Pelagic Fisheries of the Western Pacific Region

2000
Annual Report

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Western Pacific Regional Fishery Management Council
Honolulu Hawaii

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2000 Annual Report

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for the

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Cover photos: Experimental trials with an underwater setting chute on-board a Hawaii longline vessel. The chute is designed to mitigate interactions between longline vessels and seabirds such as albatrosses.

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Contents

Figures **page**

2. Guam

Tables **page**

3. Hawaii

4. Northern Mariana Islands

Pelagic Fisheries of the Western Pacific Region — 2000 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 2000, 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, and a synopsis of landings data for the US West Coast.

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 kã, 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 2000 in the Western Pacific and the percentage change between 1999 and 2000 is shown in Table 2.

Table 2. Total Pelagic Landings in Lbs in the Western Pacific Region

Species	American Samoa	% change	Guam	% change	Hawaii	% change	CNMI	% change
Swordfish	2,056	898.06%			6,500,000	-5.80%		
Blue marlin	50,807	42.82%	86,981	6.22%	1,200,000	-14.29%	2,886	1.87%
Striped marlin	770				500,000	-44.44%		
Other billfish	3,244	-72.93%	46	-97.47%	400,000	-33.33%		
Mahimahi	43,911	13.29%	84,887	-47.00%	1,600,000	23.08%	5,859	-43.14%
Wahoo	49,001	0.52%	72,473	-5.83%	700,000	-30.00%	3,278	-48.74%
Opah (moonfish)	6,468	-19.09%			700,000	-41.67%		
Sharks (whole wgt)	1,864	98.30%	1,248	-93.38%	600,000	-45.45%		
Sharks fins					2,800,000	-46.15%		
Albacore	1,451,125	103.31%			2,300,000	-42.50%		
Bigeye tuna	52,053	173.52%			6,200,000	0.00%		
Bluefin tuna					10,000	-50.00%		
Skipjack tuna	56,011	-35.79%	273,851	127.95%	1,700,000	-10.53%	112,311	32.00%
Yellowfin tuna	192,275	26.29%	86,700	-31.66%	5,000,000	25.00%	14,139	-26.96%
Other pelagics	976	550.67%	10431	-55.47%	400,000	33.33%	8407	-27.20%
Total	**1,910,561**	**71.11%**	**616,617**	**1.07%**	**30,610,000**	**-15.02%**	**146,880**	**12.02%**

II. Summary

A. Plan Administration

The year 2000 was unusual in that management of the Hawaii longline fishery included measures stemming from ongoing litigation during the year, as well as actions taken under the auspices of the Pelagics FMP. The management measures arising from litigation and subsequent actions under other statutes (National Environmental Policy Act, Endangered Species Act) are discussed in more detail under **Issues**.

Amendment 9 to the Pelagics FMP was developed to manage and allow full utilization of sharks caught by longlining. This amendment would establish an annual harvest guideline for the number of blue sharks taken in the Hawaii longline fishery; establish a trip limit for non-blue sharks in the Hawaii longline fishery; and define bottom longline gear and prohibit its use for Pelagic Management Unit Species in the US EEZ around Hawaii. This document was sent to NMFS for review and approval in June 2000. In September 2000 a regulatory amendment establishing permit and reporting requirements for the pelagic troll and handline fishery in the U.S. Remote Island Areas of the Western Pacific Region was similarly transmitted to NMFS for implementation. Lastly, in October 2000 a revised version of a framework measure for the American Samoa longline fishery, originally sent to NMFS in October 1998, and disapproved in March 1999 was resubmitted to NMFS following extensive revision. The measure would establish closed areas around the islands of American Samoa in which only vessels < 50 ft in length would be allowed to fish. In July 2000 NMFS published a proposed rule containing measures for mitigating albatross interactions with the Hawaii longline fishery. This framework adjustment to the Pelagics FMP was sent to NMFS in December 1999. No permits were requested by any foreign nations to fish in the US EEZ of the Western Pacific Region.

B. Island Areas

In **American Samoa,** total landings of all pelagic species increased 71 %, continuing an upward trend in pelagic landing that commenced in1994. An estimated 1,916,869 lb (+71%) of pelagic fish were landed in 2000, of which 1,831,428 lb were commercial landings valued at $1,923,583 (+73%). The average price for all pelagics was $1.05/lb (- 3%).

Fifty-three vessels reported landing pelagic species in 2000, which was the same number making pelagic landings in 1999. Of these, 37 reported fishing with longline gear (+32%), and 19 reported fishing as trollers (-41%).

Trolling vessels made 283 trips a decrease of 32,5% from 1999 and less than half of the long term average. Longline data are derived from both creel survey extrapolations and through submitted logbooks. Logbook data reported a total 2810 sets for 2000, or an increase of 33.8% from 1999. Creel survey extrapolation reported 3616 longline sets, a 21.3 % increase on the 1999 creel survey estimate of sets. The average duration for trolling trips in 2000 was 3.9 hr/trip, an 19% decrease from 1999. The average longline set duration by calculated via logbooks was 13.0 hr/set (-1.2%) and by creel survey was 9.0hr/set (-7%). Since the longline fishery began in 1996, trolling trips have declined by about 66% and longline sets have increased by over 400%. Data from the troll fishery suggests that the catch per unit effort (CPUE) in 2000 decreased by 16.2% and about 13% below the long term average. The overall average CPUE for longline fishing in 2000 was 30.6 fish/1,000 hooks. According to both monitoring methods, the CPUE for albacore had declined by more than 50% from the 1996 level during 1999, but recovered to about 66% of the 1996 level during 2001, or a between-year increase in CPUE of 42%. The average size of albacore has remained relatively stable between 1996 and 2000, between 43-46 lb/fish. Albacore accounts for about 60% of the total longline catch. Overall longline catch rates declined about 10% between 199 and 2000 but as well as albacore catch rates increased slightly (+7%)

Cannery landings at Pago Pago during 1999 comprised 124,391 t of skipjack, 31,981 t of yellowfin and 54,657 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 during the 1990s for skipjack and yellowfin, with 1999 landings for skipjack 9% above and yellowfin 12.4% below long term averages. Landings for albacore has been continuously increasing from the early1990s and in 2000 were 41% 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 616,617 lb a minor increase of just over 1%. However, the total revenues increased to $641,081, or an increase of 37%. Tuna landings increased to 355,710 lb (+33.8%), with a 100.4% increase in revenues to $249,406. 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 decreased to 244,362 lb (-27.3%), but adjusted revenues increased to $375,452 (+14.8%). Landings in 2000 followed the 1997 trend in Guam's pelagic fisheries towards targeting other PPMUS, principally mahimahi and wahoo, rather than tuna. Tunas comprised about 57% the 1999 pelagic landings, a marked increase on the previous three years where they formed between 39 and 41% of pelagic landings. Mahimahi comprised 13 % of the total pelagic landings, yellowfin tuna 13.5%, skipjack 42.5% blue marlin 13.5% and wahoo 11.3%.

Guam's adjusted prices for pelagic fish remained fairly stable in 1999, 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 1998 was an estimated 416 vessels. The fleet size has remained relatively stable for the past five years after a marked increase that began in 1980. The number of trips (13,204), hours fished (53,066) and hours per trip (4.0) has also remained stable since 1997.

Transhipment activity in Guam decreased (-52%) overall in Guam during 2000, with yellowfin tuna landings declining by 57% and bigeye by 43%.

The **Hawaii** fisheries for PPMUS produced total pelagic landings of 30.6 million lb in 2000, a significant decrease (-15%) from 1999, and the largest decline in catches since 1994. Swordfish

(21.23%), bigeye (20.25%), yellowfin tuna (16.33%), sharks (9.15%) were the dominant species, although most of the shark catches were taken by longliners and landed as fins only. Other major components of the pelagic fishery include albacore (7.51%), and skipjack (5.6%). Swordfish landings of 6.5 million lb in 2000 were 5.8% lower than in 1999. Bigeye tuna catch remained unchanged between years at 6.2 million lb. Blue marlin catches declined by about 14% from1999 while striped marlin catches almost halved (-44.4%) during 2000. Apart from mahimahi catches, which increased in 2000 by about 27%, sharks (-47.4%), wahoo (-23.3%) and moonfish (-42.7%) all declined significantly in 2000 from a previous 13 year high in 1999, but were still above the long term average. Overall tuna landings were similar to 1999, with only a small decline of about 6% between years. However, albacore landings declined by over 40% between years, and skipjack by about 10%. Bigeye landings remained more or less unchanged, while yellowfin landings increased by about 25%. The numbers of sharks retained for their fins decreased by almost 50% in 2000. in 1999, 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 increased by about 6% to $ 62.9 million, with an average price per pound for pelagic in 2000 of $2.06/lb, compared to $1.65/lb in 1999. In 2000 the inflation adjusted ex-vessel revenue for the longline fishery increased by about 6% to $50.1 million, while the handline fishery revenues decreased by 19.5%, the troll fishery increased by about 16%% and the 1998 aku baitboats declined by 35%..

Catch rate by trollers for wahoo, blue marlin and skipjack were down in 2000 (+12.2%, +21.3% and +36.9% respectively). Catch rate by trollers for mahimahi and yellowfin were up in 2000 (+60.7% and +24.3%, respectively). Catch rates by handliners in 2000 were higher for mahimahi (+83.7%, wahoo (+4.4%) and bigeye (+227.3%). Catch rates by handliners in 2000 were lower for swordfish (-22.2%), yellowfin (-4.2.2%) and albacore (-47.2%). Catch rates for all tunas, wahoo and blue marlin were all below long-term averages.

The Hawaii longline fleet landed 23.8 million lb of fish in 2000, a 16% decrease from 1999 landings. Of the billfish landed in Hawaii, longlining accounted for almost all the swordfish (100%), striped marlin (83%) and blue marlin (58%). About 34% of the longline landings (8 million lb) were billfish, and 81% of billfish landings were swordfish. The longline fleet also accounted for most of the bluefin tuna (80%), bigeye tuna (94%), albacore (88%), moonfish (99%) and sharks (97%) landed in Hawaii. The bluefin landings have decreased 62% since 1995.

Fishing effort for the combined pelagic fisheries in Hawaii remained at a high level in 2000. The number of longline vessels participating in this fishery increased to its highest level since 1994 to 125 vessels active in the fishery. However, the number of trips remained stable at 1,103 trips in 2000, down by about 3%. 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 2000 (-19.2%) to 20,105 This is higher than the 1979-2000 average of 18,716, but the fishery has been relatively static over the past ten years. The number of trips (198) taken by aku baitboats declined in 2000 by about 47% and remains well below the long term average. The present level of aku boat activity, in terms of trips, is about one half the long term average. The number of handline trips in 2000 (4,749) declined by about one third (-33.3%) and was about 14% below the long term average.

Landings of all pelagics in the **Northern Mariana Islands** (NMI) increased modestly by about 12% between 1999 and 2000 to 147,463 lb but continued to be 20% below the long term average. Skipjack landings were up (+32.0%) from 1999, but continued to be below (-15.8%) the long term average. Yellowfin tuna landings declined sharply from 1999 (-27.0%) but was close to long term average (-2.3%). Landings of mahimahi continued a five year decline, down -43.1 % from 1999 and by over 80% since 1996. Mahimahi was significantly lower (-65%) than the long term average. Wahoo landings decreased (-48.7%) from 1999 and was over 50% below the long term average. Blue marlin landings were more or less unchanged (+1.9%), and continued to be below the long term average.

The slight increase in landings during 2000 were matched by a small (-1.6%) decrease in total adjusted revenues ($276,083) over those in 1999. This decrease in adjusted revenues was entirely due to the major declines in the revenues from PPMUS (-57.5%), particularly mahimahi and wahoo. Tuna revenues increased by about 12%.

The number of fishers making commercial pelagic landings decreased in 2000 (-13%), from 106 to 93, but was still above the long term average (+8%). However, the number of trips landing any pelagic fish increased by 12% in 2000 and was much higher (+30%) than the long term average. Thus the average number of trips per fisher in 2000 increased to 21 from 17 trips per fisher in 1999.

The inflation adjusted price of tunas has declined since 1997 while non-tuna PPMUS have remained relatively stable. The average adjusted price of tunas fell to $1.86/lb (-5%) and of other PPMUS to $2.07/lb (+10%). Tuna prices (-4%) and prices for other PPMUS (-2%) were both slightly below below the long term average.

C. <u>Species</u>

Mahimahi landings (43,911 lb) in American Samoa during 2000 were the highest since the fishery began, increasing 12% from 1999, and was almost four times higher than the long term average. Guam's 1999 mahimahi landings (85,827 decreased substantially (-47.0%) from 1999, continuing a six year downward trend. Year 2000 landings were 52% below the long term average. Mahimahi landings in Guam have displayed wide, unexplained annual fluctuations since 1987. The trolling catch rate for mahimahi was at a six year low in 2000 with a CPUE of 1.6 lbs/hr. Mahimahi landings (1,600,000 lb) made up 10.3% of the 2000 non-tuna PPMUS landings in Hawaii, an increase of 23%. The troll catch rate in Hawaii in 2000 was 60.7% higher than the 1999 rate, and 73% above the long-term average. Northern Marianas mahimahi landings (5,591 lb)declined substantially in 2000 a trend from 1997 onwards. As with Guam, NMI experiences annual fluctuations in the catch of mahimahi. Mahimahi accounted for 42% of the total non-tuna PPMUS landings. The trolling catch rate in 2000 in the NMI was at a ten year low of 2.89 lb/trip, just over quarter of the long term average.

Blue marlin catches in American Samoa increased (-42.8%) after a seven year upward trend as a result of the expansion of the longline fishery, which took 99% of the total blue marlin catch.. Guam landings of blue marlin (81,981 lb) continued the rebound from the dip in1998. Despite the low landings in 1998, the blue marlin catch in Guam has been relatively stable for more than a decade. Blue marlin landings (1.2 million lb) were 14.3% lower than in 1999. Longliners accounted for 58% of the total Hawaii blue marlin landings. Blue marlin landings in the Northern Marianas (2,833 lb) were more or less unchanged from the 1999 figure and continued a five year decline, with 2000 landings only 42% of the 1996 level.

The catch rate of blue marlin in the American Samoa troll fishery recovered from a near all time low in 1999 (0.14 lb/troll-hr) to 0.61 lb/troll-hr, which was about 60% of the long term average. In Guam, blue marlin troll catch rate in 2000 (1.6 lb/troll-hr) increased slightly from 1999 (1.5 lb/troll-hr), and about 14% above the long term mean. 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 remained unchanged on swordfish, mixed and tuna trips. The catch rate of blue marlin in the Hawaii commercial troll fishery decreased 21% and was 33% lower than the long-term average. In the Northern Marianas, the 2000 catch rate decreased by about 9% from 1999, and was 27% below the long-term average.

Striped marlin landings ranked third among the billfish in Hawaii (after swordfish and blue marlin), and in 1999 it accounted for 3.2% of the commercial landings of non-tuna PPMUS. The 2000 landings of 0.48 million lb were down significantly from 0.87 million lb in 1999, a decline of over 80%, and 45% of the long term average. 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 2000 (35,000 lb, -43%) were markedly reduced from 1999 and about 43% below 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.

Sailfish landings were insignificant in most areas. American Samoa reported landings of 2329 lb of sailfish in 2000 were an almost 70% decrease on 1999 landings (7659 lb) and close to the long term average of 2254 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 increased by 135% to 18,846 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 [2], although the quantity has not been estimated.

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

Shortbill spearfish landings were reported for the first time in American Samoa at 610 fish in 1999, but landings amounted to only 138 lb in 2000 and no catches were reported in Guam during 2000. During 1999 120 lb of shortbill spearfish had been landed

The **swordfish** longline fishery in Hawaii expanded markedly from the mid 1980s on wards. Landings in 1989 amounted to 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 2000 amounted to 6.5 million lb a decline of about 5%, but still higher by about 7% than the long term average for the fishery. The estimated average size of longline-caught swordfish was 185 lb in 2000 the second largest average size since 1987 and above the 1987-2000 average by 16%. Swordfish comprised the largest proportion of the total non-tuna landings by all fisheries in Hawaii for the eleventh consecutive year (42% in 2000, 35% in 1999, 38% in 1998, 37% in 1997, 38% in 1996, 38% in 1995, 60% in 1994, 72% in 1993, 73% in 1992, 62% in 1991, and 38% in 1990). The longline catch rate of swordfish has remained steady since1998, and about 4% higher than the long-term average between 1991 and 1999. Swordfish landings from non-longline gear were negligible in comparison (<1%). Other areas did not report landings of swordfish, apart from a gradually increasing volume of swordfish in the American Samoa longline fishery.

American Samoa reported landings of 1,451,125 lb of **albacore** during 2000, a 103% increase on 1999 landings. This was the highest albacore landing recorded by the American Samoa fleet and an almost eightfold increase on 1996 landings. Hawaii total landing of albacore (2.3 million lb) in 2000 was a 42.5% decrease from 1999, but about 25% above the long term average. Landings of albacore by longline vessels decreased 38% in 1998 but 25% above the long-term average. Other areas did not report landings of albacore.

Hawaii landings of bigeye tuna (6.2 million lb) were the same as in 1999, and almost all (93%) caught by longline. No other areas reported bigeye landings apart from American Samoa, where the expanding longline fishery in 2000 caught 52,053 lb, or an increase of 173% on 1999 landings.

Skipjack tuna landings in American Samoa in 2000 (56,011 lb) declined (-35.8%) following a two year recovery from a a low in 1997. The 2000 landings were also 30% lower than the long-term average between 1982 and 2000. The largest decline in skipjack landings occurred in the troll fishery (-49.4%), compared with the longline fishery (-28.5%). Due to the focus on longlining, troll landings continued to be significantly below the long term average, representing only 21% of the average of troll landings between 1982 and 2000. However, trolling catch rate was only about 17% lower than the 1999 value and only 2% lower than the long-term average. Guam skipjack landings in 2000 (267,562 lb) recovered from a four year slide, surpassing the 1996 all time high of 239,006 lb. This represented a one year increase of about 123% on the 1999 landings, and 175% higher than the long-term average. Catch rates more than doubled from 2.2 lb/trolling hour to 5.0 lb/trolling hour, an increase of 127%. Hawaii skipjack landings in 2000 of 1.7 million lb represented a decrease of about 12% and remained below the long-term average for the third consecutive year. The skipjack were caught principally by baitboats, which landed 0.69 million lb of skipjack in 2000, which was about half of the aku boat total for 1999. Northern

Marianas Islands skipjack landings increased by about 30% from 85,087 1b in 1999 to 111,116 lb in 2000. The catch rate decreased by 17% from 1999 but was 40% below the long-term average.

Yellowfin tuna landings in American Samoa (192,975 lb) increased by 26%; the longline fleet catching 97.4% of the yellowfin which had catch rates similar catch rates from logbook data, but was about 23% lower in 2000 from creel survey data.

Catch rates increased 13% in the troll fishery but was still below the long term average. Guam yellowfin landings (126,858 lb) decreased 8% in 1999. Catch rates were 16% lower in 2000 and 24% below the long term average. The total Hawaii commercial landings of yellowfin (5 million lb) were 25% higher than 1999 and 21% higher than the long-term average.

Landings of yellowfin by commercial trollers and handliners in 2000 increased by 11%, while landings by longliners more than doubled between 1999 and 2000 (+140%) The commercial trolling catch rate of yellowfin increased by 24.3% during 2000 while the catch rate from handline fishing decreased by 4%. The longline CPUE of yellowfin by directed tuna trips was just over double the 1999 CPUE.

Northern Mariana Islands yellowfin landings declined in 2000 to 13,907 lb, a 28% decrease from 1999 and 36% above the long term average. Catch rates in 1999 doubled from 1998 (11.01 lb/hr) and 2% lower than the long-term average.

Wahoo landings in American Samoa stabilized in 2000, following a dramatic increase from 1996 onwards increase. This increase in landings was generated from the longline fishery as catch from trolling was less 1% of the total. The trolling catch rate continued a decline starting after 1996 and was 62% lower than the 1999 catch rate, and 67% lower than the long term average at 0.0.42 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 declined by about 8% in 2000 and were 14% lower than the long term average. Wahoo landings in Hawaii decreased from 1 million lb to 0.7 million lb between 1999 and 2000. The 2000 trolling catch rate for wahoo in Hawaii was down by 12.2% but still above the long term average (+16.7%). The Northern Marianas wahoo landings (3,223 lb) and catch rate (1.64 lb/trip) represented about 50% declines on the 1999 estimates. The catch was half of the long term average and the while the CPUE was only 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 96% of PPMUS landings. Growing charter fishing businesses in Guam and to a lesser extent in the Northern Mariana Islands contributed significantly to troll fishing effort. In Hawaii, longline landings continue to dominate pelagic fisheries production and in 2000 accounted for 77% of the landed volume of PPMUS. Other pelagic fishing methods employed in Hawaii include two types of handlining, *ika-shibi* fishing, conducted at night, and *palu-ahi* fishing, conducted during the day. Hawaii also has s small pole-and-line fishery directed at catching mainly skipjack or *aku*.

III. Issues

Bycatch and protected species interactions continued to drive most of the management initiatives of the Western Pacific Council in 2000. The Council's seabird-longline mitigation project was completed in 1999, with a resulting framework measure voted on by the Council and sent into NMFS in December, and was published as a proposed rule in July 2000 (Federal Register Vol. 65, No. 129, 41424-41426). However, the agency did not proceed with the publication of a final rule, as the U.S. Fish and Wildlife Service (USFWS) had indicated that during July 2000 that it was developing a Biological Opinion (BiOp) under Section 7 of the Endangered Species Act (ESA) for the short-tail albatross (*Phoebastria albatrus*). This endangered species is present in small numbers (2-3 birds) in the NWHI, and the USFWS BiOp, published on November 28, 2000, concluded that the Hawaii longline fishery (as proposed including cumulative effects) was not likely to jeopardize the continued existence of the short-tailed albatross.

The BiOp included several non-discretionary measures to be employed by the Hawaii longline fishery and implemented by NMFS. All vessels registered for use under a Hawaii longline limited access permit operating with longline gear north of 23° N., must use thawed blue-dyed bait and strategic offal discards to distract birds during setting and hauling of longline gear. When making deep sets (targeting tuna) north of 23° N., Hawaii longline limited access vessel operators must employ a line setting machine with weighted branch lines (minimum weight = 45 g). In addition, all longline vessel operators and crew must follow certain handling techniques to increase the likelihood that short-tailed albatrosses brought onboard alive are released in a manner that ensures their long-term survival, and vessel operators must annually complete a protected species educational workshop conducted by NMFS. Other mitigation measures such as towed deterrents, or the use of weighted branch lines without a line-setting machine (in the case of swordfish or mixed target sets), are optional. The USFWS BiOp directed vessel operators to begin setting the longline at least one hour after local sunset and complete the setting process by local sunrise, using only the minimum vessel lights necessary.

The Council completed a regulatory amendment in 2000 which addressed the issue of shark finning and several other concerns related to shark management. The Council proposed an initial annual harvest guideline of 50,000 blue sharks (*Prionace glauca*) that may be landed by the Hawaii-based longline fishery. It was decided not to impose measures mandating that blue shark carcasses be landed because there is currently no market for the meat from this species, the most frequently caught shark species in the fishery. It was considered preferable to return their carcasses to the sea rather than putting them in landfills, which would very likely happen if landing them was required. In addition, the regulatory amendment proposed a limit of one shark of any other species besides blue, landed whole or dressed, per vessel per fishing trip. Lastly, one vessel targeted near shore sharks in the Northwestern Hawaiian Islands (NWHI) in 1999 using bottom longline gear. Concerns were raised about the impact of this fishery on the endangered monk seal and the potential for the sustainability of coastal shark stocks. The regulatory amendment defined this gear as bottom longline (differentiated from pelagic longline) gear and prohibit its use in the existing longline prohibited areas in the NWHI and the Main Hawaiian Islands.

This regulatory amendment was sent to NMFS for approval in June 2000. However, NMFS did not proceed to publish a proposed rule, due to the impending likelihood of State of Hawaii and federal regulations banning shark finning during 2000. The State of Hawaii Legislature voted in mid-2000 to ban the landing of shark fins without the accompanying carcass and this became law in August. In December 2000, Congress passed a bill amending the Magnuson Act inn order to implement a nationwide ban on landing of shark fins without the shark carcass. The bill became Public Law No. 106-557 in January 2000. As a consequence, the Council withdrew the regulatory amendment as the blue shark harvest guideline is predicated on the retention of these sharks for their fins. The document is currently being revised.

Litigation by environmental advocacy organizations against NMFS resulted in major operational changes in the Hawaii longline fishery during 2000. In February 1999. Earthjustice Legal Defense Fund filed a law suit in Honolulu against NMFS on behalf of Center for Marine Conservation and Turtle Island Restoration Network. As a result of that law suit, NMFS issued an emergency rule in December 1999 to prohibit vessels registered for use under a Hawaii longline limited access permit from fishing with longline gear within the area north of 28 deg. N. lat. and between 168 deg. W. long. and 150 deg. W. long. (see Figure 1 on page 27)

NMFS published an emergency rule on August 25, 2000 implementing measures contained in an August 4th Court Order. The Court Order prohibited all Hawaii-based pelagic longline fishing activities throughout the year in waters between 28 deg. N. and 44 deg. N. lat., from 150 deg. W. to 168 deg. W. long.(Area A); limited longline fishing to a total of 154 sets from August 10 through December 31, 2000, and a total of 77 sets from January 1 through March 14, 2001, and required 100 percent observer coverage in waters between 28 deg. N. and 44 deg. N. lat., from 137 deg. W. to 150 deg. W. long., and in waters between 28 deg. N. and 44 deg. N. lat., from 168 deg. W. to 173 deg. E. long. (both areas were collectively designated as Area B). The order also prohibit Hawaii-based pelagic longline fishing for swordfish in waters between 0 deg. (the equator) and 28 deg. N. lat., from 137 deg. W. to 173 deg. E. long. (Area C) (see Figure 1 on page 27). The Court Order also directed NMFS to provide observer coverage for the longline fishery in Area C at a minimum level of 10 percent by September 21, 2000, and 20 percent by November 7, 2000.

