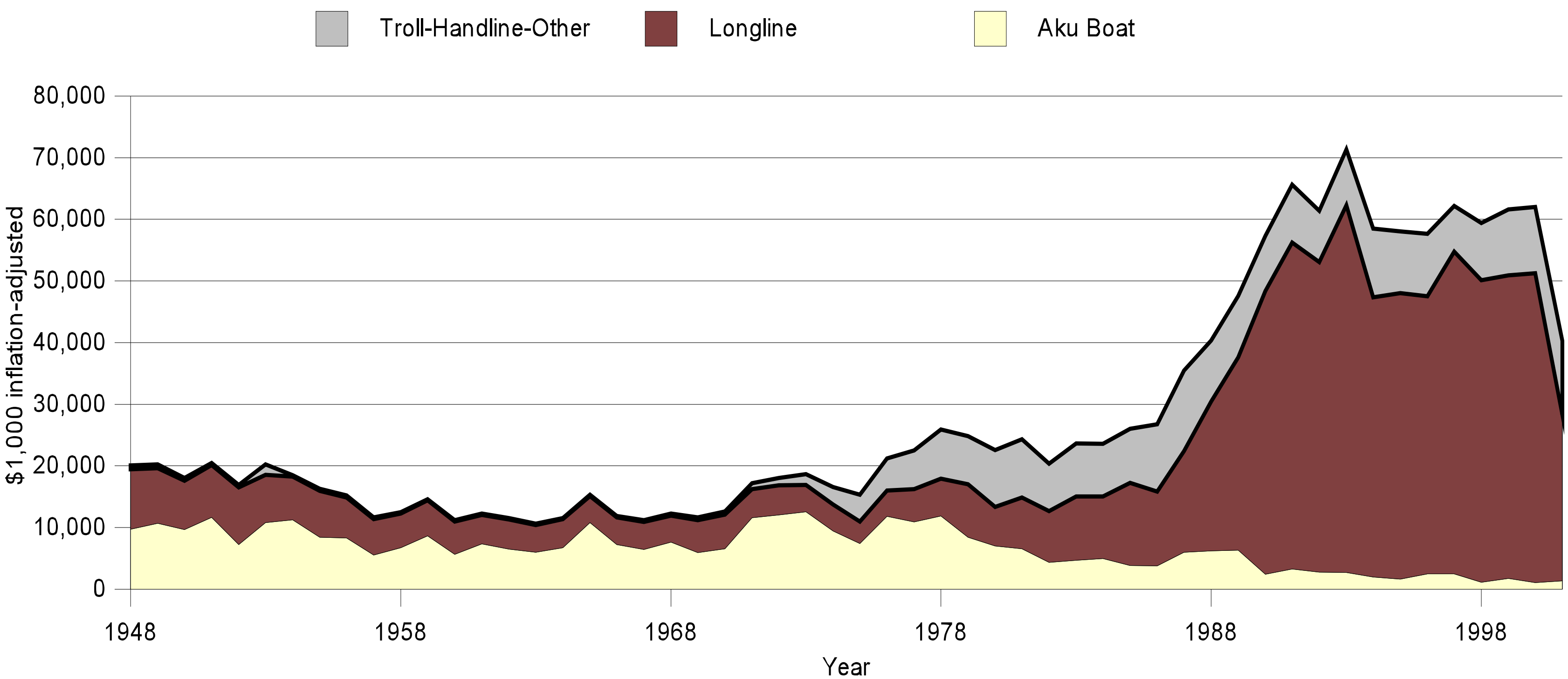
Data: Data are compiled from HDAR commercial catch reports using a data summarization program (HEPS.prg) maintained by the Fishery Monitoring and Economics Program of the NMFS Honolulu Laboratory.

Gears are categorized in this report as follows:

Trolling: Gear 6 in HDAR codes
Handline: Gears 3 (Deep sea handline), 8 (Ika Shibi), 9 (Palu Ahi), and 35 (Drifting/Pelagic handline)
Other: All remaining gears (except Longline and Aku Boat), including off-loadings by distant-water albacore trollers.

Areas are categorized as follows:
MHI: HDAR Areas 100-699
Other: Includes NWHI, the periphery of the MHI (usually outside of one-degree square of the MHI), and all other fishing locations. This includes off-shore handline landings (e.g., seamounts).

Figure 4. Hawaii commercial fishing revenue, adjusted for inflation, 1948 - present.



<u>Interpretation:</u> The longline fishery was one of the highest grossing fisheries from 1948 and decreased to a low of $3.6 million in 1975. The longline fishery then grew into and has been the highest grossing fishery from 1981. Revenue peaked at $59.6 million at the height of longlining for swordfish in 1993. Longline revenue dipped to $45.4 million the following year due to poor swordfish catches and fluctuated between $45.0 and $52.3 million up to 2000 as the fishery gradually shifted effort to target tunas. Revenue dropped dramatically to $33 million in 2001 due to the prohibition of targeting swordfish in order to reduce the number of interactions with sea turtles, weak economic conditions in the U.S. and Japan, as well as the effects of 9/11 effects on the economy near the end of the year.

The aku boat fishery was one of the fisheries that generated the most revenue from 1948 up to 1980. Revenue from this fishery peaked at $12.6 million in 1973. Aku boat revenue continued to dominate pelagic fisheries in Hawaii up to 1980 and decreased slowly thereafter. Part of the reason for contraction in the aku boat fishery was the closure of the tuna cannery in 1985. The only market available to the aku boat fishery after the closure of the cannery was the fresh fish market. This fishery was worth only $1.4 million in 2001.

Troll-handline-other pelagic revenue was typically less than $1 million prior to 1971. Revenue from these fisheries grew and peaked at $13.0 million in 1987. Revenue ranged between $7.4 (1997) and $12.0 (2001) thereafter.

Data information on following pages.

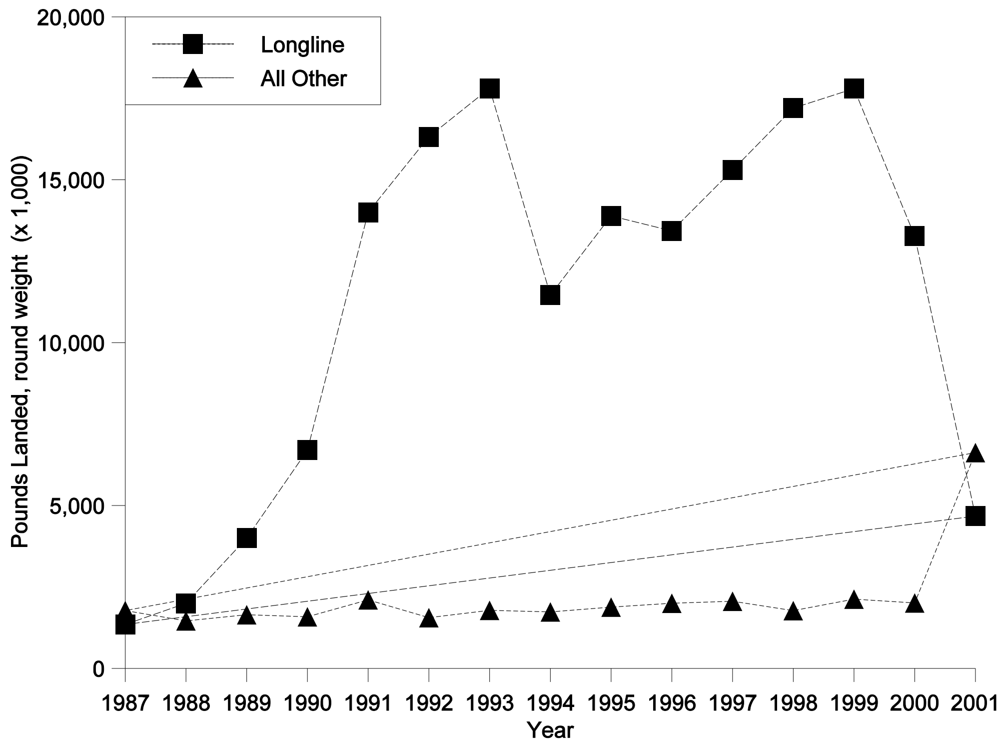
Hawaii commercial fishing revenue*, adjusted for inflation, 1948 - present. ($ x 1000)

Year	Aku Boat	Longline	Troll-Handline-Other
1948	9,736	9,737	588
1949	10,671	8,957	636
1950	9,688	7,924	442
1951	11,681	8,441	333
1952	7,234	9,284	412
1953	10,829	7,709	1,703
1954	11,270	6,988	230
1955	8,434	7,534	326
1956	8,304	6,584	335
1957	5,520	5,826	305
1958	6,712	5,563	225
1959	8,651	5,773	179
1960	5,676	5,286	233
1961	7,368	4,711	210
1962	6,482	4,844	228
1963	5,974	4,444	217
1964	6,714	4,630	221
1965	10,833	4,287	218
1966	7,265	4,362	279
1967	6,461	4,445	296
1968	7,611	4,355	309
1969	5,913	5,280	440
1970	6,583	5,544	506
1971	11,624	4,619	967
1972	12,055	4,793	1,214
1973	12,552	4,382	1,756
1974	9,475	4,284	2,818

Year	Aku Boat	Longline	Troll-Handline-Other
1975	7,386	3,586	4,369
1976	11,807	4,218	5,174
1977	10,895	5,316	6,328
1978	11,895	6,048	7,973
1979	8,448	8,563	7,843
1980	7,026	6,347	9,180
1981	6,575	8,305	9,439
1982	4,367	8,312	7,687
1983	4,715	10,315	8,600
1984	4,982	10,074	8,535
1985	3,836	13,395	8,793
1986	3,793	12,066	10,895
1987	5,972	16,450	13,031
1988	6,250	24,168	9,903
1989	6,339	31,312	9,913
1990	2,425	45,971	8,901
1991	3,269	52,958	9,399
1992	2,786	50,303	8,291
1993	2,703	59,607	9,016
1994	2,004	45,366	11,156
1995	1,656	46,355	10,058
1996	2,513	44,993	10,165
1997	2,488	52,279	7,438
1998	1,159	48,950	9,274
1999	1,731	49,168	10,711
2000	1,082	50,200	10,729
2001	**1,365**	**33,008**	**11,962**
Average	6,681	16,706	4,822
Std. Deviation	3,329	7,752	4,507

[<u>Data Source:</u> P8701b.xls (11/29/2002)]
<u>Data</u>: Combination of HDAR commercial catch reports for non-longline gears and NMFS estimates for longline.

Figure 5. Hawaii commercial billfish and other <u>non-tuna</u> PMUS catch by gear type, 1987 - present



<u>Interpretation</u>: The billfish and non-tuna PMUS include catches of swordfish, marlins, a nd incidental catches of miscellaneous pelagic species. Pelagic sharks (e.g., blue sharks), which are caught incidentally and processed at-sea only for their fins, is presented as estimated round weight. Catch was summarized into two gear types; longline gear and all other gears which included troll, handline, pole and line.

The longline billfish and non-tuna PMUS catch was composed primarily swordfish and sharks. The chart shows the rapid rise and subsequent decline of longline catches of billfish and other non-tuna PMUS from 1987 to 1994. The rise is attributed to growth in the longline fishery and increased effort directed towards swordfish. Catches fell off sharply in 1994 due to poor swordfish catches and lead to a out-migration of vessels to California and Fiji in 1995. Catch rose once again peaking in 1999 as swordfish catches stabilized and as shark catch began increasing. The practice of finning is what drove the increase in shark catch during this time.

Catches then plummeted the following two years due to State and federal laws prohibiting the practice of finning sharks unless it was accompanied with a corresponding carcass and emergency regulations prohibiting targeting of swordfish to reduce longline-turtle interactions.

The chart also shows the relative stability of billfish and non-tuna PMUS catch by all the other gears with the exception of 2001 in which catches increased more than three-fold to 6.6 million pounds.

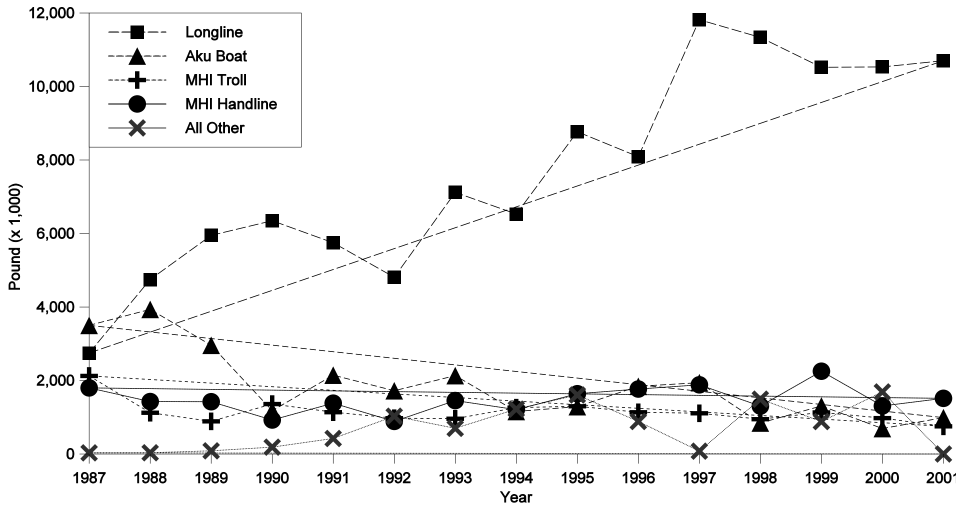
Hawaii commercial billfish and other non-tuna PMUS catch by gear type.

Year	Pounds Landed (x 1,000)	
	Longline	All Other
1987	1,350	1,776
1988	2,000	1,459
1989	4,000	1,648
1990	6,700	1,586
1991	14,000	2,105
1992	16,170	1,558
1993	17,815	1,784
1994	11,468	1,734
1995	13,868	1,882
1996	13,432	2,001
1997	15,299	2,063
1998	17,225	1,775
1999	17,800	2,154
2000	13,269	2,010
2001	**4,675**	**6,625**
Average	**11,271**	**2,144**
Standard Deviation	**5,890**	**1,257**

Data Source: P8701b.xls (11/29/02)

Data: Longline data are compiled from NMFS estimates. All other gear pelagics data are compiled from HDAR commercial catch reports.

Figure 6. Hawaii commercial tuna catch by gear type, 1987 - present.



<u>Interpretation</u>: The longline fishery had the largest tuna catches from 1988 and has been on a increasing trend. Longline effort directed towards tunas increased consistently from 1992 and as a result, tuna catch more than doubled from 1992 to 1997. Tuna catch by the longline fishery leveled off between 1997 and 2001 although tuna-target effort continued to increase up to 2001. The increased in tuna-target effort was due to the addition of a few longline vessels that previously had targeted swordfish but were then forced to make a transition to tunas in accordance with regulations to protect sea turtles. Other vessels left Hawaii and continued to target swordfish in California where this was still allowable.

Tuna catch from the aku boat fishery show a long-term decline. The aku boat fishery sold its catch to fresh fish markets and the tuna cannery prior to 1985. After the closure of the cannery, this fishery relied exclusively on fresh market sales. Although this time series begins after the closure of the cannery, the decline of catch in this fishery is a continuation due to the loss of this market. Tuna catches from this fishery were around 3 million pounds in the late 1980s, declined to 700 thousand pounds in 2000, increased slightly to 990 thousand pounds in 2001.

MHI troll and handline tuna catch experienced the least amount variation throughout 1987-2001. Catches by the MHI troll and handline fisheries were 750 thousand pounds and 1.5 million pounds, respectively, in 2001.

The all other pelagic gear is catgory includes trolling and handline in the NWHI EEZ, off-shore handline fishing outside the MHI EEZ, and distant-water albacore troll. The time-series now illustrates the tremendous growth (or reporting) and wide fluctuation of catch by other pelagic gears. Catch of other gear in 2001 was close its record level in 2000. Most of the tuna catch by other gear were primarily from off-shore handline fishing the seamounts and NOAA weather buoys.

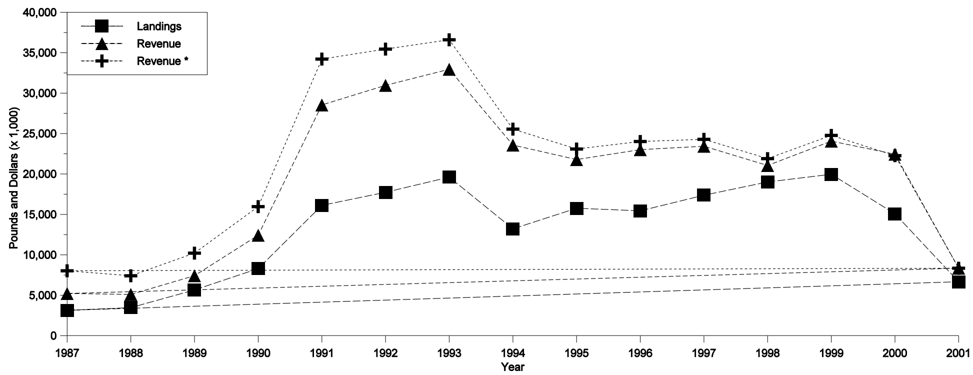
Hawaii commercial tuna catch by gear type.

	Pounds Caught (x 1,000)				
Year	Longline	Aku Boat (pole & line)	MHI Troll	MHI Handline	Other Gear
1987	2,750	3,501	2,127	1,799	34
1988	4,750	3,936	1,124	1,428	36
1989	5,950	2,961	891	1,423	87
1990	6,350	1,180	1,361	926	189
1991	5,750	2,147	1,139	1,383	424
1992	4,810	1,722	976	889	1,031
1993	7,120	2,134	962	1,455	700
1994	6,530	1,158	1,263	1,208	1,222
1995	8,770	1,290	1,301	1,642	1,607
1996	8,090	1,843	1,138	1,768	886
1997	11,819	1,942	1,110	1,883	80
1998	11,337	845	950	1,304	1,495
1999	10,524	1,309	1,133	2,254	884
2000	10,534	706	978	1,308	1,692
2001	**10,704**	**990**	**754**	**1,516**	**1,655**
Average	**7,719**	**1,844**	**1,147**	**1,479**	**801**
Standard Deviation	**2,783**	**967**	**316**	**357**	**634**

Data Source: P8701b.xls (11/29/02) + GASyr.dbf (10/21/2002)

Data: Longline data are compiled from NMFS estimates. Troll-handline-other pelagics data are compiled from HDAR commercial catch reports.

Figure 7. Hawaii billfish & other non-tuna PMUS catch and revenue, 1987 - present.



Interpretation: Billfish and other non-tuna Pelagic Management Unit Species (PMUS) include swordfish, marlins, mahimahi, ono, moonfish, and sharks. All gear types are combined. Longline was the largest producer of the pelagic catch, with swordfish and sharks the major components. Therefore, the change in billfish and other non-tuna PMUS catch is strongly related to the catch of these two species by this fishery. Much of the shark catch was from sharks which were finned. These finned sharks were raised to an estimated whole weight as a crude method to estimate total shark biomass.

Billfish and other non-tuna PMUS catch increased six-fold from 1987 to 1993, primarily by targeting swordfish. Total catch decreased 33% as swordfish catch dropped in 1994. Swordfish catch leveled off through 2000. Billfish and other non-tuna PMUS catch increased and peaked at 20 million pounds in 1999 due to increasing catches of sharks. This catch of sharks was composed predominantly of blue shark which were kept for fins. Billfish and other non-tuna PMUS decreased substantially in the following two years due to lower catches of swordfish and sharks. This represents a 67% decline from 1999 to 2001. The decline in shark catch is related to State and Federal regulations prohibiting finning sharks in 2001 without a corresponding carcass that began in the middle of 2000. The decrease in swordfish catch is due to the prohibition of targeting swordfish to reduce the turtle interactions.

Generally, revenue followed the same trend as catch. Changes in revenue have been caused by decreased in swordfish catch and a slow economy in 2001.

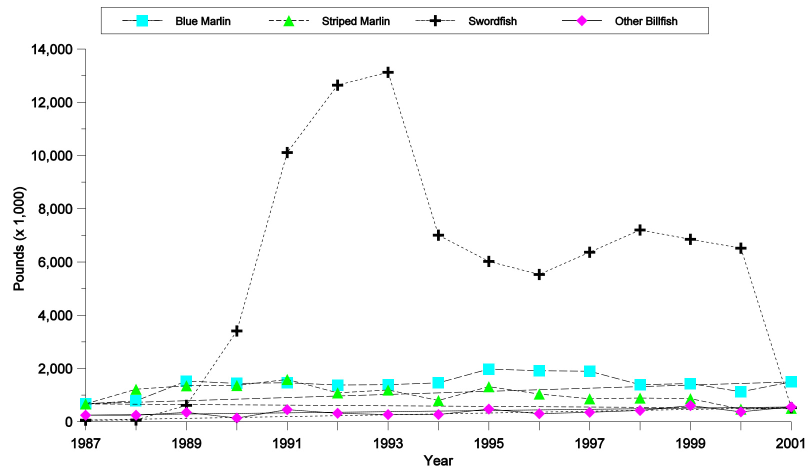
Hawaii billfish & other non-tuna PMUS catch and revenue, 1987 - present.

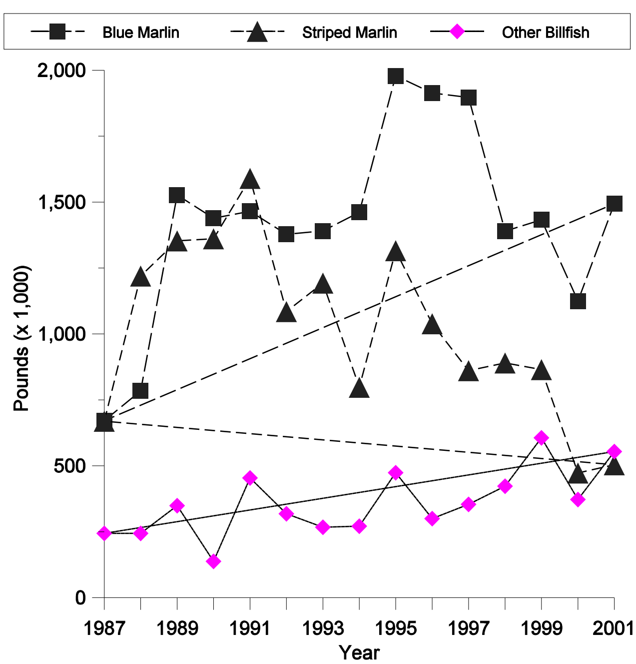
Year	Pounds (x1,000)	Nominal Revenue ($,1000)	Inflation-adjusted Revenue ($1,000)	HCPI
1987	3,126	5,207	8,019	115.9
1988	3,459	5,093	7,403	122.8
1989	5,648	7,410	10,198	129.7
1990	8,286	12,415	15,954	138.9
1991	16,105	28,530	34,202	148.9
1992	17,728	30,950	35,437	155.9
1993	19,599	32,939	36,588	160.7
1994	13,202	23,568	25,543	164.7
1995	15,750	21,772	23,078	168.4
1996	15,433	23,003	24,012	171.0
1997	17,362	23,420	24,277	172.2
1998	19,000	21,043	21,889	171.6
1999	19,954	24,053	24,760	173.4
2000	15,053	22,437	22,262	179.9
2001	**6,662**	**8,335**	**8,335**	**178.5**
Average	**13,091**	**19,345**	**21,464**	
Standard Deviation	**5,985**	**9,285**	**9,782**	

Data Source: P8701b.xls (11/29/02)

Data: Longline data are compiled from NMFS estimates. Troll-handline-other pelagics data are compiled from HDAR commercial catch reports.

Figure 8. Species composition of Hawaii commercial billfish catch, 1987 - present.





Species composition of Hawaii commercial billfish catch, 1987 - present

	Pounds Landed (x 1,000)			
Year	**Blue Marlin**	**Striped Marlin**	**Swordfish**	**Other Billfish**
1987	671	669	59	244
1988	784	1,220	65	244
1989	1,527	1,353	616	349
1990	1,439	1,361	3,411	138
1991	1,465	1,590	10,113	454
1992	1,378	1,085	12,644	318
1993	1,391	1,193	13,126	267
1994	1,461	798	7,008	271
1995	1,979	1,316	6,023	474
1996	1,914	1,039	5,532	300
1997	1,897	861	6,367	354
1998	1,390	890	7,204	423
1999	1,433	865	6,853	606
2000	1,125	473	6,520	372
2001	**1,494**	**504**	**528**	**554**
Average	**1,423**	**1,014**	**5,738**	**358**
Standard Deviation	**365**	**329**	**4,232**	**126**

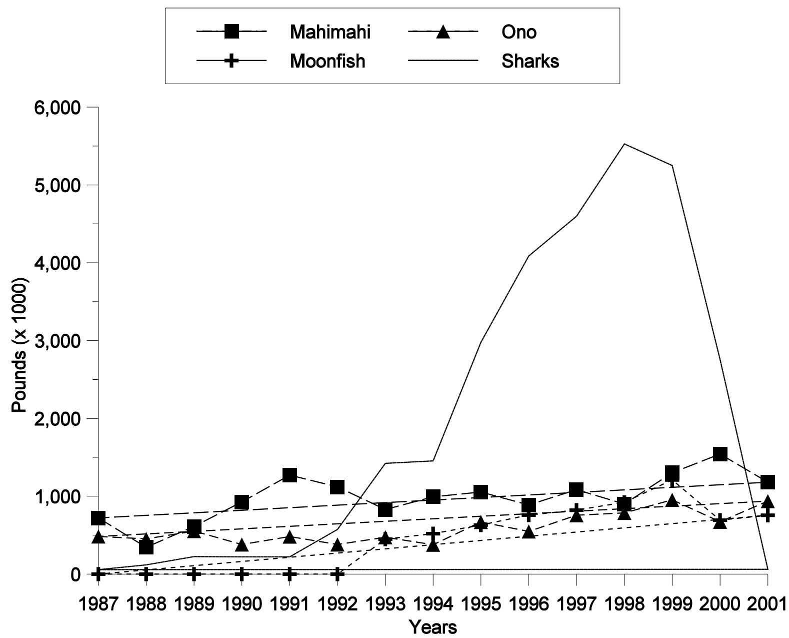
Interpretation: Swordfish catch, which was the primarily from the longline fishery, was the dominant component billfish catch from 1990 to 2000. Swordfish catch rose rapidly from negligible amounts in the late 1980s into the early 1990s peaking in 1993. Though a significant decrease of 47% occurred in 1994, along with longline effort shifting towards tuna, swordfish catches remained steady from 1994 to 2000. However, swordfish catch plummeted 92% in 2001 due to regulations designed to reduce sea turtle interactions by prohibiting swordfish-directed effort.

Blue marlin catches were below 1 million pounds prior to 1988 and nearly doubled in 1989. Blue marlin catches remained stable up to 1994 and increased to much higher levels during 1995 to 1997, then dropped back near its long-term average in 2001.

Striped marlin catch grew consistently from 1987 and peaked in 1991n as catches from the longline fishery increased. Catches remained about 1 million pounds thereafter but dropped to about half that amount in 2000 and 2001. It is unclear why striped marlin catches have decreased while longline effort targeting tuna increased .

Data: Species summaries for all gears combined are compiled from HDAR and NMFS landings figures. Longline data are compiled from NMFS estimates. Troll-handline-other pelagics data are compiled from HDAR commercial catch reports. Data are rounded to the nearest 1,000 pounds.
[Data Source: P8701b.xls (11/29/02)]

Figure 9. Hawaii commercial catch -- mahimahi, ono (wahoo), moonfish (opah), and sharks (whole weight), 1987 - present



Interpretation: Mahimahi catch rose from a record low in 1988, increased the following two years, and remained about the same thereafter. Mahimahi catch peaked in 2000 and decreased 24% to 1.2 million pounds in 2001. Troll-handline-other gear typically produced about half of the mahimahi catch. Ono catch was higher than usual during the past five years with a record catch in 1999. Ono catch in 2001 was close to that record observed in 1999. The MHI troll fishery contributes more than half of the annual ono catch. Moonfish catch grew from about 200,000 pounds in the late 1980s to 1.2 million pounds in 1999 and dropped to about 700,000 pounds thereafter. Moonfish is caught almost exclusively on longline gear. Shark catch rose rapidly from 1991 peaking in 1998 and remained about the same the following year. This rise in shark catch is a direct result of increasing numbers of shark that were finned by the longline fishery. Shark catch then decreased 88% in the following two years as a result of State and Federal regulations that began in the middle of 2000 which prohibits finning sharks unless there is a corresponding carcass

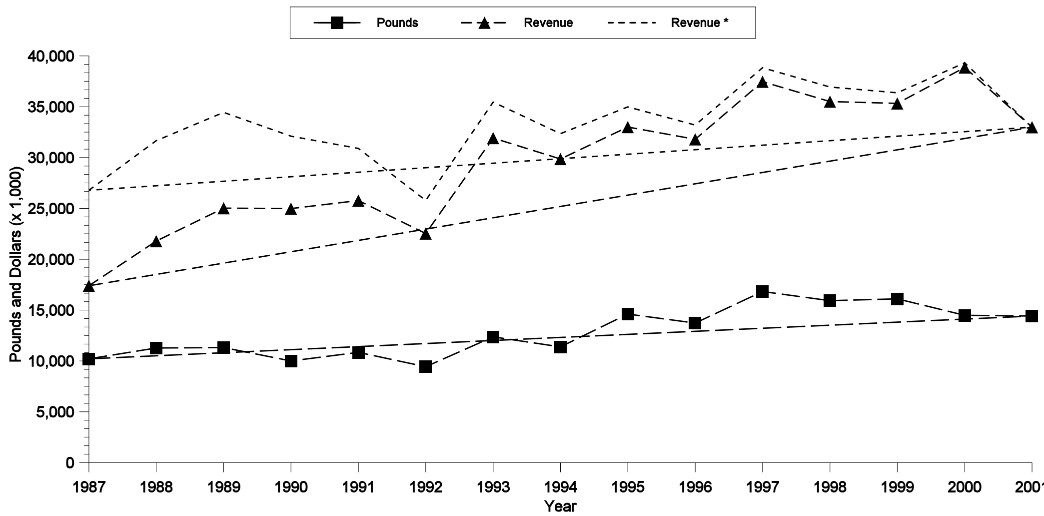
Hawaii commercial catch -- mahimahi, ono (wahoo), and sharks.

	Pounds (x 1,000)			
Year	**Mahimahi**	**Ono**	**Moonfish**	**Sharks (Whole weight)**
1987	722	484	152	57
1988	345	452	182	118
1989	612	553	274	224
1990	927	381	253	221
1991	1,271	482	270	222
1992	1,120	380	321	573
1993	830	473	450	1,423
1994	993	377	520	1,454
1995	1,055	669	630	2,978
1996	888	548	760	4,088
1997	1,085	757	823	4,598
1998	900	787	922	5,527
1999	1,302	954	1,210	5,249
2000	1,543	673	693	2,756
2001	**1,180**	**938**	**756**	**327**
Average	**985**	**594**	**548**	**1,988**
Standard Deviation	**296**	**194**	**312**	**2,034**

Data**:** Species summaries for all gears combined are compiled from HDAR and NMFS landings figures. Longline data are compiled from NMFS estimates. Troll-handline-other pelagics data are compiled from HDAR commercial catch reports. Data are rounded to the nearest 1,000 pounds. Shark landings represent reported weights for troll-handline-other gears and NMFS estimates of round or whole weights for longline-caught shark, including sharks "finned" (where only the fins are retained and the carcasses are discarded at sea).

Data Source: P8701b.xls (11/29/02)

Figure 10. Hawaii tuna catch and revenue, 1987 - present.



Interpretation: Tuna landings in Hawaii's commercial fishery plateaued between 1997 and 1999, and then decreased slightly in 2000 and 2001. Nominal and inflation-adjusted ex-vessel revenue were down from a record high in 2000 to $33 million in 2001. In general, revenue has been on an increasing trend.

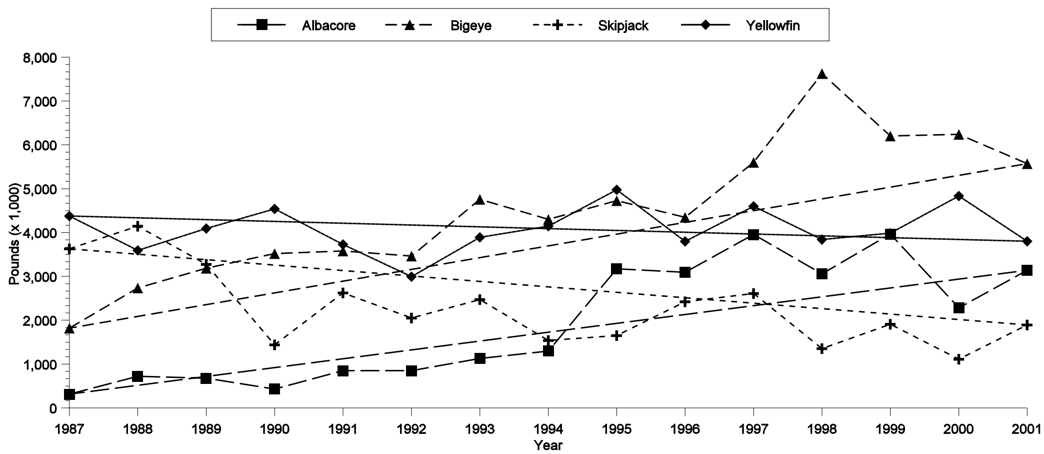
Hawaii tuna catch and revenue, 1987 - present

Year	Pounds Landed (x 1,000)	Nominal Revenue x $1,000	Inflation-adjusted Revenue x $1,000	HCPI
1987	10,211	17,390	26,783	115.9
1988	11,274	21,780	31,659	122.8
1989	11,312	25,032	34,450	129.7
1990	10,005	24,984	32,107	138.9
1991	10,843	25,776	30,900	148.9
1992	9,428	22,528	25,794	155.9
1993	12,371	31,924	35,460	160.7
1994	11,382	29,857	32,359	164.7
1995	14,609	33,001	34,980	168.4
1996	13,724	31,804	33,199	171.0
1997	16,834	37,460	38,830	172.2
1998	15,931	35,506	36,934	171.6
1999	16,104	35,333	36,372	173.4
2000	14,484	38,858	39,321	176.4
2001	**14,420**	**32,994**	**32,994**	178.5
Average	12,862	29,615	33,476	
Standard Deviation	2,434	6,357	3,850	

Data Source: P8701b.xls (11/29/02)

Data: Commercial landings and ex-vessel revenue for all gears combined are compiled from HDAR and NMFS figures. Longline data are compiled from NMFS estimates. Troll-handline-other pelagics data are compiled from HDAR commercial catch reports. Data are rounded to the nearest 1,000 pounds and dollars. Inflation-adjusted revenue bases previous year's revenues on the current year Honolulu consumer price index (HCPI).

Figure 11. Species composition of Hawaii commercial tuna catch, 1987 - present.



<u>Interpretation</u>: Bigeye tuna and albacore catches have increased due to growing participation in the longline fishery which began in the late 1980s along with more effort directed towards tuna throughout the 1990s. Bigeye tuna has been the largest component since 1996 with catch peaking in 1998. Albacore catch was low up to 1994 and increased substantially in 1995 with catch levels typically two to three times higher thereafter. The troll and handline (MHI and offshore) fisheries accounted for most of the yellowfin tuna catches and was followed by the longline fishery. Yellowfin tuna catch remained relatively unchanged throughout the time series. The aku boat (pole and ling) fishery was the largest skipjack tuna fishery in Hawaii. Skipjack tuna was highest in the late 1980s and decreased slightly thereafter with catches below 2 million pounds from 1998.

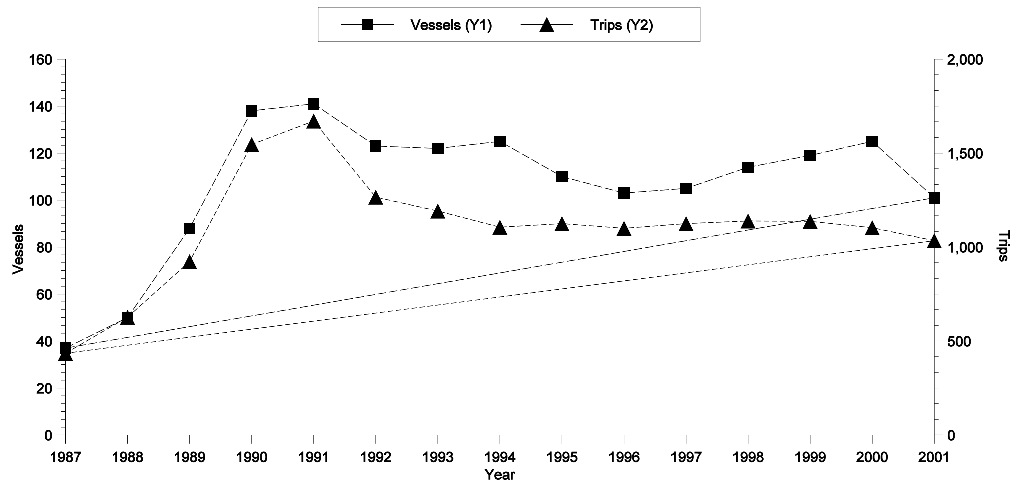
Species composition of Hawaii commercial tuna catch, 1987 - present.

	Pounds Landed (x 1,000)			
Year	**Albacore**	**Bigeye**	**Skipjack (aku)**	**Yellowfin**
1987	313	1,819	3,628	4,376
1988	720	2,737	4,147	3,594
1989	679	3,186	3,276	4,094
1990	429	3,519	1,438	4,540
1991	849	3,579	2,625	3,729
1992	851	3,464	2,051	2,994
1993	1,128	4,758	2,473	3,892
1994	1,297	4,301	1,540	4,144
1995	3,174	4,729	1,651	4,975
1996	3,092	4,348	2,423	3,798
1997	3,956	5,602	2,609	4,598
1998	3,058	7,626	1,352	3,842
1999	3,967	6,204	1,910	3,988
2000	2,282	6,240	1,111	4,833
2001	**3,139**	**5,572**	**1,891**	**3,802**
Average	1,929	4,512	2,275	4,080
Standard Deviation	1,344	1,539	878	517

Data Source: P8701b.xls (11/29/02)

Data: Species summaries for all gears combined are compiled from HDAR and NMFS landings figures. Longline data are compiled from NMFS estimates. Troll-handline-other pelagics data are compiled from HDAR commercial catch reports. Data are rounded to the nearest 1,000 pounds.

Figure 12. Hawaii longline vessel activity, 1987 - present.



Interpretation: Longline vessel activity rose rapidly in the late 1980s peaking at 141 vessels and 1,671 trips in 1991. Vessel and trip activity dropped the following year, remained relatively stable through 2000, and declined to 101 vessels and 1,034 trips in 2001. The decrease in 2001 is due to regulatory changes which prohibited targeting swordfish in order to reduce interactions with sea turtles. Some of the swordfish-directed effort shifted to the California-based longline fishery where regulations were not as stringent.

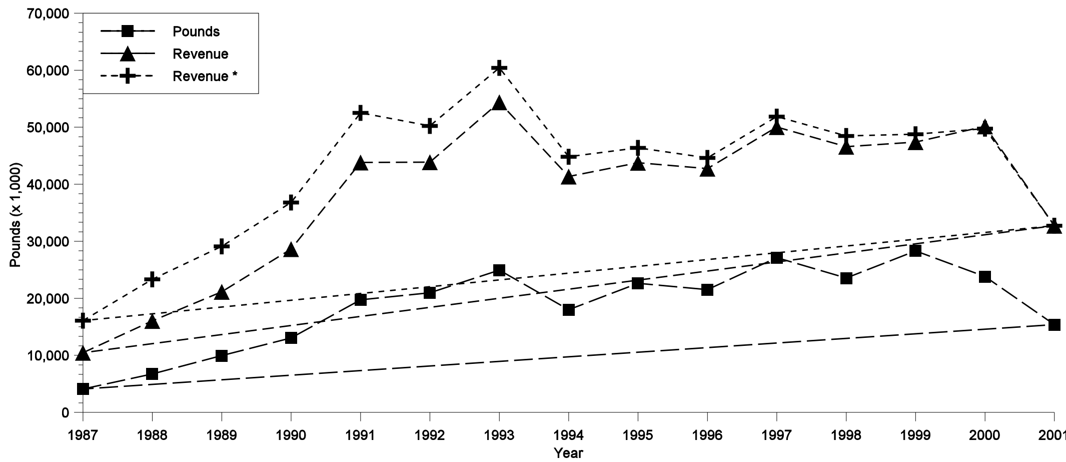
Hawaii longline vessel activity, 1987 - present.

Year	Active Vessels	Trips
1987	37	435
1988	50	627
1989	88	923
1990	138	1,546
1991	141	1,671
1992	123	1,266
1993	122	1,192
1994	125	1,106
1995	110	1,125
1996	103	1,100
1997	105	1,125
1998	114	1,139
1999	119	1,137
2000	125	1,103
2001	**101**	**1,034**
Average	107	1,102
Standard Deviation	28	291

Data source: (LL2001.xls RYI, 5/14/2002).

Data: Longline fishing effort data are compiled from Federal logbooks collected by the Fishery Monitoring & Economics Program of the NMFS Honolulu Laboratory for the year 1991-present, and by shoreside monitoring by FMEP in earlier years.

Figure 13a. Hawaii longline catch and revenue, 1987 - present.



Interpretation: Total catch by the Hawaii-based longline fishery rose six-fold from 1987 to 1993. The increase during this period was caused by increases in the number of vessels participating in the fishery and by growth in longline effort directed toward swordfish. Catch remained stable through 2000 but decreased significantly in 2001 due to lower catches of sharks and swordfish. The pattern for revenue is similar to catch which showed a rapid increase in the late 1980s and early 90s followed by a period of stability through 2000 and a significant decline in 2001.

Hawaii longline catch and revenue, 1987 - present.

Year	Pounds (x 1,000)	Nominal Revenue ($1,000)	Adjusted Revenue ($1,000)	Honolulu Consumer Price Index
1987	4,100	10,450	16,094	115.9
1988	6,750	16,050	23,330	122.8
1989	9,950	21,150	29,108	129.7
1990	13,050	28,650	36,818	138.9
1991	19,750	43,820	52,531	148.9
1992	20,980	43,875	50,235	155.9
1993	24,935	54,390	60,415	160.7
1994	17,998	41,373	44,840	164.7
1995	22,638	43,772	46,397	168.4
1996	21,522	42,754	44,629	171.0
1997	27,118	50,043	51,874	172.2
1998	23,562	46,594	48,468	171.6
1999	28,324	47,391	48,785	173.4
2000	23,803	50,153	49,763	179.9
2001	**15,379**	**32,728**	**32,728**	**178.5**
Average	**18,657**	**38,213**	**42,401**	
Standard Deviation	**7,357**	**13,359**	**12,230**	

Data Source: P8701b.xls (11/29/02)

Data: Longline catch and ex-vessel revenue estimates are compiled by the NMFS Honolulu Laboratory. The catch estimates relied exclusively on NMFS shoreside and market monitoring data during 1987 through 1991 and Federal logbook catch data combined with market monitoring summaries of average weight per fish and average price per pound from 1992 to 2001.

Figure 13b. Hawaii longline landings -- billfish (including swordfish), 1987 -present.

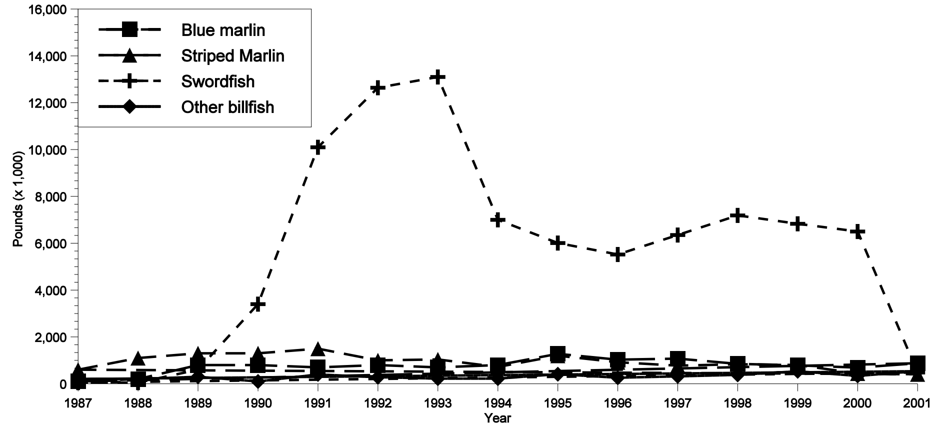
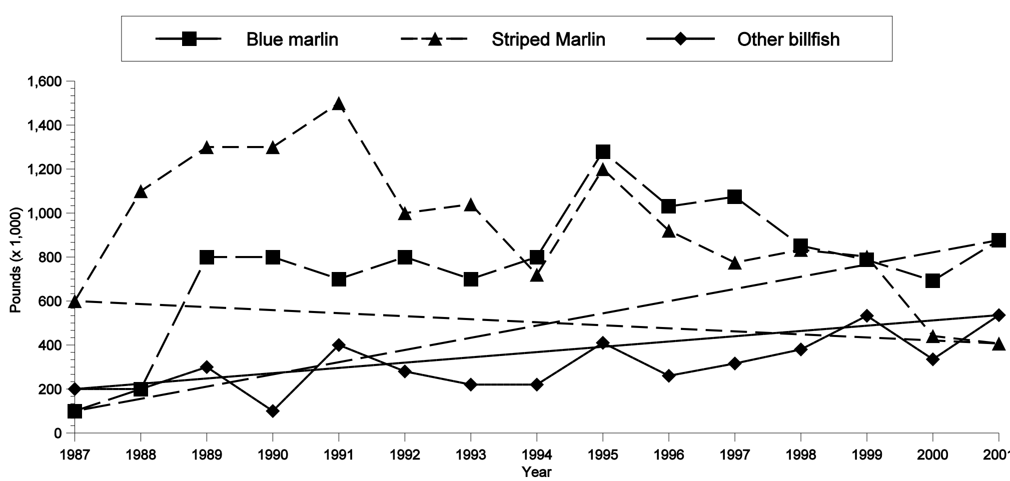


Figure 13c. Hawaii longline catch – marlins & other billfish, 1987 - present.



Interpretation: Swordfish was the dominant component of the billfish catch by the Hawaii-based longline fishery from 1990 through 2000. Hawaii longline swordfish catch rose rapidly in the early 1990s peaking in 1993 as a result of increased effort directed towards swordfish. Swordfish catch dropped the following year and remained relatively stable through 2000 but decreased substantially in 2001. The decrease in swordfish catch is due to the prohibition of targeting swordfish to reduce the turtle interactions.

Marlins are caught incidentally by the longline fishery and are retained and sold due to as moderate market price. Longline catch of blue marlin remained stable from 1989 with slightly higher catches in 1995 through 1997. Blue marlin was the largest component of the longline catch in 2001. Striped marlin catch has been on a downward trend with a record low catch in 2001. Striped marlin was the largest component of the billfish catch in the late 1980s.

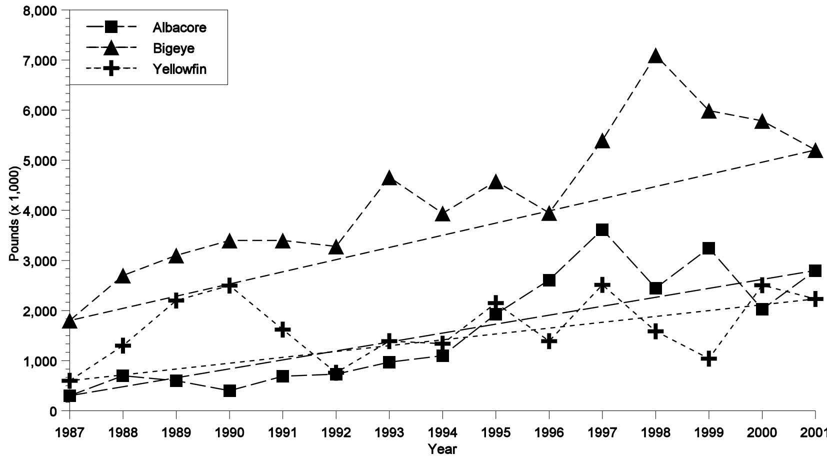
Hawaii longline catch - billfish (including swordfish), 1987 - 2001

	Pounds Caught (x 1,000)			
Year	**Blue marlin**	**Striped marlin**	**Swordfish**	**Other billfish**
1987	100	600	50	200
1988	200	1,100	50	200
1989	800	1,300	600	300
1990	800	1,300	3,400	100
1991	700	1,500	10,100	400
1992	800	1,000	12,640	280
1993	700	1,040	13,100	220
1994	800	720	7,000	220
1995	1,280	1,200	6,010	410
1996	1,030	920	5,520	260
1997	1,074	775	6,351	316
1998	851	833	7,189	380
1999	787	802	6,832	533
2000	692	441	6,502	335
2001	**877**	**407**	**483**	**536**
Average	**766**	**929**	**5,722**	**313**
Std Deviation	**297**	**320**	**4,234**	**123**

Data: Data are compiled from Federal logbooks and market monitoring information by NMFS Honolulu Laboratory and HDAR staff.

Data source: P8701b.xls (11/29/02)

Figure 14. Hawaii longline catch -- tunas, 1987 - present.



Interpretation: The three major tuna species caught by the Hawaii-based longline fishery are bigeye tuna, yellowfin tuna, and albacore. Catches for all three species have been upward due to increased effort directed towards tunas. Bigeye tuna was consistently the largest component of the longline tuna catch throughout the monitoring period. Both bigeye tuna and albacore catch increased substantially up through the late 1990s and have leveled off since. Yellowfin catches, which had much inter annual variation, has been on a general increase from 1992 . The longline fishery also catches small amounts of skipjack tuna and bluefin tuna.

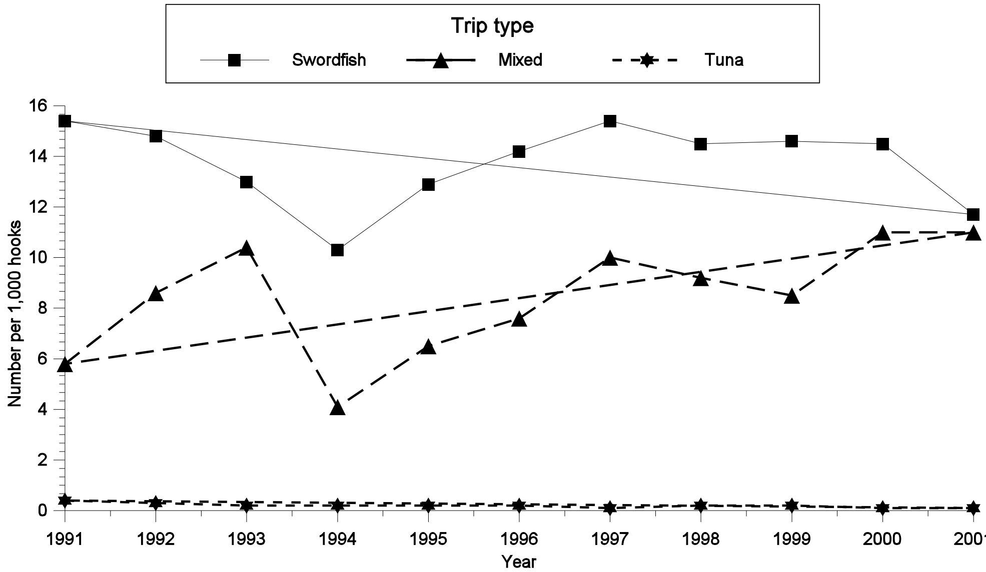
Hawaii longline catch -- tunas, 1987 - 2001.

	Pounds Caught (x 1,000)				
Year	Albacore	Bigeye	Yellowfin	Skipjack	Bluefin
1987	300	1,800	600		0
1988	700	2,700	1300		0
1989	600	3,100	2200		0
1990	400	3,400	2500		0
1991	690	3,400	1620		0
1992	730	3,280	760		0
1993	970	4,660	1390		0
1994	1,100	3,940	1340	80	30
1995	1,930	4,580	2150	50	60
1996	2,610	3,950	1390	90	50
1997	3,619	5,399	2515	234	52
1998	2,448	7,097	1,588	168	36
1999	3,250	5,990	1,042	219	23
2000	2,026	5,788	2,506	206	8
2001	**2,801**	**5,204**	**2,232**	**465**	**2**
Average	**1,705**	**4,463**	**1,752**	**189**	**19**
Standard	**1,116**	**1,421**	**639**	**131**	**22**

Data Source: P8701b.xls (11/29/02)

Data: Data are compiled from Federal logbooks and market monitoring information by NMFS Honolulu Laboratory and HDAR staff. Bluefin and skipjack tuna catches were not presented due to their small volume.

Figure 15. Hawaii longline catch rates -- swordfish catch by trip type, 1991 - present.



Interpretation: Targeting practice strongly affects swordfish CPUE. This graph shows that aggregate swordfish CPUE for the fleet was not a accurate measurement of fishery performance.

Swordfish-targeted trips had the highest swordfish CPUE of all trip types. Swordfish CPUE on swordfish target trips declined to a low in 1994 but returned to typical swordfish catch rates up through 2000. Swordfish target effort was curtailed substantially in 2001 and the swordfish CPUE dropped by 19%.

Mixed-target trips (swordfish and tuna target) had intermediate swordfish catch rates. Mixed-target trips also exhibited a record low swordfish CPUE in 1994, and this decline was greater than that of the swordfish-target trips. The CPUE for this trip type then increased from this record low to peak catch rates in 2000 and 2001.

Tuna-target trips had very low swordfish CPUEs throughout the monitoring period.

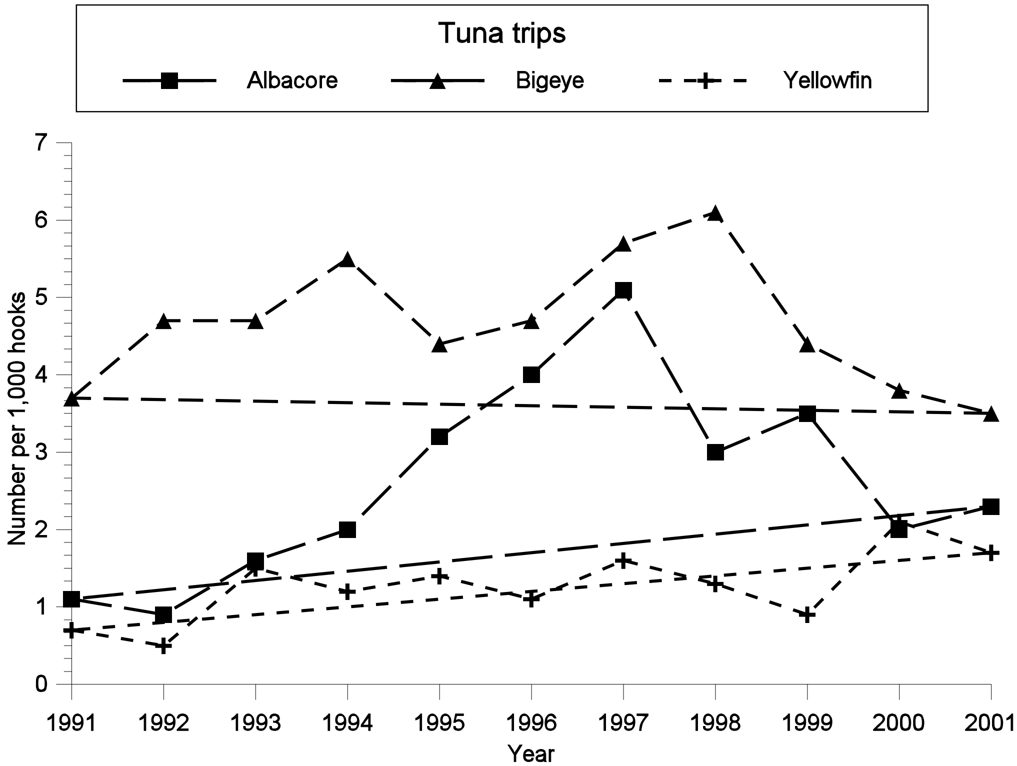
Swordfish CPUE by longline trip type, 1987 - 2001.

Year	Swordfish CPUE (number of fish per 1,000 hooks) Swordfish trips	Mixed trips	Tuna trips
1991	15.4	5.8	0.4
1992	14.8	8.6	0.3
1993	13.0	10.4	0.2
1994	10.3	4.1	0.2
1995	12.9	6.5	0.2
1996	14.2	7.6	0.2
1997	15.4	10.0	0.1
1998	14.5	9.2	0.2
1999	14.6	8.5	0.2
2000	14.5	11.0	0.1
2001	**11.7**	**11.0**	**0.1**
Average	**13.8**	**8.4**	**0.2**
Standard Deviation	**1.6**	**2.2**	**0.1**

Data source: LLCS annual output, NMFS HL

Data: Longline catch rates are compiled from Federal daily longline logbooks. CPUE (catch-per-unit-effort) is the number of fish caught per 1,000 hooks set. Trips are categorized by longline captains (or by NMFS staff in the absence of a longline captain) as targeting swordfish, tuna, or mixed species (mixed refers to either targeting both tunas and swordfish on each set or switching from one target species to another species within a trip).

Figure 16. Hawaii longline catch rates -- major tuna species by tuna trips, 1991 - present.



Interpretation: Tuna-target trips usually had the highest catch rate for bigeye tuna. Bigeye tuna is the primary target species in tuna longline fishing and CPUE for bigeye tuna was consistently higher than those for albacore or yellowfin tuna. Bigeye tuna CPUE increased from 1991 to 1994, dropped in 1995, and peaked in 1998. Bigeye tuna then declined consistently to a record low in 2001.

Since the average price for albacore is substantially lower than those for bigeye and yellowfin tuna, it is usually targeted infrequently or is caught incidentally. Albacore CPUE rose rapidly from 1992, peaked in 1997, and has declined since. The dip in albacore CPUE in 1998 may be due to better bigeye tuna CPUE but the drop in 2000 is not clearly explained.

CPUE for yellowfin tuna was usually the lowest of the three major tuna species. Yellowfin tuna CPUE was lowest in 1991 and 1992, increased slightly and remained relatively stable up to 1998 with higher CPUEs in 2000 and 2001. The higher than usual CPUEs observed in the past two years is related to increased fishing activity in the EEZ of Kingman Reef and Palmyra Atoll. Yellowfin tuna CPUE in this area was significantly higher than inall other areas fished.

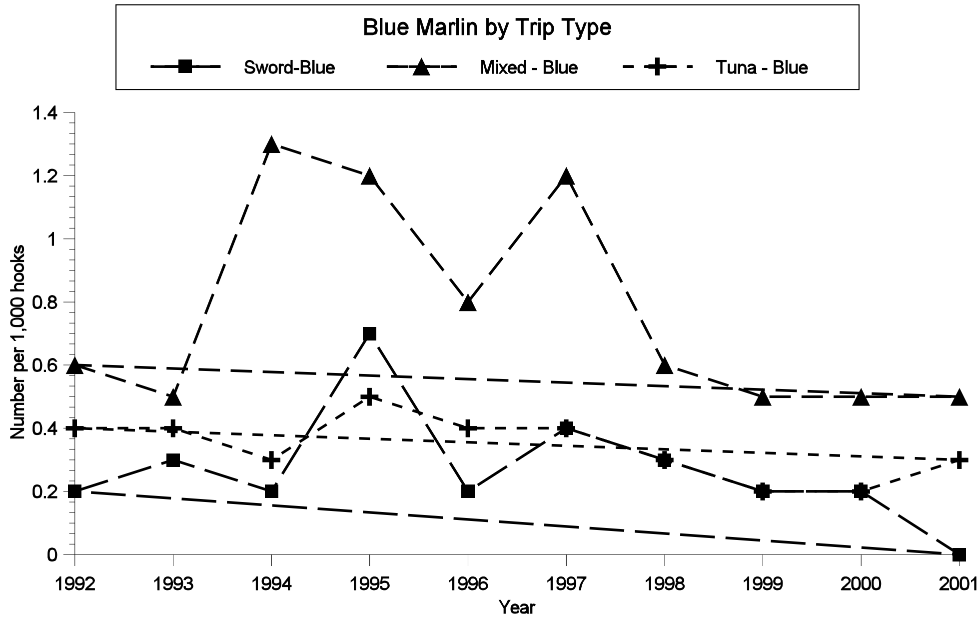
Tuna longline CPUE for tuna trips, 1987 - 2001

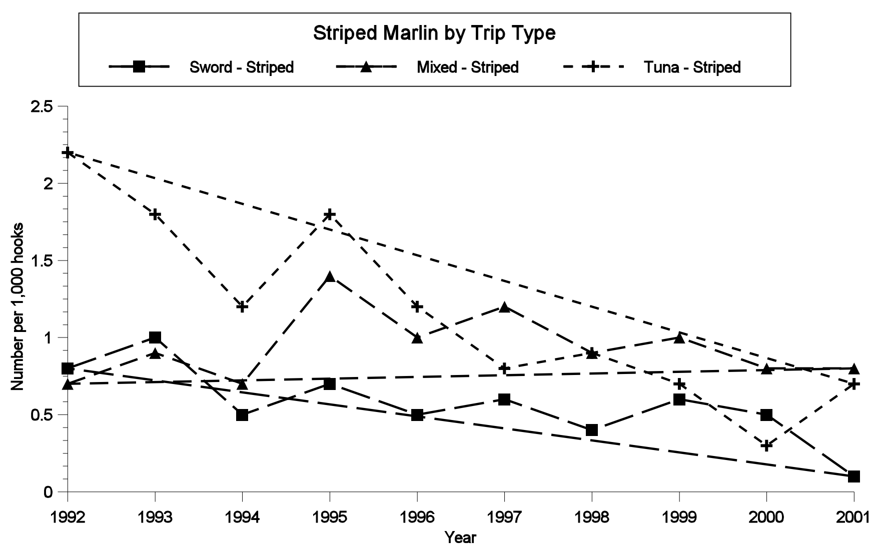
Year	Tuna-trip CPUE (number caught per 1,000 hooks)		
	Albacore	**Bigeye**	**Yellowfin**
1991	1.1	3.7	0.7
1992	0.9	4.7	0.5
1993	1.6	4.7	1.5
1994	2.0	5.5	1.2
1995	3.2	4.4	1.4
1996	4.0	4.7	1.1
1997	5.1	5.7	1.6
1998	3.0	6.1	1.3
1999	3.5	4.4	0.9
2000	2.0	3.8	2.1
2001	**2.3**	**3.5**	**1.7**
Average	**2.6**	**4.7**	**1.3**
Standard Deviation	**1.3**	**0.8**	**0.5**

Data source: LLCS annual output, NMFS HL

Data: Longline catch rates are compiled from Federal daily longline logbooks. CPUE (catch-per-unit-effort) is based on number of fish caught per 1,000 hooks set. Trips are categorized by longline captains (or by NMFS staff in the absence of a longline captain) as targeting swordfish, tuna, or mixed species (mixed in reference to targeting both tunas and swordfish on each set or switching from one target species to a different species within a trip).

Figure 17. Hawaii longline catch rates -- blue & striped marlin by trip type, 1991 - present.





Marlin longline CPUE by trip type, 1991 - 2001.

Marlin CPUE (number caught per 1,000 hooks)						
	Blue Marlin			Striped Marlin		
Year	**Swordfish Trips**	**Mixed Trips**	**Tuna Trips**	**Swordfish Trips**	**Mixed Trips**	**Tuna Trips**
1991	poor species identification precluded quantification in 1991					
1992	0.2	0.6	0.4	0.8	0.7	2.2
1993	0.3	0.5	0.4	1.0	0.9	1.8
1994	0.2	1.3	0.3	0.5	0.7	1.2
1995	0.7	1.2	0.5	0.7	1.4	1.8
1996	0.2	0.8	0.4	0.5	1.0	1.2
1997	0.4	1.2	0.4	0.6	1.2	0.8
1998	0.3	0.6	0.3	0.4	0.9	0.9
1999	0.2	0.5	0.2	0.6	1.0	0.7
2000	0.2	0.5	0.2	0.5	0.8	0.3
2001	**0.0**	**0.5**	**0.3**	**0.1**	**0.8**	**0.7**
Average	**0.3**	**0.8**	**0.3**	**0.6**	**0.9**	**1.2**
Standard Deviation	**0.2**	**0.3**	**0.1**	**0.2**	**0.2**	**0.6**

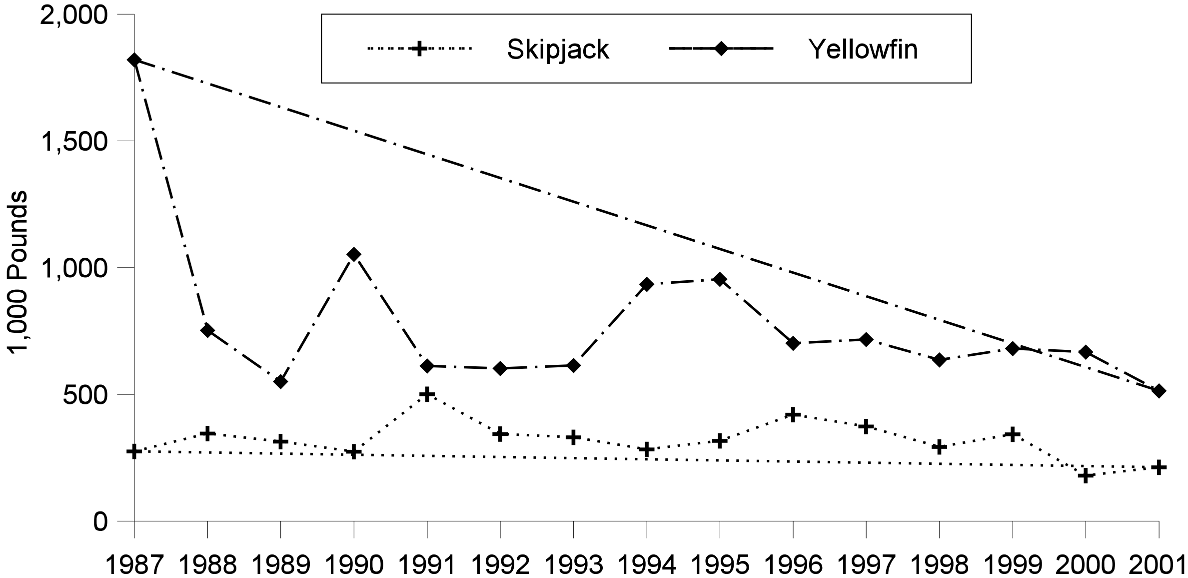
Interpretation: Blue and striped marlin were caught incidentally by the longline fishery, therefore catch rates for these two species were significantly lower than CPUE for target species such as swordfish and bigeye tuna. There was some difference in marlin CPUE between the different trip types. Blue marlin CPUE was noticeably higher on mixed-target trips. The highest blue marlin CPUE on mixed trips occurred between 1994 and 1997 with very stable catch rates from 1998 through 2001.

Striped marlin CPUE was usually higher on tuna-target trips and appeared to be on the decline.

Data source: LLCS output, NMFS HL

Data: Longline catch rates are compiled from Federal daily longline logbooks. CPUE (catch-per-unit-effort) is based on number of fish caught per 1,000 hooks set. Trips are categorized by longline captains (or by NMFS staff in the absence of a longline captain) as targeting swordfish, tuna, or mixed species (mixed in reference to targeting both tunas and swordfish on each set or switching from one target species to a different species within a trip).

Figure 18. Main Hawaiian Islands troll catch – major species, 1987 - present.



Interpretation: Yellowfin and skipjack tunas were the primary tuna species caught by the MHI troll fishery. Yellowfin tuna catch decreased almost 60% in 1988, but has remained approximately stable since. Skipjack tuna were also stable throughout the monitoring period. Small quantities of bigeye tuna, albacore, and other tunas were also caught by this fishery.

MHI Troll tuna catch, 1987 - present.

Pounds caught (X 1,000)

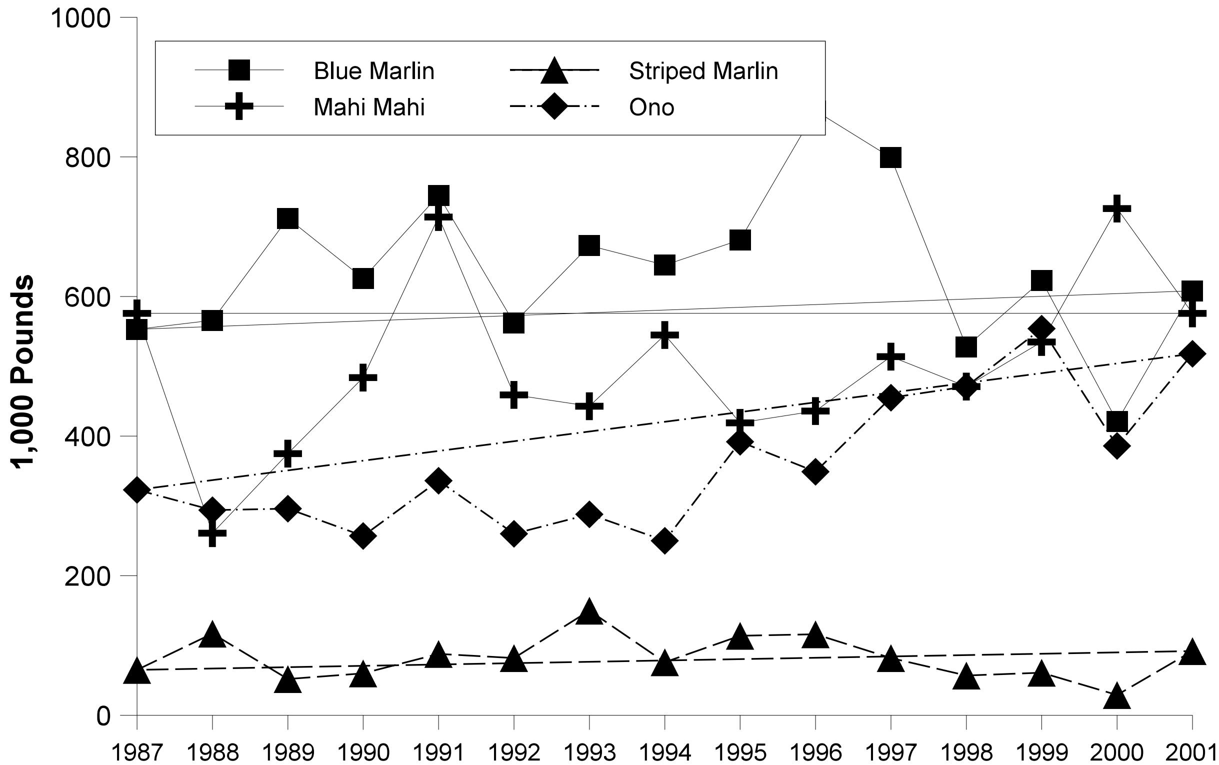
Year	Albacore	Bigeye	Skipjack	Yellowfin	Other Tuna	Total
1987	1	11	275	1,820	19	2,126
1988	1	10	346	752	16	1,124
1989	1	11	314	551	14	891
1990	1	15	274	1,053	18	1,360
1991	2	11	501	612	14	1,139
1992	3	9	344	602	16	974
1993	3	4	331	614	11	963
1994	* 21	6	283	934	19	1,263
1995	10	10	317	954	11	1,302
1996	5	4	420	702	7	1,138
1997	7	6	374	717	6	1,110
1998	4	6	293	636	10	949
1999	* 86	7	343	681	7	1,124
2000	4	6	180	667	7	864
2001	**10**	**9**	**213**	**514**	**7**	**753**
Average	**11**	**8**	**321**	**787**	**12**	**1,139**
Standard Deviation	**22**	**3**	**78**	**324**	**5**	**321**

* The albacore "spike" in 1994 and 1999 was probably distant-water albacore trollers with mis-identified location of catch (i.e., it should have been included in Other).