Other fishing restrictions included limited sales or landings of swordfish such that profits from swordfish that were harvested in Area C and sold by the permit holder, or landed in any port in U.S. territory, had to be donated to charity. The NMFS emergency rule also required vessel operators to report their swordfish catch from Area C to NMFS within 5 days following their return to port. In November 2000 NMFS added changes to the August emergency rule to contain an express prohibition on directing longline fishing effort toward the harvest of swordfish. The changes required vessels to set their main longline so that the deepest point between any two floats was greater than 100 m (328.1 ft), and prohibited the possession of lightsticks on board longline vessels. Further the permit holders or operators were required to donate to charity at least 30 percent of their gross revenues from the sale of incidentally caught swordfish, and require each longline vessel operator to have aboard the vessel an observer waiver form issued by NMFS if the vessel fished without an observer.

IV. 2000 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. **All of the annual report modules should attempt to address bycatch reporting requirements of the SFA.**

4. **Council should seek similar provisions excluding tagged and/or released fish from being counted as bycatch as are given for Atlantic HMS.**

V. Plan Administration

A. Administrative Activities

A regulatory amendment proposed by the Council to close an area around American Samoa to fishing for PPMUS by vessels more than 50 feet in length was disapproved by NMFS on March 11, 1999. NMFS determined that the proposal was not consistent with National Standard 4 (allocations of fishing privileges among US fishermen must be fair and equitable), National Standard 5 (restricting large vessels' access to the near-shore fishery would impose economic costs, or inefficiencies, and the record for the proposal did not show those costs would have been outweighed by benefits to the stocks, fishing communities, or small vessel fishermen), and National Standard 7 (the closure would result in administrative and enforcement costs which did not appear justified in light of the projected benefits). Work commenced again in 1999, following recommendations received from NMFS. The revised document is expected to be submitted in 2000.

A second regulatory amendment proposed by the Council to require the use of a minimum of two seabird deterrents north of 25° while employing pelagic longline gear was submitted to NMFS in December 1999.

B. Longline Permits

During 1999, 164 permits, the maximum allowed under the FMP, were maintained in the Hawaii longline limited entry fishery. Administrative activities at PIAO primarily involved the transfer of 23 Hawaii longline limited permits. Of the 164 issued permit holders, 26 were without vessels for those permits. One receiving vessel permit was issued this year in Hawaii. PIAO also processed and issued Western Pacific general longline permits for the pelagic fisheries in American Samoa (63 permits), Guam (5 permits), and the Northern Mariana Islands (1 permit). The number of longline permits issued in American Samoa increased dramatically for the third straight year, with 16 new permits in 1998 and 14 new permits in 1999.

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 2000

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. LE	L & T Fishery Corp.
F/V CAPT. MILLIONS I	Nga Van Le
F/V CAPT. MILLIONS III	Capt. Millions III Inc.
F/V CHRIS	Kan-Do Pesca Inc.
F/V CORI DAWN	Cori Dawn Corp.
F/V CRYSTAL	Davis B Inc.
F/V DAE IN HO	KYL Inc.
F/V DAE IN HO IV	Wynne Inc.
F/V DAEINHO III	Chunha 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 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 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 ICY POINT	Pacific Fisheries Corp.
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 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 KAY	K.Y. Fishing Inc.
F/V KELLY ANN	Kelly Ann Corp.
F/V KILAUEA	Aukai Fishing Co.Ltd.
F/V KING DIAMOND II	Scotty Nguyen
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 ANN MARGARET	Lady Ann Margaret 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 LUCKY I	Duoc Nguyen
F/V LUCKY THREE	Pacific Seafoods 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 OCEAN DIAMOND	Ocean Diamond Inc.
F/V PACIFIC DREAM	Pacific Seafoods Inc.
F/V PACIFIC FIN	Fishrite Inc.
F/V PACIFIC PRIDE	Pacific Seafoods Inc.
F/V PACIFIC REFLECTION	Gunn Pacific Reflection
F/V PACIFIC STAR	N. Pac Fishery Inc.
F/V PACIFICA	Jackson Bay Co.
F/V PAN AM II	Dongwon Marine Inc.
F/V PEARL HARBOR II	Gilbert DeCosta
F/V PETITE ONE	Ka'upu Ltd.
F/V PIKY	M/V Piky Inc.
F/V POHO NUI	Joseph/Maria Parisi
F/V PRINCESS K	Princess K Fishing Corp.
F/V PURPLE MARCH	PN Inc.
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 RED OCTOBER	Pacific Fishing & Supply
F/V ROBIN	Fat City Fishing
F/V ROBIN II	Robin Fishing Inc.
F/V RUBY STORM	Allen C. Witbeck Sr.
F/V SANDY DORY	Highliner Inc.
F/V SAPPHIRE	Hanh Thi Nguyen
F/V SEA DIAMOND	Nancy Nguyen
F/V SEA DIAMOND II	Sea Diamond II Inc.
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 SUNFLOWER III	Le's Brothers Fishing Inc
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.

Hawaii longline permit holders without vessels

All Star Fishery Inc.	
Andy Hoang	
Bac Tran	
Christine Tran	2 permits
Diana Thi To	
H & M Marine Inc.	
Hong Lu	
Hong Thanh Nguyen	
Jack Cartwright	
James Chan Song Kim	
John Gibbs	
Khanh Truong	2 permits
Lan Thi Van	
Larry DaRosa	
Liana Do	
Liem Truong	
Lindgren-Pitman Inc.	
Long Thanh Nguyen	
Master Vincent Inc.	
My Viet Dang	2 permits
Ocean Associates Corp.	
Pacific Fishing & Supply	2 permits
Quang Nguyen	
Richard Nice	
Sea Dragon II Inc.	
Shaman Partnership	
Steven Nguyen	
Theodore Benjestorf	
Tina Hoang	
Tom C.Y. Kim	
Tony Phan Truong	
Vessel Management Assoc.	5 permits

Western Pacific General Longline Permit Holders in 2000

American Samoa

VESSEL NAME	PERMIT HOLDER
F/V 38 SPECIAL	Peter Reid
F/V AAONE	Asaua Fuimaono
F/V ADELITA	Adelita Fishing LLC
F/V ALEUTIAN BEAUTY	Daniel Gunn
F/V ALI-B	Harbor Refuse and Environmental Services
F/V ALIA O SINA	Afoa Moega Lutu
F/V AMERICA	Robert/Dorothy Pringle
F/V AMIGO	Jay Vaoalii
F/V BREANA LYNN	Robert/Dorothy Pringle
F/V CAPT. CARLOS ANDRES	Afoa Lures
F/V CAPTAIN JUSTIN LUTU	Afoa Lures
F/V CAPTAIN MICHAEL JOSEP	Afoa Lures
F/V CLASSIC CAT	Frank Gaisoa
F/V DOS GRIS	George Poysky III
F/V EAGLE II	Steve Haleck
F/V FA PEPA SAI	Joseph/Maria Parisi
F/V FAISUA	Sui Aveina
F/V FAIVAIMOANA I	Faivaimoana Fishing Co Lt
F/V FAUVASA	Lemaisu Fesili
F/V FOTOLUPE	Richard Solaita
F/V FUATINO	Nana Aveina
F/V GOGOSINA	Native Resources Develope

F/V GREEN PEACE I	Maselino Ioane
F/V GREEN PEACE II	Maselino Ioane
F/V ISABELLA	Jose Lugo
F/V JOHANNA	Luis Diaz
F/V JOHN G	South Pacific Aquatics
F/V LADY GEORGIA	Paepae Simi
F/V LADY HANNACHO II	Afoa Lutu
F/V LADY HERMINA	Jadran Satalic
F/V LADY LEANN	Steve Vaiau
F/V LADY LU	Lu's Fish Grotto
F/V LADY MOEMOE	Meapae Scanlan
F/V LADY NOELA	Eveni John Pilcher
F/V LADY POLATAI	Tagaimamao Masaniai
F/V LADY RUTA	Tau Malae
F/V LADYSMITH	Coastal&Offshore Pac Corp
F/V LITTLE SISTER	John Pedro
F/VLUPESINA	Maselino Ioane
F/V MAHI MAHI	Lorn Cramer
F/V MALIA	Uili Talimao
F/V MERRY EMMELY	Malua/Henry Nickel
F/V MISS MIHI	Timothy Jones
F/V MONA OF THE OCEAN	Terry Chang
F/V MOSI I	Fiavivini Atofau
F/V MOSI II	Fiavivini Atofau
F/V MTC	Faatauvaa Kitiona
F/V NORTH STAR	Richard Mathisen
F/V NORTHWEST	Harbor Refuse & Environm
F/V OFIRA	Asaua Fuimaono
F/V ORION NO. I	Laszlo Lukacs
F/V PRINCESS DANIELA	Afoa Lures
F/V PRINCESS MARLENE	Afoa Lures
F/V PTL LIGHT BOAT	Lino Schwenke
F/V RACHEL	Bethel Inc.
F/V REEL CAT	Dave Haleck
F/V SAMOAN BOY	Feli Fisheries Inc.
F/V SAVANNA	PJ Wulf Engineering
F/V SEA VENTURE	Daniel/Douglas Gunn/Williscroft
F/V SILVER BULLET	David Pedro
F/V SINATALA	Valavala Enosa
F/V SINATALA II	Valavala Enosa
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 TABU SORO	Bruce A. Mounier Jr.
F/V TAE SUNG	Byoung In Ki
F/V TAMARINA	Ioane Maselino
F/V TARLY	Omar Shallout
F/V TOGO AASA	Tuaifaiva Seiuli
F/V TRACEY C	Tracey C Fishing LLC
F/V WILD CAT	Neil/Alfred Annandale

Guam

VESSEL NAME	HOLDER
F/V ANDREA ROSE	Mladen Bakic
F/V ATALOA	Jim/Nathan Elliott
F/V KARIYUSHI	Guam YTK Corp
F/V LADY OLIVIA	Ocean Bounty Inc
F/V MAIKAZE	Robert Joslin
F/V PIONEER	Sunbeam Seafoods Inc
F/V TRES MARIA	Tong Kim
No name	William Bradford
No name	Larry Taylor

Northern Mariana Islands

VESSEL NAME	HOLDER
F/V CHARITO	Renato Azucenas

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 shore-side 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. A total of 1,130 longline trips were made by Hawaii-based longline vessels between January 1 and December 31, 2000, 118 of which carried observers, representing about 10.4 % observer coverage. The following table summarizes protected species interactions for all observed trips that returned during calendar year 2000. The total observed fishing effort was approximately 2,238,842 hooks and 1401 sets, during which interactions with 246 seabirds, 54 sea turtles and 8 marine mammal were observed. (Tables 4,5,6)

The most observed interactions between turtles and longlines in 2000 involved loggerheads turtles, followed by olive ridleys and leatherbacks, with the least interactions with green turtles. Of the 54 turtles observed taken, 49 were released alive, 0 were released injured and 5 released dead (Table 4). Between 1994 to 1999, the annual mean captures and estimated mortalities of sea turtles over the same period is shown in Table 5.

Table 4. Observed longline gear/turtle interactions, 2000

Turtle Species	Condition		
	Released Alive	Dead	Total
Loggerhead	27	0	27
Olive Ridley	8	3	11
Leatherback	11	0	11
Unidentified Hardshell	0	0	0
Green	3	2	5
Hawksbill	0	0	0
TOTAL	49	5	54

Table 5. Annual Mean Fleet-wide Turtle Takes and Kills in the Hawaiian Longline Fishery, 1994-1999 (Source NMFS SWFSC Administrative Report H-00-06)

Species	Captures	Mortalities
Loggerhead	418	73
Olive Ridley	146	49
Leatherback	112	9
Green	40	5
Total	**716**	**136**

A total of 248 seabirds were taken by the Hawaii longline fishery in 2000, through diving and being caught on baited hooks, of which 24% were released alive (Table 6). Almost all interactions involved albatrosses nesting in the Northwestern Hawaiian Islands, comprising Blackfooted albatrosses (65%) and Laysan albatrosses (34%). Between 1994 to 1999, an annual mean of 1388 Blackfooted albatrosses and 1175 Laysan albatrosses were estimated caught and killed each year by the Hawaii longline fishery. Interactions between the Hawaii longline vessels are very rare (Table 7), and in 2000 all seven captured whales and dolphins were released alive.

Table 6. Observed longline gear/seabird interactions, 2000

Seabird Species	Condition		
	Released alive	Returned dead	Total
Black-footed albatross	29	133	162
Laysan albatross	30	55	85
Sooty shearwater	1	0	1
Total	60	188	248

Table 7. Observed longline gear/marine mammal interactions, 2000

Marine mammal species	Condition		
	Released alive	Released dead	Total
Spinner dolphin	1	0	1
Risso's dolphin	1	0	1
Common dolphin	1	0	1
Short-finned pilot whale	1	0	1
Unidentified whale	1	0	1
Unidentified cetacean	2	0	2
Total	7	0	7

As 2000 was an unusual year for the longline fishery, given that it operated under two management regimes, both of which differed from the period 1994-1999. Interaction estimates prepared by the National Marine Fisheries Service's Honolulu Laboratory divided the year into two time periods corresponding to the changes in fishery regulations that took place in August, 2000.

> During Period One (January 1 - August 24, 2000), the fleet was prohibited from fishing within a box (termed "Area A") which was bounded by 28° N, 44° N, 150° W and 168° W (see Figure 1).
>
> During Period Two (August 25 - December 31, 2000), the fleet continued to be prohibited from fishing within Area A, but was also limited to no more than 154 sets (with 100% observer coverage) within the area on either side of Area A and bounded by 28° N and 44° N and between 173° E and 168° W (termed "Area B", see Figure 1). Targeting of swordfish (shallow setting) was prohibited in waters between the equator and 28° N, from 173° E to 137° W ("Area C", see Figure 1).

For this analysis, an interaction was defined as a fishing event that resulted in a hooking or entanglement in longline gear that may or may not result in a serious injury or mortality to that species. Total fleet wide effort is the total number of sets made by the Hawaii-based longline fleet in the time period and area specified. This number does not include sets made by vessels on trips that began in Hawaii but landed in another location. Information on observed interactions is based on data collected by NMFS' observers while information on fishing effort is based on NMFS logbooks filed by fishing vessel captains.

Total fleet wide interactions were estimated using a prediction model that related observer recorded interactions to ancillary (predictor) variables recorded in vessel logbooks. Interactions for unobserved trips were predicted by applying the model to the predictor variables recorded in the vessel logbooks for those trips. The analysis was very similar to that used for estimating 1999 seabird interactions in the NMFS SWFSC Administrative Report H-01-02 (McCracken, 2001). Interaction rates were then calculated as the interactions per set (fleet-wide interactions/fleet-wide effort). Where available, 95% prediction intervals are provided.

Tables 8-11 and 13-16 present the year 2000 estimated interactions between the Hawaii-based longline fishery and sea turtles and seabirds respectively, as well as summary information on observer coverage and fishing effort. A comparison of interaction rates between 1999, and Periods One and Two of 2000 (Tables 12 and 17 for sea turtles and seabirds respectively), reveals that Period One's area closure reduced the interaction rate for loggerhead turtles but was less successful in reducing interactions with other sea turtles or seabirds. However, evidence suggests that Period Two's further area closures and prohibition on shallow setting greatly reduced all interaction rates. Neither of these interaction rates should be directly extrapolated to an annual basis because interaction rates may change throughout the year as a function of behavioral patterns and seabird breeding biology as well as subsequent changes to the regulatory regime governing Hawaii-based domestic longline fishing.

Further regulatory changes have been made in 2001, of most relevance are a prohibition on shallow setting for longline vessels fishing north of the equator and a two month (April - May) area closure between the equator and 15/ N. Based on observer data, it is anticipated that year 2001 interactions and interaction rates will be also be low. Estimates for 2001 will not be available until later in 2002 when all longline logbook and observer data are compiled and inter-linked, and the prediction model applied.

Table 8. Fleet-wide sea turtle interactions with the Hawaii longline fleet during 2000

		Loggerhead	Leatherback	Olive Ridley	Green
Observer coverage (% of trips)	9.9%				
Total fleet wide effort (number of sets)	12,983				
Estimated total fleet wide interactions		114	132	113	65
Estimated fleet wide interactions per set		0.0088	0.0102	0.0087	0.0050

Table 9. Fleet-wide sea turtle interactions with the Hawaii longline fleet during 2000 Time Period One (1/1 - 8/24/2000): Area A closed to longline fishing.

		Loggerhead	Leatherback	Olive Ridley	Green
Observer coverage (% of trips)	4.4%				
Total fleet wide effort (number of sets)	9,156				
Estimated total fleet wide interactions (95% prediction interval)		105 (45-176)	124 (79-174)	100 (41-166)	43 (23-67)
Estimated fleet wide interactions per set (95% prediction interval)		0.0115 (0.005-0.019)	0.0135 (0.009-0.019)	0.0109 (0.004-0.018)	0.0047 (0.003-0.007)

Table 10. Fleet-wide sea turtle interactions with the Hawaii longline fleet during 2000 Time Period Two (8/25 - 12/31/2000): Area A closed to longline fishing, Area B limited to 154 sets (all types), no swordfish targeting in Area C.

		Loggerhead	Leatherback	Olive Ridley	Green
Observer coverage (% of trips)	21.3%				
Total fleet wide effort (number of sets)	3,827				
Estimated total fleet wide interactions (95% prediction interval)		9 (2-21)	8 (5-17)	13 (3-27)	22 (5-43)
Estimated fleet wide interactions per set (95% prediction interval)		0.0023 (0.001-0.006)	0.0021 (0.001-0.005)	0.0034 (0.001-0.007)	0.0057 (0.001-0.011)

Table 11. Fleet-wide sea turtle interactions with the Hawaii longline fleet during 2000 Breakdown of Year 2000 Time Period Two (8/25 - 12/31/2000) by area: Area A closed to longline fishing, Area B limited to 154 sets (all types), no swordfish targeting in Area C.

		Loggerhead	Leatherback	Olive Ridley	Green
Area B interactions (100% observer coverage, no prediction interval required)	100% observer coverage	0	4	0	0
Area B interactions per set		0	0.0488	0	0
Estimated Area C interactions* (95% prediction interval)	21.3% observer coverage	9 (2-21)	4 (1-13)	13 (3-27)	22 (5-43)
Estimated Area C interactions per set (95% prediction interval)		0.0024 (0.001-0.006)	0.0011 (0.0003-0.004)	0.0035 (0.001-0.007)	0.0059 (0.001-0.011)

Table 12. Fleet-wide sea turtle interactions with the Hawaii longline fleet during 1999 (for comparison purposes): No relevant restrictions.

		Loggerhead	Leatherback	Olive Ridley	Green
Observer coverage (% of trips)	3.2%				
Total fleet wide effort (number of sets)	12,776				
Estimated total fleet wide interactions (95% prediction interval)		369 (234-466)	132 (76-193)	164 (111-231)	45 (18-82)
Estimated fleet wide interactions per set (95% prediction interval)		0.0289 (0.018-0.037)	0.0103 (0.006-0.015)	0.0128 (0.009-0.018)	0.0035 (0.001-0.007)

Table 13. Fleet-wide albatross interactions with the Hawaii longline fleet during 2000

		Black- footed albatross	Laysan albatross
Observer coverage (% of trips)	9.9%		
Total fleet wide effort (number of sets)	12,983		
Estimated total fleet wide interactions (95% prediction interval)		1,339 (N/A)	1,094 (N/A)
Estimated fleet wide interactions per set		0.1031	0.0843

Table 14. Fleet-wide albatross interactions with the Hawaii longline fleet during 2000 - Time Period One (1/1 - 8/24/2000): Area A closed to longline fishing.

		Black- footed albatross	Laysan albatross
Observer coverage (% of trips)	4.4%		
Total fleet wide effort (number of sets)	9,156		
Estimated total fleet wide interactions (95% prediction interval)		1,262 (1,060-1,487)	1,081 (751-1,398)
Estimated fleet wide interactions per set (95% prediction interval)		0.1378 (0.1157-0.1625)	0.1181 (0.0820-0.1527)

Table 15. Fleet-wide albatross interactions with the Hawaii longline fleet during 2000- Time Period Two (8/25 - 12/31/2000): Area A closed to longline fishing, Area B limited to 154 sets (all types), no swordfish targeting in Area C.

		Black- footed albatross	Laysan albatross
Observer coverage (% of trips)	21.3%		
Total fleet wide effort (number of sets)	3,827		
Estimated total fleet wide interactions (95% prediction interval)		77 (16-212)	13 (3-43)
Estimated total fleet wide interactions per set		0.0191 (0.0041-.0564)	0.0034 (0.0007-0.0113)

Table 16. Fleet-wide albatross interactions with the Hawaii longline fleet during 2000. Breakdown of Year 2000 Time Period Two (8/25 - 12/31/2000) by area: Area A closed to longline fishing, Area B limited to 154 sets (all types), no swordfish targeting in Area C

		Black- footed albatross	Laysan albatross
Area B interactions (100% observer coverage, no prediction interval required)	100% observer coverage	5	0
Area B interactions per set		0.0610	0
Estimated Area C interactions (95% prediction interval)	21.3% observer coverage	72 (16-212)	13 (3-43)
Estimated Area C interactions per set (95% prediction interval)		0.0192 (0.0042-0.0567)	0.0035 (0.0008-0.0115)

Table 17. Fleet-wide albatross interactions with the Hawaii longline fleet during 1999 totals (for comparison purposes): No relevant restrictions

		Black- footed albatross	Laysan albatross
Observer coverage (% of trips)	3.2%		
Total fleet wide effort (number of sets)	12,776		
Estimated total fleet wide interactions (95% prediction interval)		1,301 (1,021-1,600)	1,019 (688-1,435)
Estimated fleet wide interactions per set		0.1018 (0.0799-0.1253)	.0798 (0.0538-0.1124)

E. USCG Enforcement Activities

The USCG conducted roughly 1000 hours of fisheries patrols with C-130 aircraft in the Central and Western Pacific ocean during fiscal year 2000. The C-130 surveillance of the eight non-contiguous EEZ s was broken down as follows: 60 hours in the Main Hawaiian Islands, 10 hours in the Northwest Hawaiian islands, 270 hours in Guam and the Northern Mariana Islands, 50 hours in American Samoa, 10 hours in Palmyra Atoll/Kingman Reef, 15 hours in Jarvis Island, and 60 hours in Howland/Baker Islands.

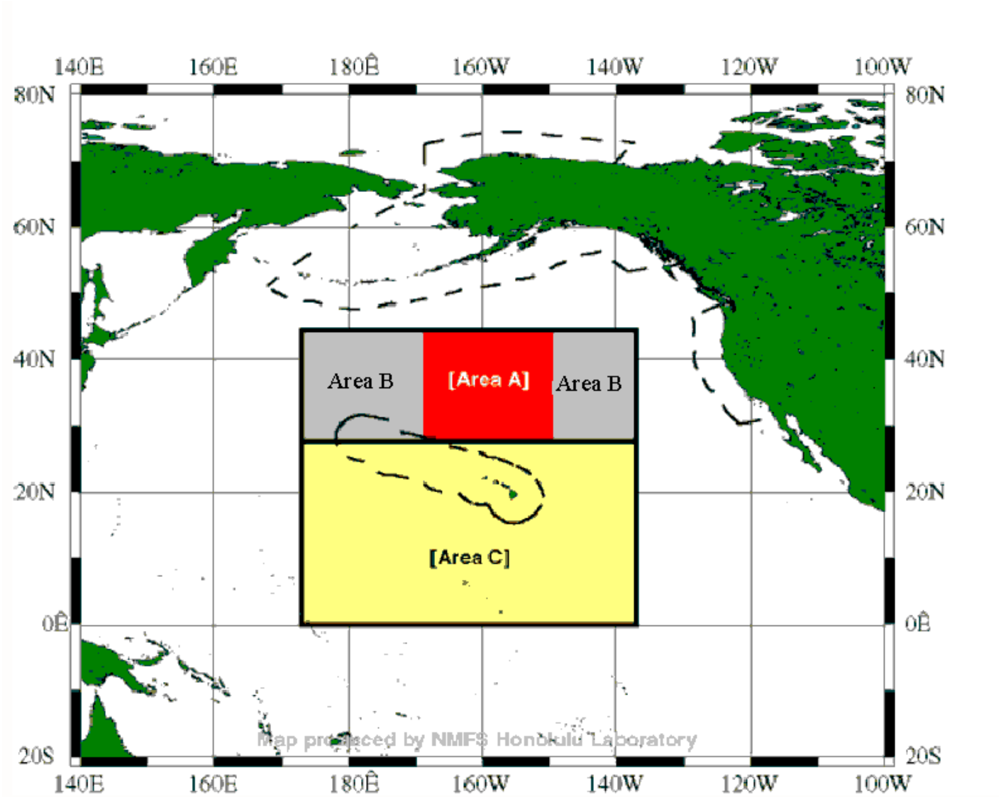


Figure 1. Illustration of year 2000 longline fishing restricted areas. Area A was first implemented in December 1999, while Areas B and C were added in August 2000.

In FY 2000, over 300 cutter days of fisheries patrol was conducted in the Central and Western Pacific ocean. There was a total 184 fishing vessel boardings. The breakdown of vessels boarded is as follows: 159 were U.S and 25 were foreign.

It is estimated that 32 EEZ encroachments by foreign fishing vessels occurred in FY 2000 and only seven 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 2000, including:

In April 2000, F/V SEA MOON II, was detected possibly fishing in the NWHI Protected Species Zone (PSZ), north of Laysan Island. The vessel had been reporting sporadically on the NMFS VMS, and when the VMS signal returned, the SEA MOON II was in the PSZ. A C-130 was dispatched to investigate and document the violation. A case package was forwarded to NMFS for disposition.

F/V CAPT DIAMOND was boarded on 10 June after the NMFS VMS indicated an incursion into the Protected Species Zone around Lisianski Island. The closed area violations were documented and a case package forwarded to NMFS for disposition.

There were also numerous other violations documented on commercial fishing vessels in the region. Noteworthy was a marked increase in the number of manning violations detected on the longline fleet.