Data source: Gas01b.dbf (10/21/2002) for current year, GASyr.dbf for previous years.

Data: Data compiled by NMFS staff from HDAR commercial catch reports. Year 2000 data are preliminary (as compiled through April 2001). These data reflect only trolling gear codes and main Hawaiian islands locations. Some off-shore seamounts (e.g., Cross) are excluded, as are distant-water albacore catch. However some off-shore seamounts (e.g., Jagger) are included, based on the HDAR area code determinations (area codes less than 1000).

Figure 19. MHI Troll Billfish and non-Tuna catch, 1987-present



Interpretation: MHI troll catch for non-tunas has remained fairly steady throughout the monitoring period. Blue marlin was usually higher than catch of the other species and was followed by mahimahi and ono, respectively. Striped marlin made up only a small contribution to this fishery's billfish and non-tuna catch. The MHI troll fishery also caught negligible amounts of swordfish although catch reached a record in 2001.

MHI Troll Billfish and non-tuna catch, 1987-present.

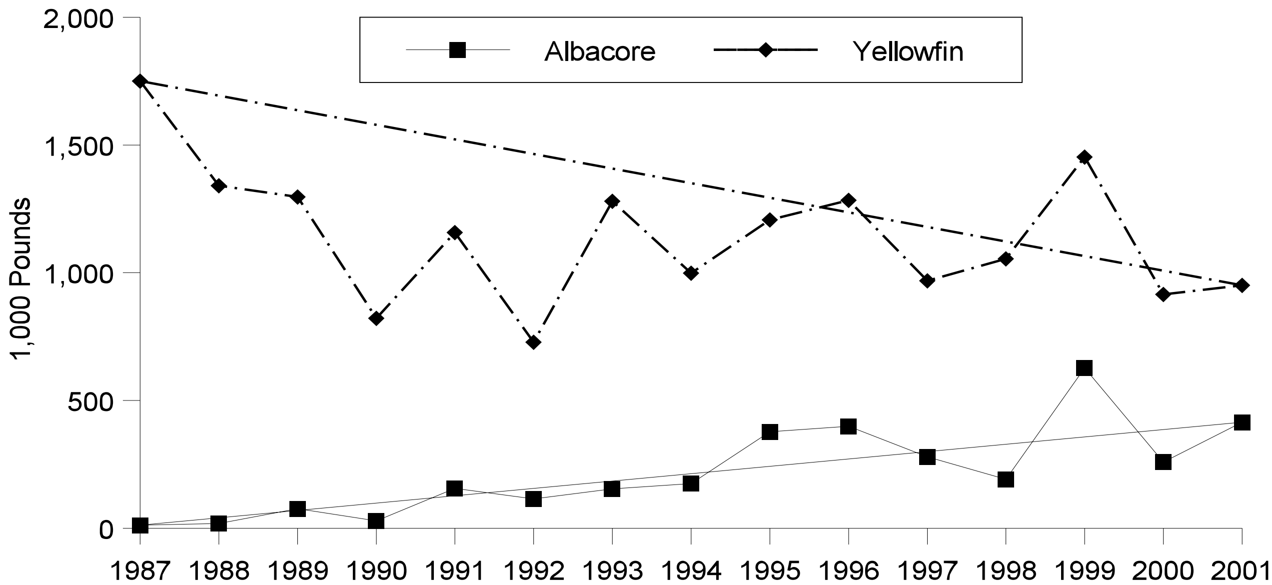
1,000 Pounds caught

Year	**Blue Marlin**	**Striped Marlin**	**Swordfish**	**Mahimahi**	**Ono (wahoo)**
1987	553	65	1	576	323
1988	566	117	2	261	294
1989	712	52	2	375	296
1990	626	60	1	484	257
1991	745	88	1	714	336
1992	562	82	0	459	260
1993	673	150	0	443	288
1994	645	76	1	545	250
1995	681	114	1	419	392
1996	866	116	1	436	349
1997	799	82	1	514	455
1998	528	57	1	471	471
1999	623	61	1	535	554
2000	421	29	1	726	386
2001	**608**	**92**	**30**	**576**	**518**
Average	**641**	**83**	**3**	**502**	**362**
Standard Deviation	**112**	**31**	**8**	**120**	**98**

Data source: Gas01b.dbf (10/21/2002) for current year, GASyr.dbf for previous years.

Data: Data was compiled by NMFS staff from HDAR commercial catch reports. These data reflect only trolling gear codes in area codes within the main Hawaiian islands. Catches from some off-shore seamounts (e.g., Cross) are excluded, as is the distant-water albacore catch. However, some off-shore seamounts (e.g., Jagger) are included, based on the HDAR area code determinations (area codes less than 1000).

Figure 20 Main Hawaiian Islands handline catch (excluding distant seamounts) – major species, 1987 - present



<u>Interpretation</u>: MHI handline catch was composed primarily of yellowfin tuna. Though yellowfin tuna catch can fluctuate from year to year, the general trend for this species shows a decrease in the late 1980s with catches stable in the 1990s up through 2001. Albacore catch was the second largest component of this fishery. Catches of albacore grew throughout the monitoring period with catch peaking in 1999. This fishery made smaller catches of bigeye and skipjack tuna with bigeye tuna catch exceeded 100,000 pounds in the past two years.

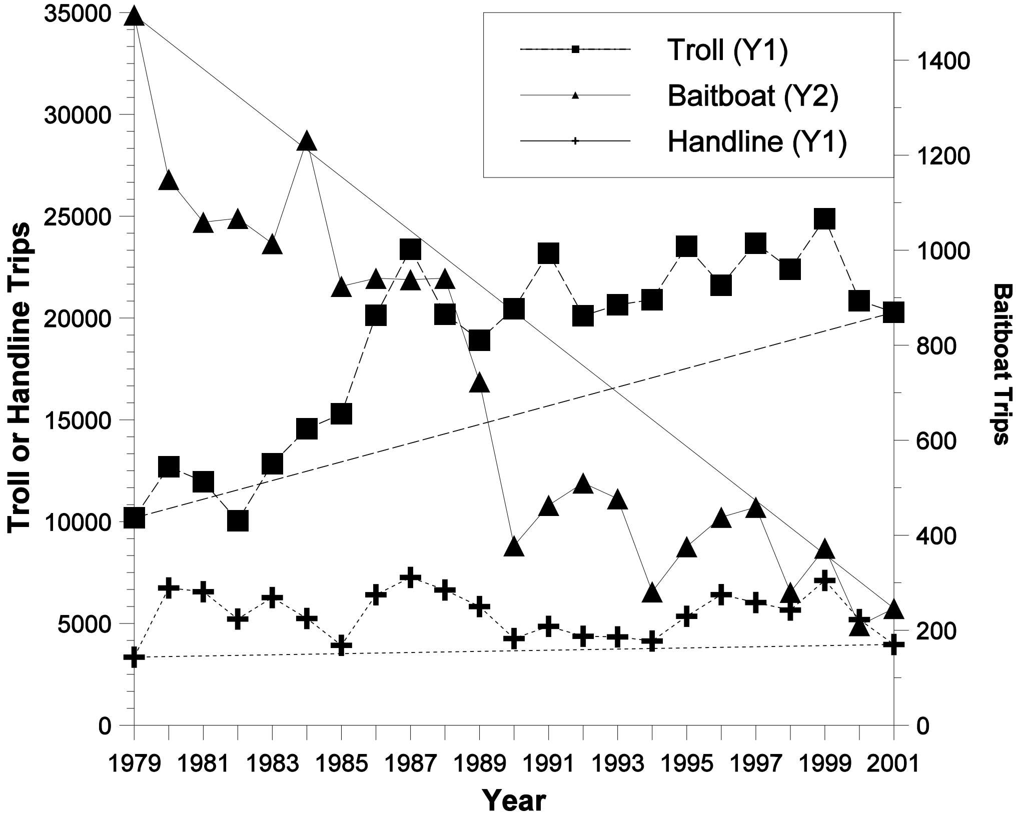
Main Hawaiian Islands handline catch (excluding distant seamounts) -- major species

	Pounds Caught (X 1,000)					
	Albacore	**Bigeye tuna**	**Skipjack tuna**	**Yellowfin tuna**	**Other tunas**	**Total Tuna**
1987	12	6	25	1,750	5	1,798
1988	19	28	31	1,341	9	1,428
1989	77	19	20	1,297	11	1,420
1990	29	42	26	822	6	925
1991	156	45	19	1,158	6	1,383
1992	115	164	21	728	7	1,035
1993	154	2	13	1,280	5	1,454
1994	175	10	21	999	3	1,208
1995	378	33	17	1,207	6	1,641
1996	399	11	70	1,284	4	1,768
1997	280	52	57	969	3	1,360
1998	192	15	38	1,055	3	1,303
1999	627	42	50	1,453	2	2,174
2000	259	129	14	915	2	1,319
2001	**415**	**117**	**30**	**951**	**3**	**1,516**
Average	**219**	**48**	**30**	**1,147**	**5**	**1,449**
Standard Deviation	**175**	**49**	**17**	**266**	**3**	**310**

Data source: Gas01b.dbf (10/21/2002) for current year, GASyr.dbf for previous years.

Data: Data was compiled by NMFS staff from HDAR commercial catch reports. These data reflect only trolling gear codes in area codes within the main Hawaiian islands. Some off-shore seamounts (e.g., Cross) are excluded, as are distant-water albacore catch. However, some off-shore seamounts (e.g., Jagger) are included, based on the HDAR area code determinations (area codes less than 1000).

Figure 21. Hawaii commercial pelagic trips by the troll, handline, and aku boat fisheries.

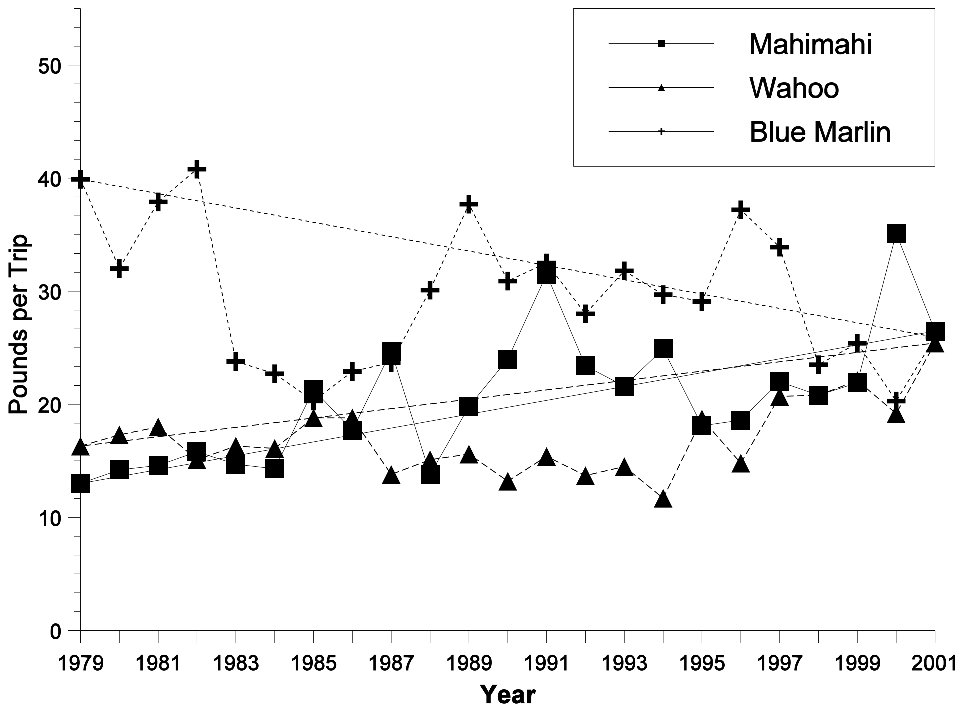


Interpretation: Trips by troll and combined handline (including offshore handline) fishing vessels dropped in 2001, but increased for aku boats. Commercial trolling activity was about the same as 2000 and continued at the high level between 20,000 and 25,000 trips per year beginning in 1986. Combined handline effort dropped 24% (based on preliminary data) and was below the long-term average. Part of the decrease may be due to under-reporting in 2001. Aku boat activity rose 17% from the record low in 2000, but was still well below the long-term average. Only two vessels would be considered to be full-time vessels, while another five (including one in Haleiwa and one on Maui) were fishing part-time. The once thriving aku boat fleet continues to decline due to attrition.

Data: Data compiled from HDAR commercial catch reports using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 2001 data were updated with more complete data available in 2002. Non-commercial data are not available.

Year	Number of Trips		
	Troll	Aku boat	Handline
1979	10,185	1,495	3,346
1980	12,692	1,149	6,746
1981	11,975	1,059	6,562
1982	10,039	1,067	5,219
1983	12,842	1,014	6,275
1984	14,556	1,232	5,248
1985	15,291	924	3,929
1986	20,139	941	6,412
1987	23,391	938	7,263
1988	20,202	941	6,647
1989	18,924	723	5,834
1990	20,468	378	4,261
1991	23,184	463	4,861
1992	20,109	510	4,374
1993	20,647	477	4,343
1994	20,905	281	4,142
1995	23,527	376	5,357
1996	21,611	438	6,416
1997	23,674	459	6,032
1998	22,403	280	5,660
1999	24,884	373	7,116
2000	20,855	210	5,191
2001	**20,281**	**246**	**3,967**
Average	**18,817**	**695**	**5,444**
Standard Deviation	**4,610**	**374**	**1,137**

Figure 22. Commercial trolling catch per trip---mahimahi, wahoo and blue marlin.

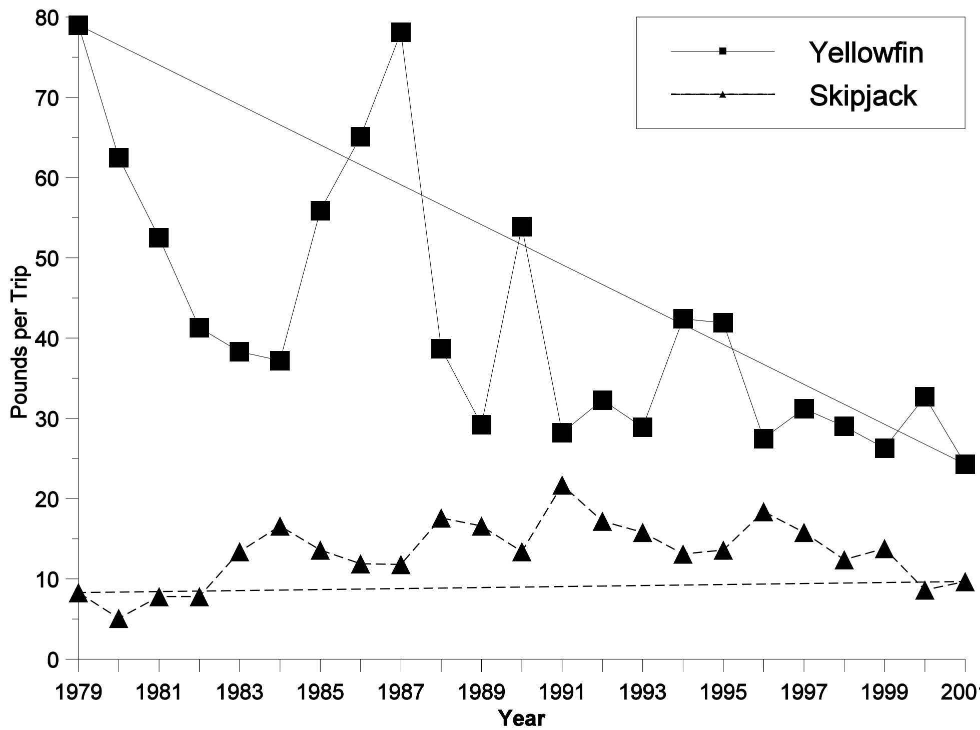


Interpretation: The troll catch rates for non-tuna species were highly variable. The mahimahi catch rate dropped 24% from the record high in 2000, but was still above the long-term average. The wahoo catch rate reached a new record peak in 2001. The blue marlin catch rate rose 28% and was within the long-term average. Reported troll mahimahi landings were 536,915 pounds (-27% from 2000), wahoo 515,559 pounds (+29%), and blue marlin 526,115 pounds (+24%). While 2000 was a good year for mahimahi and a poor year for wahoo and blue marlin, 2001 was the inverse.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2002) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 2001 data were updated with more complete data available in 2002. Non-commercial data are not available.

Year	Catch per Trolling Trip (Pounds)		
	Mahimahi	**Wahoo (Ono)**	**Blue Marlin**
1979	13.0	16.3	39.9
1980	14.2	17.3	32.0
1981	14.6	18.0	37.9
1982	15.8	15.1	40.8
1983	14.7	16.3	23.8
1984	14.3	16.1	22.7
1985	21.3	18.8	20.3
1986	17.7	18.8	22.9
1987	24.7	13.8	23.7
1988	13.8	15.1	30.1
1989	19.8	15.6	37.7
1990	24.0	13.2	30.9
1991	31.5	15.4	32.5
1992	23.4	13.7	28.0
1993	21.6	14.5	31.8
1994	24.9	11.7	29.7
1995	18.1	18.7	29.1
1996	18.6	14.8	37.2
1997	22.0	20.7	33.9
1998	20.8	20.8	23.5
1999	21.9	22.1	25.4
2000	35.1	19.2	20.3
2001	**26.5**	**25.4**	**25.9**
Average	**20.5**	**17.0**	**29.6**
Standard Deviation	**5.7**	**3.2**	**6.3**

Figure 23a. Commercial trolling catch per trip -- yellowfin and skipjack tuna.

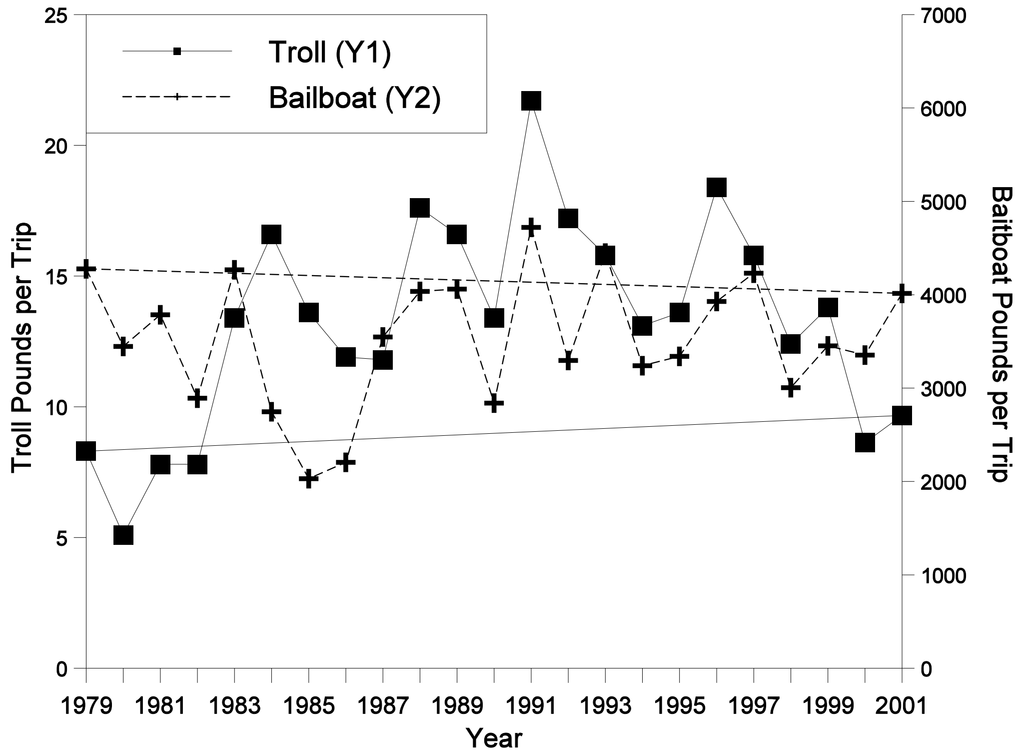


Interpretation: The troll catch rate for yellowfin tuna reached a record low in 2001. Although the catch rates are variable, the period from 1991 through 2001 exhibits a generally lower average catch rate than the period from 1979 to 1990. The later period coincides with the rapid growth of the Hawaii-based longline fleet, but there were low catch rates in the 1982-1984 period as well, when a strong ENSO occurred. The skipjack catch rate improved slightly (13%) and was just within the long-term average. Reported troll landings were 492,328 pounds for yellowfin (-28% from 2000) and 196,205 pounds for skipjack (+9%).

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2002) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 2001 data were updated with more complete data available in 2002. Non-commercial data are not available.

	Catch per Trolling Trip (Pounds)	
Year	**Yellowfin**	**Skipjack**
1979	79.0	8.3
1980	62.5	5.1
1981	52.5	7.8
1982	41.3	7.8
1983	38.3	13.4
1984	37.2	16.6
1985	55.9	13.6
1986	65.1	11.9
1987	78.1	11.8
1988	38.7	17.6
1989	29.2	16.6
1990	53.9	13.4
1991	28.2	21.7
1992	32.3	17.2
1993	28.9	15.8
1994	42.4	13.1
1995	41.9	13.6
1996	27.5	18.4
1997	31.2	15.8
1998	29.0	12.4
1999	26.3	13.8
2000	32.7	8.6
2001	**24.3**	**9.7**
Average	**42.5**	**13.2**
Standard Deviation	**16.0**	**3.9**

Figure 23b. Aku boat and commercial trolling catch per trip -- skipjack tuna

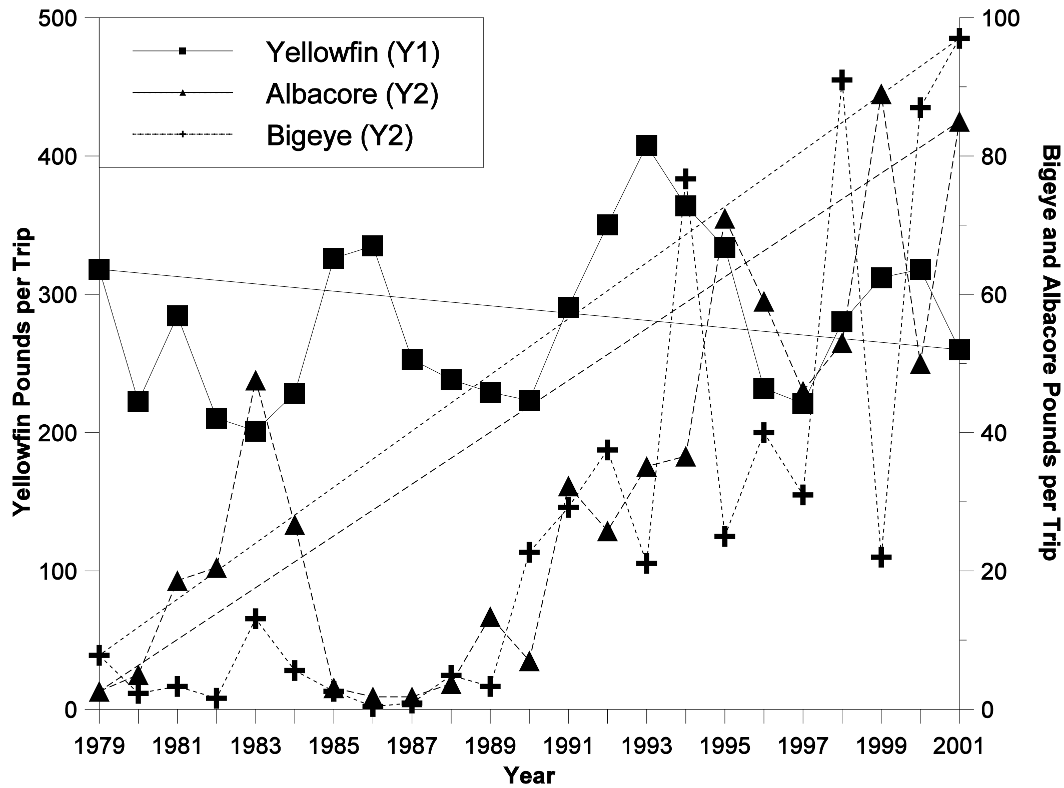


Interpretation: This figure shows the generally close correspondence of aku boat and trolling catch rates for skipjack once the level of cannery catch declined substantially, beginning in the mid-1980s. Both trolling and aku boat skipjack catch rates rose in 2001. HDAR reports show the aku boats landed 987,790 pounds of skipjack tuna in 2001, a substantial 40% improvement from 2000 (704,392 pounds).

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2002) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 2001 data were updated with more complete data available in 2002. Non-commercial data are not available.

	Skipjack Tuna Catch per Trip (pounds)	
Year	**Trolling**	**Aku boat**
1979	8.3	4,278
1980	5.1	3,447
1981	7.8	3,786
1982	7.8	2,892
1983	13.4	2,468
1984	16.6	2,748
1985	13.6	2,031
1986	11.9	2,206
1987	11.8	3,548
1988	17.6	4,036
1989	16.6	4,061
1990	13.4	2,840
1991	21.7	4,722
1992	17.2	3,297
1993	15.8	4,447
1994	13.1	3,240
1995	13.6	3,341
1996	18.4	3,928
1997	15.8	4,231
1998	12.4	3,005
1999	13.8	3,453
2000	8.6	3,354
2001	**9.7**	**4,015**
Average	**13.2**	**3,451**
Standard Deviation	**4.0**	**716**

Figure 24. Combined commercial handline catch per trip -- yellowfin, albacore, and bigeye tunas



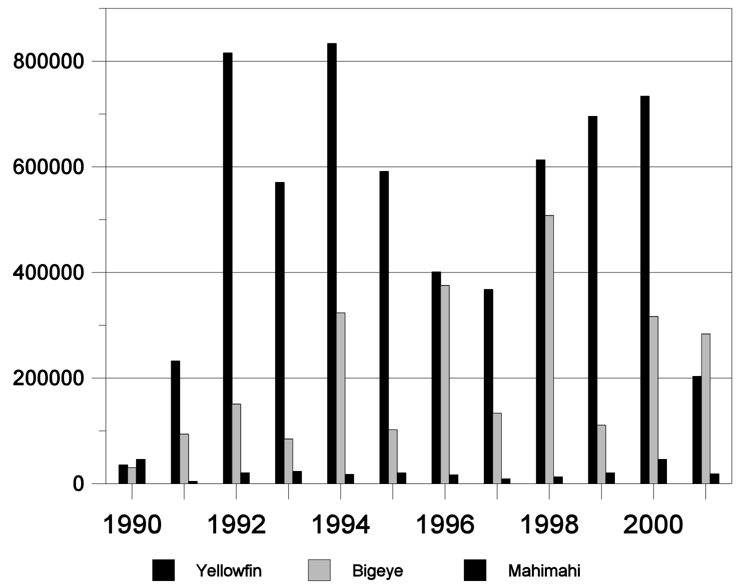
Interpretation: The handline catch rates for the three major tuna species have been somewhat variable. The yellowfin tuna catch rate decreased 18% in 2001, but was well within the long-term average. The albacore catch rate rose to almost match the record peak in 1999. Bigeye tuna catch rate reached a new peak in 2001. Reported preliminary 2001 handline landings were down for yellowfin and bigeye from the revised 2000 data; 1,031,293 pounds (-37%) for yellowfin and 383,148 pounds (-19%) for bigeye. But, reported albacore landings increased to 336,811 pounds (+30%). These may change when revised 2001 data are reported next year. The "inshore" tuna handline fleet which operates within about 20 miles of shore mainly catches yellowfin tuna. However, the bigeye landings still seem low and are probably the result of problems in species identification, especially in the offshore handline fleet which fishes at remote seamounts and NOAA weather buoys, whose tuna catch is actually mainly bigeye (estimated 70%, David Itano, pers. comm.). In addition, under-reporting in the offshore handline fleet is a serious problem.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2002) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). Data combined from reported ika-shibi, palu-ahi, and drifting handline methods from both "inshore" and offshore handline areas. 2001 data were updated with more complete data available in 2002. Non-commercial data are not available.

Catch per Handline Trip (Pounds)

Year	Yellowfin	Albacore	Bigeye
1979	318	3	8
1980	222	5	2
1981	285	19	3
1982	211	21	2
1983	201	48	13
1984	229	27	6
1985	326	3	3
1986	335	2	0
1987	253	2	1
1988	238	4	5
1989	229	13	3
1990	223	7	23
1991	291	32	29
1992	350	26	38
1993	408	35	21
1994	364	37	77
1995	334	71	25
1996	232	59	40
1997	221	46	31
1998	280	53	91
1999	312	89	22
2000	318	50	87
2001	**260**	**85**	**97**
Average	**280**	**32**	**27**
Standard Deviation	**57**	**27**	**31**

Figure 25. Offshore Tuna Handline Catch and Other Data.



Interpretation:
Landings of major species from the offshore tuna handline fleet from 1990 - 2001 are shown in the graph. There are no recorded landings from the offshore areas in the HDAR data previous to 1990. The table below also shows the number of trips reported and trip catch rates. The handline fleet that fishes on the offshore seamounts obviously lands most of the reported bigeye landings and significant proportions of the total yellowfin landings of the combined tuna handline fleet. Their catch rates are also higher, although these are based on multi-day trips and cannot be directly compared to the "inshore" fleet.

Most of the reported yellowfin landings may actually be bigeye, due to species mis-identification. Bigeye that are recorded on the report forms by the fishermen as "ahi" are coded by the HDAR Fisheries Statistics Unit as yellowfin tuna. The stat unit must record the species as reported by fishermen unless the stat unit have evidence to make corrections. Most of the tuna landed in this fishery are small, smaller than the sizes usually caught in the "inshore" tuna handline fleet. Observers have reported that most of the small tuna landed are actually bigeye (estimated 70%, David Itano, pers. comm.). It may be more useful to combine the totals of yellowfin and bigeye tunas and consider them as one unit with respect to the handline fisheries. It is possible, though difficult, to distinguish juvenile bigeye from yellowfin and fishermen and marine dealers need to report species accurately for this problem to be solved. HDAR is making efforts to help educate fishermen and dealers.

Also, timeliness of reporting remains a problem as the revised data available the next year will show substantial changes from the preliminary figures reported here. Recently, under-reporting of catches in this fishery has become more serious, especially in 2001. The HDAR has developed a new trip-based fishing report form especially for the offshore handline fishery to help differentiate yellowfin from bigeye and to improve reporting and analyses of effort. The new report form should be implemented by the end of 2002.

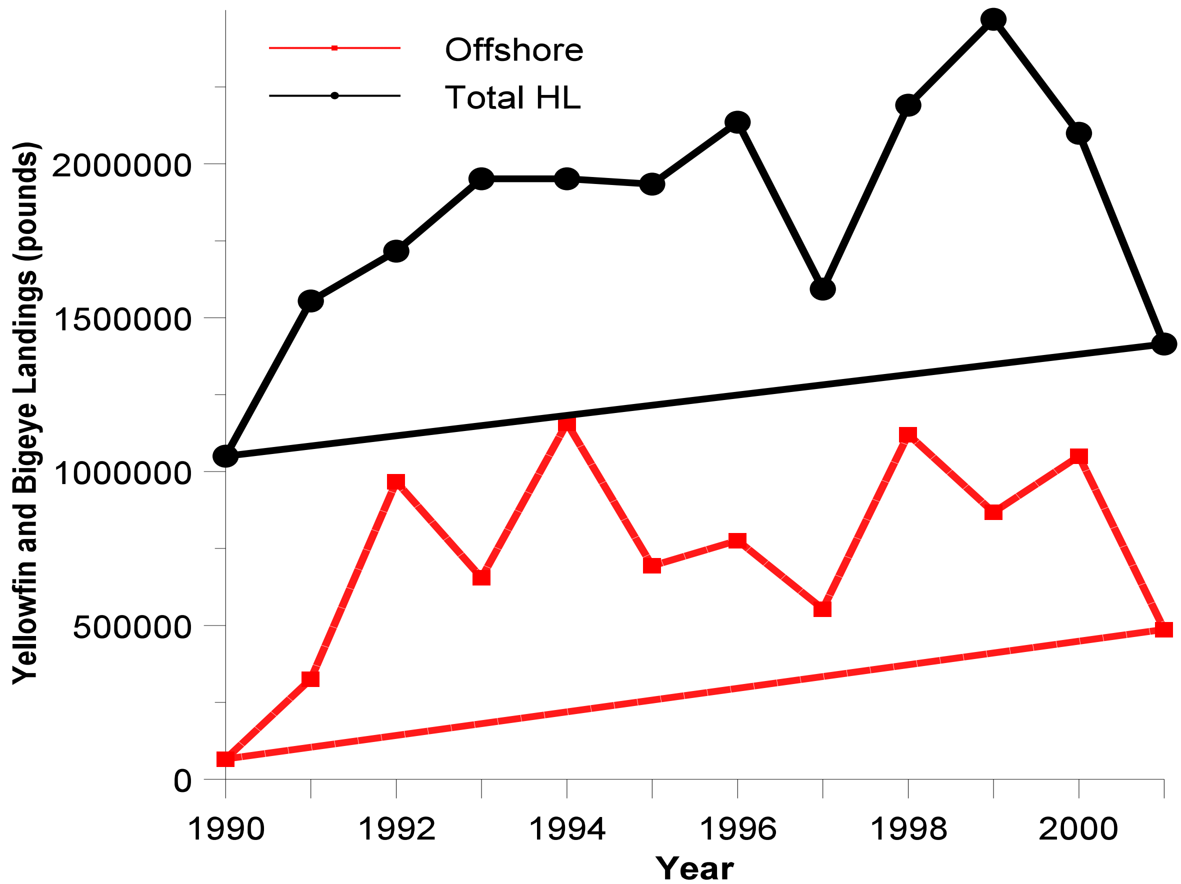
The offshore handliners use a combination of methods to catch fish, not strictly limited to the "classic" ika-shibi or palu-ahi methods used in the areas closer to the islands. The methods used include a mixture of handline, trolling, and live-bait methods, although fish are still retrieved manually.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2002) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). These data are a subset of the combined tuna handline data reported earlier. Data combined from reported ika-shibi, palu-ahi, and drifting handline methods for HDAR fishery statistical areas 15217 (NOAA weather buoy 4), 15717 (W2), 15818 (Cross Seamount), 16019 (W3) and 16223 (W1). Data for all years were updated with more complete data available in 2002. Years previous to 1997 were added. Non-commercial data are not available.

Offshore Handline Catch (Pounds)

		Yellowfin		Bigeye		Mahimahi	
Year	**Trips**	**Pounds**	**lb/trip**	**Pounds**	**lb/trip**	**Pounds**	**lb/trip**
1990	29	35,335	1,218	30,468	1,051	66	2
1991	148	232,244	1,569	93,896	634	4,573	31
1992	420	815,755	1,942	150,731	359	20,619	49
1993	307	570,468	1,858	84,653	276	23,322	76
1994	316	833,520	2,638	323,575	1,024	17,848	56
1995	216	591,265	2,737	102,209	473	20,319	94
1996	204	400,963	1,966	375,310	1,840	16,787	82
1997	145	414,992	2,862	138,393	954	9,375	65
1998	228	612,943	2,688	507,841	2,227	12,946	57
1999	202	703,374	3,482	164,446	814	20,444	101
2000	228	733,776	3,218	316,528	1,388	45,942	202
2001	**101**	**203,141**	**2,011**	**283,790**	**2,810**	**18,842**	**187**

Figure 26. Contribution of Offshore to Total Handline Tuna Landings, Yellowfin and Bigeye Combined.



Interpretation: The chart illustrates the importance of the offshore tuna handline fishery to the total tuna handline fishery in Hawaii. Inshore handline landings are the difference between total and offshore landings. Yellowfin and bigeye tuna landings are combined to sidestep the probable misidentification of juvenile bigeye tuna as yellowfin in catch reports from the offshore handline fishery (see Interpretation for Figure 25). The offshore handline fishery accounted for between 33 to 60% of the yellowfin and bigeye landings of the total handline fishery from 1991 - 2001. Preliminary 2001 landings (and maybe earlier years) are low partly because of under-reporting problems in the offshore fishery.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2002) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). The offshore handline data are a subset of the combined tuna handline data reported earlier. Data combined from reported ika-shibi, palu-ahi, and drifting handline methods for HDAR fishery statistical areas 15217 (NOAA weather buoy 4), 15717 (W2), 15818 (Cross Seamount), 16019 (W3) and 16223 (W1). Data for all years were updated with more complete data available in 2002. Non-commercial data are not available.

Total Handline and Offshore Handline Catch (Pounds)

	Total Handline	Offshore	Offshore % of Total
1990	1,049,793	65,803	6.3
1991	1,554,371	326,140	21.0
1992	1,716,650	966,486	56.3
1993	1,951,778	655,121	33.6
1994	2,166,896	1,157,095	53.4
1995	1,934,300	693,474	35.9
1996	2,135,801	776,273	36.3
1997	1,593,292	553,385	34.7
1998	2,191,145	1,120,784	51.2
1999	2,469,778	867,820	35.1
2000	2,097,551	1,050,304	50.1
2001	**1,414,441**	**486,931**	**34.4**

Appendix 4

Commonwealth of the Northern Mariana Islands

Introduction

The Northern Mariana Islands pelagic fishery occurs primarily from the island of Farallon de Medinilla south to the island of Rota. The fishery is characterized using data in the Commercial Purchase Data Base. The collection system for the data is dependent upon first-level purchasers of local fresh fish to accurately record all fish purchases by species categories on specially designed invoices. Staff from the Department of Lands and Natural Resources, Division of Fish and Wildlife (DFW) routinely distributes and collects invoice books from 80 participating local fish purchasers on Saipan. Purchasers include practically all fish markets, stores, restaurants, hotels and roadside vendors ("fish-mobiles").

The current commercial purchase database collection system only documents landings on Saipan. The establishment of a data collection system for the islands of Tinian and Rota are in the process. It is believed that the commercial purchase database landings include more than 90% of all commercial landings on Saipan.

Although the Saipan data collection system has been in operation since the mid-1970s, only data collected since 1983 are considered accurate enough to be used. It is assumed that data in this report are credible.

This database lacks information concerning fishing method, location, and effort because previous data generated from Creel Survey are believed to be unreliable.

To fish commercially within the NMI's exclusive economic zone (EEZ), commercial vessels more than five net tons must have a Commercial Fishing License issued annually and jointly by the Department of Commerce and the Department of Lands and Natural Resources. Depending on the information supplied in the application package, the DFW may impose certain fishing restrictions in the form of license conditions. Although commercial boats less than five net tons are not required to have a license to fish, all fishing boats are registered with the Department of Public Safety(DPS).

Summary

Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet, other than charter boats, consists primarily of vessels less than 24 ft in length which usually have a limited 20-mile travel radius from Saipan. In 2001, about 82% of all registered boats participated in some form of fishing activity. Sixty-three vessels were identified as involved in full-time commercial fishing and 58 vessels were classified as part-time. Subsistence fishing and/or recreational usage included 142 vessels.

Twenty-seven vessels were registered with the Boating Safety Office as charter vessels for 2001. Charter vessels generally retain their catches, selling half or more to local markets. While the general magnitude of charter boat sales is unknown, it is questionable whether the local market can absorb these catches without impacting commercial fishermen. No logbook system is currently in effect.

The primary target and most marketable species for the pelagic fleet are skipjack tuna. Yellowfin and mahimahi are also marketable species but are seasonal. During their seasonal runs, these fish are usually found close to shore and provide easy targets for the local fishermen. In addition to the economic advantages of being near shore and their relative ease of capture, these species are widely accepted by all ethnic groups. This has kept market demand fairly high due to the continuing immigrant population growth on Saipan (over half of the population on Saipan is nonnative).

Recommendations

1) Continued assistance to the CNMI with training in offshore creel survey, both data collection and analyzing.

2) To develop confidence limits in the current offshore creel survey program.

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Table 1. NMI 2001 commercial pelagic landings, revenues and price

Species	Landings (lb.)	Revenue ($)	Ave. Price ($/lb.)
Misc. tunas	178	223	1.25
Skipjack tuna	107,107	209,539	1.96
Yellowfin tuna	11,634	24,588	2.11
Kawakawa	2,888	5,911	2.05
Subtotal Above Tunas	**121,807**	**240,261**	**1.84**
Dogtooth tuna	2,778	5,806	2.09
Mahimahi	11,384	24,487	2.15
Marlin	1,539	2,161	1.40
Sailfish	73	146	2.00
Wahoo	3,640	8,620	2.37
Subtotal Other PPMUS	**19,414**	**41,220**	**2.00**
Troll fish	183	414	2.26
Barracuda	3	5	1.50
Rainbow runner	1,707	4,588	2.69
Subtotal Misc.	**1,893**	**5,007**	**2.15**
All Pelagics	**143,114**	**286,488**	**2.00**

Interpretation: Skipjack landings decreased 5% or more than 4,000 pounds in 2001. Skipjack tuna continues to dominate the pelagic landings, comprising around 75 % of the (commercially receipted) industry's pelagic catch. Yellowfin tuna and mahimahi were still ranked second and third in total landings during 2001. Mahimahi landings increased by 94% in 2001 while yellowfin landings decreased 18%. Skipjack tunas are easily caught in near shore waters throughout the year. Mahimahi is seasonal with peak catch usually from February through April. Yellowfin season usually runs from April to September. The overall pelagic catch decreased 4% in 2001.

The highest average price of identified pelagic species was $2.37/lb for Wahoo, which is up 1% from the 2000 high of $2.34/lb. The lowest priced species remained marlin at $1.40/lb, which is down 14% from 2000. In 2001, Dogtooth tuna increased in landings by 45% over the 2000 landings and an increase in price from $1.91/lb to $2.09/lb. The average price per pound for Skipjack tuna, the species with the greatest landings, increased by 6% from $1.85/lb in 2000 to $1.96/lb in 2001. Skipjack revenue increased 1% from $207,338 in 2000 to $209,539 in 2001.

Blue Marlin, which again brought the lowest average price in 2001, is taken primarily by charter boat. The catch of Blue Marlin decreased from 2,886 pounds in 2000 to 1,539 pounds in 2001. The low ex-vessel price may be partially related to the manner in which the fish is kept prior to sale. Other attributes of the Blue Marlin that may make it unpopular among the public is it’s bulky size and the relative quality of the cooked product. Fishers generally sell the whole fish to avoid cleaning and repackaging into smaller units.

Source and Calculation: Annual summaries for each species from the Commercial Purchase Data Base invoices.

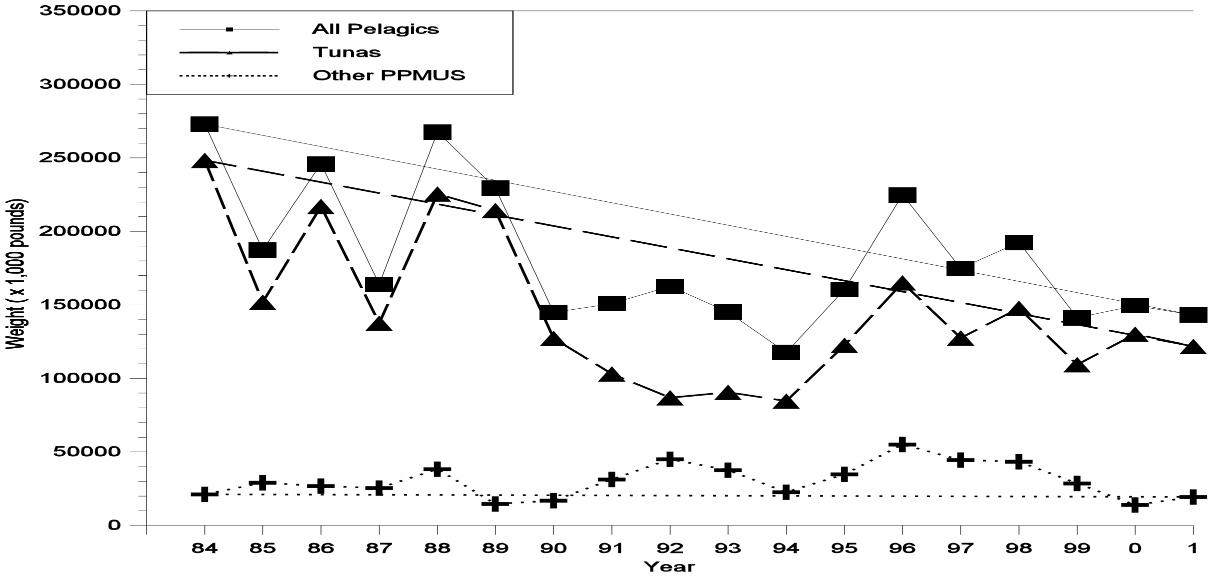


Figure 1. NMI annual commercial landings: all pelagics, tuna and PPMUS.

Interpretation: Total weight of pelagics landed in 2001 decreased 4% from 2000 level. Tuna landings have also decreased by 6% or nearly 8,391 pounds. Landings recorded in the "Other PPMUS" category increased by 5,412 pounds or 39% from 2000 figures.

Source and Calculation: All pelagics, tuna and other PPMUS landings were summed from the Commercial Purchase Data Base.

	Total Landings (lb.)		
Year	All Pelagics	Tunas	Other PPMUS
1983	196,788	163,754	23,081
1984	272,909	248,339	21,223
1985	187,378	151,882	29,105
1986	245,967	217,023	26,800
1987	164,055	137,566	25,467
1988	267,619	225,498	38,368
1989	229,427	214,249	14,650
1990	144,862	127,172	16,893
1991	150,915	103,078	31,300
1992	162,691	86,931	45,061
1993	145,115	90,584	37,628
1994	117,668	8,4598	22,701
1995	160,540	122,616	34,863
1996	224,962	165,122	55,088
1997	174,914	127,580	44,455
1998	192,568	147,688	43,439
1999	141,252	109,398	28,626
2000	149,479	130,198	14,002
2001	**143,114**	**121,807**	**19,414**

Average	181,969	145,074	30,505
Standard Deviation	46,780	50,025	11,514

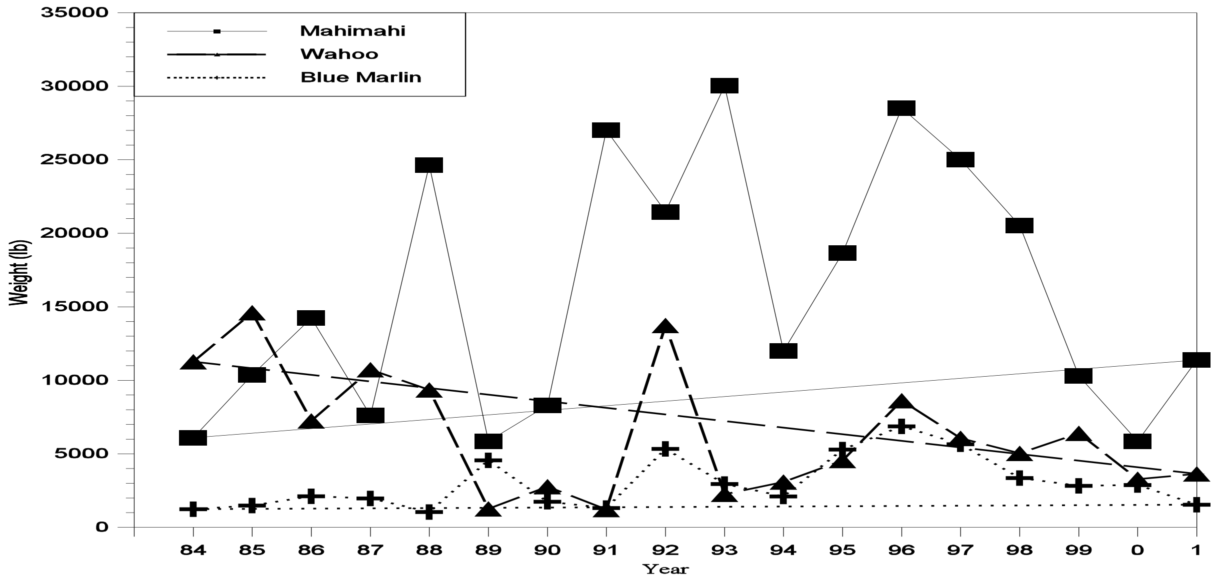


Figure 2. NMI annual commercial landings: mahimahi, wahoo, and marlin.

Interpretation: Mahimahi landings increased by 94% from 5,895 pounds in 2000 to 11,384 pounds in 2001. It is noteworthy that the NMI and Guam mahimahi catches have been fluctuating similarly since 1987, which may indicate a strong biological influence in local landing patterns.

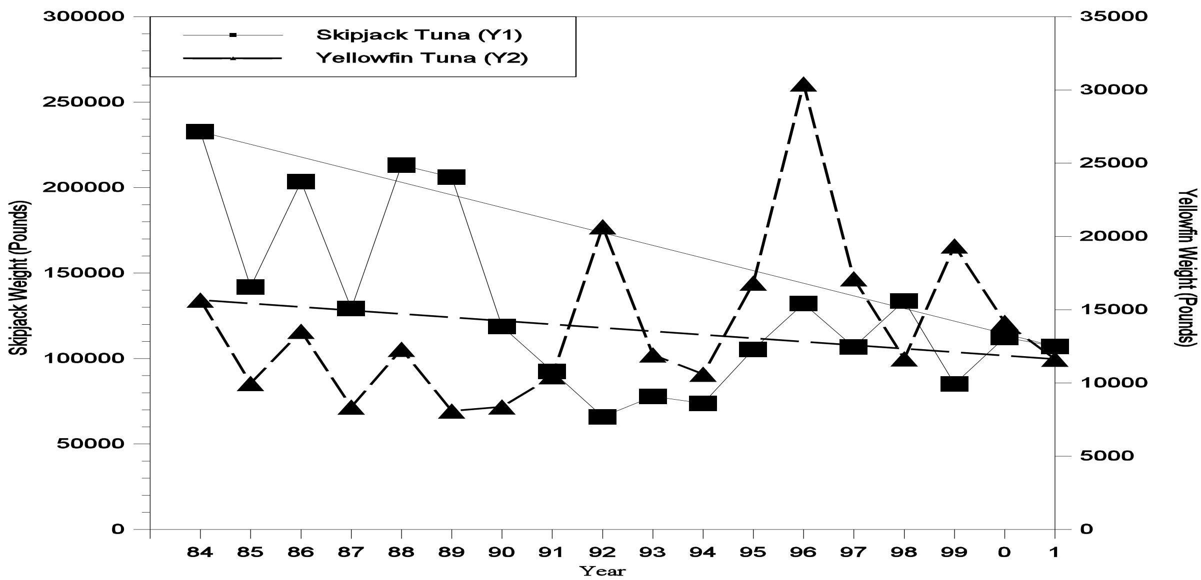
From 1983 to 1988, wahoo landings were somewhat consistent and did not fall below 7,000 lbs., but in 1989 landings notably declined by 86% and remained at depressed levels until the dramatic increase in landings during 1992. Following the near-record 1992 landings, the 1993 wahoo landings again decreased by 84%, falling below the mean. Wahoo landings in 2001 increased by 362 pounds or 11% over the 2000 landings.

The Blue Marlin landing decrease 47% from the 2000 figures.

Source and Calculation: The annual commercial landings of the three major PPMUS species (mahimahi, wahoo and blue marlin) were summed directly from the Commercial Purchase Data Base.

	Total Commercial Landings (lb)		
Year	**Mahimahi**	**Wahoo**	**Blue Marlin**
1983	11,151	7,008	3,030
1984	6,091	11,270	1,235
1983	10,364	14,601	1,488
1986	14,237	7,250	2,123
1987	7,602	10,723	1,968
1988	24,639	9,358	1,047
1989	5,856	1,257	4,563
1990	8,306	2,770	1,748
1991	27,005	1,217	1,320
1992	21,462	13,738	5,345
1993	30,036	2,257	2,950
1994	11,993	3,090	2,108
1995	18,657	4,555	5,295
1996	28,524	8,626	6,874
1997	25,021	6,064	5,655
1998	20,529	5,039	3,361
1999	10,305	6,395	2,833
2000	5,859	3,278	2,886
2001	**11,384**	**3,640**	**1,539**
Average	15,993	6,396	3,019
Standard Deviation	8,495	4,168	1,779

Figure 3. NMI annual commercial landings: skipjack and yellowfin tuna.



Interpretation: Historically, skipjack landings exhibited an alternating two-year cycle from 1983 to 1988 and comprised more than 73% by weight of the total pelagic landings each year from 1983 to 1989 (data taken from Table 1 and Fig. 3). Skipjack tuna landings declined after that, reaching record lows from 1990 through 1994. In 1993 and 1994 skipjack landings showed signs of stabilizing at about half of their respective eleven and twelve year means, while the nearly 32,000 pounds increase in 1995 landings attained 61% of the 1983-1990 averages of 174,020 pounds. Skipjack landings for the year 2001 decreased by 5%.

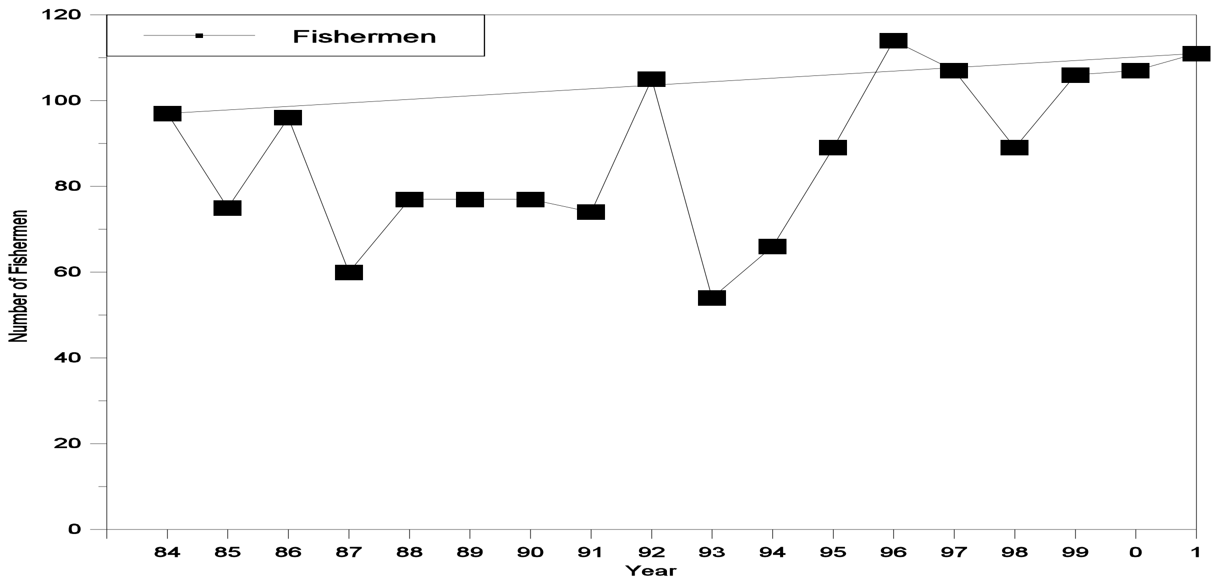
Schools of skipjack tuna have historically been common in near shore waters, providing an opportunity to catch numerous fish with a minimum of travel time and fuel costs. Skipjack is readily consumed by the local populace, primarily as sashimi.

Although more highly prized than skipjack, yellowfin tuna are not as common, and therefore not landed as often. The average fish size tends to be smaller when compared with yellowfin tuna from other geographic areas. The total landings for yellowfin tuna decreased 18% from the 2000 figures.

Source and Calculation: Landings were summed directly from the Commercial Purchase Data Base.

	Total Commercial Landings (lb)	
Year	Skipjack tuna	Yellowfin tuna
1983	146,729	17,025
1984	232,675	15,664
1985	141,910	9,973
1986	203,490	13,533
1987	129,203	8,363
1988	213,198	12,300
1989	206,162	8,087
1990	118,798	8,374
1991	92,642	10,433
1992	65,982	20,672
1993	77,832	11,919
1994	73,769	10,600
1995	105,423	16,824
1996	132,155	30,410
1997	106,757	17,121
1998	133,819	11,656
1999	85,087	19,359
2000	112,311	14,139
2001	**107,107**	**11,634**
Average	129,907	13,948
Standard Deviation	51,064	5,533

Figure 4. Number of NMI fishermen (boats) making commercial pelagic landings.



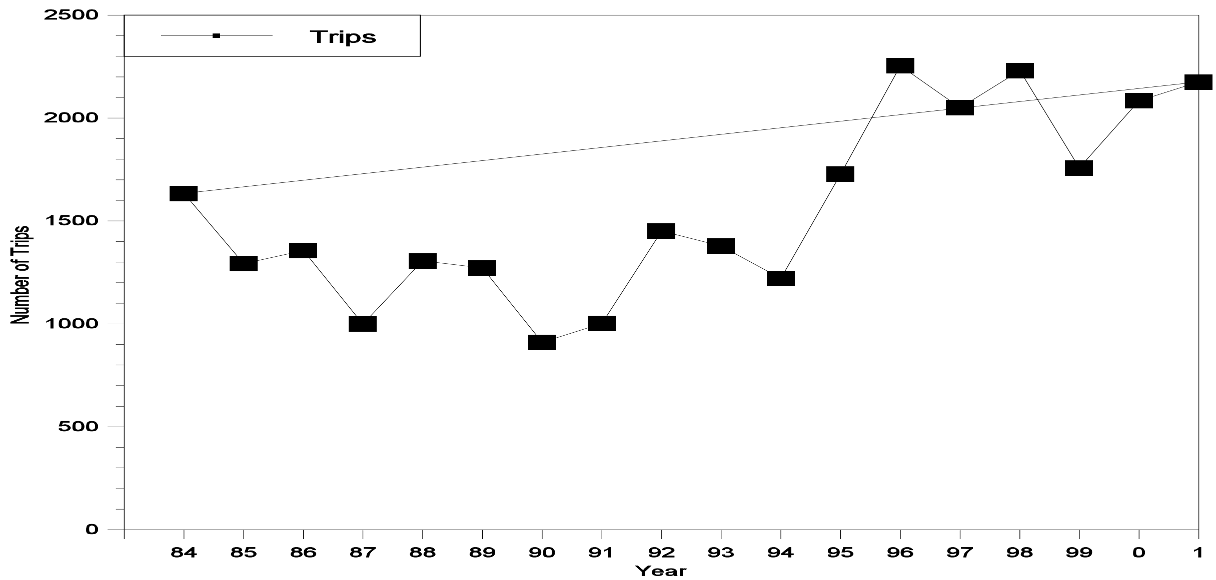
Interpretation: The number of fishers (boats) making commercial pelagic landings was relatively constant from 1988-91 compared to earlier years, but a record high number was recorded for 1992. Part of the increase in 1992 was attributable to the influx of new fishing boats as a result of money obtained by leasing property. In addition, it was discovered that some fishermen were using several different boats, thus artificially inflating the total number of boats making pelagic landings.

Many of the 1992's "new" fishermen, with their new boats, are believed to have left the fishery during 1993. It has been suggested that the increase from 1994 to 1997 might be due to the re-entry of repaired and refurbished boats from the 1992 fleet. The number of fishermen making pelagic landings slightly increased 4% from 107 in 2000 to 111 in 2001

Source and Calculation: Each invoice from the Commercial Purchase Data Base records the fisherman's name from whom the fish were purchased. The number of fishermen who sold any pelagic species was calculated directly from the data invoices.

Year	No. fishermen landing any pelagic species
1983	92
1984	97
1985	75
1986	96
1987	60
1988	77
1989	77
1990	77
1991	74
1992	105
1993	54
1994	66
1995	89
1996	114
1997	107
1998	89
1999	106
2000	107
2001	**111**
Average	88
Standard Deviation	19

Figure 5. NMI numbers of trips catching any pelagic fish.



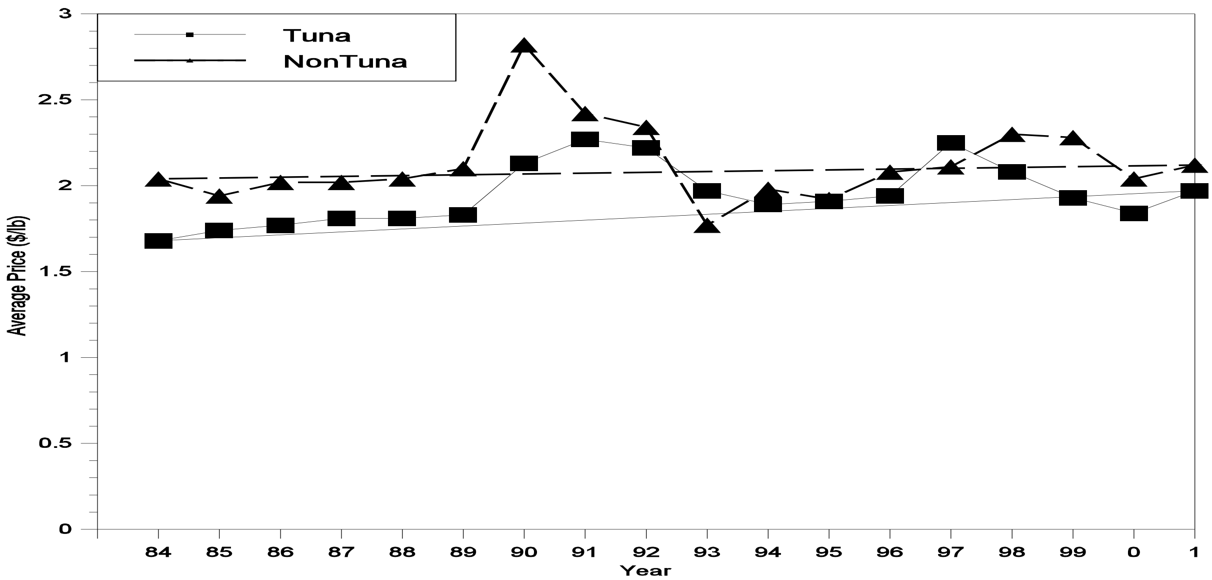
Interpretation: The number of pelagic trips increased in 2001 by 4% from 2,084 in 2000 to 2,176. Although the number of pelagic trips rose in 1998, the decrease in 1999 figures may be caused by the refusal of vendors to participate in the Ticket System.

Source and Calculation: The total trips for all pelagic species were summed from the Commercial Purchase Data Base. Trips were calculated based on the assumptions that no fisherman makes more than one trip per day, and that all sales from a single trip are made on a single day.

Year	Number trips
1983	1,408
1984	1,634
1985	1,293
1986	1,356
1987	999
1988	1,306
1989	1,272
1990	910
1991	1,002
1992	1,451
1993	1,378
1994	1,221
1995	1,727
1996	2,254
1997	2,050
1998	2,230
1999	1,758
2000	2,084
2001	**2,176**
Average	1,561
Standard Deviation	445

Figure 6. NMI average inflation-adjusted price of tunas and other PPMUS.

Interpretation: The inflation-adjusted average price of tuna was stable from 1983 until 1989,



when an obvious rise was observed. The 1990-92 rise in price corresponds with the notable decrease in Skipjack tuna landings (Fig. 3) during the same period of time. In 1994 commercially receipted tunas commanded a lower price than in recent years. However, considering the inflation-adjusted prices from 1983 to 1996, it would appear that tuna prices have, on the whole, kept pace with inflation. The average price of tuna has continued to decrease since 1997. The inflation-adjusted average price of tuna decreased by 5% from 1999 to 2000 and increased 7% for 2001.

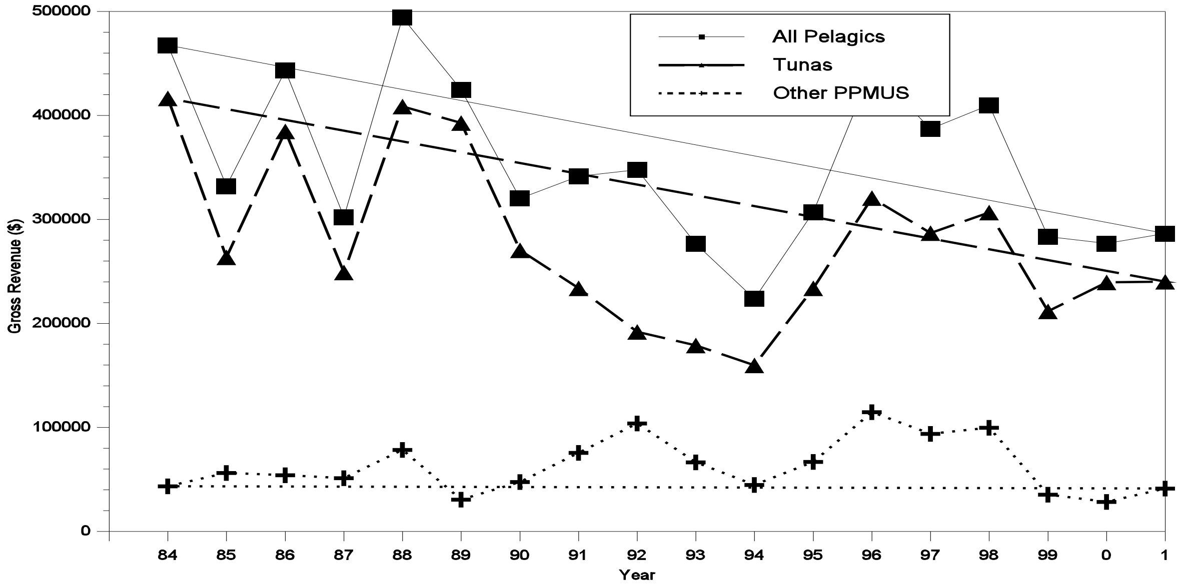
The average price of “Other PPMUS” increased 4% in 2001 on the inflation-adjusted price.

Although there was a loss of the large Korean market in the CNMI, there appears to be no substantial loss to revenue. This may be attributed to a redirection of the market toward the local community.

Source and Calculation: The unadjusted average price is calculated by dividing the total revenues generated by the total weight sold. The inflation adjustment is made using the 1998 NMI Consumer Price Index (CPI) as the basis by which calculations of previous years' prices are made.

		Average Price ($/lb)			
		Tunas		Other PPMUS	
Year	**CPI**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1983	140.90	1.90	1.90	1.12	2.14
1984	153.20	0.95	1.68	1.15	2.04
1985	159.30	1.02	1.74	1.14	1.94
1986	163.50	1.07	1.77	1.22	2.02
1987	170.70	1.14	1.81	1.27	2.02
1988	179.60	1.20	1.81	1.35	2.04
1989	190.20	1.29	1.83	1.48	2.10
1990	199.33	1.56	2.13	2.07	2.82
1991	214.93	1.80	2.27	1.92	2.42
1992	232.90	1.91	2.22	2.01	2.34
1993	243.18	1.78	1.97	1.59	1.77
1994	250.00	1.75	1.89	1.83	1.98
1995	254.48	1.80	1.91	1.81	1.92
1996	261.98	1.89	1.94	2.02	2.08
1997	264.95	2.20	2.25	2.07	2.11
1998	264.18	2.02	2.08	2.23	2.30
1999	267.80	1.91	1.93	2.26	2.28
2000	273.23	1.86	1.84	2.06	2.04
2001	**270.98**	**1.97**	**1.97**	**2.12**	**2.12**
Average	218.70	1.63	1.94	1.83	2.13
Standard Deviation	46.67	0.39	0.17	0.41	0.23

Figure 7. NMI annual commercial adjusted revenues.