F/V LADY CHUL was boarded on 18 February and cited for operation of a U. S. documented vessel without a U. S. citizen as master.

F/V DASHER II was boarded on 19 February and cited for operation of a U. S. documented vessel without a U. S. citizen as master. Additionally, the daily fishing logs appeared to have been fraudulently signed by the vessel owner, who was not on board. The case was turned over to NMFS for further investigation. A second violation by the F/V DASHER II is being investigated.
F/V VUI VUI was boarded on 21 March and cited for operation of a U. S. documented vessel without a U. S. citizen as master. F/V VUI VUI was cited for a second time on 15 August.

F/V CAPT LE was boarded on 18 April and cited for operation of a U. S. documented vessel without a U. S. citizen as master.

F. NOAA Fisheries Office for Law Enforcement Southwest Enforcement Division

Summaries of the Office for Law Enforcement (OLE) in the Western Pacific is given below in Tables 18 and 19.

During the 1st half of FY2000, NMFS OLE's Fisheries Enforcement Advisor to the Forum Fisheries Agency (FFA), was involved with many of the member states of the FFA. Some highlights are: Tuvalu asked for FFA's assistance in taking action against the Solomon Island's flagged purse seiner Alexandros. In reviewing catch report data at FFA, OLE's Advisor found the vessel to have been fishing illegally in Tuvalu. A case package was prepared and forwarded to the island state of Tuvalu. OLE's Advisor also met with the Solomon Islands Assistant Attorney General to discuss a potentially large case against Solgreen, a locally based fishing company. The Advisor had been reviewing member countries licensing lists, port calls and VMS data. It was noted that the 11 Solgreen vessels had been fishing for at least two months in the Solomon Islands EEZ without a license. Solgreen had applied for licensing but have not been able to come up with the money to pay for the licenses. In another matter, OLE Advisor's reviewed VMS data and found what appeared to be illegal fishing by a Korean purse seiner in the Territorial Sea of Papua New Guinea (PNG). FFA then notified PNG Surveillance and recommended that they board the vessel to determine if a violation had actually occurred. As June came to the Solomons, all fishery enforcement activities came to a standstill....

In early June, a military coup took place in the Solomon Islands. The coup was of vital concern to the OLE as the Solomon's capital city, Honiara, was home and duty station to OLE's Fisheries Enforcement Advisor, Special Agent Kevin Painter. The coup, a military takeover by a group that called themselves the Malaitan Eagle Forces, brought about a shutdown to the island nation's commerce. Unfortunately, the coup also brought with it a series of armed battles between the warring ethnic groups in and around Honiara. For ten days, Agent Painter and his family remained at or near the compound of the Australian High Command and were ultimately rescued by the Navy and Special Forces of Australia. Agent Painter and his family were carried to Australia and OLE then brought the group to Long Beach. Ultimately, he was reassigned to a safe duty station, Guam, where he continued to support the Forum Fisheries Agency in all possible ways.

Table 18. Summary of NMFS OLE activities during 1999 and 2000

PROGRAM AREA	ENFORCEMENT HOURS FY99	ENFORCEMENT HOURS FY00
Lacey Act - Federal	2207	1764
South Pacific Tuna Act	318	703
Western Pacific/FFA	1490	1331
Pacific Precious Coral	10	28
Western Pacific Bottomfish	20	08
Western Pacific Pelagics	2488	2392
Western Pacific Tuna	86	65
TOTALS	**6718**	**6291**

Table 19. Summary of NMFS OLE investigations in 2000

INVESTIGATION TYPE	INVESTIGATIONS OPENED
Fail to keep, maintain, or submit logbooks	15
Fishing without valid permit	05
Fishing in closed area	07
Foreign fishing in US EEZ	01
Fail to give 72 hour departure notification	06
Observer interference	03
Failure to affix or maintain Official number	01

In addition to routine activities, OLE launched a comprehensive effort to increase compliance with the Western Pacific Pelagic fishery reporting and record keeping requirements in the waters surrounding American Samoa as well as Hawaii. In this project, Special Agents worked closely with personnel from the NMFS Honolulu Lab, DOCARE, and American Samoa's Division of Marine & Wildlife Resources. A total of 22 cases were initiated as a result of this effort.

The Southwest OLE's VMS continues to serve as guardian of the closed areas surrounding the Hawaiian Islands. During the year, seven vessel potential fishing incursions were documented by the System.

On November 23rd, the US District Court in Hawaii published an order that set terms to an injunction aimed at the NMFS. Of particular interest to Enforcement was the order's language that directs the NMFS to "... prohibit all activities of the Hawaii Longline fishery authorized by the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region, as amended, within the area encompassed and bounded by the following description: north of 28/N and between 168/W and 150/W.". Enforcement responded by working with the Region, HQ, USCG D14, and GC, in their preparations for the closure. Related directly to this court order, VMS Manager Bob Harman took up the task of reprogramming the VMS Base station software. Coordinates for the closure were successfully plugged in and the viewing characteristics of the base station were modified so as to allow monitoring of the closed zone.

In another VMS project, Bob Harman worked with Argos to design and implement a three month VMS trial in American Samoa. Bob Harman traveled to American Samoa with Peter Griffith from North American CLS to install Argos transmitters on two small alia fishing boats. The transmitters were then activated and the vessels were tracked within the architecture of the Southwest Division's VMS. The Samoan fishermen and government representatives were very supportive of the project. Six fishermen volunteered to take turns carrying the transmitters on their boats. The trial demonstrated the feasibility of using VMS as an enforcement tool in fisheries that are comprised of small boats that operate in remote geographical areas.

Appendix 1

Territory of American Samoa

Introduction

The pelagic fishery in American Samoa has historically been an important component of the traditional domestic fisheries. The fishery was first monitored in the mid 1970s and operated on a similar small scale until 1995 when a local longline fishery began developing. Prior to 1985, only commercial landings were monitored. From October 1985 to the present, data were collected through a creel survey that included subsistence and recreational fishing as well as commercial fishing.

Prior to 1995 the pelagic fishery was largely a troll-based fishery. In 1995 the local fishers found longlining to be a worthwhile venture to engage in primarily because they land more pounds with less effort and use less gas for each fishing trip. Apart from a few of bigger (>40ft) inboards participating, the most frequently used are the "alias", twin-hulled (wood with fiberglass or aluminum) boats about 28 plus feet long, and powered by small gasoline outboard engines. Five alias began longlining in 1995. 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 about a 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. Haul back 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 1996 12 alias were involved in the longline fishery. In 1997, 33 vessel had permits to longline, of which approximately 21 were actively fishing on a monthly basis. Also, in 1997, the first large longline vessel of 60 plus feet capable of making multi-day trips began operating in American Samoa. In 1998, 50 local vessel received federal permits to longline but only 25 did longline. In 1999, 59 vessel received federal permits to longline but only 28 participated in the longline fishery. This year, 37 vessels were active in the longline fishery. Also, in 2000 the number of larger multi-day longline boats (>50 ft.) operating in American Samoa grew dramatically to over a half a dozen and is expected to increase in the future.

In September 1990 a Commercial Purchase (receipt book) System was instituted in which all businesses in American 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 American Samoa for any missing data and were then sent to the NMFS Honolulu Lab for further editing and data processing. Starting with 2000, logbook data was entered and maintained in American Samoa and uploaded 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 boats joined the longline fleet and were not yet entered in the DEC system. At the same time many longline boats started making multi-day trips 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 concern 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 1986-2000 in this report has been re-expanded with the new 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 re-expanded and adjusted data. As a result, the graph presentations have also changed.

Total landings data covers all fish caught, brought back to shore and consumed by humans whether it enters the commercial market or not. Commercial Landings covers that portion of the Total Landings that was sold commercially in American Samoa both to the canneries and other smaller local business that buy fish. These landings include both the commercial and recreational/subsistence components of the fishery. Total Landings and 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. The only change to this data and that the various sizes of barracudas were combined into one category, Barracudas. This same species combination was also made for 1991-2000.

One of the problems with the offshore creel survey was that spearfishing and bottomfishing 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 American 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 catch from interviewed vessels in the offshore creel survey system.

The catch of wahoo, albacore, bigeye, skipjack and yellowfin tuna sold to the canneries was added to the commercial landings at canneries prices obtained from the creel survey system. The catch of the species sold to the canneries plus all other kept species was added to the total landings. The weight per fish was calculated from the data in the offshore creel survey system on a monthly basis where possible and on a yearly basis or on a default basis were the monthly data was not available. The weight per fish data was enhanced using sampling data obtained from each non-interviewed vessel as it offloaded at the cannery. The sampled data listed the length for each individual fish which is converted to weight and averaged for each vessel for each month.

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.

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.

Both Offshore Creel Survey and Longline Logbook Data showed almost no By-Catch species during 2000. Bycatch is defined as the released species in the longline logbook system or species in the offshore creel survey system that are either not brought back to shore or are not consumed by humans they are brought back to shore. No fishing tournaments occurred during 2000.

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 21) it does not contain data on distant-waters landings at the canneries. This report partially fulfills the national standard requirement for a Stock Assessment and Fishery Evaluation (SAFE) report.

Summary

The longline fishery has been growing significantly since it began developing in 1995. This reflects a steady increase in total landings since 1995 with a 70% increase this year. This year, 37 vessels were actively involved in the longline fishery, whereas only 19 vessels participated in the trolling fishery. The longline fleet has been targeting albacore mostly for the cannery market and have caused the albacore havest to increase 103 % with a total catch of 1,451,117 pounds in 2000. Local longline fleet deployed 2,810 sets and total of 1,330,574 hooks. Local longlining this year recorded 31 fish per 1000 hooks obtained from logbook data and 24 fish per 1000 hooks obtained from the offshore creel survey data. Troll catches for most of the tunas decreased in 2000. This is probably due to the fishers concentrating more on longlining method than trolling. Prices for pelagic species remained relatively the same this year. Estimated commercial landings increased by 78% this year with a total of 1,831,428 pounds valued at $1,923,583. Overall, estimated total landings for all pelagic species has been increasing since 1993.

1999 Recommendations and Current Status:

1. Integrate creel survey and federal logbook data to provide a more complete picture of the domestic longline fishery, preferably in next years report.

This effort has been completed as described above.

2. Add CPUE comparison between creel survey and log book data in future reports.
This data is presented in Table 3 of this report.

3. Continue to work with WPacFIN to improve and implement algorithms that better represent all offshore fisheries in American Samoa.

This effort has been completed except for issues mentioned in the 2000 Recommendations.

2000 Recommendations:

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.

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.

3. Four new alias entered the longline fishery this year that are berthed in Vatia which is not one of the offshore creel survey sample areas. These vessels are also not covered by the Daily Effort Census (DEC). The creel survey and DEC need to be expanded to address this problem.

4. Collect cannery sampling data for local, large, non-interviewed vessels that lists the length of pelagic species 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.

5. Collect data on receiving vessels that receive fish offloaded to them from other vessels out at sea and factor this into the commercial landings data.

6. It appears that some of the pelagic catch by the larger longliners is being exported to Hawaii and other places. A method needs to be developed and implemented to monitor this exported catch.

Table 1. American Samoa 2000 estimated total landings of pelagic species by gear type.

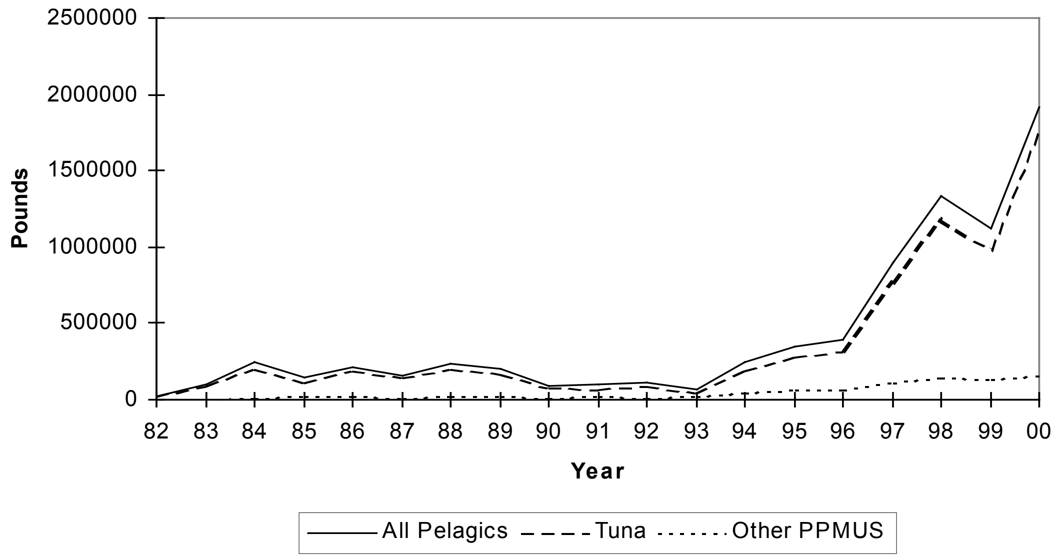
Species	LongLine Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack Tuna	40534	15477	0	56011
Albacore	1451117	8	0	1451125
Yellowfin Tuna	187446	4829	0	192275
Kawakawa	0	121	0	121
BigeyeTuna	52053	0	0	52053
TUNAS SUBTOTALS	1731150	20435	0	1751585
Mahimahi	43845	66	0	43911
Black marlin	777	0	0	777
Blue marlin	50184	623	0	50807
Striped Marlin	770	0	0	770
Wahoo	48867	140	0	49007
Dogtooth tuna	182	2	0	184
Other Sharks	1344	520	0	1864
Swordfish	2030	25	2	2056
Sailfish	2329	0	0	2329
Spearfish	138	0	0	138
OTHER PPMUS SUBTOTALS	150466	1376	2	151844
Barracudas	3484	1054	172	4710
Rainbow runner	0	149	1259	1408
Moonfish	6468	0	0	6468
Oilfish	12	0	0	12
Pomfret	843	0	0	843
MISC SUBTOTALS	10807	1203	1431	13441
TOTAL PELAGICS	**1892423**	**23014**	**1433**	**1916869**

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 2000 estimated commercial landings, value and average price of pelagic species.

Species	Pounds	$/lb	Value ($)
Skipjack tuna	39539	$0.94	$37216
Albacore	1443048	$1.08	$1553476
Yellowfin tuna	174433	$0.93	$162996
Kawakawa	39	$1.03	$40
Bigeye tuna	51711	$0.60	$31095
TUNAS SUBTOTALS	1708770	$1.04	$1784823
Mahimahi	32887	$1.39	$45626
Blue marlin	35693	$0.84	$30008
Wahoo	44690	$1.09	$48654
Dogtooth tuna	184	$1.36	$251
Sharks	308	$0.50	$154
Swordfish	2056	$2.77	$5705
Sailfish	1445	$0.89	$1286
OTHER PPMUS SUBTOTALS	117262	$1.12	$131683
Barracudas	2153	$1.06	$2503
Rainbow runner	1369	$1.97	$2699
Moonfish	1875	$1.00	$1875
MISC SUBTOTALS	5396	$1.31	$7077
TOTAL PELAGICS	**1831428**	**$1.05**	**$1923583**

Figure 1. American Samoa total annual estimated landings: all pelagics, tuna and other PPMUS

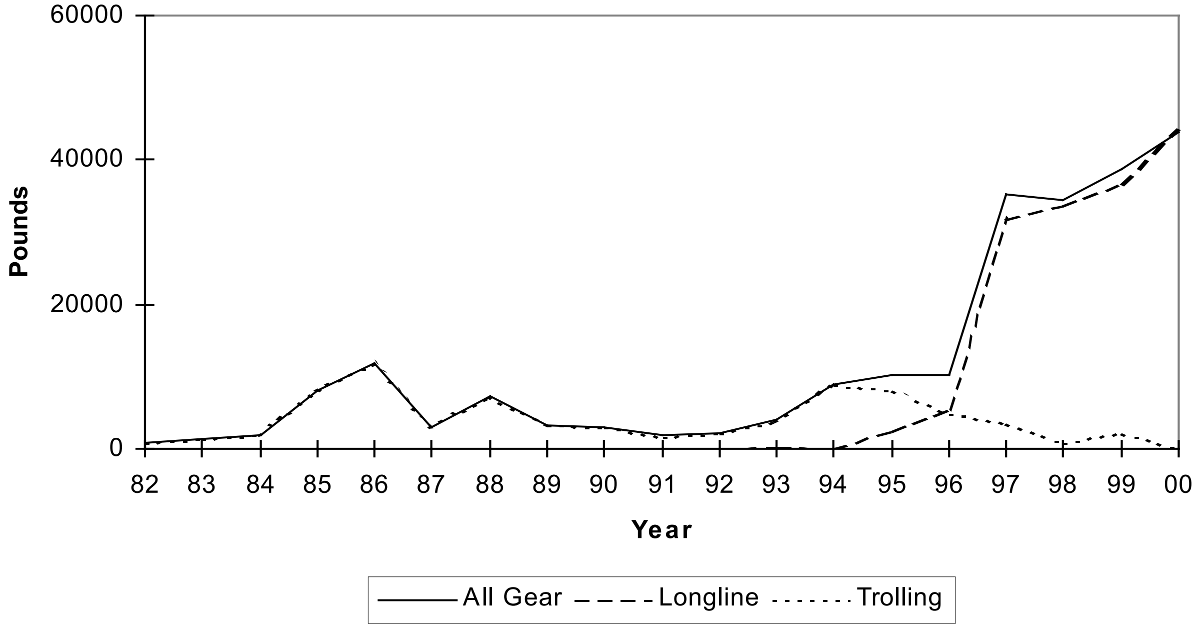


Interpretation: Estimated total landings are variable in the 1980s. But a gradual increase in total landings from 1993 to 1996, where there was a significant increase in landings probably due to an increase in longline effort since 1995. In 1999, for unknown reasons, a trend shows a decrease of 16% even though number of boats and fishing effort increased both for longlining and trolling. An increase of 70% in total landings this year reflects a dramatic increase in the number of larger boats entering the longline fishery.

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. Estimated total landings for All Pelagics represent the sum of the Tuna, Other PPMUS and Miscellaneous categories as defined by Table 1.

	Pounds Landed		
Year	All Pelagics	Tuna	Other PPMUS
1982	26396	23042	2106
1983	96318	90057	4806
1984	241099	198961	15121
1985	143212	107659	19686
1986	214950	186204	27440
1987	157040	144121	12526
1988	235859	205995	26344
1989	200764	173518	23006
1990	91669	78827	10893
1991	96287	71425	22760
1992	108315	92600	13554
1993	68547	45806	20869
1994	242416	187459	49558
1995	351873	282897	63340
1996	390142	315320	69333
1997	893636	767830	111512
1998	1334132	1179950	144211
1999	1125875	973274	139841
2000	1916869	1751585	151844
Average	**417653**	**361923**	**48882**

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. 1997 Mahimahi landings were the largest since then, due to the influxed in longlining starting in 1995. Mahimahi landings continue to rise in 1999 and 2000 with longliners landing 94% of the Mahimahi this year.

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.

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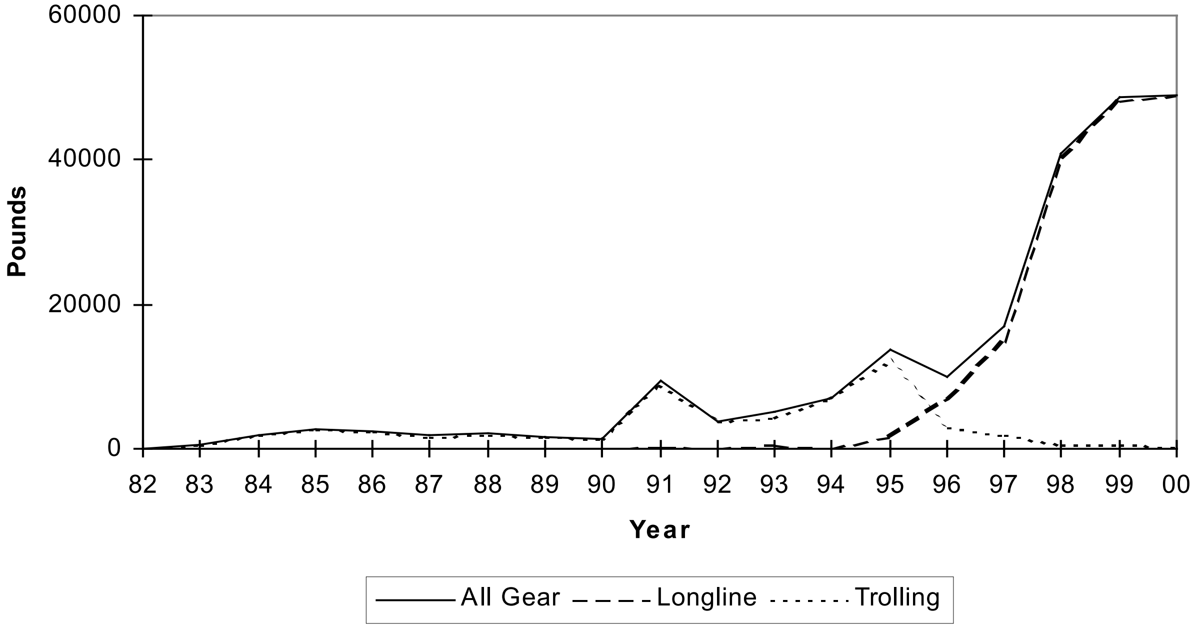
	Pounds Landed		
Year	**All Methods**	**Longline**	**Trolling**
1982	777	0	777
1983	1443	0	1443
1984	1844	0	1844
1985	8011	0	8011
1986	11883	0	11883
1987	3051	0	3051
1988	7165	0	7165
1989	3201	0	3201
1990	3064	0	2971
1991	1868	74	1748
1992	2242	0	2242
1993	4024	215	3809
1994	8967	98	8869
1995	10353	2301	8052
1996	10301	5395	4906
1997	35377	31860	3517
1998	34422	33578	843
1999	38761	36569	2193
2000	43911	43845	66
Average	**12140**	**8102**	**4031**

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

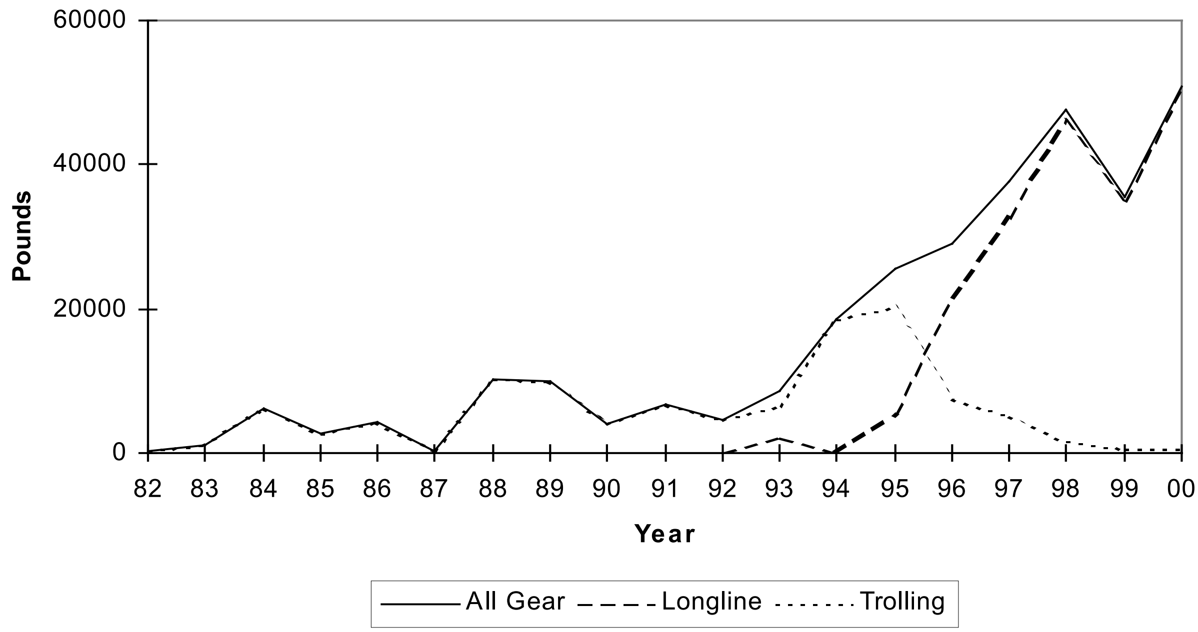


Interpretaion: Wahoo landings increased dramatically from 1997 to 1999 and leveled off in 2000. Longliners took in 99.7% of Wahoo in 2000, but a decrease of 77% in trolling landings. The continuous increase in Wahoo landings is probably due to increases in longline trips and efforts (Figure 12 & 13).