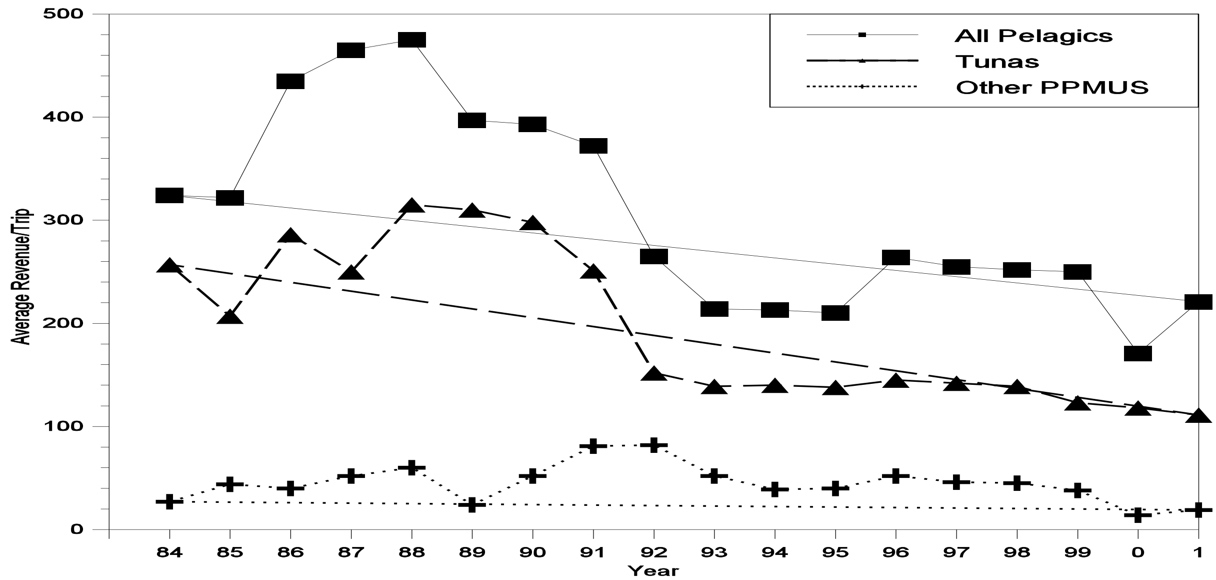
Interpretation: The erratic fluctuations of the inflation-adjusted revenues for Tunas and for All Pelagics prior to 1990 is most likely due to the annual variations in skipjack tuna landings (see Fig. 3) which completely dominated the tuna category and the "All Pelagic" category.

The tunas' inflation-adjusted revenues remained the same with the 2000 figures, while data indicates an increase of 44% for the "Other PPMUS" inflation-adjusted revenues for the year 2001.

Source and Calculation: Annual revenue in dollars was summed separately for all pelagic fish, tunas and other PPMUS. Inflation-adjusted revenues were calculated using the Consumer Price Index, with 1998 as a base by which previous years' nominal prices are adjusted.

		All Pelagics		Tunas		Other PPMUS	
Year	**CPI**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1983	140.90	198,710	381,523	162,240	311,501	25,770	49,478
1984	153.20	264,203	467,639	235,262	416,414	24,503	43,370
1985	159.30	195,372	332,132	155,171	263,791	33,162	56,375
1986	163.50	267,013	443,242	231,745	384,697	32,631	54,167
1987	170.70	190,150	302,339	156,634	249,048	32,333	51,409
1988	179.60	327,260	494,163	270,679	408,725	51,950	78,445
1989	190.20	299,142	424,782	276,671	392,873	21,635	30,722
1990	199.33	235,520	320,307	198,775	270,334	34,968	47,556
1991	214.93	271,030	341,498	185,662	233,934	60,031	75,639
1992	232.90	299,836	347,810	165,415	191,881	89,640	103,982
1993	243.18	249,136	276,541	161,100	178,821	60,001	66,601
1994	250.00	207,124	223,694	147,940	159,775	41,548	44,872
1995	254.48	289,740	307,124	220,633	233,871	63,264	67,060
1996	261.98	431,560	444,507	311,271	320,609	111,445	114,788
1997	264.95	379,620	387,212	281,291	286,917	91,988	93,828
1998	264.18	398,086	410,029	297,906	306,843	96,956	99,865
1999	267.80	280,670	283,477	209,552	211,648	64,689	65,336
2000	273.23	279,826	277,028	241,978	239,558	28,874	28,585
2001	**270.98**	**286,488**	**286,488**	**240,261**	**240,261**	**41,221**	**41,221**
Average	219	281,605	355,344	218,431	279,026	52,979	63,858
Standard Deviation	47	66,877	75,939	52,751	77,524	27,388	24,925

Figure 8. NMI annual commercial adjusted revenues per trip for PPMUS trips only.

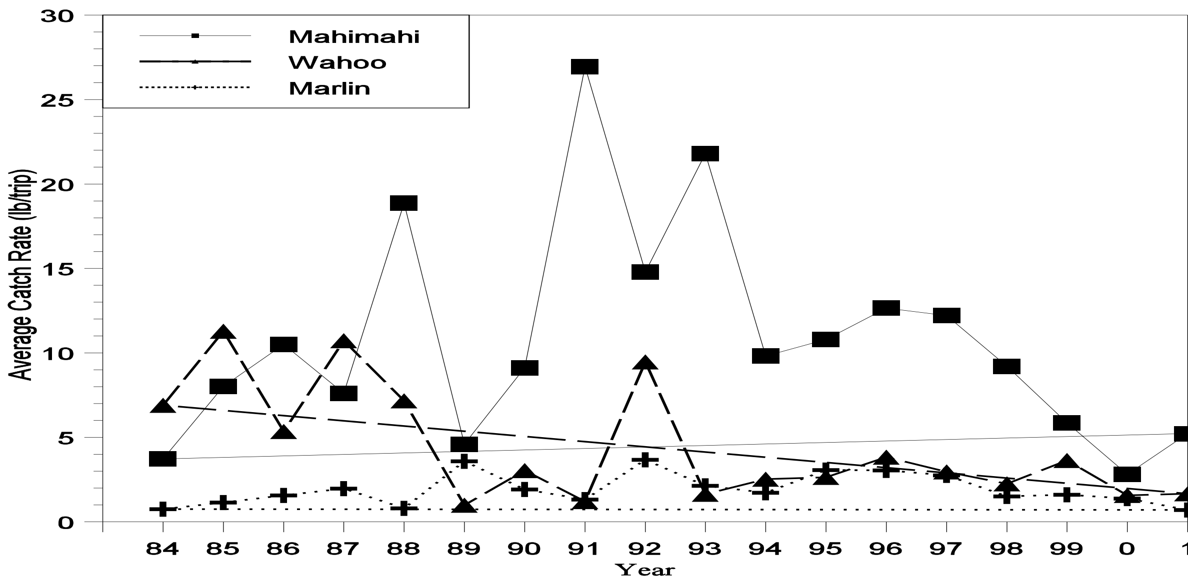


Interpretation: The inflation-adjusted revenue per trip for "All Species" indicates an increase of 29% while “Other PPMUS” indicates a decrease of 36% and “Tunas” decreased by 6% in 2001. The current year values for all categories were below their respective 18 year means.

Source and Calculation: Values were obtained by selecting, from the Commercial Purchase Data Base, all trips which landed at least one PPMUS, and then calculating a) the average revenue of all species combined, b) the average revenue of other PPMUS only, and c) the average revenue of tuna only.

		Revenues per PPMUS Trip ($)					
		All Species		**Tunas**		**Other PPMUS**	
Year	**CPI**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1983	140.90	159	306	121	232	19	37
1984	153.20	183	324	145	257	15	27
1985	159.30	189	322	122	207	26	44
1986	163.50	262	435	172	286	24	40
1987	170.70	292	465	157	250	32	52
1988	179.60	315	475	209	315	40	60
1989	190.20	279	397	218	310	17	24
1990	199.33	289	393	219	298	39	52
1991	214.93	295	372	199	251	64	81
1992	232.90	228	265	130	152	71	82
1993	243.18	192	214	125	139	47	52
1994	250.00	197	213	129	140	36	39
1995	254.48	198	210	130	138	37	40
1996	261.98	256	264	141	145	51	52
1997	264.95	250	255	139	142	46	46
1998	264.18	244	252	135	139	44	45
1999	267.80	247	250	121	123	37	38
2000	273.23	173	171	119	118	14	14
2001	**270.98**	**221**	**221**	**111**	**111**	**19**	**19**
Average	219	235	305	150	198	36	44
Standard Deviation	47	47	93	36	73	16	18

Figure 9. NMI trolling catch rate of mahimahi, wahoo and marlin.



Interpretation: The 2001 mahimahi catch rate increased by 86% from 2000, which fell below the eighteen-year mean. It may also be biological because it appears that the trolling catch rates of Guam and the NMI have fluctuated similarly over the last eighteen years. There has also been a three-year decline in the landing of the species.

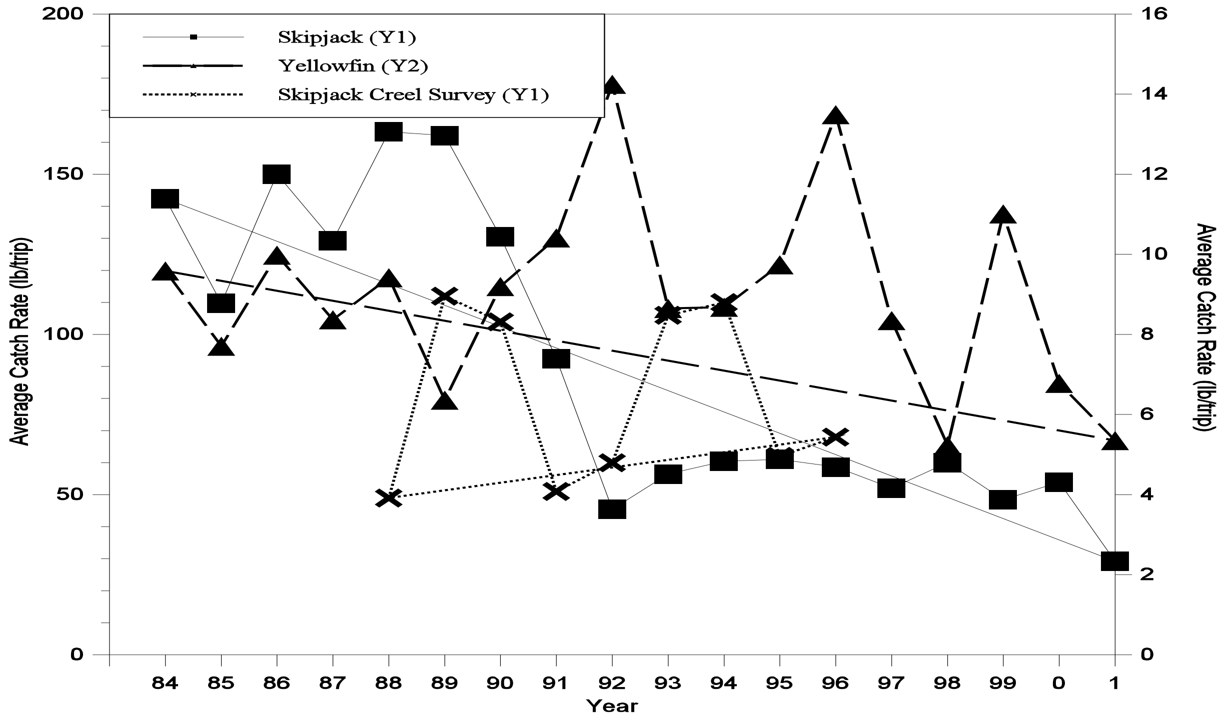
Prior to the 1989 record low, wahoo catch rates rivaled those for mahimahi. Wahoo catch rates have generally never regained those historical levels. The 2001 catch rate increased by 6% from 2000, and remained less than the eighteen-year mean of 4.81lb/trip.

Marlin catch rates decreased by 49% from 2000 level. Marlins are not a marketable species and is rarely a target by fishermen except during fishing tournaments. During the 2000 Saipan International Fishing Derby a 996-pound blue marlin was landed.

Source and Calculation: Annual catch rates for selected species were obtained by calculating the average weight per trip for each year. Trips were assumed to be one day in length and each commercial invoice assumed to represent one trip.

	Trolling Catch Rate (lb/trip)		
Year	**Mahimahi**	**Wahoo**	**Marlin**
1983	7.92	4.98	2.15
1984	3.73	6.90	0.76
1985	8.02	11.29	1.15
1986	10.50	5.35	1.57
1987	7.61	10.73	1.97
1988	18.87	7.17	0.80
1989	4.60	0.99	3.59
1990	9.13	3.04	1.92
1991	26.95	1.21	1.32
1992	14.79	9.47	3.68
1993	21.80	1.64	2.14
1994	9.82	2.53	1.73
1995	10.80	2.64	3.07
1996	12.65	3.83	3.05
1997	12.21	2.96	2.76
1998	9.21	2.26	1.51
1999	5.86	3.64	1.61
2000	2.81	1.57	1.38
2001	**5.23**	**1.67**	**.71**
Average	10.66	4.41	1.94
Standard Deviation	6.27	3.24	0.91

Figure 10. NMI trolling catch rates of skipjack and yellowfin tuna.



Interpretation: Catch rates for Skipjack tuna decreased dramatically commencing in 1990. The 1992 through 1997 catch rates have appeared to stabilize around the six-year mean of 55.7lb/trip. The Creel Survey data on skipjack tuna catch rates show a very different pattern from the Commercial Purchase data. Creel survey catch rates show catch rates oscillating between 50 and 100 lb/trip both before and after 1991 whereas, the Commercial Purchase data indicate sustained high catch rates before, and low catch rates after 1991. Catch rate based on the Commercial Purchase Data Base for 2001 of 49.22 lbs/trip is a decrease of 9% in comparison with the 2000 catch rate of 53.89. Skipjack tuna is the preferred species in the troll fishery of the NMI because of their relative ease of capture and local popularity. Previous discussions have suggested that non-tuna PPMUS may be increasing in value and a slight shift in target troll fish may be occurring.

Catch rates of yellowfin tuna per trip more than doubled from 1998 levels. However, 2000 catch rates declined by 39% and again declined 21% in 2001. Yellowfin tuna, although more highly prized than skipjack, are seasonal therefore not encountered as often.

Source and Calculation: Data were summarized from the Commercial Purchase Data Base, which provides average pounds caught per trip. Annual catch rates for selected species were obtained by calculating the average weight per trip for each year. Trips were assumed to be one day in length and each commercial invoice represents one trip.

	Trolling Catch Rate (lb/trip)	
Year	Skipjack	Yellowfin
1983	104.21	12.09
1984	142.40	9.59
1985	109.75	7.71
1986	150.07	9.98
1987	129.33	8.37
1988	163.25	9.42
1989	162.08	6.36
1990	130.55	9.20
1991	92.46	10.41
1992	45.47	14.25
1993	56.48	8.65
1994	60.42	8.68
1995	61.04	9.74
1996	58.63	13.49
1997	52.08	8.35
1998	60.01	5.23
1999	48.40	11.01
2000	53.89	6.78
2001	**49.22**	**5.35**
Average	91.04	9.19
Standard Deviation	43.16	2.44

Table 2. Offshore Daytime Creel Survey by Catch Summary
Based on the Interview Catch Data in Year 2000-2001
Method: Trolling

	Species	Number Caught					Trip		
		Released	Dead/ Injured	Both	All	BC%	With BC	All	BC%
Non Charter							2	309	0.65
	Mahimahi	3		3	323	0.93			
	Yellowfin Tuna		1	1	186	0.54			
	Total			4	509	0.79			
	Compared With All Species			4	7,344	0.05			
Charter							0	29	0.00
	Compared With All Species			0	218	0.00			

Interpretation: With the assistance of NMFS staff, the implementation of an Offshore Day Time Creel Survey program began on April 2000. Based on earlier understanding by interviewers of the definition of by catch, interpretation of by catch reports must be interpreted cautiously.

A summary report by both non charter and charter boats indicates less than 1% or 4 out of 7,344 of the total pelagic species landed is released. The only two species reported as by catch was Mahimahi and Yellowfin Tuna. 3 out of 323 Mahimahi or .93% landed was released. And 1 out of 186 Yellowfin Tuna or .54% landed was released. Charter boats had no by catch reported.

Source: Offshore Daytime Creel Survey Expansion Program.

Appendix 5

International Module

The areas administered by the Council are surrounded by large and diverse fisheries targeting pelagic species. The International Module contains reported catches of pelagic species in the entire Pacific Ocean by fleets of various nations and a summary of the status of tuna stocks in the western and central Pacific Ocean (WCPO). The spatial distribution of catch is illustrated in 2000 for the purse seine, longline and pole-and-line fisheries.

Fishery trends in the Pacific Ocean for the purse seine, longline and pole-and-line fisheries.

The 2000 purse-seine fishery

Vessels The purse seine fleets comprised 236 vessels in the 2000 WCPO fishery. The fleet structure was 155 distant-water vessels, 53 domestic Pacific Island (PI) vessels and 28 domestic non-Pacific Island vessels.

Catch The 2000 catch of 1,038,000 mt was comprised of: skipjack – 812,000 (78% of the total), yellowfin – 197,000 (19%) and bigeye – 28,750 (3%). The catch in 2000 was the second highest on record despite the prevailing unfavorable economic conditions in the fishery with historically low prices during much of the year ($US400 per mt) and some voluntary effort reduction late in 2000 as a result of oversupply to canneries. The yellowfin catch continued the 1999 trend in declining from the very high 1998 catch, but this decrease is typical of the La Niña condition prevailing during 1999–2000. The purse seine bigeye catch for 2000 was slightly down on the record 1999 catch, partly associated with reduced fishing effort on drifting FADs by some fleets in 2000. Catch rates (CPUE) remained high during 2000.

Catches for the PI domestic purse-seine fleets continue to increase and now comprise a significant proportion of the WCPO purse seine catch. The major PI fleets are from FSM, PNG, Solomon Islands and Vanuatu.

Fleet distribution Purse seine activity occurs within 10° of the equator. There is a shift in activity relative to the warm pool (ocean area with sea surface temperature >28°C). The fleets typically fish farther to the east during warm El Niño events, when the warm pool expands, conversely the purse seine fishery contracts westward during La Niña or cool events. The western Pacific experienced a La Niña phenomena through most of 2000. Typical of La Niña years, the Korean and Taiwanese fleets located further to the west in the vicinity of PNG and FSM. The US fleet remained in the central Pacific and relied on drifting FAD fishing but this strategy was not as productive as in 1999.

Table 1. Total reported purse seine catch (metric tonnes) of skipjack, yellowfin and bigeye tuna in the Pacific Ocean. Source: SCTB15 report.

Year	Skipjack	Yellowfin	Bigeye	Total
1967	108,916	76,583	976	186,475
1968	61,847	100,830	2,679	165,356
1969	45,279	123,179	624	169,082
1970	52,687	155,166	2,058	209,911
1971	102,118	125,263	3,371	230,752
1972	46,125	181,232	3,037	230,394
1973	56,284	217,104	2,926	276,314
1974	85,997	220,025	2,279	308,301
1975	128,320	210,651	5,023	343,994
1976	142,863	249,092	11,448	403,403
1977	117,350	214,936	8,640	340,926
1978	205,101	189,610	12,860	407,571
1979	189,797	215,598	9,564	414,959
1980	206,223	192,492	17,480	416,195
1981	207,879	242,248	14,405	464,532
1982	269,374	196,814	9,229	475,417
1983	377,753	194,882	12,532	585,167
1984	384,006	251,316	14,475	649,797
1985	357,844	320,977	11,808	690,629
1986	431,095	370,192	9,448	810,735
1987	433,272	423,447	12,166	868,885
1988	569,950	382,562	8,356	960,868
1989	566,040	448,956	14,121	1,029,117
1990	674,374	444,110	16,844	1,135,328
1991	833,376	446,017	17,108	1,296,501
1992	788,747	474,564	24,972	1,288,283
1993	663,292	467,701	22,440	1,153,433
1994	793,107	437,934	40,004	1,271,045
1995	855,080	408,284	50,326	1,313,690
1996	845,176	367,534	68,243	1,280,953
1997	811,601	512,335	82,111	1,406,047
1998	1,090,273	532,764	53,769	1,676,806
1999	1,050,508	513,600	75,659	1,639,767
2000	1,075,118	477,330	100,763	1,653,211
Average	430,199	305,451	21,816	757,466
STD Deviation	342,362	138,908	25,801	493,731

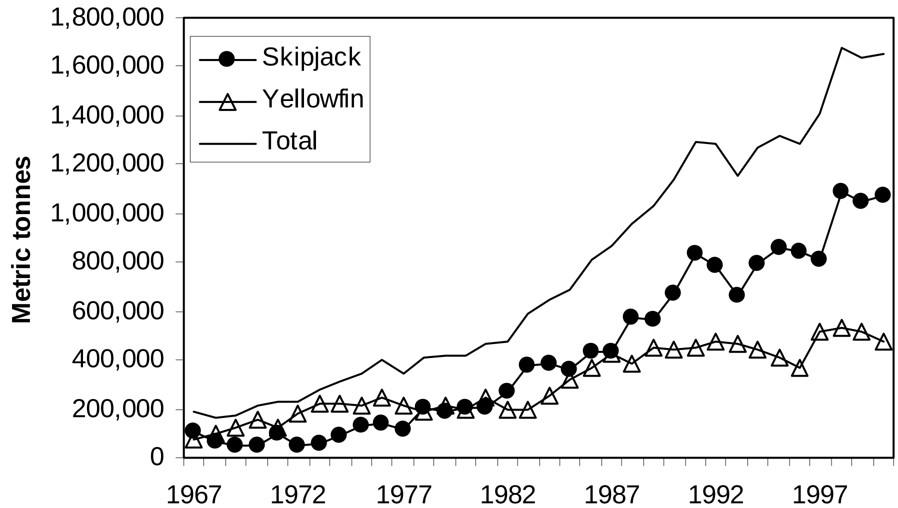


Figure 1. Total purse seine catch of skipjack and yellowfin tuna in the Pacific Ocean, 1967–2000. Source: SCTB15 report .

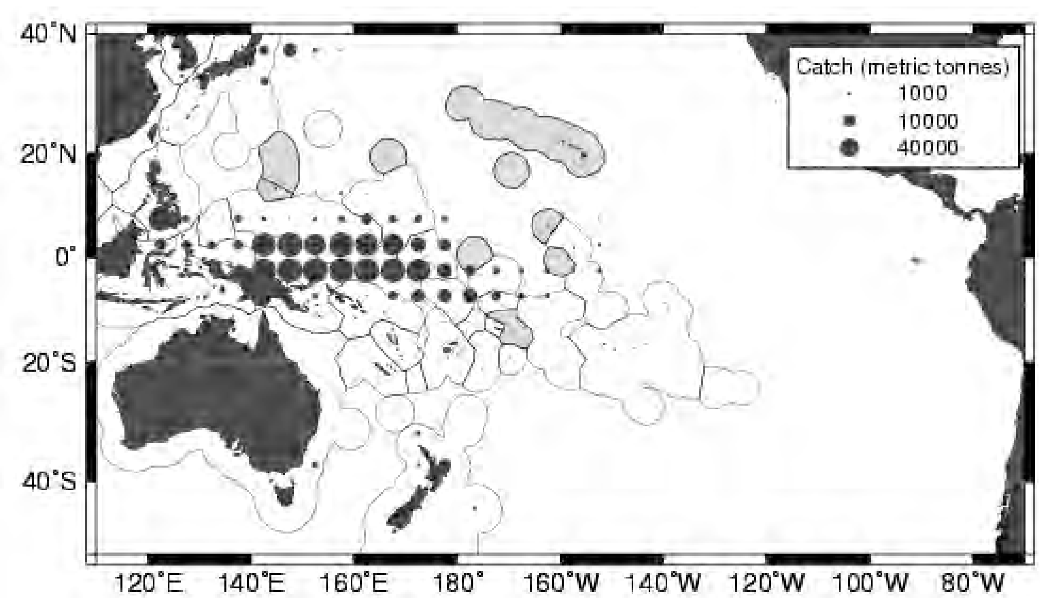


Figure 2. Distribution of total purse seine WCPO skipjack catch in 2000. Source: SPC public domain data.

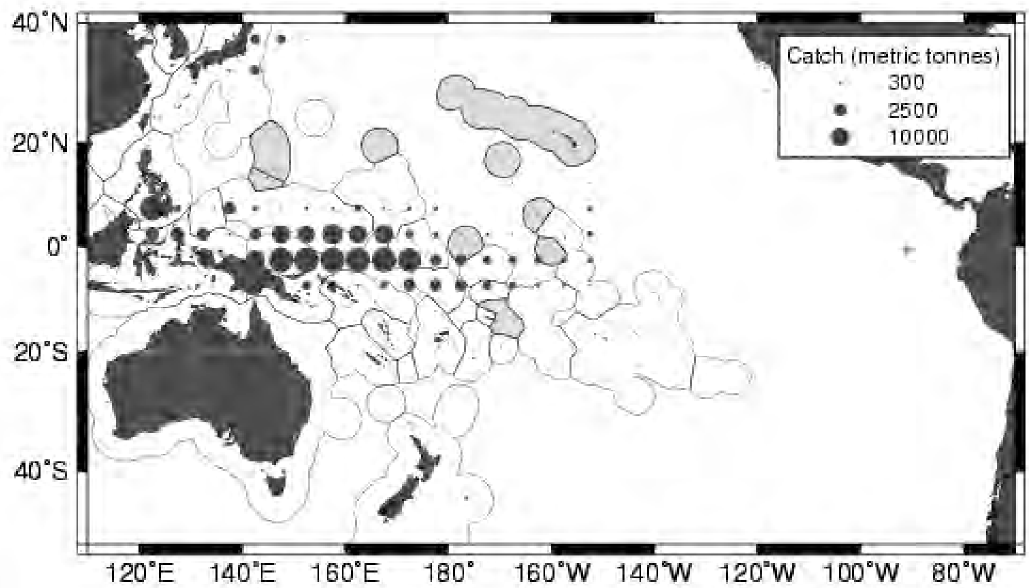


Figure 3. Distribution of total purse seine WCPO yellowfin catch in 2000. Source: SPC public domain data.

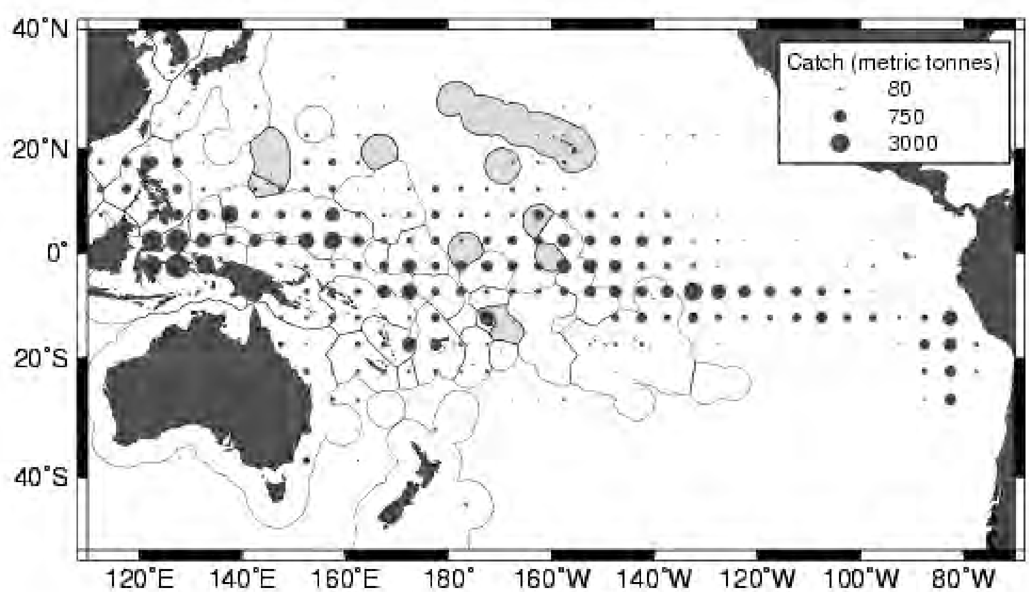


Figure 4. Distribution of longline catches of yellowfin tuna reported in 2000. Source: SPC public domain data.

The 2000 longline fishery

Vessels

The diverse longline fleet in the WCPO was composed of roughly 4,700 vessels in 2000.

These vessels can be divided into four components largely based on the area of fishing operations:

1. Over 400 vessels are **domestically-based in the Pacific Islands** with the Samoa alia fleet representing half of these vessels,
2. approximately 3,000 vessels are **domestically-based in non-Pacific Island** countries such as Japan and Taiwan,
3. about 750 large **distant-water** freezer vessels from Japan, Korea and Taiwan that operate over large areas in the region, and
4. about 450 **offshore vessels based in Pacific Island countries**. The offshore fleet is composed of equal numbers of vessels from mainland China, Japan and Taiwan.

Catch

The 2000 longline catch (211,149 mt) was a record for the WCPO. The previous high (211,104 mt) was taken some 20 years earlier, in 1980, but with a vastly different species composition comprising mostly yellowfin. By contrast, in 2000, yellowfin made the smallest contribution to the catch. The overall tuna species composition of the 2000 longline catch was 30% yellowfin, 38% albacore and 32% bigeye. The bigeye catch (68,091 mt) for 2000 was a record for this fishery, with the albacore catch the second highest on record (78,068 mt).

The 2000 yellowfin catch (63,382 mt) represented a significant recovery from the lowest catch recorded for nearly 30 years in 1999. As in previous years, most (>100,000 mt) of the 2000 catch was taken by the distant-water fleets of Japan, Korea and Taiwan. In recent years, there has been an increase in domestic fleet activity in some areas of the WCPO; the most significant example is the establishment of the domestic Samoan fleet targeting albacore in their EEZ and just beyond.

Fleet distribution

Effort by the distant-water fleets is widespread as vessels target bigeye and yellowfin in tropical waters for the frozen sashimi market, and albacore in the subtropical waters for canning. In contrast, the offshore fleets fished in tropical waters of Palau, FSM, Marshall Islands and international waters where they targeted bigeye and yellowfin for the fresh sashimi market.

Table 2. Total reported longline catch (metric tonnes) of PMUS in the Pacific Ocean. Source: SCTB15 report and SPC public domain data.

Year	Albacore	Yellowfin	Bigeye	Striped Marlin	Black Marlin	Blue Marlin	Swordfish	Total
1962	50,990	73,290	78,816	22,507	2,229	18,797	11,216	257,845
1963	44,566	79,732	106,325	26,602	2,342	19,032	11,414	290,013
1964	38,418	68,523	74,851	39,524	1,876	13,989	8,615	245,796
1965	39,803	69,014	57,304	32,794	2,375	11,084	9,665	222,039
1966	64,442	78,208	65,314	27,351	2,172	10,497	11,615	259,599
1967	69,834	50,040	66,848	31,827	1,825	9,702	12,041	242,116
1968	53,721	61,441	58,508	39,418	1,883	9,469	11,477	235,917
1969	43,014	67,256	80,949	25,564	2,073	10,348	14,358	243,561
1970	50,398	67,080	65,787	35,416	1,605	12,686	10,329	243,301
1971	48,001	57,674	64,559	30,975	2,127	8,058	9,410	220,804
1972	49,985	67,390	81,729	20,922	1,884	9,334	9,102	240,347
1973	54,586	69,728	88,878	18,603	1,935	9,964	9,604	253,297
1974	44,973	64,102	75,529	18,559	1,620	8,946	8,693	222,423
1975	40,439	71,315	94,543	15,181	1,845	7,962	9,124	240,409
1976	42,063	86,342	118,752	16,197	1,056	8,694	11,350	284,454
1977	52,247	100,135	136,636	9,325	936	8,523	10,927	318,729
1978	48,447	119,522	119,805	9,973	1,624	10,090	10,930	320,391
1979	43,400	116,389	112,090	15,694	1,950	10,439	11,189	311,152
1980	46,631	131,011	118,740	17,594	1,652	10,988	17,714	344,331
1981	51,377	100,493	94,605	20,840	2,067	13,409	22,791	305,582
1982	46,158	94,767	98,009	20,980	2,277	13,401	19,248	294,839
1983	40,380	94,488	101,027	14,480	1,916	10,997	20,730	284,018
1984	36,009	80,061	92,401	11,726	1,524	13,298	16,366	251,384
1985	41,889	86,720	117,240	12,494	1,234	11,589	18,849	290,015
1986	45,810	84,828	148,730	17,322	1,250	14,278	20,905	333,124
1987	41,911	92,071	158,618	20,241	1,896	18,196	25,506	358,439
1988	46,717	94,348	118,169	18,264	2,752	15,858	24,332	320,439
1989	36,217	79,851	120,295	12,520	1,515	13,125	16,542	280,065
1990	38,897	102,737	157,506	9,072	1,880	12,157	15,226	337,475
1991	42,422	85,268	141,060	10,518	2,180	14,539	18,265	314,252
1992	49,976	87,905	140,502	8,753	2,103	14,400	19,102	322,742
1993	60,930	89,273	131,254	10,359	1,707	15,602	19,065	328,190
1994	64,022	102,690	136,119	10,372	1,834	17,388	15,753	348,178
1995	58,162	100,378	110,568	11,233	1,370	17,684	14,052	313,447
1996	63,180	91,937	91,152	8,198	865	13,331	15,481	284,143
1997	80,396	89,209	104,653	9,314	1,554	14,583	15,788	315,497
1998	86,802	77,362	110,789	6,367	1,822	14,028	15,852	313,021
1999	85,313	65,802	82,001	5,228	1,653	12,253	13,716	265,966
2000	87,460	85,167	84,116	4,316	2,074	12,763	16,373	292,269
Average	52,051	84,194	102,687	18,909	1,804	12,568	14,633	285,887
STD deviation	13,914	17,446	28,054	9,053	414	3,163	4,762	39,303

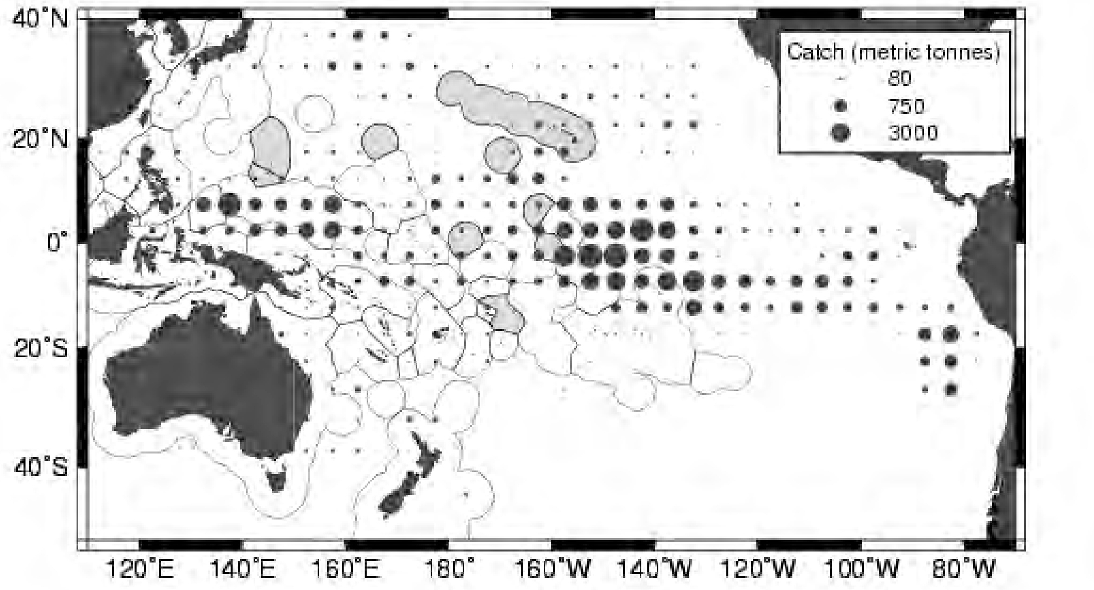


Figure 5. Distribution of longline catches of bigeye tuna reported in 2000. Source: SPC public domain data .