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	**All Methods**	**Longline**	**Trolling**
1982	114	0	114
1983	632	0	632
1984	1777	0	1777
1985	2678	0	2678
1986	2513	0	2413
1987	1798	0	1506
1988	2039	84	1956
1989	1489	0	1489
1990	1308	0	1299
1991	9367	369	8764
1992	3895	0	3848
1993	4978	557	4250
1994	7124	0	7124
1995	13724	1576	11986
1996	10042	6931	2945
1997	16918	14917	2001
1998	40870	40324	487
1999	48748	48113	618
2000	49007	48867	140
Average	**11527**	**8513**	**2949**

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

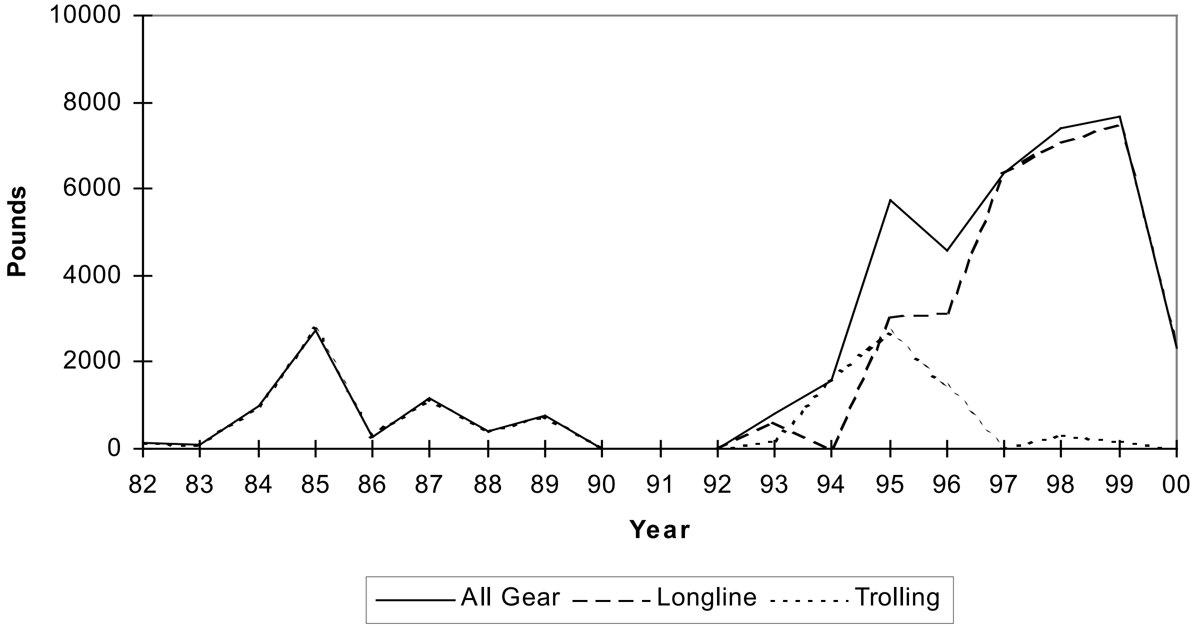


Interpretation: Increases in Blue marlin landings for 1997 and 1998 were due to the increase in longlining trips and efforts, however there was a decrease of 25% in 1999. But landings increased 43% to set a new record high in 2000. In 2000 longliners caught 99% of Blue marlin landings whereas trolling took in only 2%; an increase of 6% from 1999.

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	**All Methods**	**Longline**	**Trolling**
1982	315	0	315
1983	1083	0	1083
1984	6097	0	6097
1985	2574	0	2574
1986	4171	0	4171
1987	265	0	265
1988	10175	0	10175
1989	10012	0	10012
1990	4012	0	4012
1991	6726	0	6726
1992	4524	0	4524
1993	8524	2193	6331
1994	18538	0	18538
1995	25464	5267	20196
1996	28997	21450	7547
1997	37717	32558	5159
1998	47592	46000	1592
1999	35575	34985	590
2000	50807	50184	623
Average	**15956**	**10139**	**5817**

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

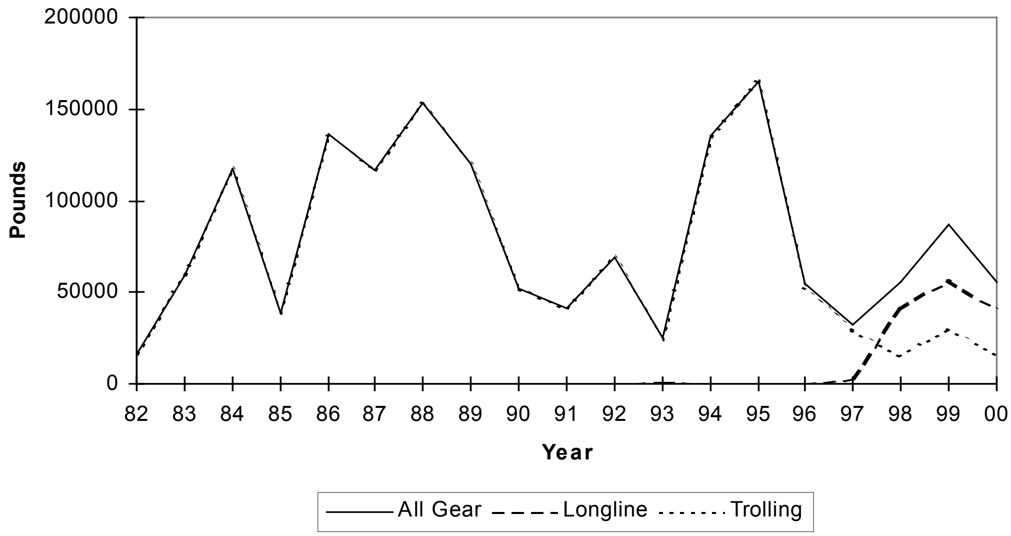


Interpretation: Sailfish landings are variable across time except in 1996 to 1999 when there was a substantial increase in longline fishery. But this year, for uknown reasons, there is a significant decrease of 70% in Sailfish landings.

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	**All Methods**	**Longline**	**Trolling**
1982	127	0	127
1983	74	0	74
1984	989	0	989
1985	2744	0	2744
1986	275	0	275
1987	1188	0	1188
1988	392	0	392
1989	767	0	767
1990	0	0	0
1991	0	0	0
1992	0	0	0
1993	808	626	183
1994	1561	0	1561
1995	5741	3048	2693
1996	4565	3146	1420
1997	6387	6387	0
1998	7401	7086	314
1999	7659	7475	184
2000	2329	2329	0
Average	**2264**	**1584**	**680**

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

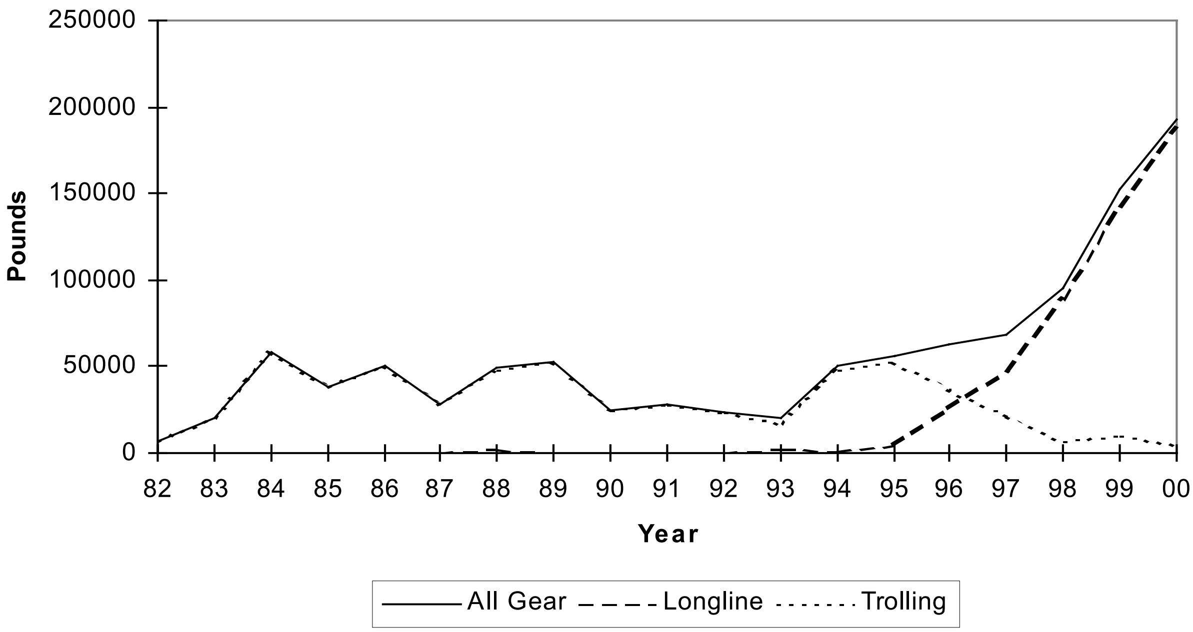


Interpretation: A decrease of 36% in Skipjack tuna landings is probably due to the decrease in fishing trips and efforts (figure 12 & 15) for trolling this year. Also, it reflects the decline (41%) in the number of boats participating in the trolling activities.

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	**All Methods**	**Longline**	**Trolling**
1982	15877	0	15877
1983	58997	0	58997
1984	117693	0	117693
1985	38902	0	38902
1986	135936	0	135936
1987	116505	0	116505
1988	153026	0	152803
1989	120171	0	120171
1990	51669	0	51650
1991	41337	345	40992
1992	68977	0	68977
1993	24803	539	24264
1994	135056	101	134955
1995	165117	160	164957
1996	54598	434	52562
1997	32433	2512	29891
1998	55288	40436	14822
1999	87312	56711	30602
2000	56011	40534	15477
Average	**80511**	**7462**	**72949**

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

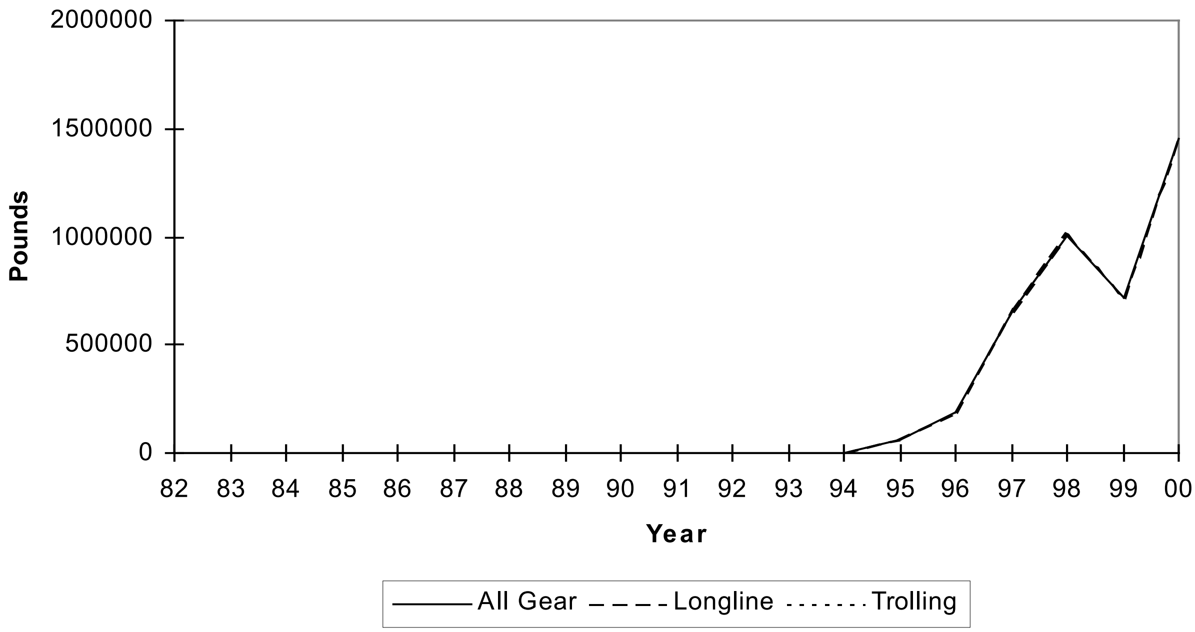


Interpretation: Yellowfin tuna landings varied through out the 1980s and continue to rise since 1995, a period of influx longline activities, with an increase of 60% for all methods this year. Longliners caught 97% of Yellowfin tuna in 2000 probably due to an increase in the number of boats and effort in the longline activities. But a significant decrease of 53% in trolling landings which reflects the decrease in trips and effort in trolling activities.

	Pounds Landed		
Year	**All Methods**	**Longline**	**Trolling**
1982	7038	0	7038
1983	19789	0	19789
1984	58704	0	58704
1985	38586	0	38586
1986	50162	0	50162
1987	27467	0	27467
1988	49877	1775	48101
1989	52479	129	52350
1990	24152	0	24152
1991	27787	262	27525
1992	23247	0	23247
1993	19901	2225	16990
1994	50185	1637	48548
1995	56450	4022	52428
1996	62755	25655	36551
1997	68232	47006	21217
1998	95793	89021	6762
1999	152254	141946	10308
2000	192275	187446	4829
Average	**56691**	**26375**	**30250**

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.

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

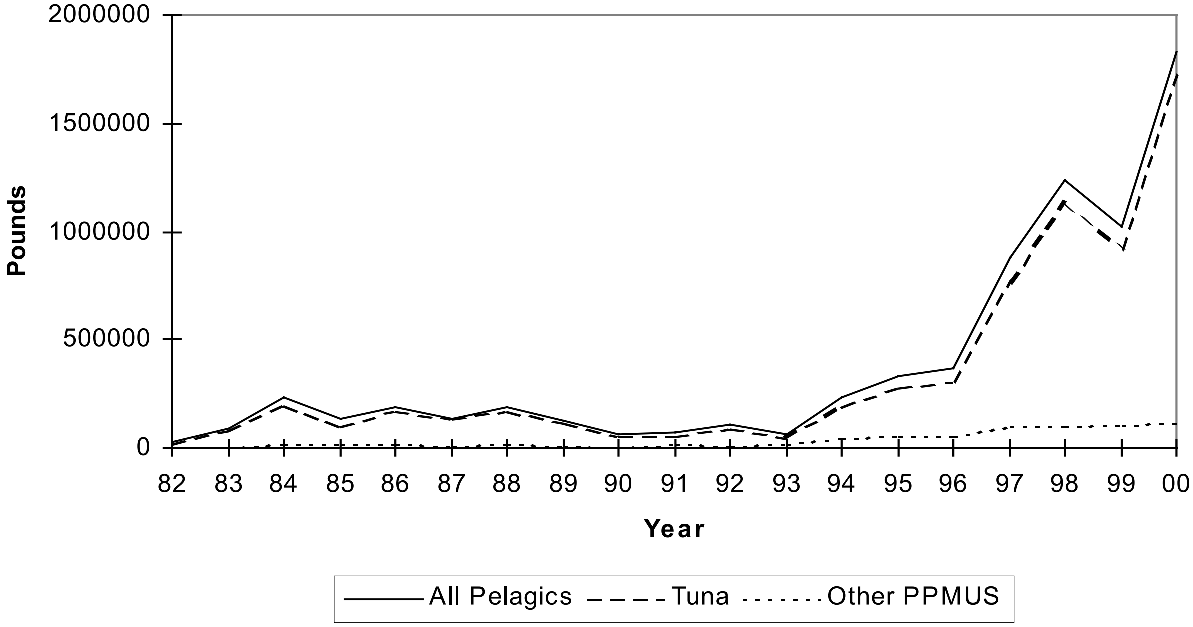


Interpretation: A steady increase in albacore landings continue to rise since 1995, except in 1999 where there was a decrease of 29% even though there was an increase in number sets made and effort in longline activities. But this year, a significant increase of 103% in albacore landings with longlining taking in virtually 99.9% of the catch.

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.

	Pounds Landed		
Year	**All Methods**	**Longline**	**Trolling**
1982	0	0	0
1983	0	0	0
1984	0	0	0
1985	0	0	0
1986	0	0	0
1987	0	0	0
1988	1875	1875	0
1989	244	244	0
1990	0	0	0
1991	1730	1730	0
1992	0	0	0
1993	315	35	269
1994	1572	1572	0
1995	58446	58446	0
1996	189210	189210	0
1997	658827	658827	0
1998	1006371	1006371	0
1999	714567	714567	0
2000	1451125	1451117	8
Average	**214962**	**214947**	**15**

Figure 9. American Samoa annual commercial landings: all pelagics species, tunas and other PPMUS.

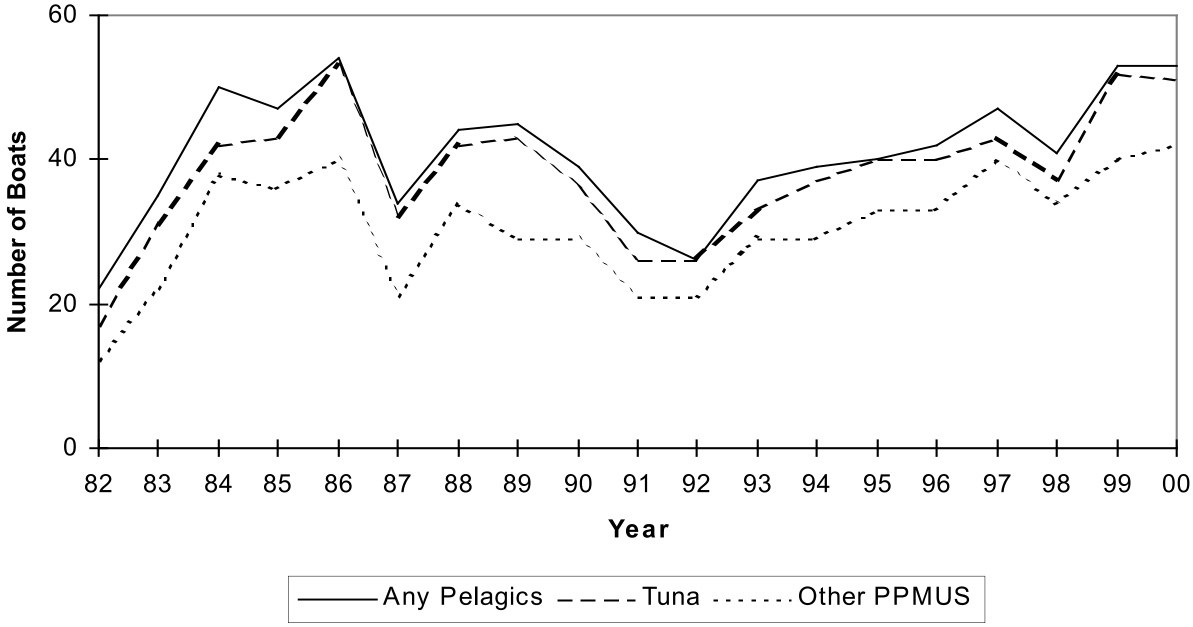


Interpretation: Commercial landings represent 92% of the landings for pelagic species in 1999 and about 96% this year. Much of the increase in landings since 1995 was due to a surge in the longlining effort, however there was a decrease of 17% in 1999. Commercial landings this year continue to rise again with a 78% increase.

	Pounds Landed		
Year	**All Pelagics**	**Tuna**	**Other PPMUS**
1982	24820	22065	1515
1983	90744	85069	4441
1984	236216	196100	13458
1985	131310	99987	17515
1986	186305	166339	18966
1987	138809	132316	6319
1988	188821	171787	14702
1989	127068	114671	9623
1990	60717	55420	4264
1991	75398	57474	16416
1992	103473	88953	12359
1993	61017	43525	15907
1994	234204	186199	42839
1995	336137	276332	54590
1996	366500	309147	52169
1997	875362	765720	96597
1998	1233292	1134463	95482
1999	1026546	914561	110036
2000	1831428	1708770	117262
Average	**385693**	**343626**	**37077**

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. Estimated commercial landings for All Pelagics is the sum of the Tuna, Other PPMUS and Miscellaneous categories as defined by Table 2.

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

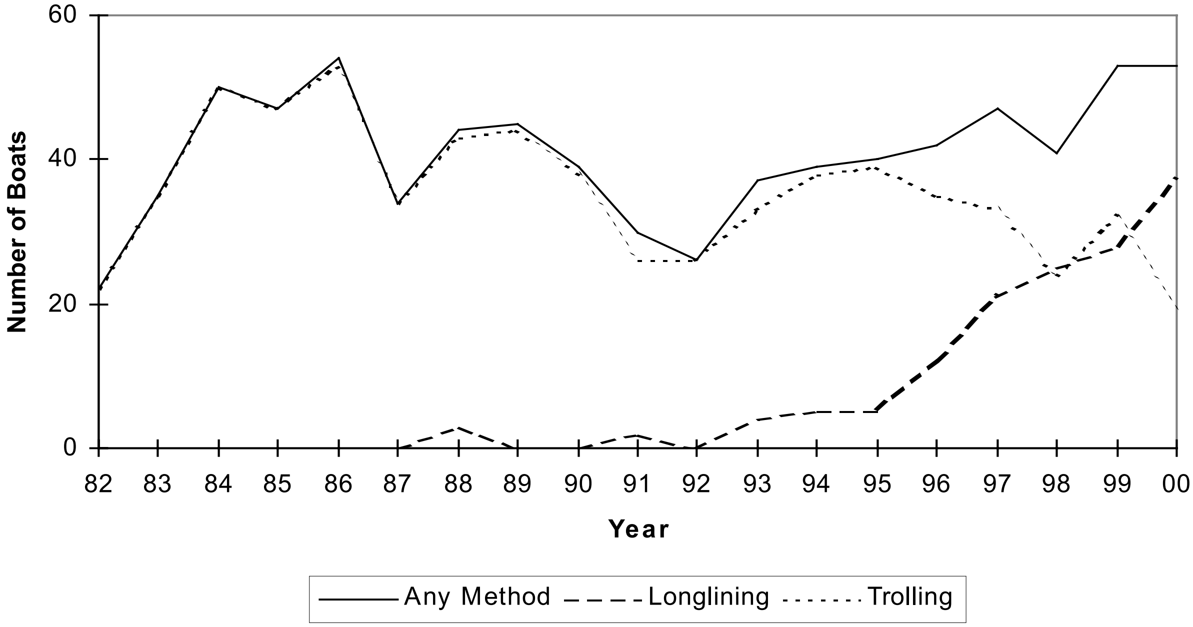


Interpretation: The number of boats participating in the pelagic fishery remained the same this year with an increase of 32% of boats participating in the longline fishery (Figure 11). This reflects the increase in the number of trips and increase in effort for longline fishery.

	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	40
1987	34	32	21
1988	44	42	34
1989	45	43	29
1990	39	36	29
1991	30	26	21
1992	26	26	21
1993	37	33	29
1994	39	37	29
1995	40	40	33
1996	42	40	33
1997	47	43	40
1998	41	37	34
1999	53	52	40
2000	53	51	42
Average	**41**	**38**	**31**

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 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.

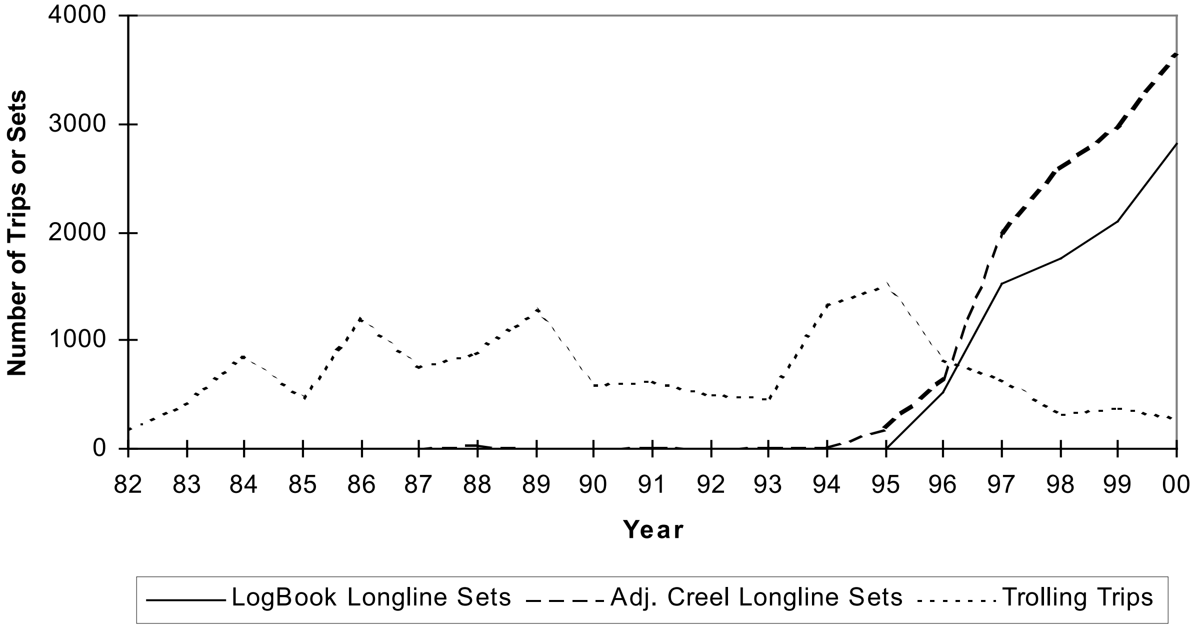


Interpretation: Boats using longline method increased by 32% this year, whereas boats using trolling method decreased by 41%. In 1999, only 28 boats participated in the longline fishery from a total of 59 boats that received federal permits. This year, 37 boats were active in the longline fishery and only 19 boats were active in the trolling fishery.

	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	53	28	32
2000	53	37	19
Average	**41**	**7**	**35**

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 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 decreased by 24% while longline number of sets for creel survey increased by 21% and longline number of sets for logbooks submitted increased by 33%. This reflects the increase in the number of boats switching over to longline fishery.

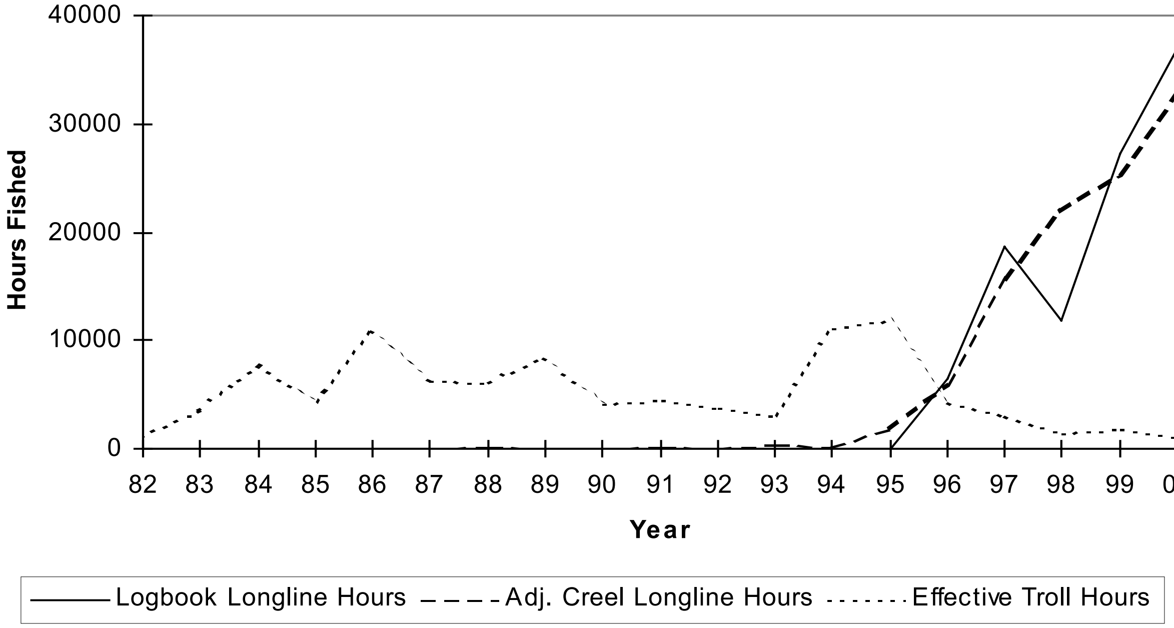
Calculation The number of Troll Trips is calculated by first subtracting the total longline pounds of Table 1 from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips, from the offshore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

		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	1207	0	0
1987	754	0	0
1988	876	0	31
1989	1273	0	3
1990	587	0	0
1991	635	0	21
1992	506	0	0
1993	464	0	17
1994	1327	0	19
1995	1505	0	184
1996	834	528	650
1997	644	1529	1994
1998	316	1754	2583
1999	375	2100	2982
2000	283	2810	3618
Average	**710**	**459**	**637**

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 all vessels submitting logbooks which include those interviewed in the creel survey plus those landing directly at the canneries

Prior to 1997, when the fleet consisted only of smaller vessels that were included in the creel survey, 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 larger vessels.

Figure 13. American Samoa fishing effort for all pelagic species by method.



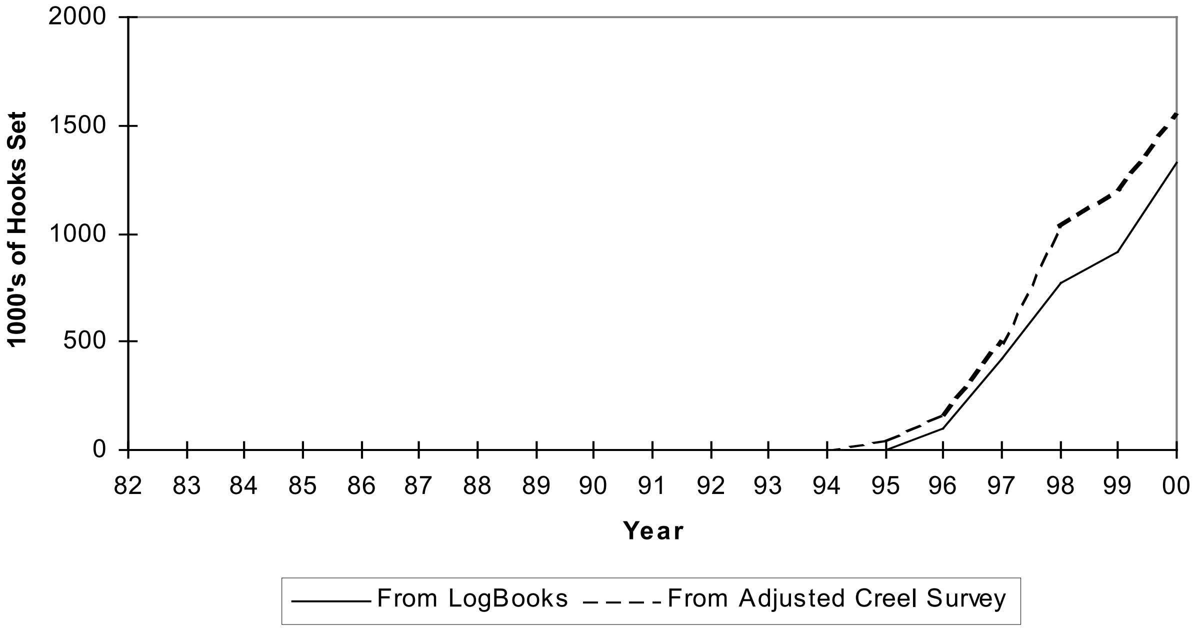
Interpretation: The number of hours using trolling method decrease by 38% is probably due to the decrease in the number of trolling trips and the number of boats participating in trolling activities in 2000. Logbook longline hours fished increased significantly from 1996 to 1997, but for some reason it declined in 1998. It gradually increased again from 1999 to 2000. Creel longline hours fished shows a steady increase since 1995 is probably due to increase in number of fishermen switching over to longline fishery.

	Number of Hours Fished Using		
Year	Trolling (Effective)	Longline Logbook	Longline Creel (Adj.)
1982	1019	0	0
1983	3513	0	0
1984	7785	0	0
1985	4394	0	0
1986	11014	0	0
1987	6198	0	0
1988	6119	0	198
1989	8396	0	17
1990	4136	0	0
1991	4417	0	164
1992	3748	0	0
1993	3065	0	299
1994	11184	0	156
1995	11785	0	1824
1996	4365	6403	5877
1997	3087	18712	15662
1998	1405	11890	21851
1999	1788	27345	25235
2000	1116	36954	32686
Average	**5186**	**5332**	**5472**

Calculation: The number of effective Trolling 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 hours. The number of longline hours fished 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 the beginning of the set time to the end of the haul time.

Prior to 1997, the number of longline hours fished using creel survey data is the expanded number of longline fishing 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.

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



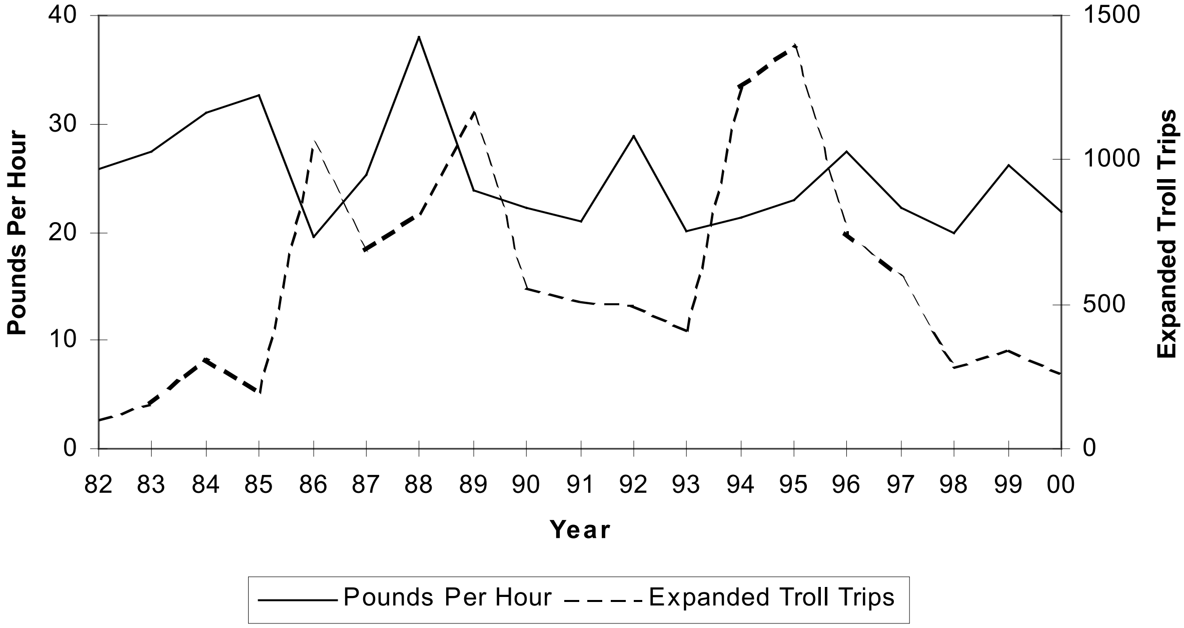
Interpretation: The number of hooks used in 2000 increased by 28% according to the creel survey and by 45% according to the logbook monitoring system. A steady increase in the number of hooks set by the longline fishery has been seen since 1996. However, the rate of increase is slowing indicating that 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 of the number of hooks for the sets entered in the longline logbook system for non-interviewed vessels.

	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	493
1998	767	1030
1999	912	1204
2000	1331	1546
Average	**186**	**236**

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 88% of the total troll catch. 2000 CPUE is lower than 1999 due to decreased CPUEs for most pelagic species caught by trolling (Figure 16 and 17). The 23% increase in the number of trips in 1999 may be due to increase in the number of boats that participated in the trolling fishery. However, the number of trips decreased 24% this year.

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. The Trips is the expanded number of purely trolling trips from the offshore creel survey system.

Year	CPUE	Trips
1982	25.91	104
1983	27.41	156
1984	30.97	311
1985	32.59	193
1986	19.52	1054
1987	25.34	686
1988	37.94	817
1989	23.87	1155
1990	22.16	557
1991	20.93	509
1992	28.90	495
1993	20.17	407
1994	21.37	1250
1995	23.01	1390
1996	27.36	746
1997	22.29	589
1998	19.93	280
1999	26.19	343
2000	21.94	261
Average	25.15	595

Table 3. **American Samoa 1997 - 2000 catch rates for the creel interviewed portion of the longline fishery comparing Logbook and Creel Survey Data**

	Number of Fish Per 1000 Hooks							
	1997		1998		1999		2000	
Species	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**
Skipjack Tuna	1.18	.604	3.78	4.01	4.59	4.69	1.81	1.96
Albacore	31.7	31.2	28.6	20.4	18.0	13.3	18.8	14.6
Yellowfin Tuna	2.65	2.52	2.60	2.29	6.23	4.38	6.33	3.39
BigeyeTuna	.355	.139	.325	.109	.657	.197	.432	.218
Mahimahi	2.26	2.85	1.87	1.85	2.08	1.77	1.58	1.73
Blue marlin	.633	.613	.571	.499	.461	.384	.428	.482
Wahoo	.889	.853	2.25	2.03	1.89	1.54	1.09	.861
Dogtooth tuna				.004				
Other Sharks	.012	.174	.053	.094	.010	.028		.036
Swordfish	.049	.008	.043	.022	.040	.009	.019	
Sailfish	.176	.219	.048	.140	.005	.129	.027	.062
Barracudas		.870		.416		.188		.299
Rainbow runner		.006		.009		.023	.004	
Moonfish	.089	.161	.076	.074	.068	.124	.063	.195
Oilfish	.040		.030	.039	.016	.007	.004	
Pomfret	.006		.003		.028		.019	.027

Interpretation: The longline fishery in American Samoa is a newly emerging fishery since 1995. This table compares the interview versus logbook reported catch rates of the vessels included in the creel survey. Catch rates of the major targeted species are fairly comparable between the two monitoring systems, but catch rates of other species are more variable and less comparable. According to both monitoring programs there was a decline in the catch rate of albacore, the primary target species, for 3 years and the 2000 rates was about the same as last year.

Calculation: This Table compares the CPUE's of only the creel interviewed longline vessels. 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 interviewed 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.

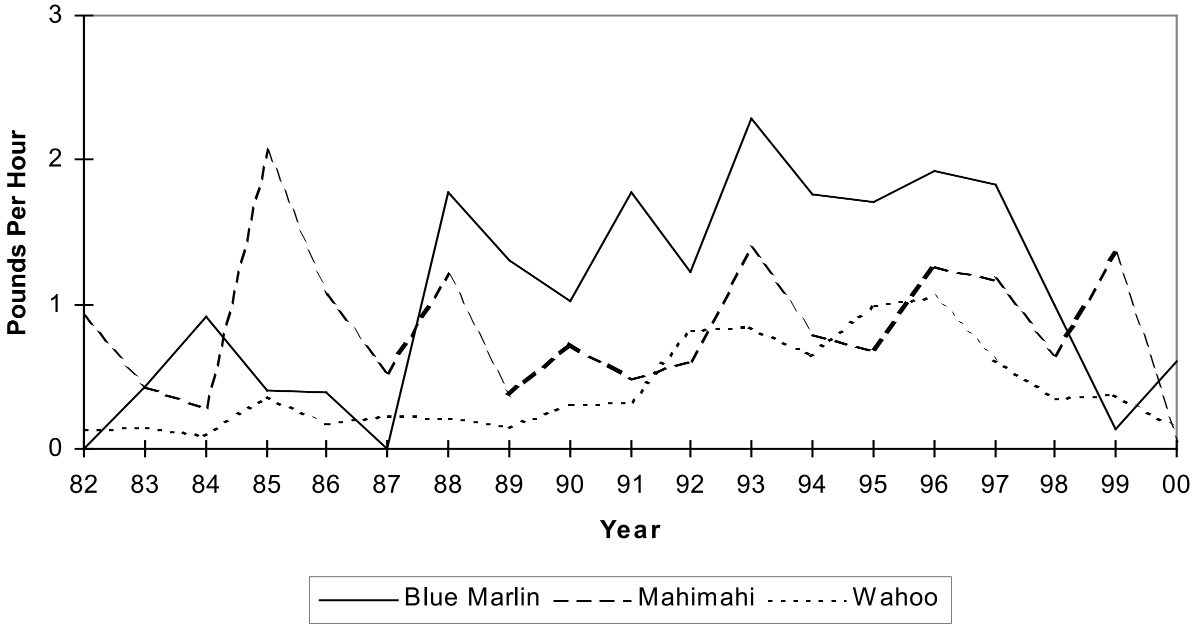
Table 4. American Samoa 1997-2000 estimated average lbs. per fish by species for the longline fishery .

Species	Average Lbs. per Fish 1997	1998	1999	2000
Skipjack Tuna	8.4	12.4	9.7	11.3
Albacore	44.0	45.7	42.7	45.0
Yellowfin Tuna	44.2	46.4	33.5	37.0
BigeyeTuna	82.8	79.2	57.1	63.9
Mahimahi	25.6	23.3	22.3	25.1
Blue marlin	117.7	119.5	101.5	111.5
Wahoo	38.4	26.3	27.3	32.8
Dogtooth tuna		10.0		
Other Sharks	96.8	112.1	38.0	39.5
Swordfish	100.0	212.6	12.0	
Sailfish	69.0	67.0	61.8	39.1
Barracudas	14.4	14.8	11.0	12.8
Rainbow runner	14.0	17.5	6.5	
Moonfish	68.6	33.5	57.7	30.0
Oilfish		12.7	10.0	
Pomfret				18.3

Interpretation: Average size for most of the pelagic species remained stabled this year. In 1999 longline boats began landing their catches gilled and gutted to obtain higher prices at the canneries. . WPacFIN implemented modification to the data system which converts gilled and gutted weights to appropriate round weights for all species.

Calculation: The average pounds per fish for each species was calculated from the creel survey interview data by dividing the total pounds of each species by the number of fish of that species caught during the year in question.

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

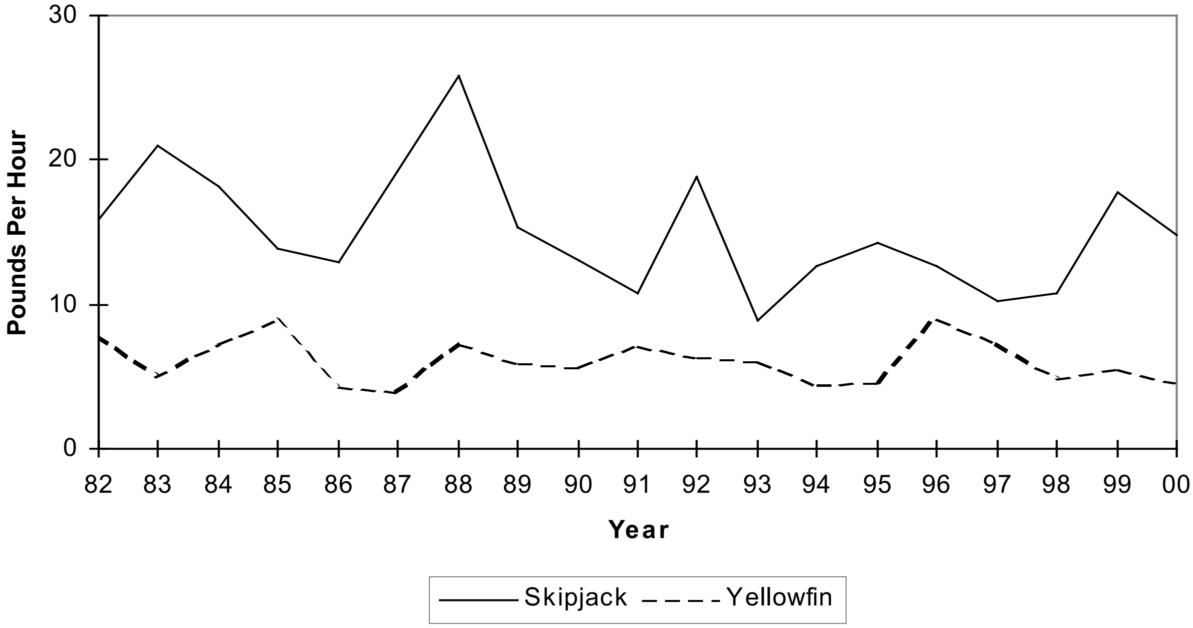


Interpretation: Blue marlin CPUE is variable but generally increased over time until about 1996 when it began a notable decrease. It is not known if this decrease has any relationship to the huge growth in the longline fishery during this time span. Mahimahi CPUE peaked in the mid-eighties, when an exported market existed for this species. Since that time, Mahimahi CPUE has been variable and dropped to a record low this year. Wahoo CPUE seemed fairly stable in the 1980s and then increased substantially from 1992-1996. Since 1996 Wahoo catch rates have dropped, but this may not be related to the increase in longline activities. On the other hand, this could an indication of "localized over-fishing" and interactions.

	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	0.14	1.34	0.37
2000	0.61	0.06	0.14
Average	**1.08**	**0.84**	**0.42**

Calculation: The values for each of the three species are 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

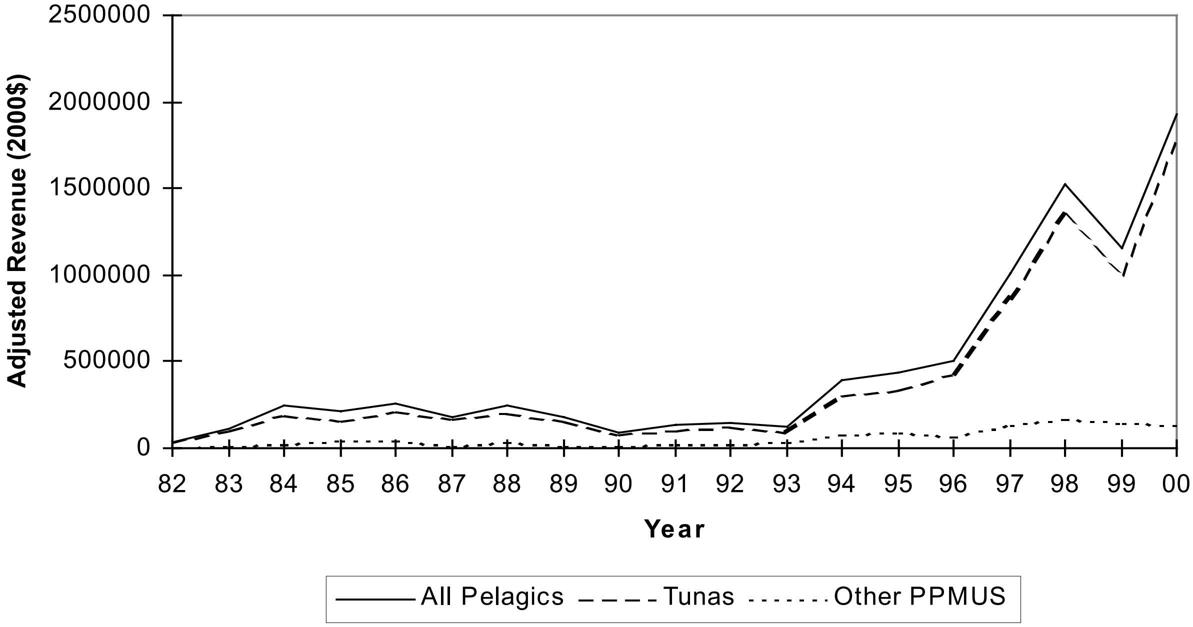


Interpretation: Total pelagic species CPUE is predominantly the combined Skipjack and Yellowfin CPUE shown in Figure 17, as these two species contributed about 88% of the total troll catch. 2000 CPUE was lower than 1999 due to decreased CPUEs for most species caught by trolling (Figure 16&17). The 41% decrease in the number of boats in 2000 may be due to increase in the number boats switching over to the longline fishery.

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 hours fished 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	17.70	5.52
2000	14.80	4.64
Average	**15.09**	**6.09**

Figure 18. American Samoa annual inflation-adjusted revenue for commercially landed pelagic species.

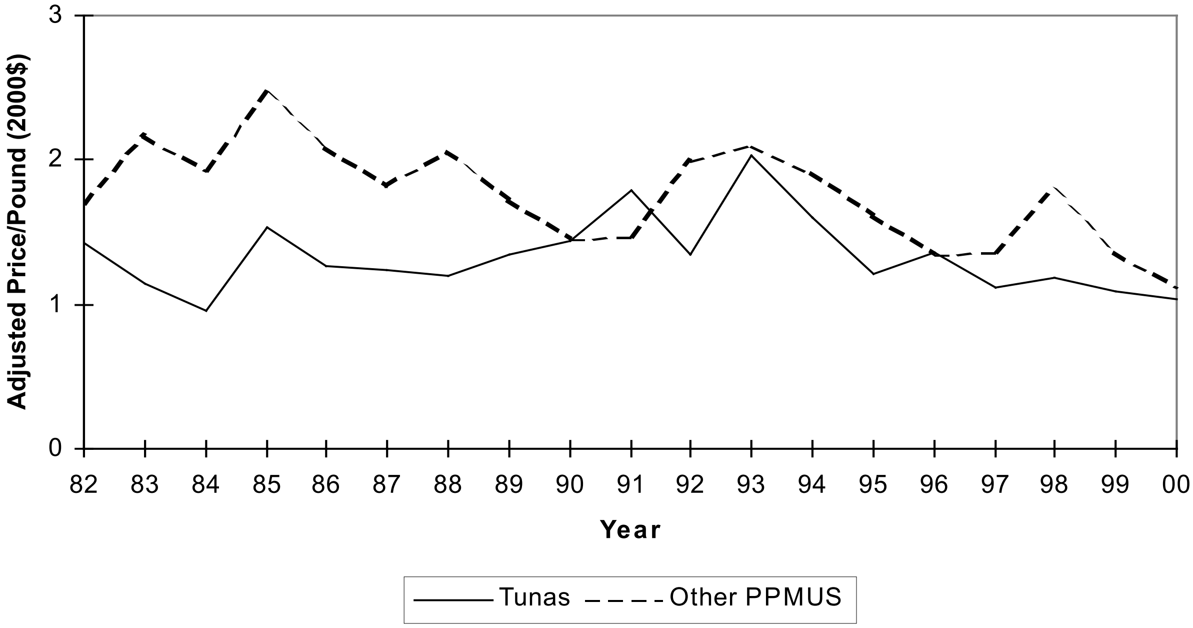


Interpretation: Revenues for commercial landings of all pelagic species decreased in 1999 but increased for all pelagic species this year. This is probably due to the dramatic increase of 78% in commercial landings for this year (Figure 9).

		Revenue ($)					
		All Pelagics		Tunas		Other PPMUS	
Year	CPI	Unadjust	Adjusted	Unadjust.	Adjusted	Unadjust.	Adjusted
1982	100.0	$21824	$36359	$18990	$31637	$1534	$2556
1983	100.8	$66254	$109584	$58561	$96860	$5828	$9640
1984	102.7	$153571	$249092	$114981	$186499	$15938	$25851
1985	103.7	$131961	$212061	$95157	$152917	$26800	$43068
1986	107.1	$162390	$252679	$135894	$211451	$25474	$39637
1987	111.8	$117730	$175535	$109807	$163721	$7686	$11460
1988	115.3	$166907	$241180	$142728	$206241	$20933	$30248
1989	120.3	$127531	$176758	$111506	$154547	$11940	$16548
1990	129.6	$68551	$88156	$62226	$80023	$4820	$6198
1991	135.3	$105495	$129969	$83477	$102844	$19506	$24031
1992	140.9	$125860	$148893	$101009	$119493	$20832	$24644
1993	141.1	$105828	$125089	$74914	$88549	$28236	$33375
1994	143.8	$335489	$388832	$256571	$297366	$70528	$81742
1995	147.0	$381903	$433078	$295381	$334962	$77285	$87641
1996	152.5	$457248	$499772	$384946	$420746	$64329	$70311
1997	156.4	$949810	$1012497	$805770	$858950	$123450	$131598
1998	158.4	$1452265	$1527783	$1284011	$1350779	$162162	$170595
1999	159.9	$1109976	$1156594	$960275	$1000607	$144081	$150132
2000	166.7	$1923584	$1923584	$1784823	$1784823	$131683	$131683
Average	**131.2**	**$419167**	**$467763**	**$362159**	**$402264**	**$50687**	**$57419**

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. he 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.

Figure 19. American Samoa average inflation-adjusted price for tunas and other PPMUS.