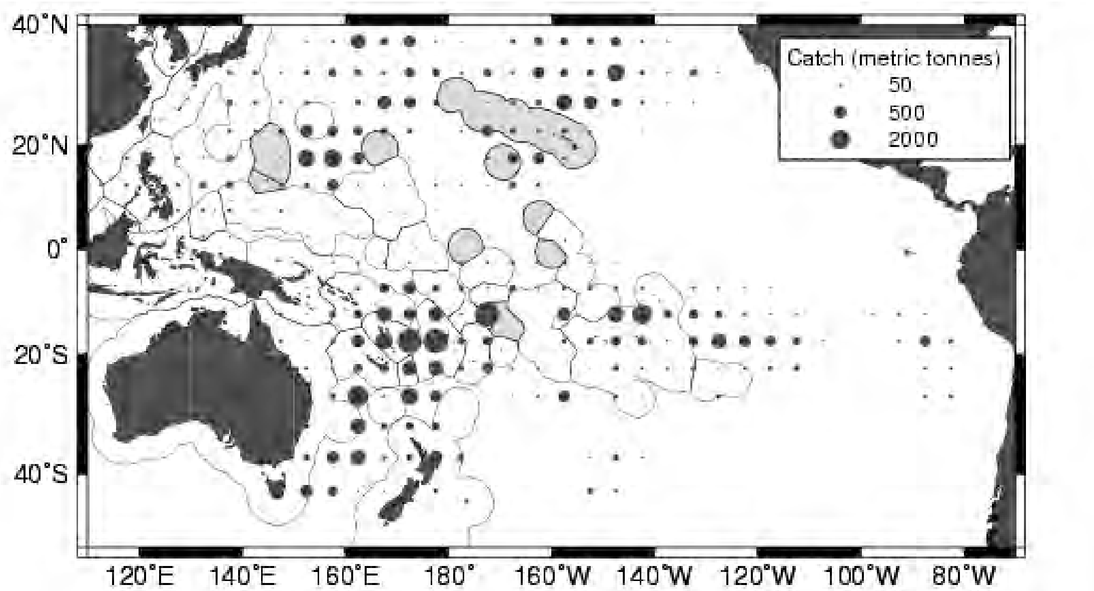


Figure 6. Distribution of longline catches of albacore tuna reported in 2000. Source: SPC public domain data.

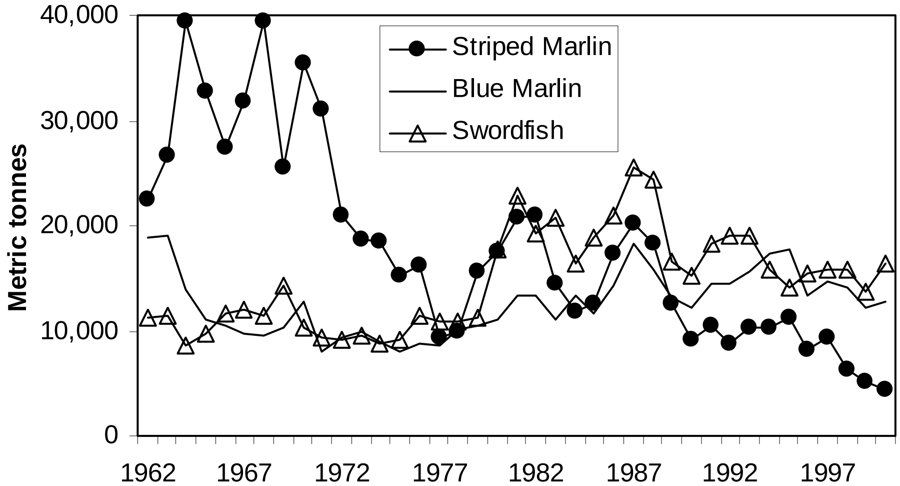


Figure 7. Reported longline billfish catches in the Pacific Ocean. Source: SPC public domain data.

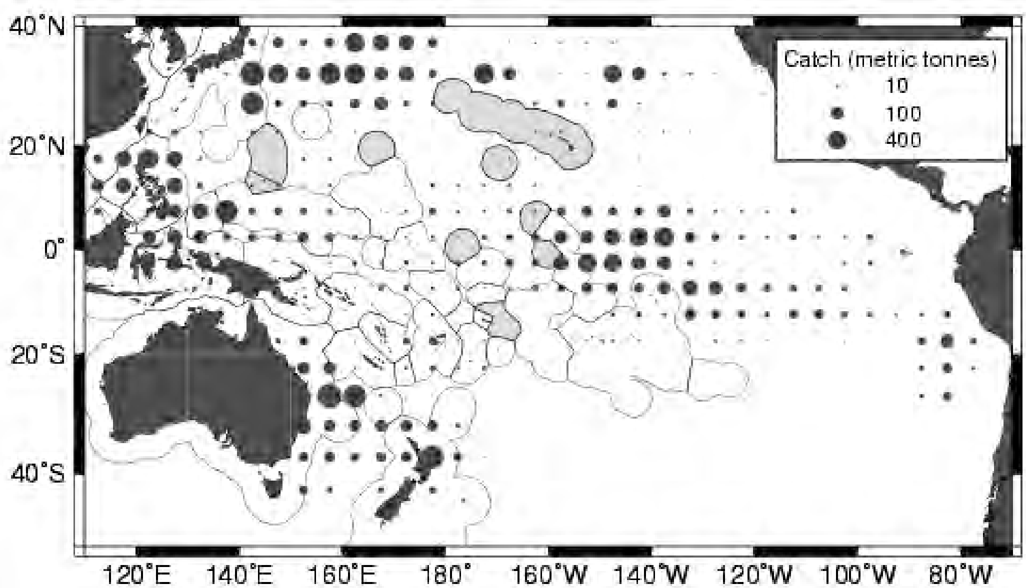


Figure 8. Distribution of longline catches of swordfish reported in 2000. Source: SPC public domain data.

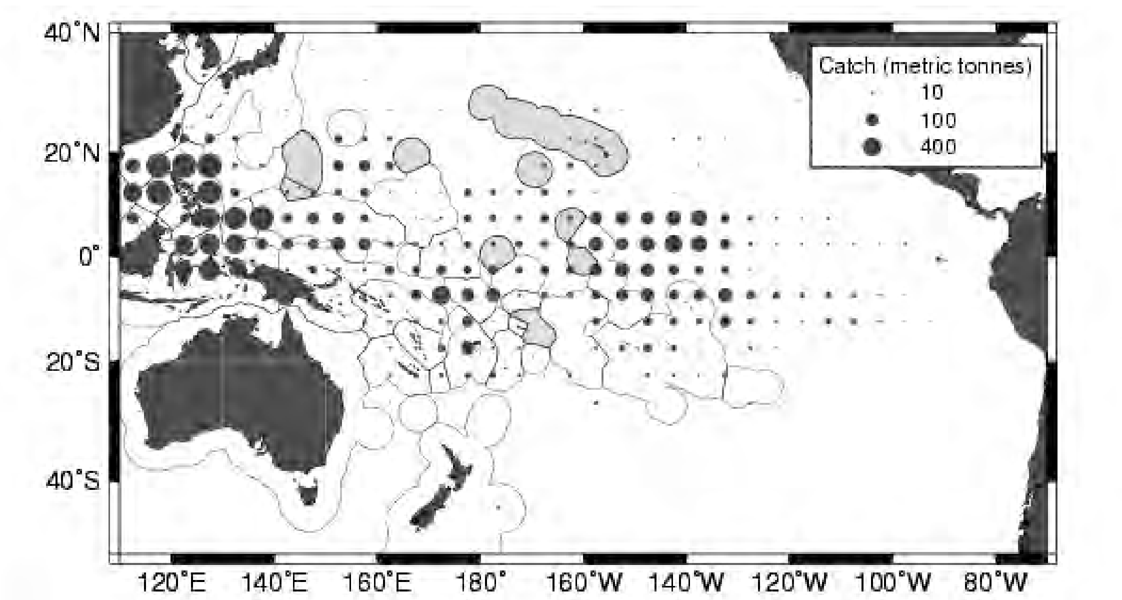


Figure 9. Distribution of longline catches of blue marlin reported in 2000. Source: SPC public domain data.

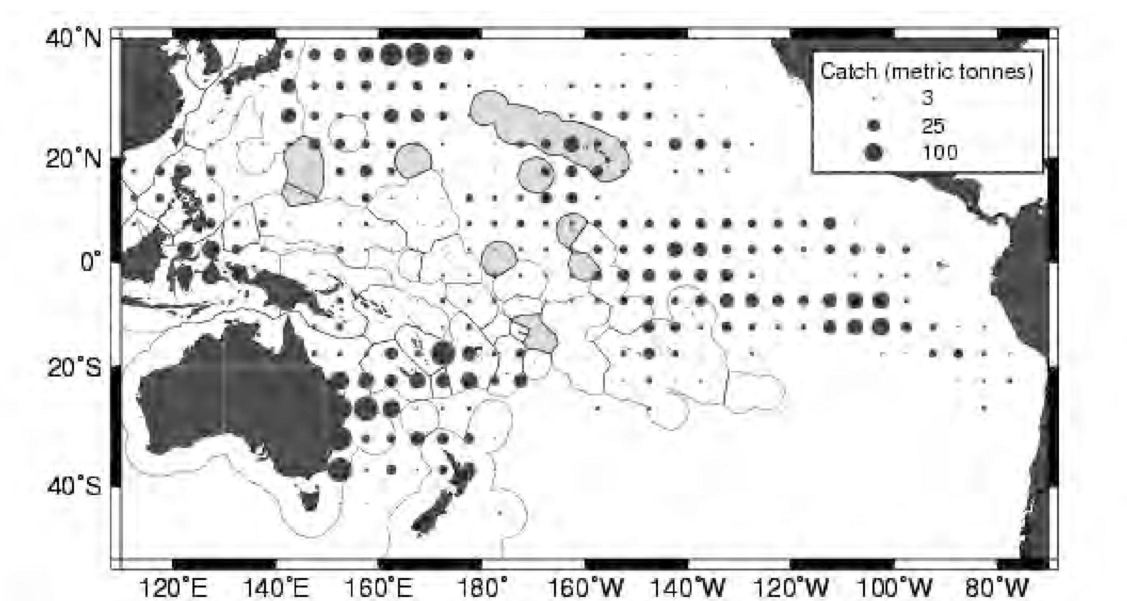


Figure 10. Distribution of longline catches of striped marlin reported in 2000. Source: SPC public domain data.

The 2000 pole-and-line fishery

Vessels

The pole-and-line fleet was composed of approximately 1,400 vessels in the 2000 WCPO fishery. Most of the vessels operated in the domestic fisheries in Indonesia and Japan. Over 100 vessels operate in Pacific Island countries and there are 159 vessels in the Japanese distant-water fleet.

Catch

The preliminary 2000 catch of 352,000 mt is a slight decrease on the 1999 level (369,121 mt); this catch represents about 19% of the total WCPO tuna catch. As in previous years, skipjack accounts for the vast majority of the catch (79%); albacore taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific (16%), yellowfin (4%) and a small component of bigeye (1%) make up the remainder of the catch. Catch estimates for some fleets have not been provided for recent years, but the Japanese distant-water and offshore (157,500 mt in 1998) and the Indonesian fleets (162,700 mt in 1999) are expected to once again account for most of the catch. The Solomon Island fleet accounted for only 2,700 mt during 2000, much lower than in recent years and attributable to the prevailing civil unrest.

Fleet distribution

The WCPO pole-and-line fishery has three components:

1. a year-round tropical skipjack fishery that provides most of the catch. The fishery involves the domestic fleets of Indonesia, Solomon Islands, French Polynesia, and the distant water fleet of Japan,
2. seasonal sub-tropical skipjack fisheries in home waters of Japan (March–July) and Australia (March–May), and
3. a seasonal albacore/skipjack fishery northeast of Japan (June to November) occurs as an extension of the Japanese homewater fishery.

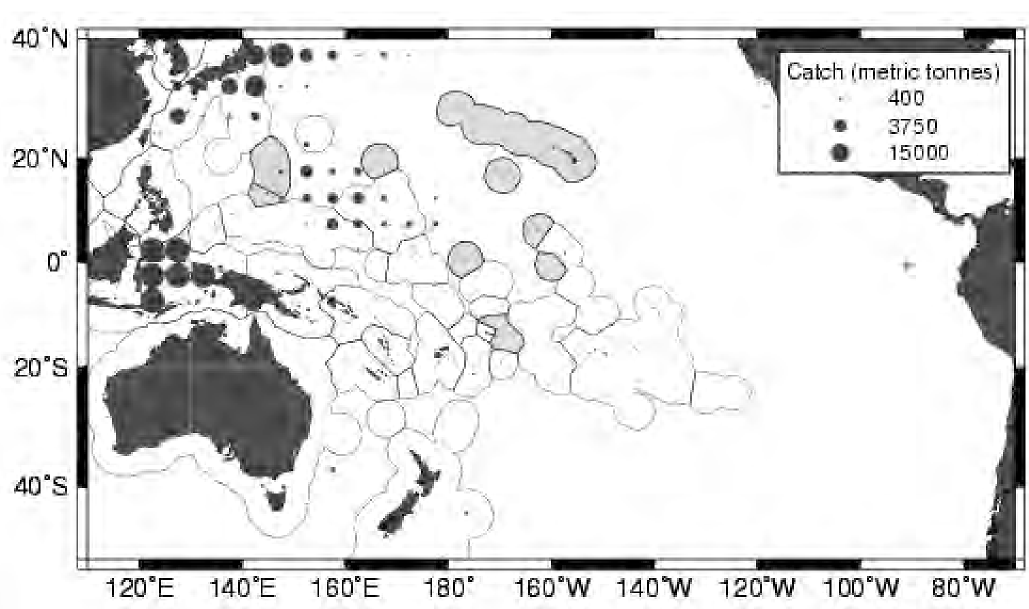


Figure 11. Distribution of pole-and-line catch of skipjack reported in 2000. Source: SPC public domain data.

Table 3. Total reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: SCTB15 report.

Year	Skipjack
1970	197,873
1971	180,945
1972	172,827
1973	253,065
1974	289,202
1975	218,271
1976	276,581
1977	294,641
1978	331,401
1979	283,494
1980	332,465
1981	294,187
1982	262,233
1983	299,762
1984	379,474
1985	250,010
1986	336,694
1987	262,467
1988	295,691
1989	285,780
1990	224,130
1991	288,401
1992	232,784
1993	277,504
1994	237,251
1995	270,474
1996	233,881
1997	254,041
1998	293,494
1999	282,281
2000	289,540
Average	270,350
STD deviation	45,217

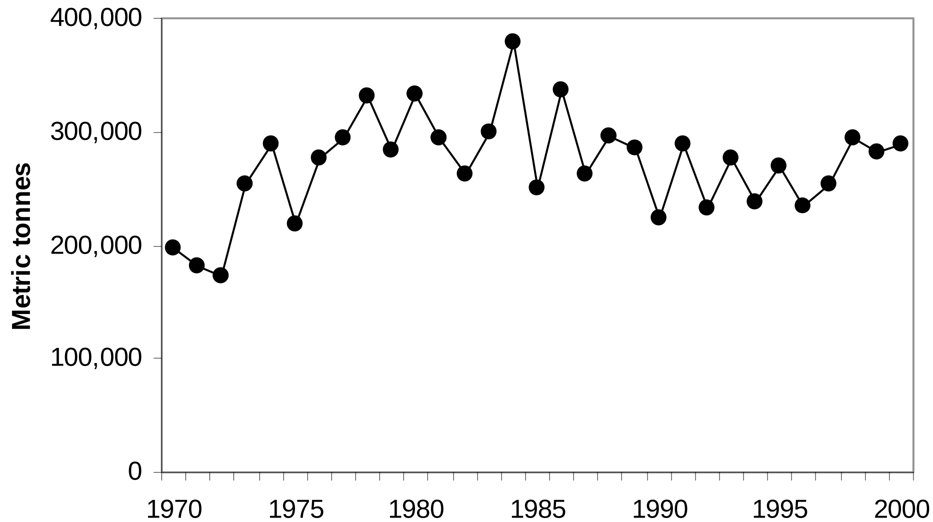


Figure 12. Reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: SCTB15 report.

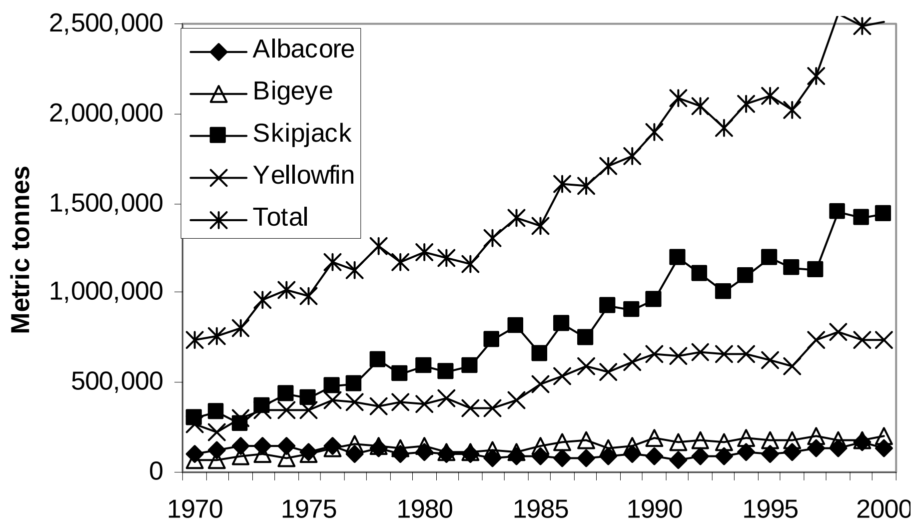


Figure 13. Estimated total annual catch of tuna species in the Pacific Ocean. Source: SCTB15 report.

Table 4. Estimated annual catch (metric tonnes) of tuna species in the Pacific Ocean. Source: SCTB15.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	102,253	72,265	298,212	263,452	736,182
1971	127,797	71,962	331,194	225,231	756,184
1972	143,861	90,092	269,297	299,497	802,747
1973	145,252	97,411	370,641	341,064	954,368
1974	147,898	83,566	434,227	347,619	1,013,310
1975	116,860	105,871	412,447	345,003	980,181
1976	149,634	137,811	484,144	397,347	1,168,936
1977	98,706	154,240	490,646	387,810	1,131,402
1978	135,798	140,245	620,360	365,177	1,261,580
1979	100,794	128,736	543,354	395,263	1,168,147
1980	107,815	142,708	589,109	383,088	1,222,720
1981	106,020	116,526	557,812	415,074	1,195,432
1982	99,324	116,107	589,880	355,453	1,160,764
1983	80,338	122,717	741,598	358,957	1,303,610
1984	91,661	115,534	812,239	402,059	1,421,493
1985	90,690	139,529	653,629	488,326	1,372,174
1986	82,040	167,523	820,440	535,568	1,605,571
1987	78,620	179,486	748,308	592,239	1,598,653
1988	86,628	137,078	921,632	559,830	1,705,168
1989	97,238	145,825	906,708	617,251	1,767,022
1990	91,438	187,080	963,410	654,562	1,896,490
1991	71,848	170,340	1,192,215	649,041	2,083,444
1992	92,399	176,461	1,106,108	670,772	2,045,740
1993	89,342	163,994	1,006,105	656,175	1,915,616
1994	114,896	189,855	1,088,346	659,000	2,052,097
1995	99,638	176,147	1,195,045	629,787	2,100,617
1996	114,139	175,416	1,141,437	591,126	2,022,118
1997	138,205	202,256	1,129,165	735,535	2,205,161
1998	138,171	182,834	1,455,463	780,301	2,556,769
1999	162,541	174,943	1,413,319	739,733	2,490,536
2000	130,988	204,149	1,437,108	739,702	2,511,947
Average	110,737	144,152	797,535	502,614	1,555,038
STD deviation	24,736	37,944	351,618	162,663	540,117

Status of stocks based on summary statements of the Standing Committee on Tuna and Billfish (SCTB15) – July 2002

SKIPJACK RESEARCH GROUP – SUMMARY STATEMENT

Skipjack tuna are the most important tuna resource in the WCPO, in terms of its contribution by weight to the total catch. In the past decade, skipjack tuna catches have been approximately 1 million mt per year, contributing about 63% to the total tuna catch from the region. The 2001 catch was slightly more than 1.2 million mt, the second highest catch on record. The purse seine fishery accounted for most of this catch (69%) with 24% from the pole-and-line fishery.

The CPUEs for purse seine are variable with nominal CPUE for log and FAD sets showing an increasing trend (mainly due to increased efficiency of purse seiners), particularly in recent years. Nominal CPUEs for free-swimming school sets and for pole-and-line fisheries are essentially flat. A lack of trend was also seen in standardized pole-and-line CPUEs.

Skipjack tuna are concentrated in tropical waters but expand seasonally into subtropical waters to the north and south. Their fast growth, early maturity, high fecundity, year round spawning, relatively short life span, high and variable recruitment, and few ages classes on which the fishery depends makes this species unique among the main tuna species. Ongoing fishery oceanography and environmental studies continue to improve understanding of the factors influencing availability and productivity of skipjack tuna in the WCPO. They suggest a positive impact of El Niño skipjack tuna recruitment, particularly when followed by a La Nina event. The cause for these recruitment differences appears to be changes in the area of the spawning habitat with temperature and in forage availability. Modeling results predict lower skipjack tuna recruitment over the next 2 years resulting from the 1998-2000 La Nina event. The biomass trend appears to be recruitment driven, with large variability and with the largest biomass levels estimated to be for the model period 1998 to 2000. The model results suggest that the skipjack tuna population in the WCPO in recent years is at an all time high relative to the last 30 years.

Tag-based assessments from the early 1990s suggested low to moderate exploitation at catch levels slightly lower than those in recent years. Recent results from MULTIFAN-CL model analysis which incorporates tagging and other information, were consistent with earlier assessments but indicated that fishing mortality had continued to increase from the 1970s and falling to some extent in recent years, probably due to economic factors. While fishing mortality has increased, the impact of fishing on the stock is estimated to be relatively slight throughout the time period. The ratio of fishing mortality relative to F_{MSY} is small (<0.20) and fishing mortality over the past 30 years has been significantly less than natural mortality. Similarly, estimates of recent spawning stock biomass (SSB) are considerably higher than the estimated level producing MSY ($SSB/SSB_{MSY} > 5.0$). The skipjack tuna stock appears to be healthy and capable of sustaining the current catch without adverse effect on stock condition.

Nevertheless, the Group noted that it does not appear that skipjack tuna move over great distances rapidly and hence, do not thoroughly mix over the entire region. Concentrated and sustained fishing effort in local areas, consequently, could result in local depletion. In such areas, further increase in fishing effort may not result in proportionate increase in catches, but instead result in decline in CPUE and even in average size of skipjack tuna taken. The experience in the Atlantic skipjack tuna fisheries where this has occurred was noted.

Future advances in the basic biology, data collection and stock assessment of skipjack tuna are required to substantiate the information required for the management of this economically and ecologically important species. Of particular importance is the need to estimate the magnitude and size composition of skipjack tuna caught in the domestic fisheries of the Philippines and Indonesia.

YELLOWFIN RESEARCH GROUP – SUMMARY STATEMENT

Catches of yellowfin tuna represent the second largest component (21-28% since 1990) of the total annual catch of the four main target tuna species in the WCPO. For stock assessment purposes, yellowfin tuna are believed to constitute a single stock in the WCPO.

The catch of yellowfin tuna in the WCPO first exceeded 200,000 mt in 1980. With the expansion of the purse seine fishery during the 1980s catches doubled to reach around 414,000 mt by 1992. Since that time yellowfin catches in the WCPO have varied between 326,000 and 500,000 mt, with the catches during the last five years being at historical high levels, averaging 464,000 mt. The catch during 2001 is currently estimated to be 473,000 mt, the second highest recorded. Purse seine vessels harvested the majority of the yellowfin catch (45% by weight) during 2001, while longline and pole-and-line fisheries caught 17% and 3% respectively and various other gears accounted for 34 % (mostly eastern Indonesia and the Philippines).

Nominal catch rates of yellowfin for purse seine fleets are characterised by strong interannual variability believed to be associated with variation in environmental conditions associated with the El Niño Southern Oscillation cycle. Catch rates for most fleets indicate no clear trend over the available time series of data, despite the increased efficiencies associated with the use of drifting FADs. Nominal catch rates of yellowfin for the Japanese distant water longline fleet display a steady decline during the 1980s, increased during the mid-1990s, dropped sharply to a historical low during 1999 before recovering somewhat during 2000. However, after accounting for the increased targeting on bigeye tunas since the mid-1970s, standardised catch rates for this fleet in most regions of the WCPO display large interannual variability, no overall long term trend, but somewhat higher values between the mid-1970s through to the late 1990s.

New research on the displacement patterns of tagged yellowfin, together with the results of research on juvenile recruitment patterns; indicate the possibility that short to medium (less than 1000 km) distance movements may be more characteristic of overall yellowfin movement patterns than long-distance migrations and large scale mixing. While further work with archival tags is required to increase our understanding of movement patterns, the higher degree of regionalisation of yellowfin populations implied by these results increase the risk of localised depletions where catch levels are too high relative to local immigration rates of yellowfin.

New research on the trophic ecology of yellowfin associated with natural and man-made aggregation sites is also improving our understanding of the ecological consequences of the increased used of FADs. However, further work is required to understand habitat preferences, trophic dynamics and the influences of recent increases in fishing efficiencies (e.g. the increased used of drifting FADs) to help improve the standardisation of catch rates.

Tag-based assessments from the early 1990s found exploitation levels of yellowfin tuna to be low to moderate at catch levels at that time, about 20-25 percent below those in recent years. However, more recent assessments of the yellowfin stock in the WCPO using the MULTIFAN-CL model indicate that fishing mortality has increased significantly since this time, largely as a result of catchability increases in the purse seine fisheries. The results from the latest assessment reaffirm these earlier findings as well as the result from last year's assessment that indicated recent recruitment may have declined significantly. The reasons for this decline remains uncertain though do not appear to be related to a decline in spawning biomass due to fishing. It is possible that a shift to a lower productivity regime characterised by lower average recruitment has occurred.

The recent declines in recruitment have produced a significant decline of around one-third in overall stock biomass since 1997. Biomass levels in 2000 and 2001 are estimated to be the lowest since the mid-1970s. The decline in biomass is most evident in the main catch regions of the western equatorial Pacific where current biomass is estimated to have declined by over 50 percent since the mid-1990s. For the WCPO in total, the current biomass is estimated to be around 35% less than that which would have occurred in the absence of fishing.

Attempts to estimate an MSY for yellowfin continue to be hampered by uncertainty in the stock-recruitment relationship and the age-specific exploitation patterns as well as other uncertainties in the stock assessment models. The possibility of two different productivity regimes also complicates the situation, as estimation of the MSY level and associated spawning biomass ratio (the ratio of spawning biomass to that for the unfished stock) are dependent on overall stock productivity. Nevertheless, the assessment reviewed by SCTB 15 reaffirms the result of the previous assessment that the yellowfin stock in the WCPO is presently not being overfished (i.e. $F/F_{MSY} < 1$) nor is it in an overfished state ($SSB/SSB_{MSY} > 1$). However, the current trends in both ratios are towards their respective reference points, and if a shift to a lower productivity regime has occurred, it is believed that present catches may not be sustainable.

There is increasing evidence that the north Pacific Ocean is undergoing an environmental regime change and this is likely to have an effect on the productivity and distribution of tunas in the Pacific Ocean. The results of recent assessments of yellowfin tuna in the WCPO suggest that the stock may be responding to this regime change with lower recruitment now than before. The results, however, have elements of uncertainty because of assumptions used in the assessment models and incomplete fisheries information available for the analyses. Furthermore, due to the short time-series on which they are based, estimates of recruitment and cohort strength in the most recent years are the most poorly determined. As a result, further years data will be needed to confirm the present results, especially in terms of future stock productivity. Nonetheless, if the stock is entering a regime of low recruitment, the current catch of 475,000 t is significantly higher than the estimated MSY for a low recruitment regime (~290,000 t) and is not sustainable. In such an event fishing mortality would need to be reduced, especially on juvenile yellowfin in the equatorial regions where the stock is believed to be close to if not already fully exploited. If, however, recent estimates of low recruitment are normal variability of a high-recruitment regime, the current catch is estimated to be close to the estimated MSY for a high recruitment regime and appears to be sustainable.

While recognizing continuing uncertainties associated with the present stock assessment, the Group reiterates the previous recommendation that there be no further increases in fishing mortality (particularly on juvenile yellowfin) in the WCPO. If future evidence supports a shift to a lower productivity regime, a decrease in fishing mortality is recommended.
Furthermore, the Group believes that this uncertainty and its impact on stock status advice highlights the need for the following immediate actions:

1. The condition of the yellowfin stock should be closely monitored over the next few years;
2. Fishery data collections should be significantly improved, particularly for the fisheries that catch a significant amount of yellowfin tuna;
3. Options for fishery management actions required for maintaining a healthy stock in a low recruitment regime should be evaluated in order to be prepared should further analyses validate that the future is a low-recruitment regime;
4. A greater understanding of changes in catchabilities is required in order to develop improved indices of stock abundance based on CPUE;
5. Further development of stock assessment models, particularly MULTIFAN-CL should be undertaken;
6. The development of alternative recruitment indices, other than those provided by MULTIFAN-CL, should be developed; and
7. Studies on the multi-species influences of the assessment should be carried out.
8. The Group also saw the need for additional large-scale and archival tagging to help validate the recent level of fishing mortality estimated from the assessment models and provide additional information on yellowfin movement, natural mortality and exploitation rates to support future stock assessment analyses.

ALBACORE RESEARCH GROUP – SUMMARY STATEMENT

The South Pacific albacore comprises a single stock. Catch in 2001 reached about 52,000 mt with a noticeable increase of fish caught by longliners from some Pacific Island countries (PICs). These vessels accounted for almost 50% of the total longline catch, which was estimated at

46,000 mt in 2001. Less than 15% of fish are taken east of 150° west, and most fishing occurs from 10ºS to 50°S.

The total catch last year was the highest since the peak recorded in 1989 when driftnet vessels fished in the region of the subtropical convergence zone (STCZ). The albacore surface fishery is now composed only of trollers with a fishing season spanning from November to April around the STCZ and in New Zealand coastal waters.

Albacore CPUE of Taiwanese longliners operating in the South Pacific showed a slight increase during the 1990s except at the lowest latitudes where a drop was recorded in the most recent years. This appears to be related to changes in the fishing practices of this fleet towards targeting of bigeye and yellowfin, particularly in the waters north of French Polynesia. Changes in fishing practices of PIC longliners may also explain some recent trends in the albacore CPUE recorded in the EEZs of these countries. Some of these vessels are now fitted to target different species with flexibility.

CPUE for the New Zealand troll fleet has been relatively stable during the 1990s, showing some convergence in recent years with that of the US troll fleet, which was previously higher and more variable.

The length frequency data collected from longline and troll fleets indicate a single multiple-age class mode throughout the year with some overlap in the size composition of fish taken by both fisheries from January to March.

From the most recent stock assessment carried out with the MULTIFAN-CL model, biomass levels appear to reflect the variation of recruitment: the current biomass is about 85% of the estimated equilibrium unexploited biomass.

The impact of the fisheries on total biomass is estimated to be low (reduction of less than 20% from the unexploited conditions). However, there is a need to improve the assessment with additional tagging data and more information on tag-reporting rates. Better knowledge of the South Pacific albacore stock with respect to recruitment and biomass is expected from the use of a high resolution environmental and population dynamics simulation model originally developed for skipjack (SEPODYM model). With regard to albacore this model gives encouraging preliminary results but further refinement is required.

The MULTIFAN-CL model results indicate that current less than the MSY, aggregate fishing mortality is less than F_{MSY}, and the adult biomass is greater than B_{MSY}. The assessment could be improved by the following priority research and monitoring activities:

1. Strengthen the monitoring of catch, effort and size composition of albacore caught by PIC longline fleets;
2. Obtain information on the fishing depth of longline gear targeting albacore;
3. Conduct conventional tagging to improve estimates of natural mortality, fishing mortality and movements, and archival tagging to obtain information on albacore vertical habitat utilization.

BIGEYE RESEARCH GROUP – SUMMARY STATEMENT

Bigeye tuna account for a relatively small proportion of the total tuna catch in the Pacific Ocean, but their economic value probably exceeds US$1 billion annually. The preliminary estimate of Pacific-wide catch of bigeye in 2001 is 183,372 mt, slightly down on the record catch of the previous year (204,149 mt). In the WCPO, the 2001 catch was an estimated 107,262 mt, unchanged from 2000. The longline catch in the WCPO in 2001 increased to a record level (61,019 mt) while the purse seine catch (26,707 mt) decreased by about 15% from the level observed in 2000. During the meeting, preliminary catch estimates were presented on a rapidly developing longline fishery based in Vietnam, for which the catch in 2001 may consist of up to 70% bigeye tuna. Catches by other gears (pole-and-line and various gears in Indonesia and Philippines) remained largely unchanged from the levels reported in recent years. In the Eastern Pacific Ocean (EPO), bigeye catch in 2001 was an estimated 76,110 mt, down considerably from the 2000 catch of 97,402 mt. This decrease was due to a drop in the purse seine catch from the

2000 record level of 70,098 mt to 43,009 mt in 2001. The EPO longline catch of bigeye in 2001 was 33,101 mt, about a 20% increase over the previous year.

Considerable progress has been made in understanding bigeye tuna vertical habitat utilization and movements as the results of archival tagging experiments in various parts of the Pacific come to hand. Work being conducted in the Coral Sea, around Hawaii, and in the eastern tropical Pacific suggests that bigeye vertical distribution varies across the Pacific and is likely to be related to variation in several oceanographic variables. This information will be of considerable value in the estimation of effective longline effort for bigeye using habitat models. Movement data thus far collected from archival tags suggest a degree of regional fidelity, although longer term recaptures are required before strong inferences can be drawn regarding stock structure and mixing rates.

Several nominal and standardized CPUE time series were examined by the Group. The purse seine CPUE trends for the main fleets generally reflect the extent to which associated sets, especially on drifting FADs (which have produced higher juvenile bigeye catches in recent years), have occurred in the fishery. Nominal CPUE for Japanese longliners fishing in the tropical WCPO has been fairly stable over a long period of time. However, habitat-model standardized CPUE, which removes variability due to changes in targeting and some environmental variables, shows a declining trend.