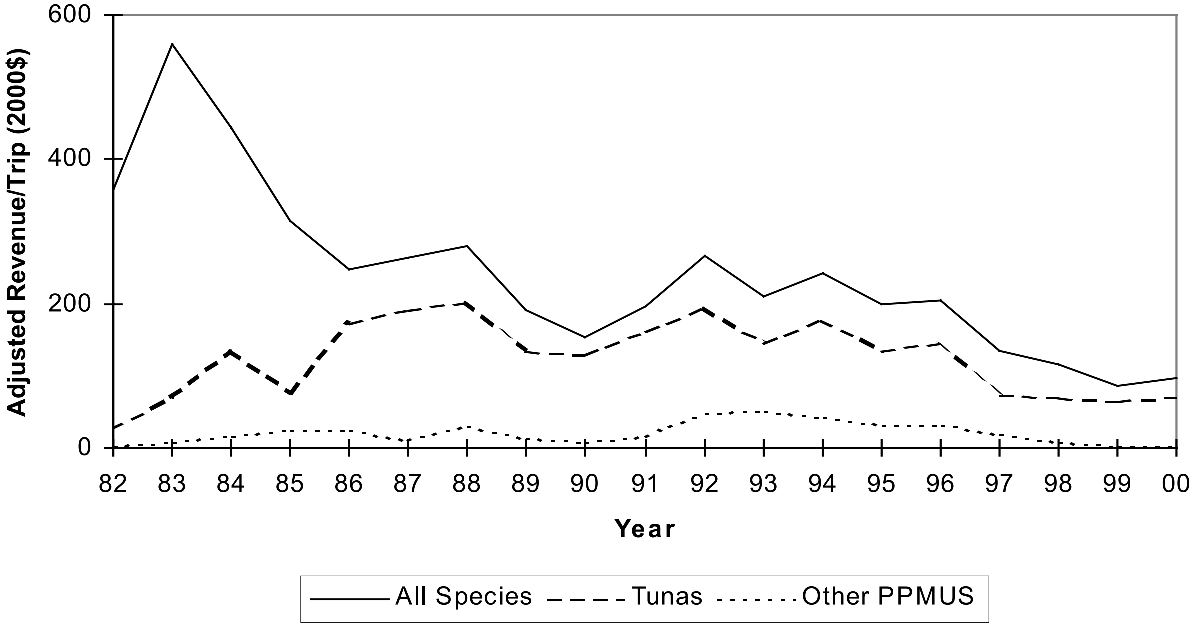
Interpretation: Prices for tuna increased 5% in 1998, but decreased by 8% in 1999 and remained relatively the same this year. The overall decrease since 1993 may be due to the lower price that the canneries pay per pound of tuna than the local stores and restaurants may pay. Prices in general for pelagic species remained low, 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 influx of longline catches that make to the local markets probably contribute to the prices being low.

	Average Price/Pound ($)			
	Tunas		Other PPMUS	
Year	Unadjust.	Adjusted	Unadjust.	Adjusted
1982	$0.86	$1.43	$1.01	$1.69
1983	$0.69	$1.14	$1.31	$2.17
1984	$0.59	$0.95	$1.18	$1.92
1985	$0.95	$1.53	$1.53	$2.46
1986	$0.82	$1.27	$1.34	$2.09
1987	$0.83	$1.24	$1.22	$1.81
1988	$0.83	$1.20	$1.42	$2.06
1989	$0.97	$1.35	$1.24	$1.72
1990	$1.12	$1.44	$1.13	$1.45
1991	$1.45	$1.79	$1.19	$1.46
1992	$1.14	$1.34	$1.69	$1.99
1993	$1.72	$2.03	$1.78	$2.10
1994	$1.38	$1.60	$1.65	$1.91
1995	$1.07	$1.21	$1.42	$1.61
1996	$1.25	$1.36	$1.23	$1.35
1997	$1.05	$1.12	$1.28	$1.36
1998	$1.13	$1.19	$1.70	$1.79
1999	$1.05	$1.09	$1.31	$1.36
2000	$1.04	$1.04	$1.12	$1.12
Average	**$1.05**	**$1.33**	**$1.36**	**$1.76**

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 20. American Samoa average inflation-adjusted revenue per trip landing Pelagic Fish for trolling method.



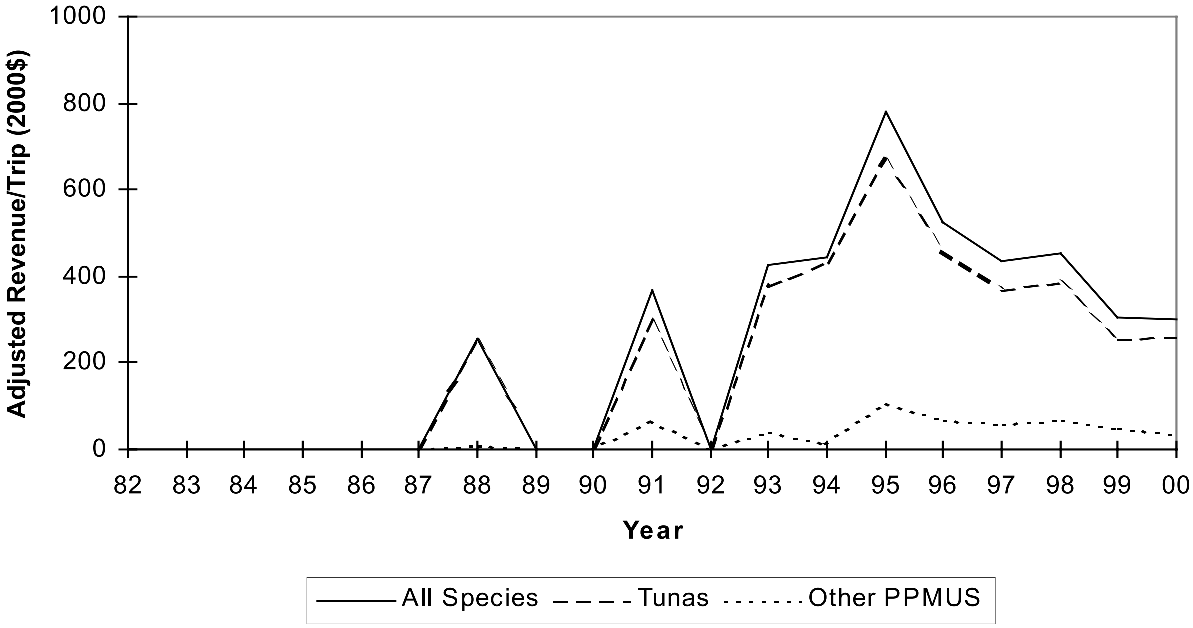
Interpretation: Revenue per trip (all species) decreased by 25% in 1999, setting a new record low, and remained relatively the same this year. This may be due to the overall decrease in price per pound for all pelagic species sold at the canneries and the local markets.

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 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	$357	$214	$27	$16	$2.2	$1.3
1983	$559	$338	$71	$43	$8.6	$5.2
1984	$444	$274	$133	$82	$17.0	$10.5
1985	$315	$196	$75	$47	$25.4	$15.8
1986	$247	$159	$172	$111	$25.1	$16.1
1987	$264	$177	$192	$129	$11.2	$7.5
1988	$280	$194	$201	$139	$28.9	$20.0
1989	$190	$137	$134	$97	$12.8	$9.2
1990	$155	$120	$130	$101	$8.5	$6.6
1991	$197	$160	$160	$130	$14.9	$12.1
1992	$266	$225	$192	$163	$47.8	$40.4
1993	$209	$177	$146	$124	$51.3	$43.4
1994	$242	$209	$178	$154	$43.7	$37.7
1995	$199	$175	$135	$119	$33.6	$29.6
1996	$204	$186	$146	$133	$31.0	$28.4
1997	$134	$126	$74	$69	$18.2	$17.1
1998	$116	$110	$71	$68	$6.7	$6.4
1999	$87	$83	$65	$62	$3.3	$3.2
2000	$96	$96	$70	$70	$1.5	$1.5
Average	**$240**	**$177**	**$125**	**$98**	**$20.6**	**$16.4**

Figure 21. American Samoa average inflation-adjusted revenue per trip landing PPMUS for longline method.



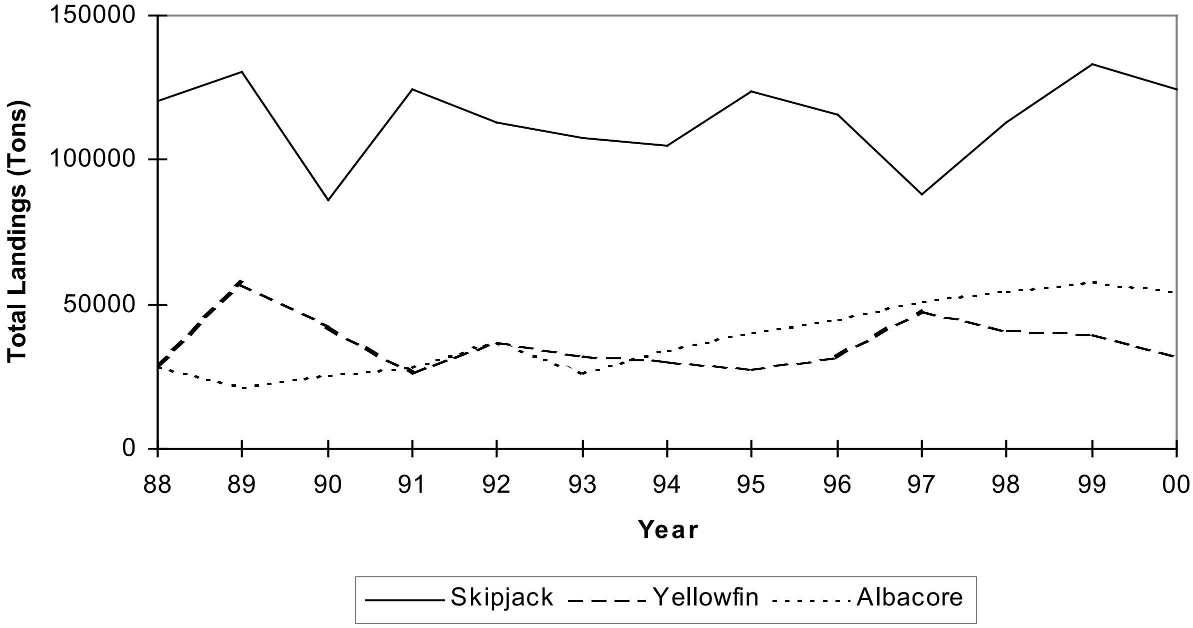
Interpretation: The longline revenue per trip decreased by 33% in 1999 and 3% in 2000. This may be due to a steady decrease of price per pound for tunas since 1998. In addition, competition from frozen fish purchased from foreign longline vessels moored in Pago Harbor and from fishes imported from neighboring islands may have contributed to the decline in revenue per trip this year.

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.

Year	All Species		Tunas		Other PPMUS	
	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	$257	$178	$250	$173	$6.8	$4.7
1989	$0	$0	$0	$0	$0.0	$0.0
1990	$0	$0	$0	$0	$0.0	$0.0
1991	$370	$300	$295	$239	$67.6	$54.9
1992	$0	$0	$0	$0	$0.0	$0.0
1993	$427	$361	$379	$320	$39.6	$33.5
1994	$443	$383	$431	$372	$12.5	$10.8
1995	$781	$689	$666	$587	$109	$96.2
1996	$524	$480	$456	$417	$65.0	$59.5
1997	$435	$408	$369	$346	$58.3	$54.7
1998	$455	$432	$384	$365	$69.2	$65.8
1999	$307	$295	$258	$247	$47.4	$45.5
2000	$299	$299	$262	$262	$36.5	$36.5
Average	**$226**	**$201**	**$197**	**$175**	**$27.0**	**$24.3**

Figure 22. Total cannery landings for skipjack, yellowfin, and albacore tuna.



Interpretation: The quantity of fish landed at American Samoa's canneries exceeds local landings by a factor of a thousand. Though some locally caught pelagics, especially albacore, are sold to the canneries, the vast majority of the fish landed have been taken in distant water fisheries. Cannery landings have remained essentially stable for the last several years, though albacore landings have increased across time.

	Short Tons Landed		
Year	Skipjack	Yellowfin	Albacore
1988	120500	28800	28200
1989	130800	57500	21400
1990	86300	42600	25700
1991	124400	26200	28500
1992	113200	37200	36900
1993	107400	32200	26000
1994	105248	30496	34601
1995	123771	27640	40328
1996	115654	31611	45340
1997	88421	47710	50911
1998	112764	41306	54540
1999	133079	39765	57981
2000	124391	31981	54657
Average	**114302**	**36539**	**38851**

Calculation: Cannery landings are from the monthly landings summary reports supplied by the canneries. The values in these reports are adjusted to round weight by dividing gilled and gutted and loins weights in the reports by the appropriate conversion factors for each of the three species.

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 466 in 1996 and has remained stable 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 and charters 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 147 and 422 tons. Total pelagic landings in 2000 were approximately 275 tons, a decrease of 4% compared with 1999. Landings in 2000 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 mahimahi, wahoo, marlin, and tuna landings. Yellowfin tuna landings increased from 1983 to 1985, declined from 1985 to 1987, increased from 1987 to 1999, then increased in 2000. Blue marlin landings show a general increase from 1983 to 1990, decrease from 1990 to 1993, increased from 1993 to 1997, then fluctuates. Skipjack tuna landings declined until 1987, show a general increase until 1996, generally declines until 1999, then increases in 2000. Wahoo landings have fluctuated over the past 17 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 trip length and trolling hours decreased compared with 1999, and trolling effort in terms of total hours fished per total trolling trips increased compared with 1999. Charter boat activity decreased for the fourth year in a row, due to a drop in tourism as a result of the Asian economic crisis. Charter trolling trips decreased 26% in 1998, decreased 10% in 1999, and decreased 7% in 2000. Charter boats, which make up less than 10% of the pelagic fleet, account for 23% of all trolling trips, 15% of the pelagic catch, and 18% of hours spent trolling. Charter boats caught 22% of the mahimahi landings, 34% of the blue marlin landings, 11% of the skipjack landings, 5% of the yellowfin landings, and 17% of the wahoo landings
.
Trolling catch rates vary widely for all pelagic species. Trolling 2000 catch rate decreased for mahimahi, wahoo, and yellowfin, and increased for blue marlin and skipjack tuna. CPUE for non-charter boats decreased 2% and charters increased 23% from 1999.

Commercial landings and commercial revenues of all pelagics, tuna, and non-tuna PPMUS increased in 2000. Inflation-adjusted revenues per trolling trip show a general decline, although in 2000 there is an increase 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.

1999 Recommendations and Current Status

1. Continue with the reprocessing and editing of data back to 1980.
   Reprocessing and editing of data back to 1982 has been included in the report.

2. Report bycatch, and obtain software to deal with summarization of bycatch data.
   Bycatch for 2000 has been included in the report.

2000 Recommendations

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

Tables

Figures

Table 1. Guam 2000 creel survey - pelagic species composition

	2000	2000	2000
Species	**Pounds**	**Charte**	**Non charter**
Sharks	1,248	0	1,248
Mahimahi	84,887	18,844	66,043
Wahoo	72,473	10,392	62,081
Blue Marlin	86,981	30,699	56,282
Striped Marlin	0	0	0
Sailfish	46	0	46
Shortbill Spearfish	0	0	0
Dogtooth Tuna	7,728	220	7,508
Double-lined Mackerel	0	0	0
Subtotal PPMUS	**253,363**	**60,155**	**193,208**
Skipjack Tuna	273,851	30,183	243,668
Yellowfin Tuna	86,700	2,457	84,243
Bigeye Tuna	0	0	0
Kawakawa	4,978	586	4,392
Other Tuna	0	0	0
Subtotal Tunas	**365,529**	**33,226**	**332,303**
Rainbow Runner	9,362	412	8,950
Barracudas	8,235	17	8,218
Other	0	0	0
Subtotal Misc.	**17,597**	**429**	**17,168**
Assorted Troll Fish	660	0	660
Total Pelagics	**643,149**	**93,810**	**543,339**

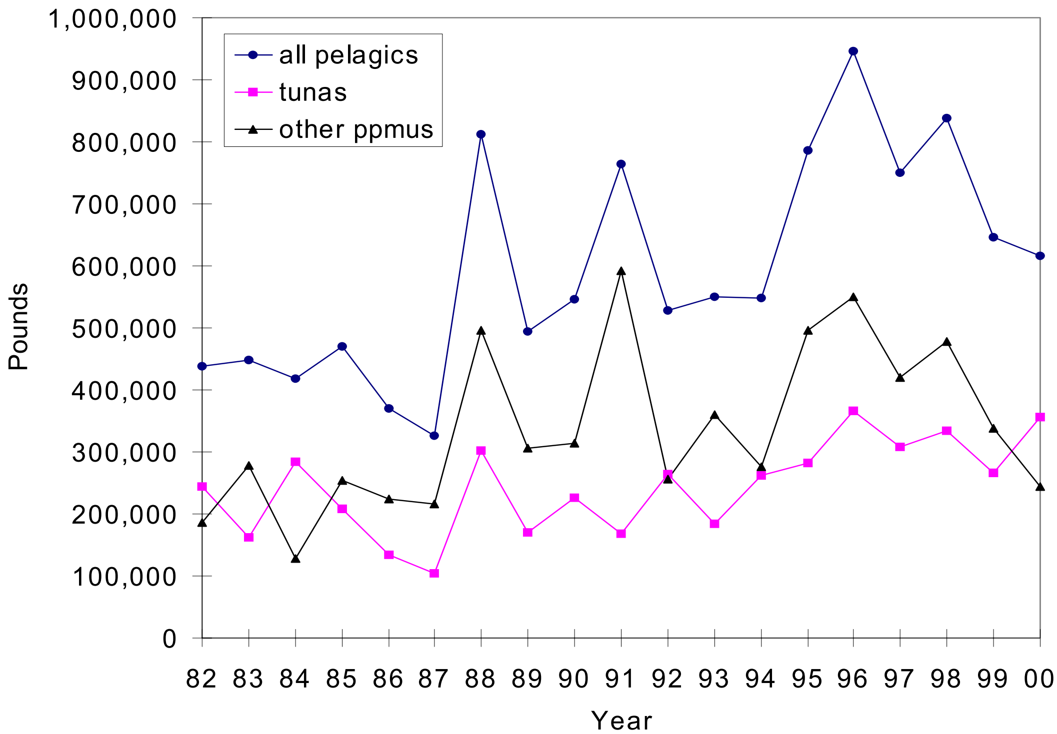
Table 2. Guam 2000 average commercial price of pelagic species

Species	**2000 Average Price ($/lb.)**
Mahimahi	2.19
Wahoo	2.18
Marlin	1.16
Spearfish	1.50
Sailfish	1.33
Dogtooth Tuna	1.39
Average Other PPMUS	1.82
Skipjack Tuna	1.27
Yellowfin Tuna	1.90
Kawakawa	1.37
Average Tuna	1.41
Rainbow Runner	2.06
Barracuda	2.08
Average All Pelagics	1.64

Table 3. Annual Consumer Price Indexes and CPI Adjustment Factors (Reference Only)

Year	CPI	CPI_Adjustment Factor
1980	134.0	3.77
1981	161.4	3.13
1982	169.7	2.98
1983	175.6	2.88
1984	190.9	2.65
1985	198.3	2.55
1986	203.7	2.48
1987	212.7	2.37
1988	223.8	2.26
1989	248.2	2.04
1990	283.5	1.78
1991	312.5	1.62
1992	344.2	1.47
1993	372.9	1.35
1994	436.0	1.16
1995	459.2	1.10
1996	482.0	1.05
1997	482.5	1.05
1998	485.3	1.04
1999	494.9	1.02
2000	505.0	1.00

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



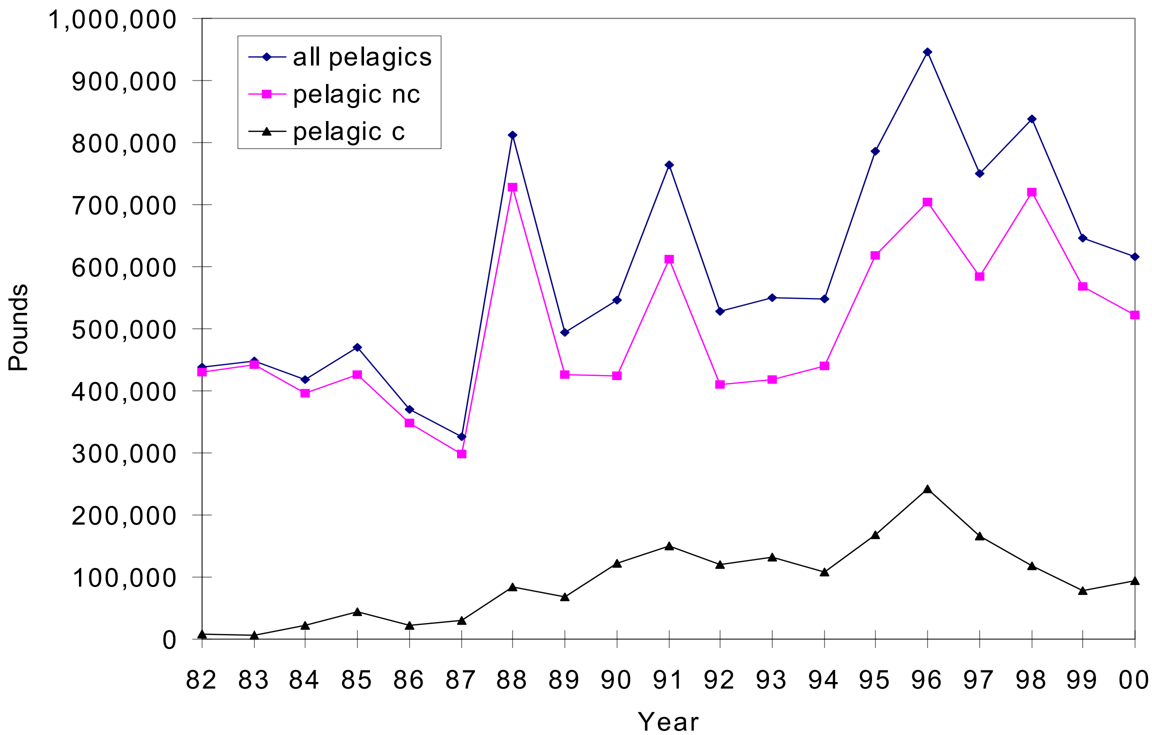
Interpretation: The general trend of the estimated total landings has increased over the past 14 years with an increase in trolling boat activity although a general decrease is observed from 1996. Because of an interest in targeting blue marlin, mahimahi, and a lack of interest in skipjack tuna, the bulk of the pelagic catch consist primarily of non-tuna PPMUS. Tunas and other PPMUS consist of 58% and 40% of the total pelagic landings in 2000. The total pelagic landings decreased 4% and non-tuna PPMUS decreased 27% from 2000. Tuna landings increased 34% from 1999. The increase in tuna landings is due to an increase in the CPUE of skipjack tuna.. The decrease in total pelagic landings and non-tuna PPMUS could be due to a decrease in CPUE of other pelagic species along with a decrease in the number of boats participating.

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**
83	447,956	162,334	278,173
84	418,038	284,899	127,711
85	470,320	207,027	254,954
86	368,877	133,570	224,911
87	328,318	104,534	217,134
88	811,221	301,785	495,782
89	494,174	170,722	305,837
90	546,385	225,926	313,551
91	761,565	168,800	590,020
92	530,642	264,392	257,290
93	550,056	184,532	359,498
94	547,261	261,665	275,036
95	786,272	282,587	495,160
96	944,216	365,855	548,756
97	750,112	308,538	419,810
98	837,577	334,991	477,950
99	643,345	265,941	336,219
00	616,617	355,710	244,362
Average	**594,268**	**243,396**	**337,358**
Std deviation	**175,909**	**75,326**	**131,722**

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



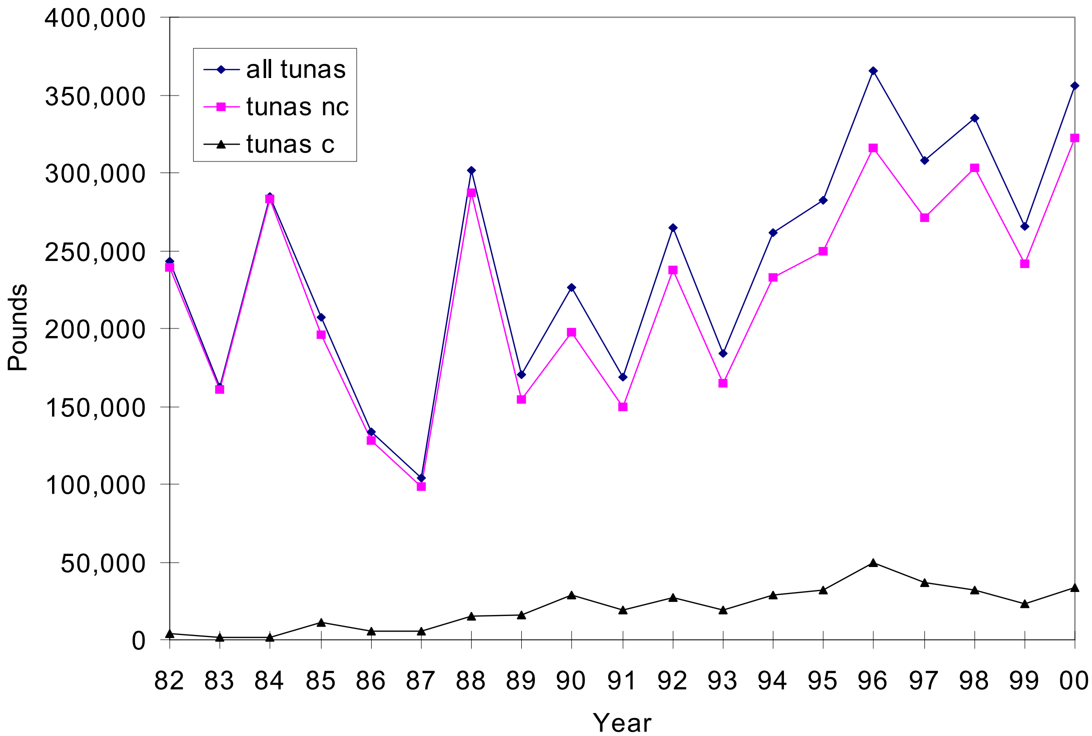
Interpretation: The general trend of the estimated total landings has increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the pelagic catch. Prior to 1988, non-charters accounted for over 90% of the catch. Beginning in 1988, 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 2000, pelagic non-charters accounted for 85% of the total pelagic catch while pelagic charters accounted for 15%. Pelagic non-charter decreased 8% and pelagic charter increased 23% from 1999. This year's decrease in non-charter landings could be due to a decrease in non-charter trolling effort along with a decrease in the number of boats participating while the increase in charter landings could be due to an increase in charter effort.

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**
83	447,956	442,301	5,655
84	418,038	395,678	22,361
85	470,320	425,791	44,528
86	368,877	347,138	21,740
87	328,318	298,385	29,933
88	811,221	727,154	84,067
89	494,174	426,524	67,651
90	546,385	423,725	122,660
91	761,565	611,025	150,540
92	530,642	411,292	119,350
93	550,056	418,248	131,809
94	547,261	440,074	107,187
95	786,272	618,925	167,347
96	944,216	702,879	241,337
97	750,112	583,500	166,612
98	837,577	719,243	118,335
99	643,345	566,030	77,314
00	616,617	521,627	94,990
Average	**594,268**	**500,463**	**93,806**
Std. Deviation	**175,909**	**128,820**	**63,420**

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



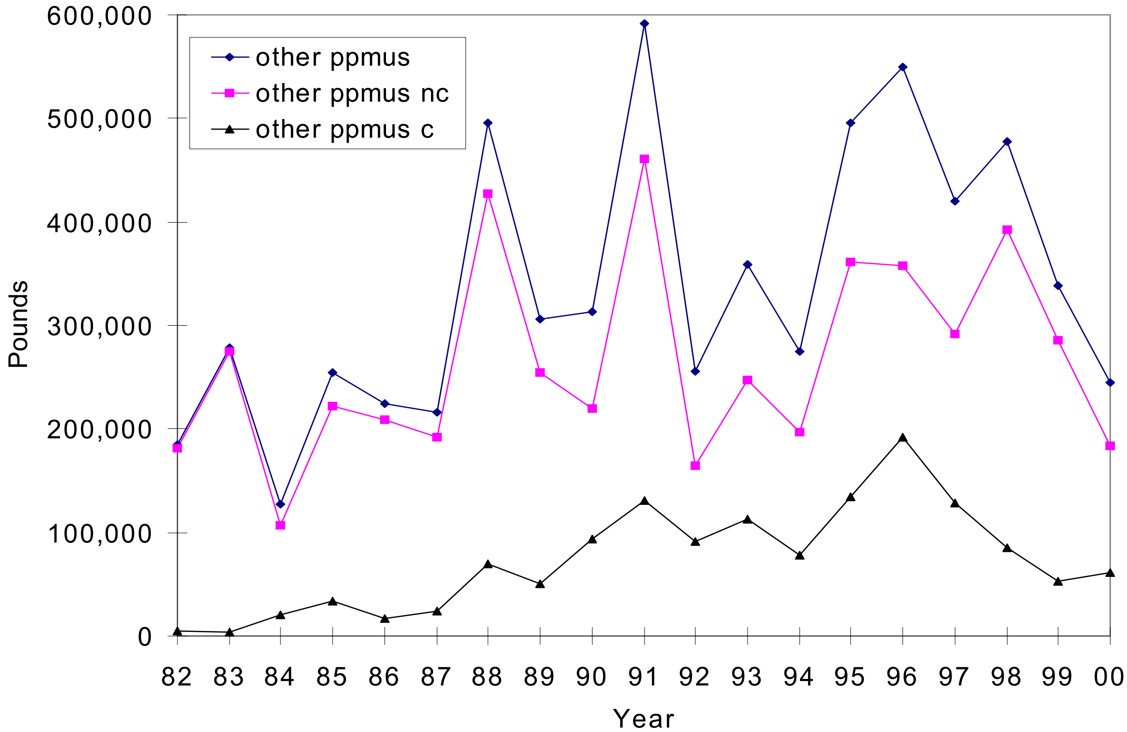
Interpretation: The general trend of the estimated total tuna landings has increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the tuna catch. In the 1980's, non-charters accounted for over 95% of the catch. This percentage decreased 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. For 1999, tuna non-charters account for 91% of the total tuna catch while tuna charters account for 9%. Tuna non-charter increased 33% and tuna charter increased 43% from 1999. This year's increase in non-charter and charter landings could be due to a increase in trolling effort.

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	**Tunas**	**Tunas_nc**	**Tunas_c**
83	162,334	160,613	1721
84	284,899	283,340	1559
85	207,027	196,020	11,007
86	133,570	128,201	5369
87	104,534	98,820	5714
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
Average	**243,396**	**222,792**	**20,604**
Std. Deviation	**75,326**	**66,591**	**13,597**

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



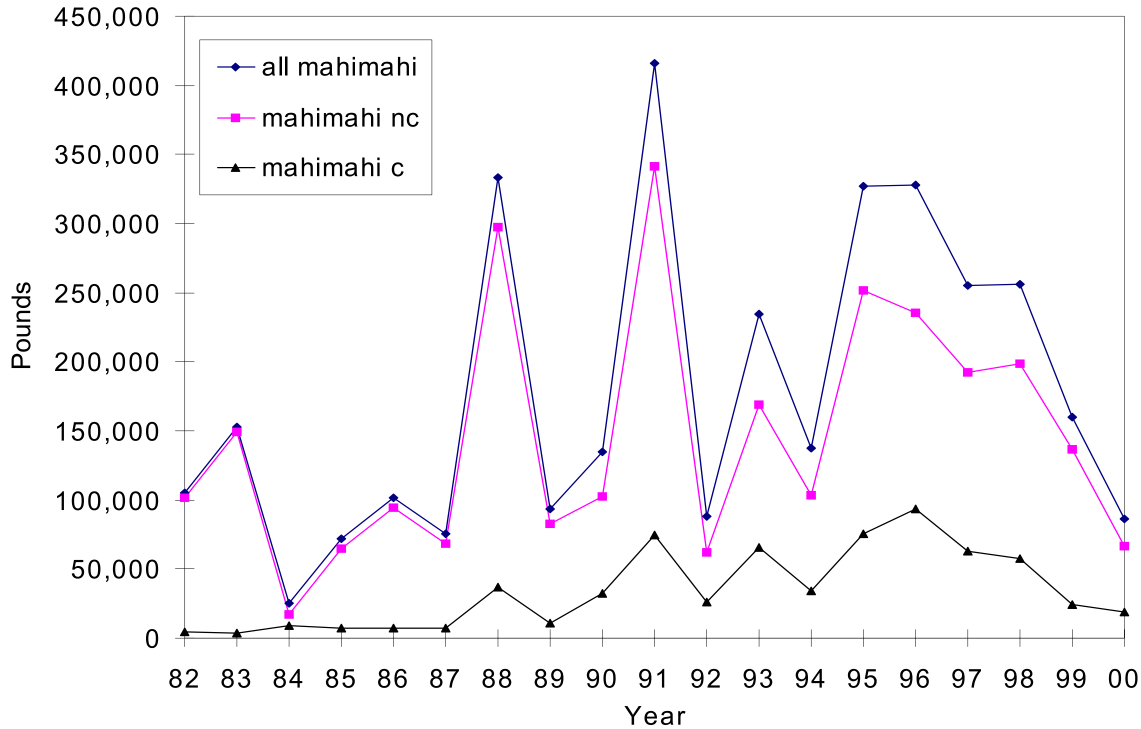
Interpretation: The general trend of the estimated total other PPMUS landings has generally increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the other PPMUS catch. In the 1980's, other PPMUS non-charters accounted for over 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 2000, other PPMUS non-charters accounted for 75% of the total other PPMUS catch while other PPMUS charters accounted for 23%. Other PPMUS non-charters decreased 35% and other PPMUS charters increased 15% from 1999. The decrease in other PPMUS non-charter could be due to a decrease in non-charter trolling effort along with a decrease in the number of boats participating while the increase in other PPMUS charter landings could be due to an increase in charter trolling effort.

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**	**PPMUS nc**	**PPMUS c**
83	278,173	274,240	3934
84	127,711	106,910	20,802
85	254,954	221,446	33,508
86	224,911	208,633	16,279
87	217,134	193,177	23,957
88	495,782	426,729	69,053
89	305,837	254,876	50,961
90	313,551	220,083	93,468
91	590,020	458,773	131,247
92	257,290	166,207	91,083
93	359,498	247,031	112,467
94	275,036	197,014	78,022
95	495,160	361,077	134,082
96	548,756	357,485	191,271
97	419,810	291,351	128,459
98	477,950	392,220	85,730
99	336,219	283,240	52,979
00	244,362	183,426	60,937
Average	**337,358**	**264,565**	**72,793**
Std. Deviation	**131,722**	**95,971**	**51,250**

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



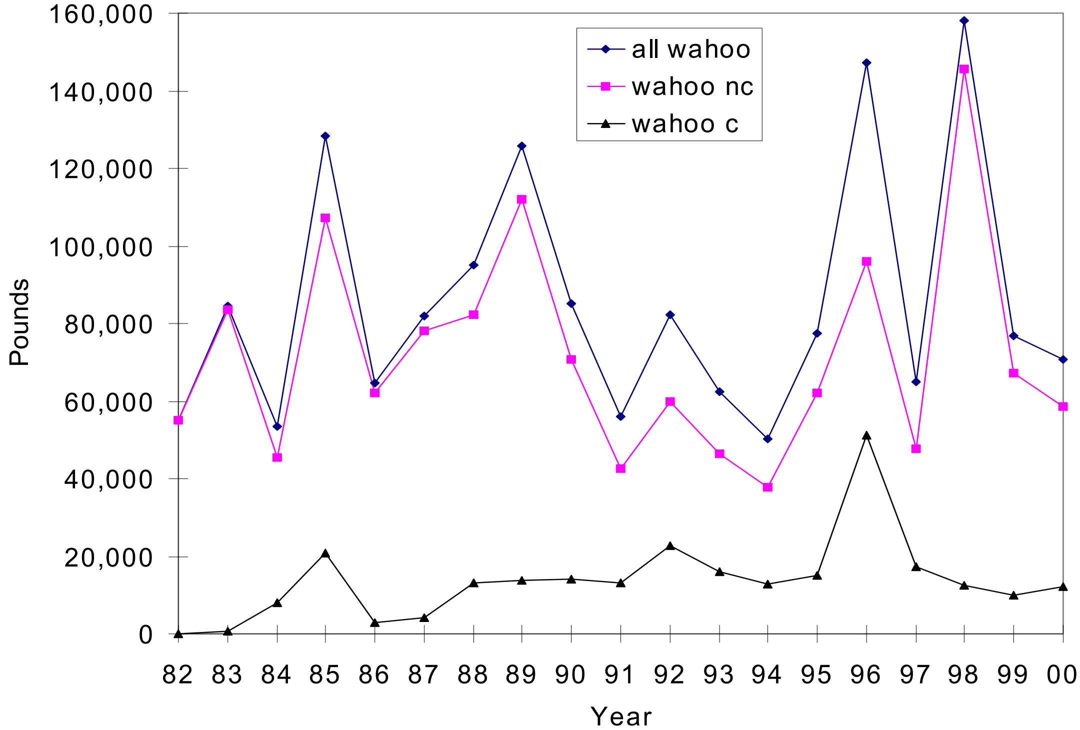
Interpretations: The general trend of the estimated mahimahi landings has increased over the past 14 years with an increase in trolling boat activity. Non-charter trolling trips account for the bulk of the mahimahi catch. Prior to 1988, mahimahi non-charters accounted for over 90% of the catch. Beginning 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 2000, mahimahi non-charters accounted for 78% of the total mahimahi catch while mahimahi charters accounted for 22%. Mahimahi non-charters decreased 51% and mahimahi charters decreased 20% from 1999. This year's decrease in non-charter and charter landings could be due to a decrease in trolling effort along with a decrease in the number of boats participating in 2000.

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**
83	152,678	149,531	3147
84	25,420	16,739	8681
85	71,569	64,619	6951
86	101,487	94,646	6841
87	76,129	69,326	6803
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
Average	**177,958**	**143,869**	**34,089**
Std. Deviation	**111,826**	**88,293**	**28,752**

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



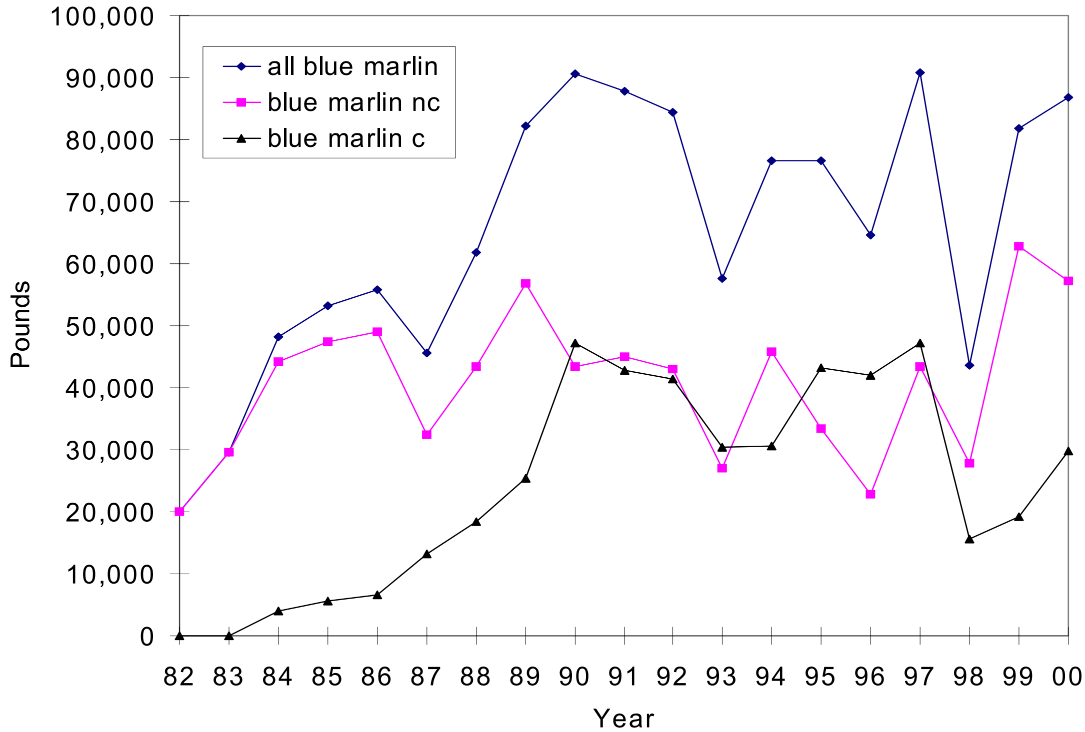
Interpretations: The general trend of wahoo non-charter landings slightly decreased over the past 14 years. Until 1987, most wahoo non-charter landings accounted for over 95% of the total catch. Beginning in 1988, this percentage decreased due to an increase in charter boat activity. From 1988 to 1998, 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 2000, wahoo non-charters accounted for 83% of the total catch while charters accounted for 17%. Wahoo non-charter landings decreased 13% and charter landings increased 24% from 1999. This year's decrease in wahoo non-charter landings could be due to a decrease in trolling effort along with a decrease in the number of boats participating while the increase in charter landings could be due to the increase in charter trolling effort.

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**
83	84,349	83,562	786
84	53,490	45,424	8066
85	128,209	107,275	20,934
86	64,756	61,985	2771
87	82,024	78,000	4024
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
Average	**85,246**	**71,538**	**13,707**
Std. Deviation	**31,997**	**27,826**	**11,025**

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



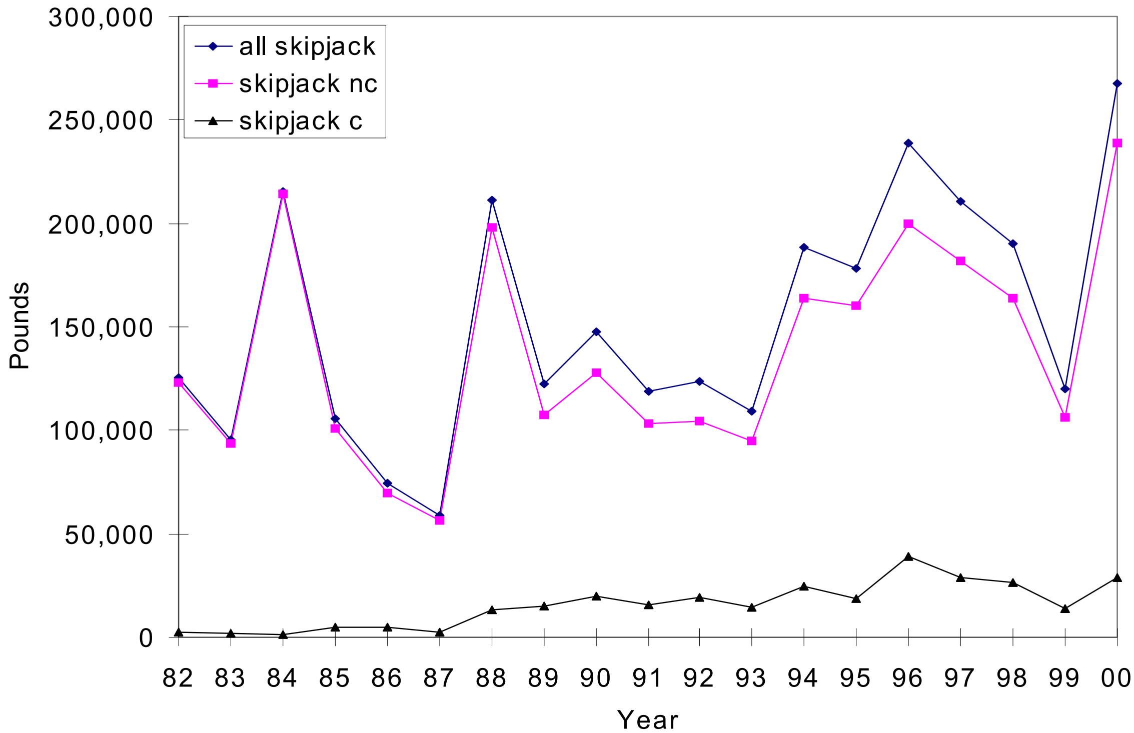
Interpretations: The general trend of blue marlin non-charter landings has decreased over the past 14 years while blue marlin charter landings has increased with the increase in trolling boat activity. During the 1980's, non-charters accounted for the bulk of the marlin catch. In the early 1990's, charters 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 2000, non-charters accounted for 66% of the total marlin catch while charters accounted for 34%. Non-charter landings decreased 9% and charter landings increased 55% from 1999. The increase in charter landings in 2000 could be due to an increase in trip length and targeting this species during marlin 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	**Blue marlin**	**Blue marlin nc**	**Blue marlin c**
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
Average	**65,139**	**40,778**	**24,361**
Std. Deviation	**21,363**	**11,909**	**16,629**

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



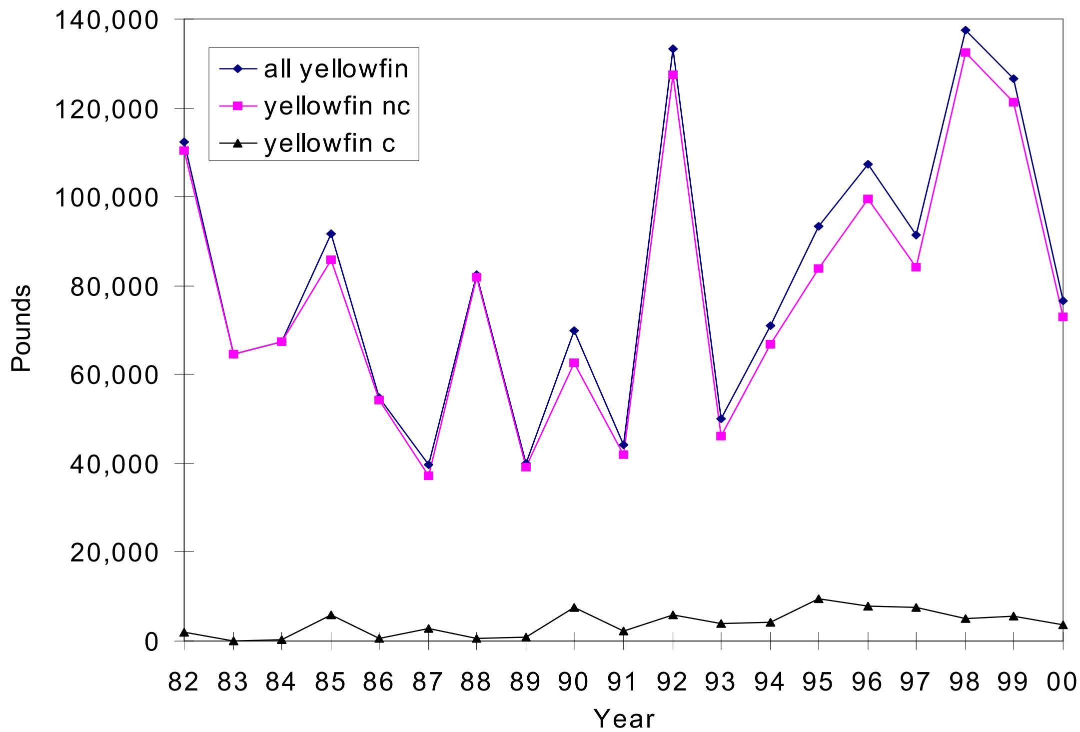
Interpretations: The estimated total landings has increased from 1987 to 1996 with an increase in trolling boat activity although a general decrease is observed from 1996. Prior to 1988, non-charter trolling trips accounted for over 90% of the pelagic catch. Because of an increase in charter activity in 1988, charters began to account for up to 16% of the skipjack tuna landings. In 2000, non-charters accounted for 89% of the total catch while charters accounted for 11%. Non-charter landings increased 125% and charter landings increased 108% from 1999. The increase in non-charter and charter landings in 2000 could be due to a increase in trolling effort.

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	**Skipjack**	**Skipjack nc**	**Skipjack c**
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
Average	**152,785**	**137,250**	**15,535**
Std. Deviation	**58,512**	**51,740**	**10,892**

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



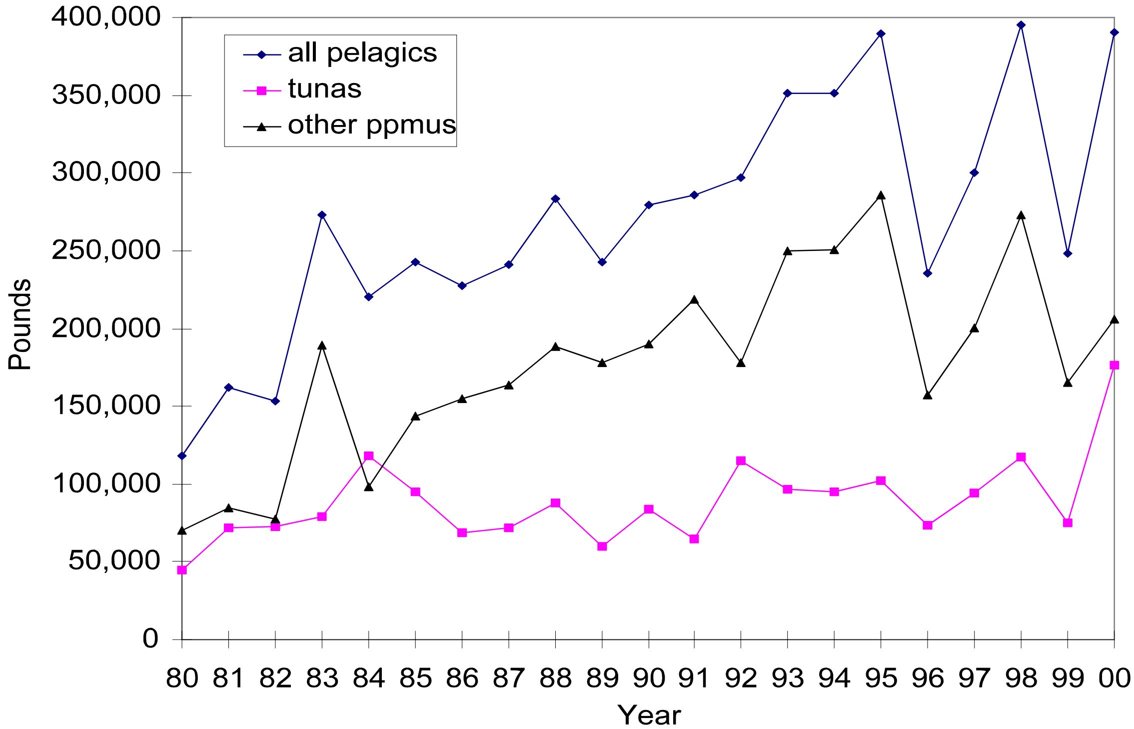
Interpretations: The estimated total landings of non-charters have increased from 1987 to 1999 while charters have only slightly increased with the increase in trolling boat activity. Non-charter trolling trips account for the bulk of the yellowfin catch. In 2000, non-charters accounted for 95% of the total yellowfin catch while charters accounted for 5%. Non-charter yellowfin and charter yellowfin landings decreased 40% and 8% from 1999. 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	Yellowfin	Yellowfin nc	Yellowfin c
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
Average	**81,794**	**77,829**	**3,964**
Std. Deviation	**30,847**	**29,526**	**2,920**

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



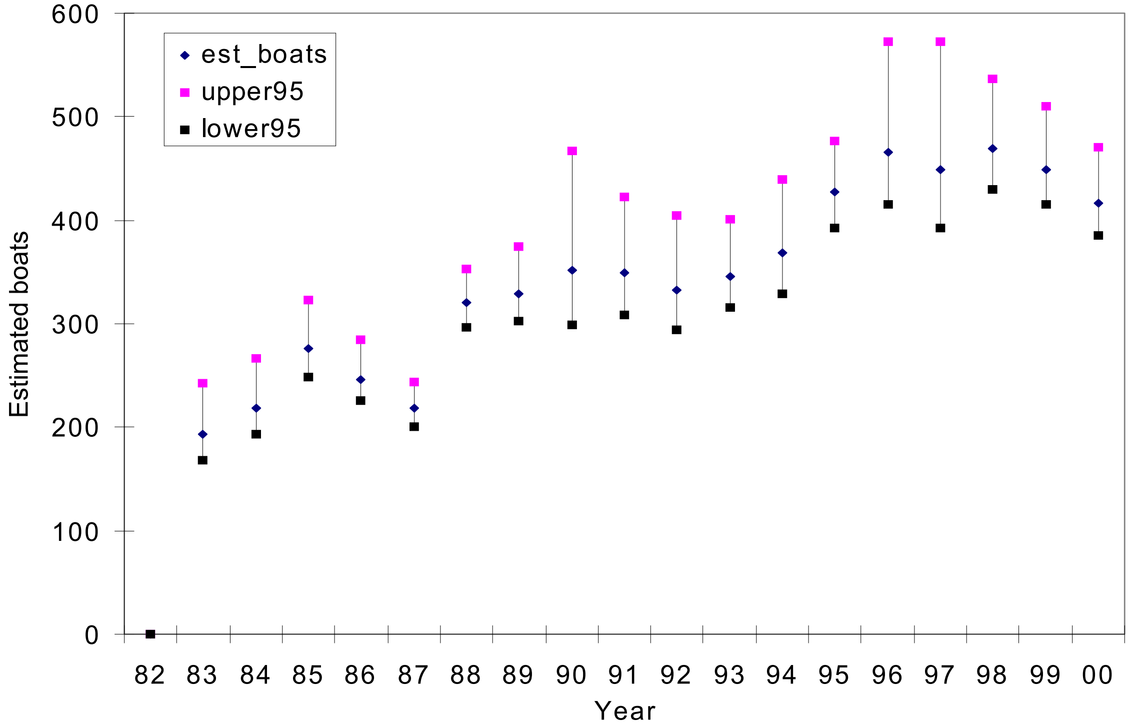
Interpretations: Commercial pelagic fishery landings appear to have increased steadily for the last 19 years, especially with the growth of the charter boat industry. In 2000, tunas accounted for 45% of the total pelagic landings while other PPMUS accounted for 53%. Commercial landings increased 57% for all pelagics, 36% for tunas, and 67% for other PPMUS. The increase in commercial landings in 2000 could be due to a increase in trolling effort. Because most vendors do not obtain the number of hours fished from fishermen, it is impossible to determine this.