Two stock assessment models were presented for WCPO bigeye, one using the MULTIFAN-CL method and the other using the A-SCALA method. While some of the details of the respective model results differed substantially because of different assumptions and data analysed (e.g. absolute biomass levels and biomass trends differ appreciably in the two analyses), both indicate that recent fishing mortality rates, particularly in the tropical region where most catch occurs, are near or above commonly used overfishing reference points. The MULTIFAN-CL analysis indicated somewhat lower impacts of fishing in the sub-tropical regions of the WCPO. On a WCPO-wide basis, the MULTIFAN-CL model estimated that fishing mortality rates and spawning biomass had not yet reached their respective MSY levels. The A-SCALA model suggested that current levels of fishing mortality are likely to be beyond the F_{MSY} reference point, although it was noted that some of the assumptions used in this analysis (particularly the assumption of constant catchability by the purse seine fishery) are probably unrealistic. However, both analyses agree that further increases in fishing mortality rates are unlikely to result in significant increases in long-term average yield with the current pattern of age-specific exploitation. Moreover, it is clear that the high juvenile fishing mortality generated by the fisheries in the Philippines and Indonesia, and by purse seine FAD and log sets in the WCPO, are limiting potential yields from the fishery and are likely impacting longline fishery performance in the tropical region.

The Group recognised that: (1) the fishing mortality rates on adults are low and without a trend; (2) there are continuing uncertainties inherent in the assessments and, in particular, uncertainties associated with estimates of the juvenile bigeye catch; and (3) there is concern regarding increasing catches, indications that current yields appear to be sustained only by recent periods of above average recruitment, and that fishing mortality rates on juveniles are high (relative to natural mortality) and increasing. For these reasons, the Group reiterated its recommendation that there be no further increase in the fishing mortality rate on juvenile bigeye tuna in the WCPO.

The Group noted that the following research and fishery monitoring activities should lead to improved stock assessment for bigeye tuna in the WCPO:

1. Improved catch, effort and size composition data from the Indonesian and Philippines fisheries, and from the rapidly developing Vietnamese fishery;
2. Improved estimates of bigeye catch from the WCPO purse seine fishery;
3. Continued acquisition of data on bigeye tuna habitat (through archival and pop-up satellite archival tagging), and the incorporation of these data into habitat models to provide estimates of effective longline effort;
4. Additional conventional tagging of bigeye to provide additional information on fishing and natural mortality, movements and other parameters.

Appendix 6

Marine Recreational Fisheries of the Western Pacific Region

Introduction

Fishing, either for subsistence or recreation continues to be an extremely important activity throughout the Western Pacific Region in the four major populated island areas of the Western Pacific Region, Hawaii, American Samoa, Guam and the Commonwealth of the Northern Mariana Islands (CNMI). Fish consumption in Micronesia and Polynesia typically averages about 130 lb/per capita/yr (Dalzell et al 1996) and even in more culturally diverse Hawaii, fish consumption is almost three times the US national average at about 42 lb/person/yr (Dalzell & Paty 1996).

Recreational fisheries in the Western Pacific Region

In Hawaii, recreational shoreline fishing was more popular than boat fishing up to and after WW II. Boat fishing during this period referred primarily to fishing from traditional canoes (Glazier2000). All fishing was greatly constrained during WW II through time and area restrictions, which effectively stopped commercial fishing and confined recreational fishing to inshore areas (Allen 1950). Following WWII, the advent of better fishing equipment and new small boat hulls and marine inboard and outboard engines led to a growth in small vessel-based recreational fishing.

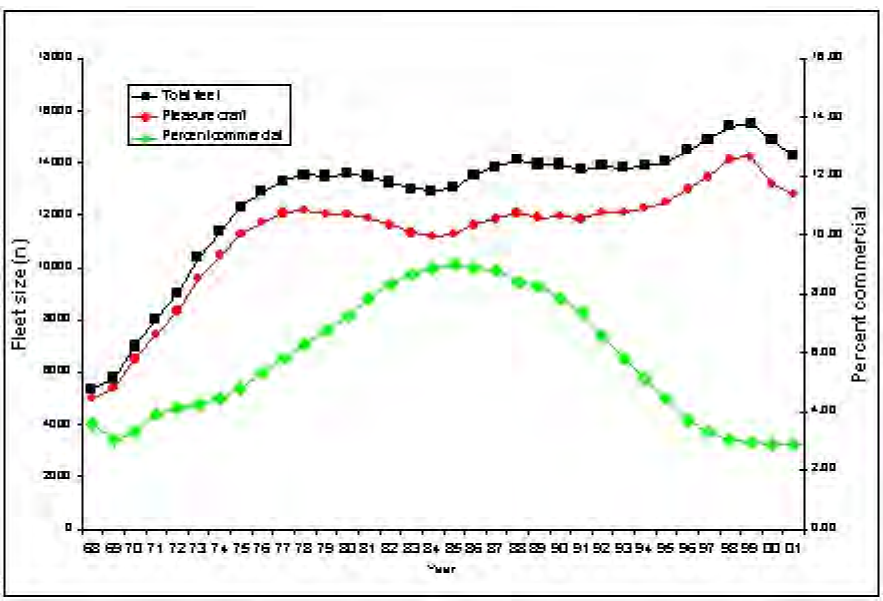


Figure 1. Annual number of small vessel fleet registratins in Hawaii. Figure shows total fleet size, and percentage of vessels being registered for commercial fishing (Source: Hawaii Division of Boating and Ocean Resources)

A major period of expansion of small vessel recreational fishing occurred between the late 1950s and early 1970s, through the introduction of fibreglass technology to Hawaii and the further refinement of marine inboard and outboard engines (Figure 1). By the early 1960s there were an estimated 5,300 small boats in the territory being used for recreational fishing. By the 1980s the number of recreational or pleasure craft had risen to almost 13,000 vessels and to about 15,000 vessels in the 1990s. There are presently some 26 fishing clubs in Hawaii, and a variety of different recreational fishing tournaments organized both by clubs and independent tournament organizers. Hawaii also hosts between 150 to 200 boat based fishing tournaments, about 30 of which are considered major competitions, with over 20 boats and entry fees of ≥$100. This level of interest in recreational fishing is sufficient to support a local fishing magazine, Hawaii Fishing News, which besides articles of interest to recreational fishermen, includes a monthly roundup of the fishing activity and conditions at the major small boat harbors in the State. Further, a directory of the State's small boat harbors and launching ramps is published annually by Hawaii Ocean Industry and Shipping news (see December 2002/January 2003 issue).

Elsewhere in the region, recreational fishing is less structured. In Guam fishing clubs have been founded along ethnic lines by Japanese and Korean residents. These clubs had memberships of 10-15 people, along with their families. Four such clubs were founded in Guam during the past 20 years, but none lasted for more than a 2-3 years (Gerry Davis, Guam DAWR pers. comm.). These was also a Guam Boating Association comprising mostly fishermen, with several hundred members. This organization functioned as a fishing club for about 10 years and then disbanded. Some school groups and the boy scouts have formed fishing clubs focused on rod and reel fishing, and there is still one spearfishing club that has only a handful of members, but appears to be still be active. There are also some limited fishing tournaments on Guam, including a fishing derby for children organized by the local Aquatic and Wildlife Resources Division (Anon 2000).There are few fishing clubs in the in the Northern Mariana Islands. The Saipan Sportfishing Association (SSA) has been in existence for at least 16 years, and is the sponsor of the annual Saipan International Fishing Tournament, which is usually held in August or September. In 1997, the SSA listed approximately 40 members. There is also a Tinian Sportfishing Association, but the status of this club is unknown at this time.

The founding of the American Samoa Game Fishing Association in 1974 in Pago Pago led to fishing tournaments being held on a regular basis in the territory (Tulafono 2001). A total of 64 tournaments, averaging two to three tournaments per year and 10 to 20 vessels in each competition, were conducted in Pago Pago between 1974 and 1998. However interest in fishing tournaments waned during the late 1990s, with only three vessels participating in the last tournament held in 1998. The reason for this decline was not entirely clear, but may be related to the expansion of the longline fishery in American Samoa and the shift from commercial trolling to longlining. According to Tulafono, fishermen were more interested in earning income and it was time consuming to switch from longline to troll gear for a weekend of tournament fishing. Tulafono (2001) noted that tag and release programs, which are gaining popularity with recreational and charter-vessel fishermen elsewhere in the U.S., would not be popular in American Samoa. In common with many Pacific islands, fish were caught to keep for food in

American Samoa, and fish landings and their distribution through the community were important in order to meet social obligations. Releasing fish would be considered a failure to meet these obligations (Tulafono 2001).

There is also some recreational fishing activity at some of the Pacific Remote Island Areas (PRIAs), namely at Midway, Wake, Johnston and Palmyra Islands. There are no resident populations at Howland & Baker and Jarvis Islands and fishing activity at these locations is likely minimal. There was a tourist facility at Midway until 2002, which operated a charter boat fishery targeting primarily pelagic fish at Midway Atoll. The company operated five vessels using for charter fishing at Midway: three 22-26 ft catamarans for lagoon and nearshore fishing operations and two 38 ft sportfishing vessels used for blue water trolling. In addition there were approximately seven small vessels maintained and used by Midway residents for recreational fishing. Of this total, three vessels engaged primarily in offshore trolling for PMUS including yellowfin tuna, ono and marlin. All vessels fishing at Midway were required to file a float plan prior to a fishing trip and complete the “Midway Sports Fishing Boat Trip Log” upon completion of each trip. The US Fish and Wildlife Service was responsible for compiling these catch data.

At Palmyra Atoll, an island privately owned by The Nature Conservancy, a 22 ft catamaran is used for offshore trolling and four small boats operated within the lagoon used for bonefish angling. There are several craft used for recreational fishing at the two military bases on Johnson and Wake Islands. These include eight Boston whalers, two cabin cruisers and a landing craft at Johnson, and two landing craft and two small vessels at Wake.

Recreational fisheries in the Western Pacific Region

Estimates of recreational catch for the Western Pacific are given in Table 1. The data for Guam, Northern Mariana Islands and American Samoa are based on the proportion of catches landed for sale and catches retained and not sold, in all landings sampled by creel surveys in each area. The ratio of unsold to sold catch in the samples was used in conjunction with the total catch estimate expanded from the creel survey data. This was adjusted downwards based on the creel surveys by the ratio of landings by vessels retaining 100 % of their catch to the total unsold catch. This accounts for that fraction of the catch not sold by commercial fishing vessels. The volume of fish landed by vessels retaining all their catch was labeled the nominal recreational catch. A similar exercise is conducted by the Honolulu Laboratory to generate recreational catch figures for Hawaii.

Table 1. Estimated recreational fish catches in the four principal island groups of the Western Pacific Region

Location	Year	Total catch (lbs)	Unsold catch (lb)	Nominal recreational catch (lb)	Recr. catch as % of total catch	Total trips	Recr. fishing trips	Recr. trips as % of total trips
American Samoa	2001	712,082[1]	39,532	33,864	4.8	2,590	770	29.7
Guam	2001	1,048,987	428,440	378,324	36.06	24,205	16,476	68.1
Hawaii[1]	2001	12,125,000	NA	4,435,000	35.57	NA	NA	28.4
NMI	2001	759,095	46,951	33,767	4.45	8,218	1,551	18.9

1.Hawaii recreational catch from NMFS Honolulu Laboratory. recreational fishing trips as a percent of total trips based on Hamilton & Huffman 1997

Charter boat sportsfishing

Most charter fishing in Hawaii is focused on catching blue marlin, which form about 60 % of the total annual charter vessel catch by weight (WPRFMC 1998). Although commercial troll vessels also take blue marlin, these only form about a quarter of their catch, with the majority of the target species being yellowfin, mahimahi, aku and ono (Table 3). Unlike other parts of the US, there is little recreational fishery interest in catching sharks in Hawaii.

Guam has a charter fishing sector, which unlike Hawaii caters for both pelagic and bottomfish fishing. Until recently the troll charter fishery was expanding, but, over the past three years the number of vessels involved, and level of fishing, has decreased in response to lower tourist volume from Japan due to the Asian economic recession in the late 1990s. Nonetheless, although compromising only 5 % of Guam's commercial troll fleet, the Guam troll charter industry accounts for 11% of the troll catch and 25 and 20% of the Guam blue marlin and mahi mahi catch respectively. (See Guam module in this volume). The Guam bottomfish charter fishery has continued to increase despite the drop in tourist volume from Japan, and accounts for about 10% of Guam's bottomfish fishing effort. The primary catch of the bottomfish charter fishery are goatfish and triggerfish, which are mostly released.

Charter fishing in NMI is limited, with less than ten boats operating on Saipan, and a few vessels on Tinian conducting occasional fishing charters. No data are available on the operations of these boats. Tourism is not a significant component of the American Samoa economy, and hence there is little charter fishing activity. There are few vessels suitable for charter-type operations and the American Samoa government does not actively promote tourism and sportfishing as the local infrastructure for this is limited (Tulafono 2001).

Table 2. Estimated catches by pelagic charter fishing vessels in Guam, Hawaii and Northern Mariana Islands in 2000

Location	Catch (lb)	Effort (trips)	Species
Guam	72,542	2,453	blue marlin, skipjack, mahimahi, wahoo
Hawaii	494,549	6,035	mahimahi, yellowfin, wahoo, blue marlin
Northern Mariana Is	19,586	717	mahimahi, yellowfin, skipjack, wahoo

Charter vessel fishing in the Western Pacific Region has elements of both recreational and commercial fishing. The primary motivation for charter patrons is recreational fishing, with the possibility of catching large game fish such as blue marlin. The charter vessel skipper and crew receive compensation in the form of the patrons fee, but are also able to dispose of fish on local markets, as is the case in Hawaii. The catch composition of charter vessel catch versus conventional commercial trolling, however, reflects the different targeting in the two fisheries. Blue marlins are the dominant feature of charter vessels in both Hawaii and Guam (Tables 3 & 4), with the balance of the catch being broadly similar to the mix of top species in the commercial troll catches

Table 3. Comparison of species composition of landings made by Hawaii pelagic troll vessels versus commercial troll vessels in 2001

	Charter vessels			Commercial trollers	
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Blue marlin	243,678	49.27%	Mahimahi	508,376	24.09%
Mahimahi	81,757	16.53%	Yellowfin	446,855	21.17%
Yellowfin	49,957	10.10%	Wahoo	466,669	22.11%
Wahoo	44,721	9.04%	Blue marlin	360,823	17.10%
Skipjack	18,291	3.70%	Skipjack	195,963	9.29%
Others	56,145	11.35%	Others	131,800	6.25%
Total	494,549	100.00%	Total	2,110,486	100.00%

Table 4. Comparison of species composition of landings made by Guam pelagic troll vessels versus commercial troll vessels in 2001

Species	Charter vessels		Commercial trollers	
	Landings (lb)	Percent	Landings (lb)	Percent
Mahimahi	25,601	34.66%	158,408	23.08%
Skipjack Tuna	19,545	26.46%	313,173	45.64%
Wahoo	12,417	16.81%	107,185	15.62%
Blue Marlin	10,979	14.86%	22,274	3.25%
Yellowfin Tuna	3,486	4.72%	55,207	8.04%
Others	1,832	2.48%	29,989	4.37%
Total Pelagics	73,860	100.00%	686,236	100.00%

In Hawaii there is considerable variation in charter vessel catches between the various islands (Table 5), with the largest charter vessel fishery based on the island of Hawaii. In 2001, charter vessel catches on the island of Hawaii accounted for over half of the total charter vessel landings within the state, with Maui and Oahu charter vessels forming most of the remaining catch. The islands of Kauai and Molokai make minor contributions to the charter vessel catch, with no charter fishing on Lanai.

Table 5. Charter vessel catches in Hawaii by island during 2001

Island	Catch (lb)	Percent	Trips	Percent	CPUE (lb/trip)
Hawaii	277,197	56.05%	2,920	48.38%	94.93
Oahu	123,375	24.95%	1,035	17.15%	119.20
Maui	71,698	14.50%	1,594	26.41%	44.98
Kauai	22,279	4.50%	486	8.05%	45.84
Molokai	NA*		NA*		
Lanai	0	0.00%	0	0.00%	
Total	494,549	100.00%	6,035	100.00%	81.95

* DAR confidentiality protocols prevent reporting 2001 charter vessel activity for Molokai. The 2000 landings figure was 3661 lb, from 66 trips, and a CPUE of 55.45 lb/trip

Most charter vessel fishing on the island of Hawaii is conducted from Kona’s small boat harbor at Honokohau, and over two thirds of the charter vessel catch comprises blue marlin (Table 6). Elsewhere, mahimahi dominate charter vessel landings, with blue marlin comprising between 21% and 34% of catches. Other important species in the charter vessel catches, depending on location, comprise yellowfin, wahoo, spearfish and skipjack.

Table 6. Composition of charter vessel catches in the Main Hawaiian Islands during 2001

Hawaii			**Kauai**		
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Blue marlin	188,462	67.99%	Wahoo	7,082	31.79%
Yellowfin	25,787	9.30%	Mahimahi	5,062	22.72%
Wahoo	17,773	6.41%	Yellowfin	3,527	15.83%
Striped marlin	13,973	5.04%	Blue marlin	3,233	14.51%
Mahimahi	13,406	4.84%	Skipjack	1,975	8.86%
Others	17,796	6.42%	Other	1,400	6.28%
Total	277,197	100.00%	Total	22,279	100.00%
Oahu			**Maui**		
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Mahimahi	46,103	37.37%	Blue marlin	25,525	35.60%
Blue marlin	26,458	21.45%	Mahimahi	17,186	23.97%
Yellowfin	18,107	14.68%	Wahoo	10,242	14.28%
Skipjack	11,430	9.26%	Striped marlin	9,148	12.76%
Wahoo	9,624	7.80%	Shortnose spearfish	3,673	5.12%
Others	11,653	9.45%	Others	5,924	8.26%
Total	123,375	100.00%	Total	71,698	100.00%

Recreational Fishing Data Collection in Hawaii

Hawaii Marine Recreational Fishing Survey

Recreational fishing catch and effort data have only been sporadically collected in the State of Hawaii. Hawaii does not have a mandatory recreational marine fishing license as many other coastal states do, and does not have mandatory reporting of recreational catches. Neither did Hawaii have a comprehensive recreational fishing creel survey until recently. Glazier (1999) compiled and documented all existing studies and reports on recreational fishing, including any recreational fishing surveys conducted in recent history.

The Council's Pelagic Fisheries Recreational Data Task Force was formed in 1999 to assess the status of recreational fishing data collection in Hawaii and to recommend solutions to the Council. Representatives from the Task Force, Council, and HDAR attended the NMFS Marine Recreational Fisheries Symposium in San Diego CA in 2000. They met with Ms. Maury Osborn, then task leader for the NMFS Marine Recreational Fisheries Statistical Survey (MRFSS) program and were able to obtain a commitment from NMFS to support a return of the MRFSS survey to Hawaii after an absence of 20 years.

Mike Nelson (HDAR) and Maury Osborn, assisted by Walter Ikehara (HDAR), developed a cooperative agreement with NMFS to initiate the Hawaii Marine Recreational Fishing Survey (HMRFS). NMFS and HDAR would contribute joint funding for intercept surveys and charter boat surveys on the islands of Oahu, Hawaii, and Maui. NMFS funded the Random Digit Dialing household telephone survey via their national contractor beginning in January 2001. The HMRFS project started up in July 2001, with Walter Ikehara as the HDAR coordinator and Mike Nelson as survey manager. Four surveyors were hired in the first year (July 2001 - June 2002) and began surveys of private boat and charter boat fishermen in late 2001.

The Task Force continued to support the effort by HDAR and NMFS to field the HMRFS survey and Task Force members provided valuable input on the intercept and telephone survey forms at the start of the project. In addition, the Task Force has sought to collect data on niche sectors of the recreational fishery, especially with regard to the "purely" recreational fishermen, those fishermen who never sell catch. It is well known that many "recreational" fishermen in Hawaii are actually expense fishermen who sell surplus catch to pay trip expenses. They do not classify themselves as commercial fishermen although Hawaii State law requires anyone who sells any catch to possess a commercial marine license.

HMRFS surveyors have collected over 360 private boat intercepts and over 570 charter boat intercepts from November 2001 to June 2002. Some waves have been low due to bad weather or startup issues and the learning process. Some preliminary results from the survey are available. The RDD telephone survey, from January 2001 to June 2002, collected responses from 19,989 households - 5,486 from Hawaii, 5,505 from Oahu, 5,670 from Maui County, and 3,328 from Kauai. About 15% of the households surveyed on Kauai, 13% on Hawaii island and Maui County, and 7% on Oahu fished in the ocean during this period. It is not unexpected that Oahu would be lower than the neighbor islands. The telephone survey (November-December 2001 only) indicated that about 30% of the fishing households fished from private boats and about 70% fished from shore, with small percentages using charter or rental boats, except for Kauai, where 14% were private boats and 86% were shoreline.

Preliminary results from the intercept surveys of private boats from November 2001 - June 2002 generally indicate that skipjack tuna are caught in the highest numbers by private boat fishermen (averaging about 23,500 per two month survey wave), followed by wahoo (7,250 average), mahimahi (6,000 average), and yellowfin tuna (5,775 average). Considerable seasonal and between wave variation should be expected, although skipjack have consistently been the highest. A wide variety of other species are also caught, including some reef fish species and invertebrates.

Summary data will be made available via the MRFSS web site (http://www.st.nmfs.gov/st1/recreational/) and HMRFS web page (http://www.hawaii.gov/dlnr/dar/surveys/index.htm) after it is cleared by MRFSS and HDAR for publication. Raw data sets will be available to authorized users.

The HMRFS project received state and federal funding to continue the project from 2002 through 2003. Supplemental state funding was obtained to support an expansion of intercept survey coverage of boat and shoreline fishermen to collect data on incidental interactions with protected sea turtles. HDAR applied to NMFS in March 2002 for an Incidental Take Permit under ESA

Section 10 to cover fishermen fishing in State waters for incidental take of sea turtles in nearshore fisheries not already covered by an FMP and a Biological Opinion (http://www.hawaii.gov/dlnr/dar/turtles.htm). HDAR intends to add a supplemental survey to the HMRFS project to collect incidental take data and to estimate total incidental turtle takes and mortalities, as will undoubtedly be required by an ITP. The ITP is still under review and has not been issued as of February 2003.

Five additional surveyors were hired in late 2002 for Oahu (2), Maui (2), and Hawaii (1). Mike Nelson, the original survey manager, left the project in September 2002 and was replaced by Matthew Parry in December 2002. David Van Voorhees is the current leader of the MRFSS program. HDAR continues to work with NMFS MRFSS staff to improve and expand the project to provide usable recreational fishing data to HDAR, NMFS, and the Council.

The NMFS/Council Pelagic Fisheries Research Program Recreational Fisheries Meta Data Project

The Recreational Meta Data Project was initiated to document and compile into database formats sources of Hawaii's pelagic recreational and sports fishing information from the past 50 years. Recreational fishery data has not been routinely collected in the State of Hawaii over the past 50 years, although there are several sources of information including previous recreational and small fishing boat surveys, boating registration data, angling club records, fishing tournament records, newspapers, and fishermen logbooks. Much of the existing literature is unpublished or "gray literature", and difficult for fishery scientists and researchers to obtain. This project has collected over 80 papers and reports and incorporated them as part of the database files. Further, the data tabulated therein has been re-entered into spreadsheet files so as to make them available to other researchers.

The project has also received information on 27 different fishing tournaments from 7 different angling and boat clubs and expects to obtain information covering an additional four more tournaments. Several of these tournaments are well documented and the project has amassed annual information covering over 40 years of catch and effort in Hawaiian waters. The number of boats participating in different tournaments has ranged from 6 to 260 boats. The majority of tournament catch is caught by fishing in association with Fish Aggregating Devices (FADs), which may provide valuable feedback to the Hawaii Division of Aquatic Resources (HDAR) in monitoring the success of its FAD deployment program, Pervious attempts by HDAR to monitor FAD performance through voluntary recreational fishery reporting have been unsuccessful.

Information on effort, catch, and tournament totals reflect the unique nature of each tournament's reporting procedures. Most tournaments do not differentiate between bigeye tuna (*Thunnus obesus)* and yellowfin tuna (*T. albacares*) and these species are listed simply as "ahi". Marlin reports can also be comprised of one or more billfish species, and skipjack tuna *(Katsuwonus pelamis*) may or may not be included in the radio logs and weigh in slips. The potential for constructing weight frequency charts from tournament radio logs to monitor size trends in tournament catches was investigated, but was confounded by the practice of rounding estimated weights in conjunction with species identification problems. Despite these limitations, this information does provide insight into hook up rates, catch composition, and average weight of catch. Time series catch rate data from a single tournament are also useful in elucidating cyclical peaks in species catch abundance. Although catching a thousand pound marlin continues to be a major goal of most tournament participants, catches of mahimahi (*Coryphaena hippurus*) and ahi are the mainstay of the tournament catches in Hawaii.

References

Dalzell, P., T. Adams,& N. Polunin, 1996. Coastal fisheries in the South Pacific. Oceanography and Marine Biology Annual Review 33, 395-531.

Dalzell, P. & W. Paty, 1996. The importance and uniqueness of fisheries in the Western Pacific Region. Paper presented at the 91st Western Pacific Fishery Council Meeting, 18-21 November 1996, Honolulu, 10 p.

Glazier, E.W. 1999. Social aspects of Hawaii's small vessel troll fishery. Phase II of the Social Aspects of Pacific Pelagic Fisheries Program, Univ. Hawaii, JIMAR, 287 pp.

Hamilton, Marcia S. and S.W. Huffman, 1997. Cost-earnings study of Hawaii's small boat fishery. University of Hawaii, Pelagic Fisheries Research Program SOEST Publication 97-06.

Tulafono, R. 2001. Gamefishing and tournaments in American Samoa. In, Proceedings of the 1998 Pacific Island Gamefish Symposium: Facing the Challenges of Resource Conservation, Sustainable Development, and the Sportfishing Ethic, 29 July-1 August, 1998, Kailua-Kona, Hawaii, Western Pacific Regional Fishery Management Council.

WPRFMC. 1998. Amendment Addressing Magnuson-Stevens Act Definitions and Required Provisions Amendment 8 to the Pelagic Fisheries Management Plan Amendment 10 to the Crustaceans Fisheries Management Plan Amendment 4 to the Precious Corals Fisheries Management Plan Amendment 6 to the Bottomfish and Seamount Groundfish Fisheries Management Plan. Western Pacific Regional Fishery Management Council, Honolulu, 99 pp + apps.

<u>**Appendix 7**</u>

Pelagic fisheries production from the Pacific West Coast States

Introduction

The following tables include time series for pelagic fisheries production along the US West Coast between the early 1980s to 2001. The 1997 annual report discusses these trends in some detail and these explanations remain current.

Table 1. Annual West Coast highly migratory species landings (mt) by species

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Big-eye Thresher	Pelagic Thresher	Shortfin Mako	Blue shark
1982	5,410	61,769	41,904	968	2,404	1,112	1,848	0	28	351	27
1983	9,574	55,741	44,995	21	764	1,758	1,331	9	96	217	7
1984	12,657	35,063	31,251	126	635	2,890	1,279	9	57	160	2
1985	7,301	15,025	2,977	7	3,254	3,418	1,190	<.05	95	149	1
1986	5,243	21,517	1,361	29	4,731	2,530	974	<.05	48	312	2
1987	3,160	23,201	5,724	50	823	1,803	562	2	20	403	2
1988	4,908	19,520	8,863	6	804	1,636	500	1	9	322	3
1989	2,214	17,615	4,505	1	1,019	1,357	504	<.05	17	255	6
1990	3,030	8,509	2,256	2	925	1,236	357	1	31	373	20
1991	1,676	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	4,885	3,350	2,586	7	1,087	1,546	292	<.05	22	142	1
1993	6,151	3,795	4,539	26	559	1,771	275	1	44	122	0
1994	10,686	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	6,528	3,038	7,037	49	714	1,161	270	5	31	95	5
1996	14,173	3,347	5,455	62	4,688	1,191	319	1	20	96	1
1997	11,292	4,774	6,070	82	2,251	1,448	319	35	32	132	1
1998	13,785	5,799	5,846	53	1,949	1,378	326	2	11	98	3
1999	9,629	1,353	3,759	105	179	1,992	320	10	5	6	0
2000	9041	1148	780	87	312	2652	295	5	3	80	1
2001	11,183	655	58	53	196	2195	373	2	2	46	2

Table 2. Annual value ($) of West Coast highly migratory landings by species

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
1982	13,167,979	122,114,308	66,432,060	1,864,472	4,405,204	8,385,654	3,241,669	0	25,192	555,869	30,839
1983	19,142,864	92,971,187	57,729,430	72,202	1,670,878	10,729,636	2,301,209	13,282	142,526	360,974	7,201
1984	26,146,708	56,409,588	37,467,700	264,792	1,395,492	17,701,329	2,485,275	11,649	71,349	287,733	3,572
1985	12,214,354	18,206,638	2,826,414	25,900	4,127,982	19,538,942	2,660,903	843	140,433	283,043	3,319
1986	8,895,672	25,475,289	1,367,387	129,108	6,618,473	18,256,026	2,412,160	277	95,181	611,399	1,886
1987	7,085,992	33,183,108	5,982,568	244,701	2,902,340	15,405,478	1,638,772	2,560	30,721	989,632	2,566
1988	12,280,116	34,161,742	12,618,821	33,772	4,445,064	13,007,930	1,310,935	1,097	13,328	868,676	2,923
1989	4,873,362	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,202,991	191	31,313	707,408	4,631
1990	6,911,021	10,485,225	2,361,619	10,928	1,433,788	8,811,042	786,534	2,067	42,599	909,368	15,834
1991	3,349,988	4,721,908	3,130,649	50,650	137,612	7,497,271	1,145,001	0	28,944	491,477	892
1992	13,214,373	4,412,452	1,606,563	51,444	1,360,230	8,709,765	521,922	693	17,108	266,344	2,056
1993	13,001,721	6,440,417	3,498,178	238,527	841,129	10,062,551	520,120	509	32,498	248,651	681
1994	22,293,343	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,555	46	37,579	270,088	17,572
1995	12,377,227	3,260,929	5,125,387	268,465	1,129,006	7,013,279	510,733	9,389	26,730	177,076	2,994
1996	28,583,043	3,388,536	4,185,411	273,321	4,238,678	6,363,798	634,493	1,635	18,591	174,621	616
1997	20,529,493	5,254,042	5,639,463	370,331	2,896,450	6,297,358	609,285	64,543	35,781	232,737	287
1998	19,068,271	5,976,102	5,322,183	277,238	3,058,769	6,052,792	574,795	2,635	9,513	173,349	6,094
1999	17,515,551	1,468,743	2,748,208	639,668	961,423	8,309,539	616,407	18,424	5,876	109,767	83
2000	17,154,639	1,294,388	483,242	579,384	577,095	11,772,245	587,702	2,738	4,636	132,970	909
2001	20,687,195	465,558	33,633	320,855	473,821	8,696,689	595,542	2,767	8,428	75,780	1,501

[1]Real values are current values adjusted to eliminate the effects of inflation by dividing current values by the current year GDP implicit price deflator, with a base year of 1999.

Table 3. Pacific coast commercial landings of highly migratory species by state, 1982-2001

	Landings (mt)										
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
Washington											
1982	266	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<.05
1983	530	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<.05
1984	67	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<.05
1985	172	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<.05
1986	845	N.A.	0	N.A.	0	0	82	N.A.	N.A.	N.A.	<.05
1987	529	N.A.	0	N.A.	0	0	65	N.A.	N.A.	N.A.	<.05
1988	1,900	N.A.	0	N.A.	0	2	6	N.A.	N.A.	N.A.	<.05
1989	855	N.A.	0	N.A.	0	0	3	N.A.	N.A.	N.A.	0
1990	1,225	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1991	428	N.A.	<.05	N.A.	0	0	<.05	N.A.	N.A.	N.A.	<.05
1992	1,864	N.A.	<.05	N.A.	0	0	1	N.A.	N.A.	N.A.	<.05
1993	2,167	N.A.	0	N.A.	0	1	<.05	N.A.	N.A.	N.A.	<.05
1994	5,377	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1995	3,413	N.A.	0	N.A.	0	<.05	5	N.A.	N.A.	N.A.	<.05
1996	4,969	N.A.	0	N.A.	0	0	4	N.A.	N.A.	N.A.	<.05
1997	3,775	N.A.	0	N.A.	0	0	2	N.A.	N.A.	N.A.	<.05
1998	6,517	N.A.	0	N.A.	0	0	6	N.A.	N.A.	N.A.	<.05
1999	2,074	N.A.	0	N.A.	12	4	65	N.A.	N.A.	N.A.	0
2000	3,185	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<0.5
2001	4,152	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
Oregon											
1982	863	<.05	<.05	N.A.	0	0	0	N.A.	N.A.	0	0
1983	1,541	<.05	<.05	N.A.	0	0	0	N.A.	N.A.	0	0
1984	737	<.05	0	N.A.	0	0	0	N.A.	N.A.	0	0
1985	692	0	0	N.A.	0	0	2	N.A.	N.A.	0	0
1986	1,116	<.05	<.05	N.A.	0	0	424	N.A.	N.A.	0	0
1987	1,038	0	0	N.A.	<.05	0	92	N.A.	N.A.	0	0
1988	1,799	0	0	N.A.	0	0	81	N.A.	N.A.	0	0
1989	490	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	0
1990	943	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1991	571	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1992	1,764	0	0	N.A.	0	0	1	N.A.	N.A.	0	<.05
1993	2,157	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1994	2,131	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1995	2,283	<.05	<.05	N.A.	<.05	3	1	N.A.	N.A.	0	<.05
1996	4,059	<.05	0	N.A.	<.05	16	<.05	N.A.	N.A.	0	1
1997	4,158	<.05	<.05	N.A.	1	6	<.05	N.A.	N.A.	0	<.05
1998	4,808	0	0	N.A.	3	35	<.05	N.A.	N.A.	1	2
1999	2,064	<.05	0	N.A.	6	6	1	N.A.	N.A.	<.05	<.05
2000	3,972	0	0	N.A.	0	0	0	N.A.	N.A.	0	1
2001	4,058	0	0	N.A.	0	0	0	N.A.	N.A.	0	2
California											
1982	4,281	61,769	41,904	968	2,404	1,112	1,848	0	28	351	27
1983	7,503	55,740	44,995	21	764	1,758	1,331	9	96	217	7
1984	11,854	35,063	31,251	126	635	2,890	1,279	9	57	160	2
1985	6,437	15,025	2,977	7	3,254	3,418	1,188	<.05	95	149	1
1986	3,282	21,517	1,361	29	4,731	2,530	468	<.05	48	312	2
1987	1,592	23,201	5,724	50	823	1,803	405	2	20	403	2
1988	1,209	19,520	8,863	6	804	1,634	414	1	9	322	3
1989	870	17,615	4,505	1	1,019	1,357	501	<.05	17	255	6
1990	862	8,509	2,256	2	925	1,236	356	1	31	373	20
1991	677	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	1,257	3,350	2,586	7	1,087	1,546	291	<.05	22	142	1
1993	1,827	3,795	4,539	26	559	1,770	275	1	44	122	<.05
1994	3,177	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	832	3,038	7,037	49	714	1,159	264	5	31	95	5
1996	5,146	3,347	5,455	62	4,687	1,175	316	1	20	96	<.05
1997	3,358	4,774	6,070	82	2,250	1,442	317	35	32	132	<.05
1998	2,459	5,799	5,846	53	1,946	1,343	319	2	11	97	1
1999	5,491	1,353	3,759	105	161	1,982	253	10	5	62	<.05
2000	1,884	1,148	780	87	312	2,612	250	3	5	80	<0.5
2001	2,972	642	57	53	196	2,194	360	2	2	46	0

Table 4. Pacific coast real commercial exvessel revenues (1999)[1] from highly migratory species by state, 1982-2001

					Revenues ($)						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
Washington											
1982	596,514	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	102
1983	1,002,286	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	201
1984	137,861	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	11
1985	292,000	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	183
1986	1,348,513	N.A.	0	N.A.	0	0	303,270	N.A.	N.A.	N.A.	170
1987	1,160,514	N.A.	0	N.A.	0	0	298,466	N.A.	N.A.	N.A.	580
1988	4,666,429	N.A.	0	N.A.	0	13,526	31,385	N.A.	N.A.	N.A.	65
1989	1,730,680	N.A.	0	N.A.	0	0	10,541	N.A.	N.A.	N.A.	0
1990	2,693,806	N.A.	0	N.A.	0	0	33	N.A.	N.A.	N.A.	0
1991	818,179	N.A.	17	N.A.	0	0	287	N.A.	N.A.	N.A.	52
1992	5,014,569	N.A.	82	N.A.	0	0	655	N.A.	N.A.	N.A.	39
1993	4,603,209	N.A.	0	N.A.	0	5,907	953	N.A.	N.A.	N.A.	34
1994	10,609,267	N.A.	0	N.A.	0	0	102	N.A.	N.A.	N.A.	0
1995	6,429,656	N.A.	0	N.A.	0	328	16,541	N.A.	N.A.	N.A.	16
1996	9,515,982	N.A.	0	N.A.	0	0	11,619	N.A.	N.A.	N.A.	44
1997	7,000,641	N.A.	0	N.A.	0	0	10,922	N.A.	N.A.	N.A.	10
1998	8,962,842	N.A.	0	N.A.	0	0	19,243	N.A.	N.A.	N.A.	71
1999	3,637,282	N.A.	0	N.A.	27,772	9,445	144,232	N.A.	N.A.	N.A.	0
2000	5,837,871	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	9
2001	7,951,774	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
Oregon											
1982	2,073,809	233	164	N.A.	0	0	0	N.A.	N.A.	0	0
1983	2,961,338	118	13	N.A.	0	0	0	N.A.	N.A.	0	0
1984	1,367,247	277	0	N.A.	0	0	0	N.A.	N.A.	0	0
1985	1,204,367	0	0	N.A.	0	0	3,064	N.A.	N.A.	0	0
1986	1,891,052	173	4	N.A.	0	0	874,406	N.A.	N.A.	0	0
1987	2,319,249	0	0	N.A.	9	0	214,998	N.A.	N.A.	0	0
1988	4,444,898	0	0	N.A.	0	0	180,477	N.A.	N.A.	0	0
1989	1,142,060	0	0	N.A.	0	0	19	N.A.	N.A.	0	0
1990	2,167,028	0	0	N.A.	0	0	664	N.A.	N.A.	0	69
1991	1,166,314	0	0	N.A.	0	0	0	N.A.	N.A.	0	73
1992	4,554,091	0	0	N.A.	0	0	1,228	N.A.	N.A.	0	99
1993	4,350,334	0	0	N.A.	0	0	498	N.A.	N.A.	0	130
1994	4,103,617	0	0	N.A.	0	0	0	N.A.	N.A.	0	93
1995	4,332,302	336	9	N.A.	454	25,141	1,681	N.A.	N.A.	0	192
1996	7,801,152	9	0	N.A.	1,203	125,422	234	N.A.	N.A.	0	438
1997	7,567,729	536	424	N.A.	3,332	51,790	199	N.A.	N.A.	0	209
1998	6,665,217	0	0	N.A.	15,783	263,820	114	N.A.	N.A.	2,726	5,628
1999	3,782,057	198	0	N.A.	38,117	46,955	2,588	N.A.	N.A.	787	48
2000	7,487,569	0	0	N.A.	0	0	1,190	N.A.	N.A.	0	529
2001	7,544,089	0	0	N.A.	0	0	0	N.A.	N.A.	0	1,211
California											
1982	10,497,656	122,114,075	66,431,896	1,864,472	4,405,204	8,385,654	3,241,669	0	25,192	555,869	30,736
1983	15,179,240	92,971,069	57,729,417	72,202	1,670,878	10,729,636	2,301,209	13,282	142,526	360,974	7,001
1984	24,641,599	56,409,311	37,467,700	264,792	1,395,492	17,701,329	2,485,275	11,649	71,349	287,733	3,561
1985	10,717,987	18,206,638	2,826,414	25,900	4,127,982	19,538,942	2,657,839	843	140,433	283,043	3,136
1986	5,656,107	25,475,116	1,367,383	129,108	6,618,473	18,256,026	1,234,483	277	95,181	611,399	1,716
1987	3,606,229	33,183,108	5,982,568	244,701	2,902,331	15,405,478	1,125,308	2,560	30,721	989,632	1,986
1988	3,168,789	34,161,742	12,618,821	33,772	4,445,064	12,994,405	1,099,073	1,097	13,328	868,676	2,858
1989	2,000,622	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,192,430	191	31,313	707,408	4,631
1990	2,050,187	10,485,225	2,361,619	10,928	1,433,788	8,811,042	785,836	2,067	42,599	909,368	15,765
1991	1,365,494	4,721,908	3,130,632	50,650	137,612	7,497,271	1,144,714	0	28,944	491,477	767
1992	3,645,713	4,412,452	1,606,481	51,444	1,360,230	8,709,765	520,038	693	17,108	266,344	1,918
1993	4,048,179	6,440,417	3,498,178	238,527	841,129	10,056,643	518,669	509	32,498	248,651	517
1994	7,580,459	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,452	46	37,579	270,088	17,479
1995	1,615,269	3,260,593	5,125,378	268,465	1,128,552	6,987,810	492,511	9,389	26,730	177,076	2,785
1996	11,265,909	3,388,527	4,185,411	273,321	4,237,475	6,238,375	622,640	1,635	18,591	174,621	135
1997	5,961,123	5,253,506	5,639,039	370,331	2,893,118	6,245,568	598,164	64,543	35,781	232,737	67
1998	3,440,213	5,976,102	5,322,183	277,238	3,042,986	5,788,972	555,437	2,635	9,513	170,623	395
1999	10,102,663	1,468,544	2,748,208	639,668	895,534	8,253,140	469,587	18,424	5,876	108,980	35
2000	3,829,200	1,294,388	483,242	579,384	576,439	11,770,080	485,073	2,736	4,636	136,698	294
2001	5,191,333	445,861	32,878	320,753	472,785	8,695,855	584,636	2,767	8,428	75,572	0

[1]Real values are current values adjusted to eliminate the effects of inflation by dividing current values by the current year GDP implicit price deflator, with a base year of 1999

Appendix 8

Honolulu Laboratory

At the Southwest Fisheries Science Center's Honolulu Laboratory, scientists assess and investigate the dynamics of various tuna and billfish species in the central Pacific Ocean as well as Pacific island resources such as bottomfish, lobster, deep sea shrimp, and other fishery resources associated with deep-sea seamounts. This work contributes to basic fisheries science and supports the Western Pacific Regional Fishery Management Council. Honolulu Laboratory scientists conduct research and recovery work on the threatened green sea turtle and the endangered Hawaiian monk seal and increasingly have focused on issues concerning fisher-protected species interactions. Staff scientists study the effects of environmental changes and human activities on fisheries and marine animal habitats and ecosystems and there is a new research emphasis oriented towards coral reef ecosystems.

This research collectively supports two primary goals of NMFS: to build sustainable fisheries and to recover protected species. These goals support the Magnuson-Stevens Fishery Conservation and Management Act, the Marine Mammal Protection Act, and the Endangered Species Act. Geographic areas of study are wide ranging, from the mid-Pacific pelagic oceanic environment, to the Northwestern Hawaiian Islands and the main Hawaiian Islands, to other central and western Pacific islands, including American Samoa, Guam, and the Northern Mariana Islands. Key programs include ecosystem and environment, stock assessment, fish bioloby and ecology, fishery management and performance, and protected species.

The following list of publication (both formal and informal) summarizes the basic science and statistics work pertaining to pelagic fisheries and related issues conducted by the Honolulu Laboratory over the past year.

Recent publications (from October 2001 through September 2002)

Publications

Brill, R. W. and M. E. Lutcavage.
2001. Understanding environmental influences on movements and depth distributions of tunas and billfishes can significantly improve population assessments. *In* Proceedings of the Charleston Bump Colloquium, Charleston, South Carolina, October 28-29, 1999 (George R. Sedberry, ed.) Am. Fish. Soc. Symp. 25:179-198.

Brill, R., Y. Swimmer, C. Taxboel, K. Cousins, T. Lowe.
2001. Gill and intestinal Na+-K+ ATPase activity, and estimated maximal osmoregulatory costs, in three high energy-demand teleosts: yellowfin tuna (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*), and dolphin fish (*Coryphaena

hippurus), Mar. Biol. 138(5):935-944.

Horrocks, J. A., L. A. Vermeer, B. Krueger, M. Coyne, B. A. Schroeder, and G. H. Balazs.
2001. Migration routes and destination characteristics of post-nesting hawksbill turtles satellite-tracked from Barbados, West Indies. Chelonian Conserv. Biol. 4(1):107-114.

Ito, R. Y. and W. A. Machado.
2001. Annual report of the Hawaii-based longline fishery for 2000. Honolulu Lab., Southwest Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin Rep. H-01-07, 55 p.

Leonard, C. L., R. R. Bidigare, M. P. Seki, J. J. Polovina.
2001. Interannual mesoscale physical and biological variability in the North Pacific Central Gyre. Prog. Oceanogr. 49:227-244.

Polovina, J. J., E. Howell, D. R. Kobayashi, M. P. Seki.
2001. The transition zone chlorophyll front, a dynamic global feature defining migration and forage habitat for marine resources. Prog. Oceanogr. 49:469-483

O'Malley, J. M., and E. W. Glazier.
2001. Motivations, satisfaction and expenditures of recreational pelagic charter fishing patrons in Hawaii. SOEST 01-03, JIMAR Contribution 01-339.

Pan, M., P. Leung, and S. G. Pooley.
2001. A decision support model for fisheries management in Hawaii: a multilevel and multiobjective programming approach. N. Am. J. Fish. Manag. 21:293-309.

Seki, M. P.
2001. Distribution patterns of pelagic cephalopods through the Subarctic and Subtropical Frontal Zones in the central North Pacific. M. Sc. thesis, Univ. Hawaii, Honolulu, Hawaii, 102 p.

Seki, M. P., and J. J. Polovina.
2001. Food webs: ocean gyre ecosystems. *In*: J. H. Steele, K. K. Turekian, and S. A. Thorpe (editors), Encyclopedia of Ocean Sciences, Vol. 4, pp. 1959-1965. Academic Press, San Diego, CA.

Seki, M. P., and J. J. Polovina.
2001. Ocean gyre ecosystems. *In*: Encyclopedia of Ocean Sciences, Steven A. Thorpe and Karl K. Turekian, editors, Volume 4, p. 1959-1965. Academic Press.

Seki, M. P., J. J. Polovina, R. E. Brainard, R. R. Bidigare, C. L. Leonard, and D. G. Foley.
2001. Biological enhancement at cyclonic eddies tracked with GOES thermal imagery in

Hawaiian waters. Geophys. Res. Letters, Vol. 28, No. 8, 1583-1586 p.

Skillman, R. A.
2001. Pacific billfishes. In K. Hinman (ed.), Getting Ahead of the Curve. Conserving the Pacific Ocean's Tunas, Swordfish, Billfishes and Sharks, p. 31-34. Marine Fisheries Symposium No. 16, Monterey Bay, California, November 4-6, 1996. National Coalition for Marine Conservation, Leesburg, Virginia.

Walsh, W. A., P. Kleiber.
2001. Generalized additive model and regression tree analyses of blue shark (*Prionace glauca*) catch rates by the Hawaii-based commercial longline fishery. Fish. Res. 53 (2001) 115-131.

Administrative Reports

Kleiber, P., Y. Takeuchi, and H. Nakano.
2001. Calculation of plausible maximum sustainable yield (MSY) for blue sharks (*Prionace glauca*) in the North Pacific. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Sci. Cent. Admin. Rep. H-01-02, 10 p.

McCracken, Marti L.
2001. Estimation of albatross take in the Hawaiian longline fisheries. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Sci. Cent. Admin. Rep. H-01-03, 26 p.

Abstracts

Baker, J. D., T. C. Johanos, and G. A. Antonelis.
2001. Population dynamics and status of the endangered Hawaiian monk seal. [Abstr.] For presentation at the 15th Annual Society for Conservation Biology Conference, Hilo, Hawaii, July 2001.

Balazs, G. H., G. L. Nakai, S. Hau, M. J. Grady, and W. G. Gilmartin.
2001. Year 2000 nesting of a captive-reared Hawaiian green turtle tagged and released as a yearling. [Abstr.] For the Twenty-first Annual Symposium on Sea Turtle Biology and Conservation, Philadelphia, Pennsylvania, February 24-28, 2001.

Balazs, G. H., M. R. Rice, N. Hoffman, S. K. K. Murakawa.
2001. Green turtle foraging and resting habitats at Midway Atoll: significant findings over 25 years, 1975-2000. [Abstr.] For the Twenty-first Annual Symposium on Sea Turtle Biology and Conservation, Philadelphia, Pennsylvania, February 24-28, 2001.

Bidigare, R. R., M. P. Seki, C. L. Leonard, C. Benitez-Nelson, R. D. Vaillancourt, and J. J. Polovina.
2001. Influence of cyclonic eddies on new production rates in the vicinity of the Hawaiian Islands. [Abstr.] For the Tenth Anniversary Meeting, North Pacific Marine Science Organization, Victoria, B.C., Canada, October 5-13, 2001.

Brill, R. W., M. K. Musyl, C. H. Boggs, D. S. Curran, M. P. Seki, and T. K. Kazama.
2001. Horizontal and vertical movements of bigeye tuna (*Thunnus obesus*) near the main Hawaiian Islands determine using archival tags. [Abstr.] For the annual Tuna Conference, Lake Arrowhead, California, May 2001.

Curran, D. S. and C. H. Boggs.
2001. The use of intrinsic rebound potential indices in comparing disparate species groups in the central Pacific. [Abstr.] For the annual Tuna Conference, Lake Arrowhead, California, May 2001.

Kikkawa, B. S., and J. W. Cushing.
2001. Variations in growth and mortality of bigeye tuna (*Thunnus obesus*) in the equatorial western Pacific Ocean. [Abstr.] Paper to be presented by the second author at the 14th SPC, Standing Committee on Tuna and Billfish, Noumea, New Caledonia, August 9-16, 2001.

Parker, D. M., G. H. Balazs, S. K. K. Murakawa, and J. J. Polovina.
2001. Post-hooking survival of sea turtles taken by pelagic longline fishing in the North Pacific. [Abstr.] For the Twenty-first Annual Symposium on Sea Turtle Biology and Conservation, Philadelphia, Pennsylvania, February 24-28, 2001.

Parker, D. M., P. Dutton, S. Eckert, D. R. Kobayashi, J. J. Polovina, D. Dutton, and G. H. Balazs.
2001. Transpacific migration along oceanic fronts by loggerhead turtles released from Sea World San Diego. [Abstr.] For the Twenty-first Annual Symposium on Sea Turtle Biology and Conservation, Philadelphia, Pennsylvania, February 24-28, 2001.

Seki, M. P. and A. Yatsu.
2001. The distribution and migration of Pacific pomfret, *Brama japonica*, in the North Pacific. [Abstr.] For the Tenth Anniversary Meeting, North Pacific Marine Science Organization, Victoria, B.C., Canada, October 5-13, 2001.

Seki, M. P., R. R. Bidigare, R. Lumpkin, P. Flament, and J. J. Polovina.
2001. Mesoscale cyclonic eddies and their interest to pelagic fisheries in Hawaiian waters. [Abstr.] For the Tenth Anniversary Meeting, North Pacific Marine Science Organization, Victoria, B.C., Canada, October 5-13, 2001.

Seki, M. P., R. R. Bidigare, R. Lumpkin, P. Flament, and J. J. Polovina.

2001. Mesoscale cyclonic eddies and their interest to pelagic fisheries in Hawaiian waters. [Abstr.] For Oceans 2001, Pelagic Fisheries Session, Hilton Hawaiian Village, Honolulu, Hawaii, November 5-8, 2001.

Seki, M. P., R. R. Bidigare, R. Lumpkin, J. J. Polovina, D. R. Kobayashi, P. Flament, and D. Foley
2001. Mesoscale cyclonic eddies and pelagic fisheries in Hawaiian waters. [Ext. Abstr.] For proceedings of Oceans 2001, Hilton Hawaiian Village, Honolulu, Hawaii, November 5-7, 2001.

Swimmer, J. Y., R. W. Brill, L. Mailloux, C. Moyes.
2001. Metabolic biochemistry of cardiac muscle in three species of tuna with widely divergent temperature and oxygen tolerances. [Abstr.] For the annual Tuna Conference, Lake Arrowhead, California, May 2001.

Swimmer, J. Y. and R. W. Brill.
2001. Research directed at mitigating sea turtle-longline interactions. [Abstr.] For the annual Tuna Conference, Lake Arrowhead, California, May 2001.

Appendix 9

The Pelagic Fisheries Research Program

The Pelagic Fisheries Research Program (PFRP) was established in 1992 after the Magnuson Fishery Conservation and Management Act (1976) was amended to include "highly migratory fish." The PFRP was created to provide scientific information on pelagic fisheries to the Council for use in development of fisheries management policies

The PFRP is located at the Joint Institute for Marine and Atmospheric Research (JIMAR), under the University of Hawaii's School of Ocean and Earth Science and Technology (SOEST). The first PFRP projects were established in late 1993, and work on these projects began in 1994. In order for the Council to determine "optimum use" of these valuable fishery resources, information is required from a broad spectrum of research disciplines, e.g., biology, genetics, statistics, socio-cultural. The PFRP has funded more than 30 research projects and solicits for new research proposals as federal funding permits. Most project investigators are affiliated with regional research institutes, such as the National Marine Fisheries Service (NMFS), Secretariat of the Pacific Community (SPC), and other universities.

Research Projects Funded in 2001:

Biology projects:

- Workshop on How to Improve Studies on the Collective Behavior of Pelagic Fish
- Describing the Vertical Habitat of Bigeye and Albacore Tunas and Post-Release Survival for Marlins in the Central Pacific Longline Fisheries with Pop-Up Archival Transmitting Tags
- Ecological Characterization of American Samoa's Small-Scale Alia Albacore Longline Fishery
- Evaluating Biochemical and Physiological Predictors of Long Term Survival in Released Pacific Blue Marlin Tagged with Pop-Up Satellite Archival Transmitters (PSATs)
- Instrumented Buoys as Autonomous Observatories of Pelagic Ecosystems

Socio-cultural projects

- A Sociological Baseline of Hawaii's Longline Fishery

Economics projects

- Modeling Longline Effort Dynamics and Protected Species Interaction

Oceanography projects

- Trophic Structure and Tuna Movement in the Cold Tongue-Warm Pool Pelagic Ecosystem of the Equatorial Pacific
- Oceanographic Characterization of the American Samoa Longline Fishing Grounds for Albacore, *Thunnus alalunga*

Protected Species projects

- A General Bayesian Integrated Population Dynamics Model for Protected Species

- Integrated Statistical Model for Hawaiian Albatross Populations

- Development of a Hierarchical Model to Estimate Sea Turtle Rookery Contributions to Mixed Stocks in Foraging Habitats

- Direct Tests of the Efficacy of Bait and Gear Modifications for Reducing Interactions of Sea Turtles with Longline Fishing Gear in Costa Rica

Statistics and Modeling projects

- Mixed-Resolution Models for Investigating Individual to Population Scale Spatial Dynamics

- Comparisons of Catch Rates for Target and Incidentally Taken Fishes in Widely Separated Areas of the Pacific Ocean

- Causes of Rapid Declines in World Billfish Catch Rates

<u>Publications in Refereed Journals</u>

Holland, K. et al, 2001. Five tags applied to a single species in a single location: The tiger shark experience. In J.R. Sibert and J. Nielsen (Eds.), *Electronic Tagging and Tracking in Marine Fisheries* (pp. 237-248). Kluwer Academic Publishers, The Netherlands.

Musyl, M., et al, 2001. Ability of archival tags to provide estimates of geographical position based on light intensity. In J.R. Sibert and J. Nielsen (Eds.), *Electronic Tagging and Tracking in Marine Fisheries* (pp. 343-368). Kluwer Academic Publishers, The Netherlands.

Sibert, J. and D. Fournier, 2001. Possible models for combining tracking data with conventional tagging data. In J.R. Sibert and J. Nielsen (Eds.), *Electronic Tagging and Tracking in Marine Fisheries* (pp. 443-456). Kluwer Academic Publishers, The Netherlands.

Walsh, W.A., and P. Kleiber. Generalized additive model and regression tree analyses of blue shark (*Prionace glauca*) catch rates by the Hawai'i-based commercial longline fishery. *Fisheries Research* 53:115-131.

<u>Other Papers, Reports, and Manuscripts Submitted During FY 2002</u>

Gu, X., 2001. Assessment of fishing capacity in domestic fisheries: Hawaii based longline fleet. (NMFS-HL internal project report).

Gu, X., 2001. Sensitivity analysis, non-inferiority set estimation, and a multiobjective programming model. (NMFS-HL internal project report).

Musyl, M. (with C. Anderson), 2001. Blue shark study nets early results. *Pelagic Fisheries Research Program Newsletter*, 6 (3) 13-14.

O'Malley, J.M. and E.W. Glazier, 2001. Motivations, satisfaction and expenditures of recreational pelagic charter fishing patrons in Hawaii. *SOEST Publication 01-03, JIMAR Contribution 01-339*, 46 pp.

Walsh, W.A. Comparisons of fish sales data gathered by National Marine Fisheries Service or Hawaii Division of Aquatic Resources personnel to electronic sales data submitted by the United Fishing Agency, Ltd. Unpublished internal report. NMFS Honolulu Laboratory, Fishery Monitoring and Economics Program.

Walsh, W.A. Incidental catches of fishes by Hawai'i longliners. *Pelagic Fisheries Research Program Newletter*, 7 (1), 1-4.

Walsh, W.A.and R.A. Skillman. Comparisons of fish catch data reported by fishery observers and in commercial logbooks to sales records from the United Fishing Agency Ltd., Honolulu, Hawaii. NMFS Honolulu Laboratory, Southwest Fisheries Science Center, Manuscript Report File 002-2001H-MRF.

Conference Presentations

Adam, S., J. Sibert, D. Itano, and K. Holland. Analysis of Hawaii Tuna Tagging Program Data: Tag Attrition Analysis and Application of the Results to Estimate Yield-per-recruit. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Allain, V. Food Web Study in the Western and Central Pacific Ocean Tuna Ecosystem. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Brainard, R., D. Foley, R. Mirshak and J. Sibert. Ocean Atlas: Second users workshop. Presentation at the 14th Annual Standing Committee on Tuna and Billfish Meeting, Noumea, New Caledonia, August 2001.

Brainard, R., D. Foley, R. Mirshak and J. Sibert. Application of Ocean Atlas Data as Part of a Comprehensive Coral Reef Ecosystem Monitoring System. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Chakravorty, U., K. Nemoto, and L. Cox. Evaluating the effect of fish stock movement on pelagic fishery management: A spatial and dynamic framework with application to the Hawaii longline fishery. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Curran, D., J. O'Malley, P. Dalzell, and S. Pooley. Recreational meta data project update. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Dagorn, L. Behavioral Features of Tuna Aggregations around Fish Aggregating Devices: Sensory Cues, Orientation and Residence Time. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Foley, D.G and R. Mirshak. Oceanography of the Hawaiian Archipelago. Presented at the Lobster Population Modeling Workshop sponsored by the National Marine Fisheries Service, Honolulu Laboratory, Honolulu, HI. December 2001.

Grubbs, D. and K. Holland. Trophic Ecology of Structure-Associated Tuna: Experimental Rationale and Prelimenary Data. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Hampton, J. (presented by J. Sibert). Pacific-Wide Analysis of Bigeye Tuna using Length-Based, Age-Structured Modeling Framework (MULTIFAN-CL). Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Hirano, T. Developing Methods to Assess Sex and Maturational Stage of Bigeye Tuna (Thunnus obesus) and Swordfish (Xiphias gladius). Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Holland, K. Introduction to Current Studies of Movements and Structure-Associated Behavior of Tuna in Hawaiian Waters. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Itano, D. Tagging Tuna in the Central Pacific: Ecological and Management Related Issues. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Kaneko, J., and P. Bartram. Incidental Catch of Non-target Fish Species and Sea Turtles: Comparing Hawaii's Pelagic Longline Fishery against Others. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Kleiber, P. Adjusting Longline Effort for the Effect of Current Shear. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Musyl, M.K., R.W. Brill and C.H. Boggs. PSATs to chronicle the survival and movements of blue shark, swordfish and yellowfin tuna following release of longline gear. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

O'Malley, J., E. Glazier, and S. Pooley. Hawaii Charter Boat Fishing Patron Motivations, Satisfactions, and Expenditures -- Results of Recent Fieldwork. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Parry, M. Trophic ecology of two oceanic squid species in Hawaiian waters. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Polovina, J. and R. Brainard. Bigeye Tuna Oceanography Project. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Pradhan, N.C., K.R. Sharma, and P. Leung. Modeling Trip Choice Behavior of the Longline Fishermen in Hawaii. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Seki, M.P., R.R. Bidigare, R. Lumpkin, P. Flament, and J.J. Polovina. Biological and fishery implications of cyclonic eddies in Hawaiian waters. Presented at the North Pacific Marine Science Organization (PICES) 10th Annual Meeting, Victoria, B.C., Canada, 5-13 October 2001.

Seki, M.P., R.R. Bidigare, R. Lumpkin, J.J. Polovina, D.R. Kobayashi, P. Flament, and D.G. Foley. Mesoscale cyclonic eddies and pelagic fisheries in Hawaiian waters. Presented at the MTS/IEEE Oceans 2001 Conference, Honolulu, Hawaii, 5-8 November 2001.

Seki, M. Investigating the Life History and Ecology of Opah and Monchong in the North Pacific. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Sibert, J. and J. Hampton. Lifetime Displacements of Tropical Tunas: How Much Ocean do you Need to Control to Conserve "your" Tuna?. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Swimmer, Y. and R. Brill. Use of PSATs to Follow the Movements and Survival of Sea Turtles Following Interactions with Pelagic Longline Gear. Presentation at the PFRP Principal Investigators Meeting, Honolulu, Hawaii, December 4-6, 2001.

Swimmer, J.Y. & R. Brill. Methods aimed to reduce marine turtle interactions with longline fishing gear.[Abstract] . In Proceedings of the 21st Annual Workshop on Sea Turtle Conservation and Biology.

Appendix 10

GLOSSARY — PELAGICS

TERM	DEFINITION
Alia	Samoan fishing catamaran, about 30 feet long, constructed of aluminum or wood with fiberglass. Used for various fisheries including trolling, longline, and bottomfishing
AP	Advisory Panel. Appointed industry/government/educational representatives functioning in an advisory capacity to the Council.
AS	American Samoa. Includes the islands of Tutuila, Manua, Rose and Swains Atolls.
ASDPW	Department of Public Works, American Samoa. Also, DPW.
Bycatch	Fish caught in a fishery but discarded or released, except in a recreational fisheries catch and release program.
Commercial	Commercial fishing, where the catch is intended to be sold, bartered, or traded.
CNMI	Commonwealth of the Northern Mariana Islands. Also, Northern Mariana Islands, Northern Marianas, and NMI. Includes the islands of Saipan, Tinian, Rota, and many others in the Marianas Archipelago.
CPUE	Catch-Per-Unit-Effort. A standard fisheries index usually expressed as numbers of fish caught per unit of gear per unit of time, eg., number of fish per hook per line-hour or number of fish per 1,000 hooks. The term catch rate is sometimes used when data are insufficiently detailed to calculate an accurate CPUE.
DAWR	Division of Aquatic & Wildlife Resources, Territory of Guam.
DBEDT	Department of Business, Economic Development & Tourism, State of Hawaii.
DFW	Division of Fish & Wildlife, Northern Mariana Islands.
DLNR	Department of Land & Natural Resources, State of Hawaii. Parent agency for Division of Aquatic Resources (HDAR).
DMWR	Department of Marine & Wildlife Resources, American Samoa. Also, MWR.
EEZ	Exclusive Economic Zone, refers to the sovereign waters of a nation, recognized internationally under the United Nations Convention on the Law of the Sea as extending out 200 nautical miles from shore. Within the U.S., the EEZ typically is between three and 200 nautical miles from shore.
ESA	Endangered Species Act. An Act of Congress passed in 1966 that establishes a federal program to protect species of animals whose survival is threatened by habitat destruction, overutilization, disease etc.
FAD	Fish Aggregating Device; a raft or pontoon, usually tethered, and under which, pelagic fish will concentrate.
FDCC	Fishery Data Coordinating Committee, WPRFMC.
FFA	Forum Fisheries Agency. An agency of the South Pacific Forum, which comprises the independent island states of the South Pacific, Australia and New Zealand. The FFA formed to negotiated access agreements between FFA member countries and distant water fishing nations such as Japan and the USA.
FMP	Fishery Management Plan.
Guam	A U.S. territory in the Marianas Archipelago. South of and adjacent to the Commonwealth of Northern Marianas Islands.

Hawaii	U.S. state. See MHI, NWHI. Composed of the islands, atolls and reefs of the Hawaiian Archipelago from Hawai'i to Kure Atoll, except Midway Islands. Capitol - Honolulu.
HDAR	Hawaii Division of Aquatic Resources. Also, DAR.
HIMB	Hawaii Institute of Marine Biology, University of Hawaii.
HURL	Hawaii Undersea Research Lab.
JIMAR	Joint Institute of Marine and Atmospheric Research, University of Hawaii.
IATTC	Inter-American Tropical Tuna Commission.
Ika-shibi	Hawaiian term for nigh tuna handline fishing method. Fishing for tuna using baited handlines at night with a nightlight and chumming to attract squid and tuna.
Incidental Catch	Fish caught that are retained in whole or part, though not necessarily the targeted species. Examples include monchong, opah and sharks.
Interaction	Catch of protected species, which is required to be released. Examples: Hawaiian monk seals, marine turtles and albatrosses.
Logbook	Journal kept by fishing vessels for each fishing trip; records catch data, including bycatch and incidental catch. Required in the federally regulated longline and crustacean fisheries in the Hawaiian EEZ.
Longline	Fishing method utilizing a horizontal mainline stretching from several hundred yards to many miles in length, suspended for the surface by floats, to which droppers with baited hooks are attached.
Longliner	Fishing vessel specifically adapted to use the longline fishing method.
MFCMA	Magnuson Fishery Conservation and Management Act of 1976. Also, Magnuson-Stevens Fishery Conservation and Management Act of 1996. Sustainable Fisheries Act.
MHI	Main Hawaiian Islands (comprising the islands of Hawai'i, Mau'i, Lana'i, Moloka'i, Kaho'olawe, O'ahu, Kauai', Ni'ihau and Ka'ula).
MSY	Maximum Sustainable Yield.
NMFS	National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce. Also NOAA Fisheries.
NOAA	National Oceanic and Atmospheric Administration, Department of Commerce.
NWHI	Northwestern Hawaiian Islands. All islands in the Hawaiian Archipelago, other than the Main Hawaiian Islands (MHI).
OFP	Oceanic Fisheries Program of the South Pacific Commission.
OY	Optimum Yield.
Palu-ahi	Hawaiian term for day tuna handline fishing. Fishing for tuna using baited handlines and chumming with cut bait in a chum bag or wrapped around a stone. Also, drop-stone, make-dog, etc.
PAO	Pacific Area Office, National Marine Fisheries Service. Also, NMFS/PAO.
Pelagic	The pelagic habitat is the upper layer of the water column from the surface to the thermocline. The pelagic species include all commercially targeted highly migratory species such as tuns, billfish and some incidental-catch species such as sharks, as well as coastal pelagic species such as akule and opelu.
PFRP	Pacific Pelagic Fisheries Research Program, JIMAR, University of Hawaii. Also PPFRP.

PMUS	Pacific Pelagic Management Unit Species. Also, PPMUS. Species managed under the Pelagics FMP.
Pole-and-Line	Fishing for tuna using poles and fixed leaders with barbless lures and chumming with live baitfish. Poles can be operated manually or mechanically. Also, fishing vessels called baitboats or aku-boats (Hawaii).
Protected	Refers to species which are protected by federal legislation such as the Endangered Species Act, Marine Mammal Protection Act, and Migratory Bird Treaty Act. Examples: Black-footed and Laysan albatrosses, marine turtles, dolphins.
PT or PPT	Pelagic Plan Team. Advisory body to the Council composed of scientists and fishermen who monitor and manage the fisheries under the jurisdiction of the Pelagics FMP.
Purse seine	Fishing for tuna by surrounding schools of fish with a very large net and trapping them by closing the bottom of the net.
Recreational	Recreational fishing for sport or pleasure, where the catch is not sold, bartered or traded.
SAFE	Stock Assessment and Fishery Evaluation, NMFS.
Sanctuary	Protected area. Commercial/recreational fishing may be restricted.
Secretary	When capitalized and used in reference to fisheries within the U.S. EEZs, it refers to the U. S. Secretary of Commerce.
Small pelagics	Species such as akule (big-eye scad - *Selar* spp.) And opelu (mackerel scad - *Decapterus* spp). These fish occur mainly in shallow inshore waters but may also be found in deeper offshore waters. Not part of the PMUS.
SPC	South Pacific Commission. A technical assistance organization comprising the independent island states of the tropical Pacific Ocean, dependant territories and the metropolitan countries of Australia, New Zealand, USA, France and Britain.
SPR	Spawning Potential Ratio. A term for a method to measure the effects of fishing pressure on a stock by expressing the spawning potential of the fished biomass as a percentage of the unfished virgin spawning biomass. Stocks are deemed to be overfished when the SPR<20%.
SSC	Scientific & Statistical Committee, an advisory body to the Council comprising experts in fisheries, marine biology, oceanography, etc.
Trolling	Fishing by towing lines with lures or live-bait from a moving vessel.
USCG	U.S. Coast Guard, 14th District, Department of Transportation.
USFWS	U.S. Fish & Wildlife Service, Department of Interior. Also, FWS.
VMS	Vessel Monitoring System. A satellite based system for locating and tracking fishing vessels. Fishing vessels carry a transponder which can be located by overhead satellites. Two-way communication is also possible via most VMS systems.
WPacFIN	Western Pacific Fishery Information Network, NMFS.
WPRFMC	Also, the Council. Western Pacific Regional Fishery Management Council. One of eight nationwide fishery management bodies created by the Magnuson Fisheries Conservation and Management Act pf 1976 to develop and manage domestic fisheries in the U.S. EEZ. Composed of American Samoa, Guam, Hawaii, and Commonwealth of Northern Mariana Islands.