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	273,120	79,313	189,241
84	220,074	118,167	98,412
85	243,060	94,691	143,509
86	227,928	68,510	154,749
87	240,790	71,711	163,449
88	283,264	87,962	188,498
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	200,121
98	395,473	117,330	273,445
99	248,472	75,346	165,374
00	390,089	176,267	205,960
Average	**270,879**	**88,735**	**177,324**
Std. Deviation	**76,263**	**27,798**	**60,710**

Figure 6. Guam estimated number of trolling boats



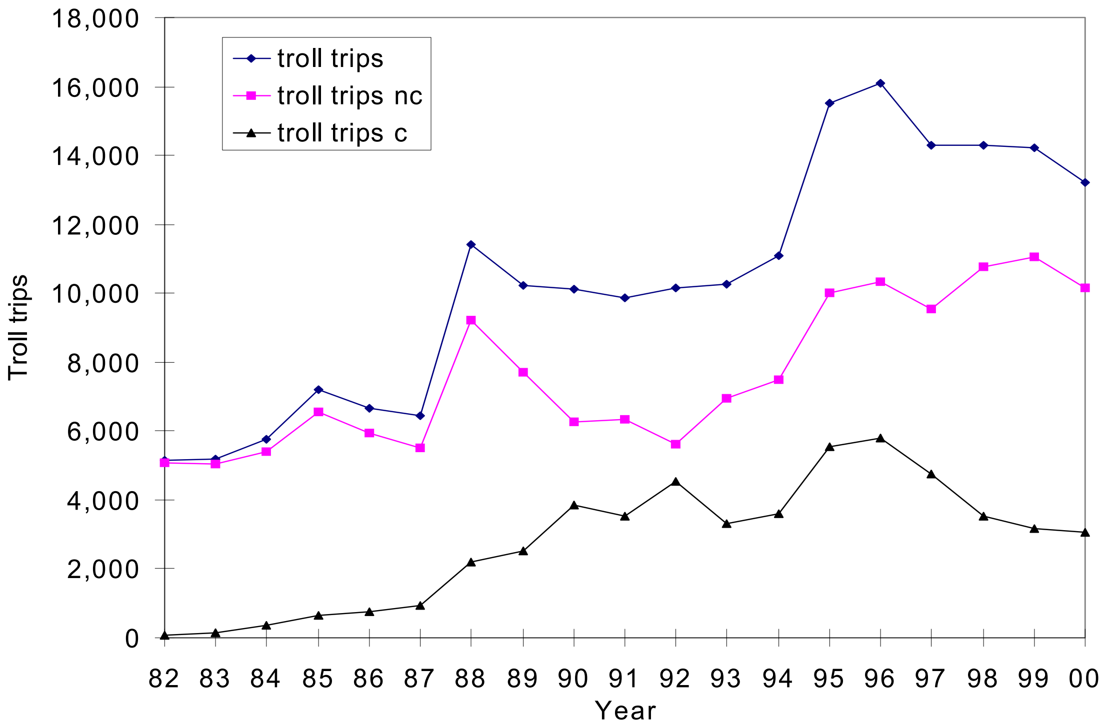
Interpretations: The number of trolling boats on Guam has been steadily increasing, especially since the addition of two marinas to the offshore sampling program. There appears to be a general increase in the number of small boats participating in Guam's pelagic fishery, while the number of charter vessels has remained fairly constant for several years. The number of trolling boats decreased slightly in 2000, approximately 7%. The estimated number of boats was 416 with an upper 95% non-parametric confidence limit of 470 and a lower of 385.

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.

	Estimated Number of Boats		
Year	**Est_boats**	**Upper 95% CL**	**Lower 95% CL**
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
Average	**328**	**387**	**296**
Std. Deviation	**117**	**140**	**107**

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



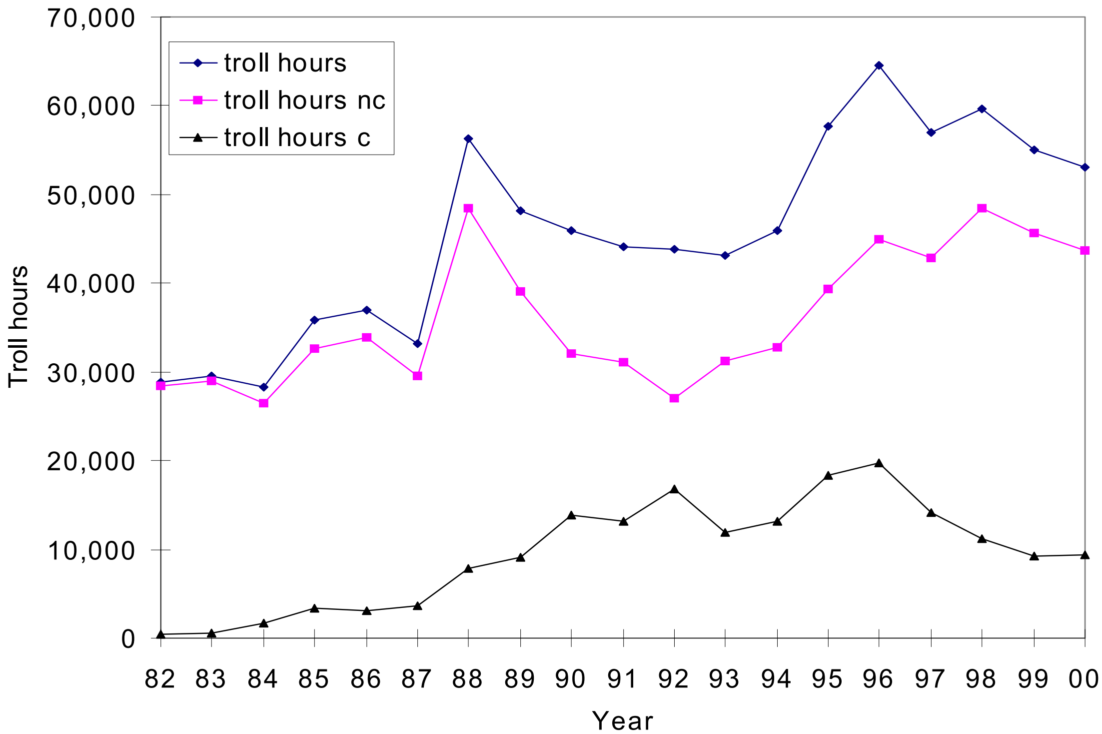
Interpretations: Non-charter and charter troll trips have increased over the past 17 years. Charter boat trips decreased over the past three years due to a decrease in charter activity resulting from a significant drop in tourism while non-charter trips have increased over the past two years. Compared with 1999, charter trolling trips and non-charter trips decreased 4% and 8%. Charter trolling trips made up 77% of all trolling trips while charters made up 23%.

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
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
Average	**10,380**	**7,626**	**2,754**
Std. Deviation	**3,570**	**2,130**	**1,822**

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



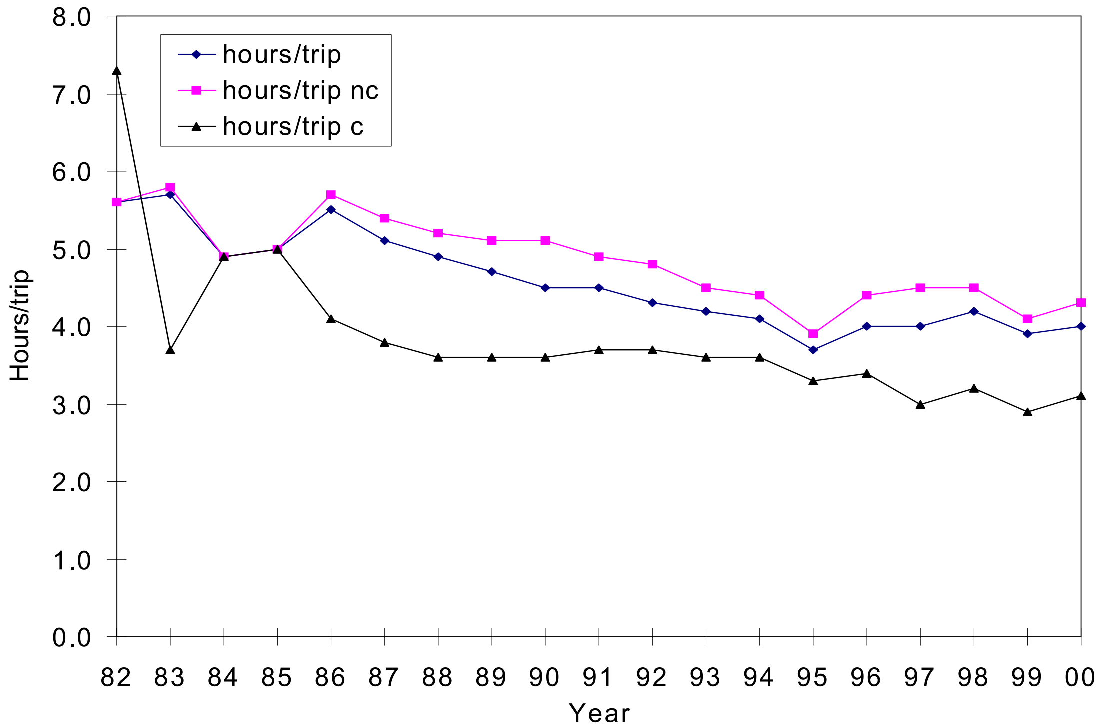
Interpretations: Trolling hours for non-charters and charters have increased over the past 17 years. From 1996, charter troll hours decreased due to a decrease in charter trolling activity, which also contributed to the decrease in total troll hours. Compared with 1999, charter trolling hours remained fairly stable while non-charter trips decreased 4%. Non-charters accounted for 82% of the total trolling hours while charters accounted for 18%.

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
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
Average	**45,641**	**36,144**	**9,497**
Std. Deviation	**11,227**	**7,505**	**6,016**

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



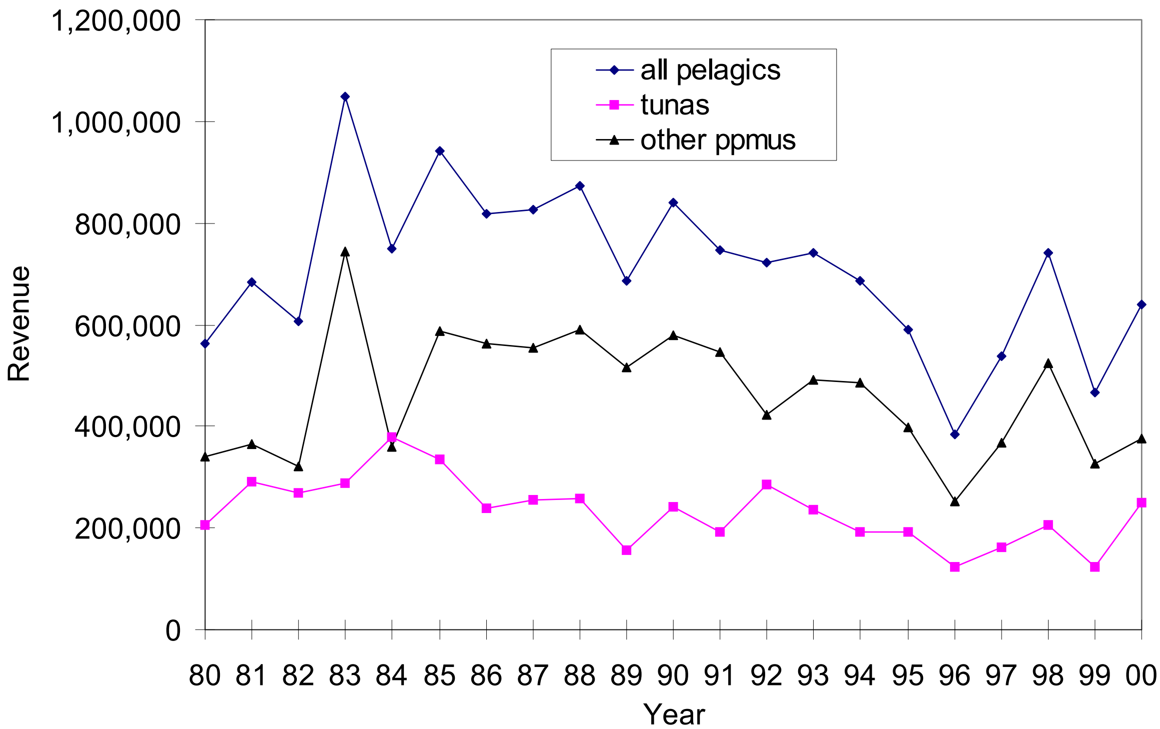
Interpretations: Hours per trip for non-charters and charters have decreased over the past 14 years from 1986 to 1999. Compared with 1999, charter and non-charter hours per trip increased 5% and 7%, respectively.

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
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
Average	**4.6**	**4.8**	**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



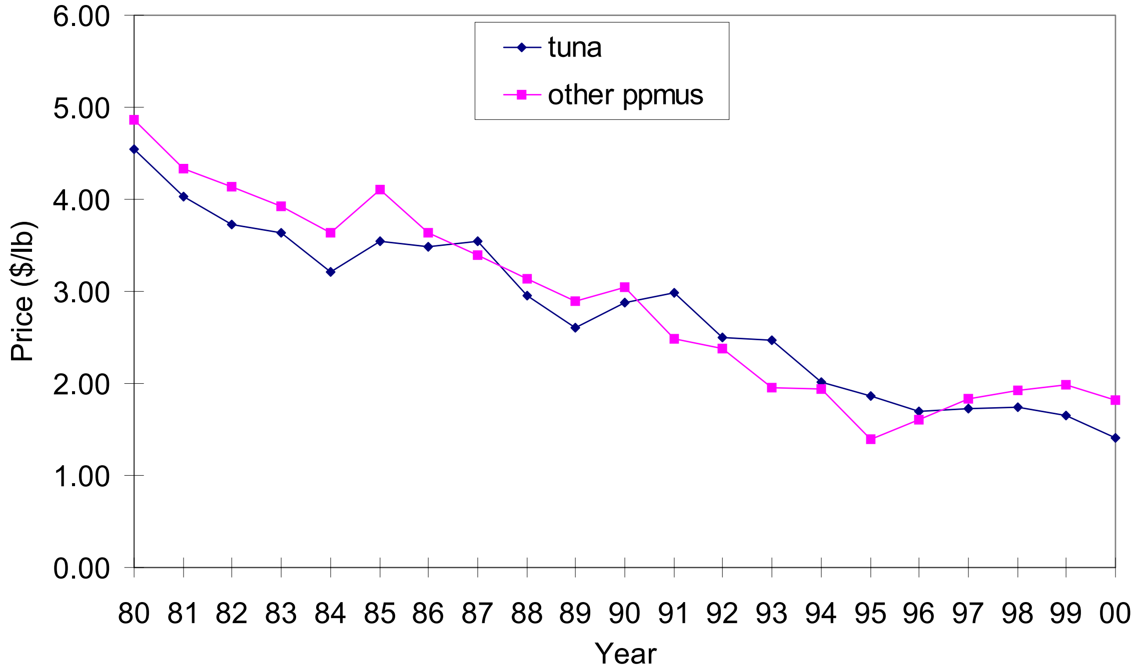
Interpretations: Adjusted revenues in 2000 increased for all pelagics, tunas, and other PPMUS. Revenues increased 37% for all pelagics, 100% for tunas, and 15% for other PPMUS.

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	562,183	54,353	204,855	90,623	341,558
1981	218,384	683,324	92,914	290,729	117,052	366,257
1982	203,847	606,650	90,719	269,980	107,573	320,138
1983	364,527	1,048,380	100,029	287,684	258,501	743,448
1984	283,724	750,450	143,598	379,817	135,498	358,392
1985	369,651	941,501	131,953	336,085	230,855	587,989
1986	330,302	818,819	96,395	238,963	226,935	562,571
1987	347,753	825,567	107,055	254,148	233,116	553,417
1988	386,468	871,872	114,981	259,398	261,901	590,849
1989	337,586	686,987	76,865	156,421	253,932	516,751
1990	471,241	839,281	136,321	242,787	325,372	579,487
1991	462,191	746,900	119,640	193,339	337,328	545,122
1992	492,707	722,802	195,547	286,867	289,129	424,152
1993	547,835	741,769	175,360	237,438	362,728	491,133
1994	593,838	687,665	165,296	191,413	418,612	484,753
1995	537,889	591,678	173,629	190,992	361,363	397,499
1996	366,280	383,861	118,883	124,590	239,901	251,416
1997	515,007	539,212	154,819	162,095	351,229	367,737
1998	711,066	740,219	197,677	205,781	503,600	524,247
1999	458,638	467,810	122,023	124,464	320,462	326,871
2000	641,081	641,081	249,406	249,406	375,452	375,452
	Average	**709,429**		**232,726**		**462,345**
	Std. Deviation	**156,284**		**65,330**		**122,110**

Figure 9. Guam average price of tunas and other PPMUS



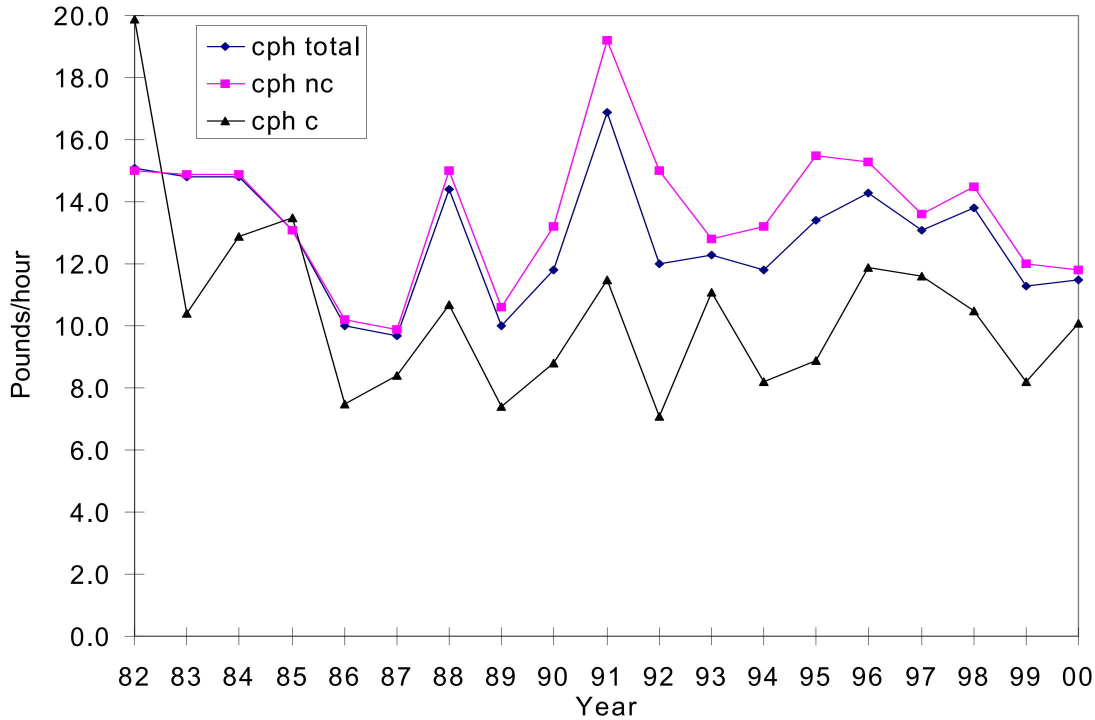
Interpretations: The inflation-adjusted price of tunas and other PPMUS shows a general decline during the past 20 years. Compared with 1999, the adjusted price for tuna and other PPMUS decreased 15% and 8%. The rate of drop has flattened and stabilized due to less inflation rate.

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	4.55	1.29	4.86
1981	1.29	4.03	1.39	4.34
1982	1.25	3.73	1.39	4.13
1983	1.26	3.63	1.37	3.93
1984	1.22	3.21	1.38	3.64
1985	1.39	3.55	1.61	4.10
1986	1.41	3.49	1.47	3.64
1987	1.49	3.54	1.43	3.39
1988	1.31	2.95	1.39	3.13
1989	1.28	2.61	1.42	2.90
1990	1.62	2.88	1.71	3.05
1991	1.85	2.99	1.54	2.49
1992	1.70	2.50	1.62	2.38
1993	1.82	2.47	1.45	1.96
1994	1.73	2.01	1.67	1.94
1995	1.70	1.87	1.27	1.39
1996	1.62	1.70	1.53	1.60
1997	1.65	1.73	1.76	1.84
1998	1.68	1.75	1.84	1.92
1999	1.62	1.65	1.94	1.98
2000	1.41	1.41	1.82	1.82
	Average	**2.77**		**2.88**
	Std. Deviation	**0.90**		**1.04**

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



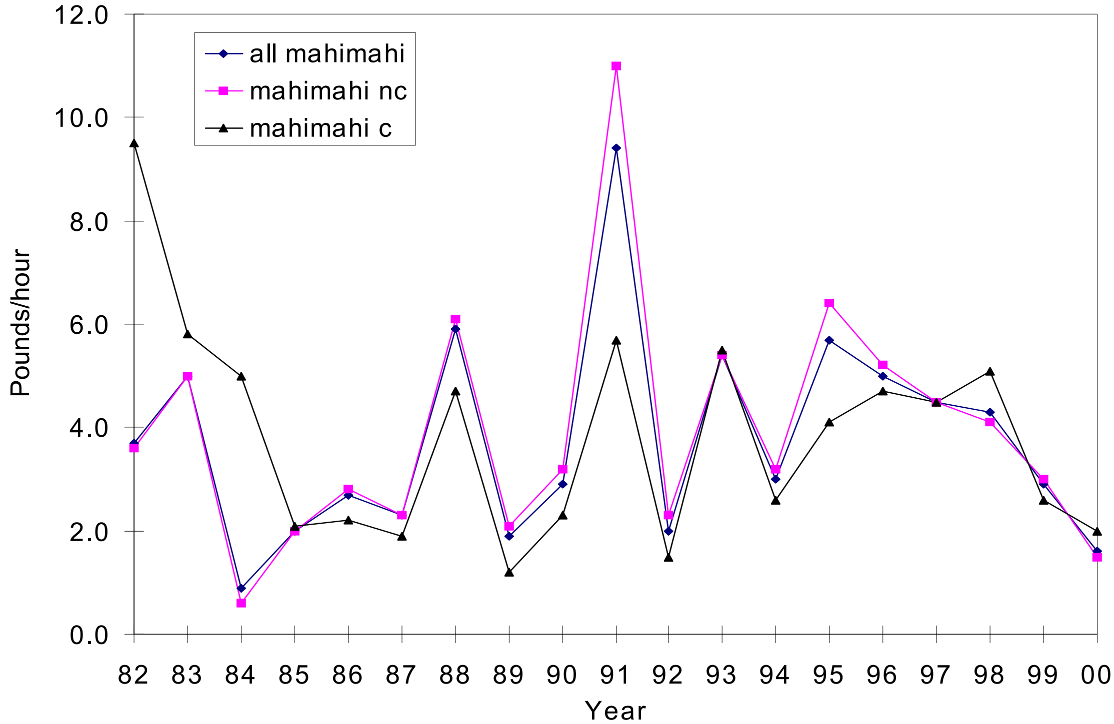
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. In 2000, total catch rate increased 2 %, non-charter catch rate decreased 2%, and charter catch rate increased 23%. No general trend in CPUE is apparent. The total CPUE has been pretty stable over the past 14 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
83	14.8	14.9	10.4
84	14.8	14.9	12.9
85	13.1	13.1	13.5
86	10	10.2	7.5
87	9.7	9.9	8.4
88	14.4	15	10.7
89	10	10.6	7.4
90	11.8	13.1	8.8
91	16.9	19.2	11.5
92	12	15	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	8.2
00	11.5	11.8	10.1
Average	**12.8**	**13.7**	**10.5**
Std. Deviation	**2.0**	**2.2**	**3.0**

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



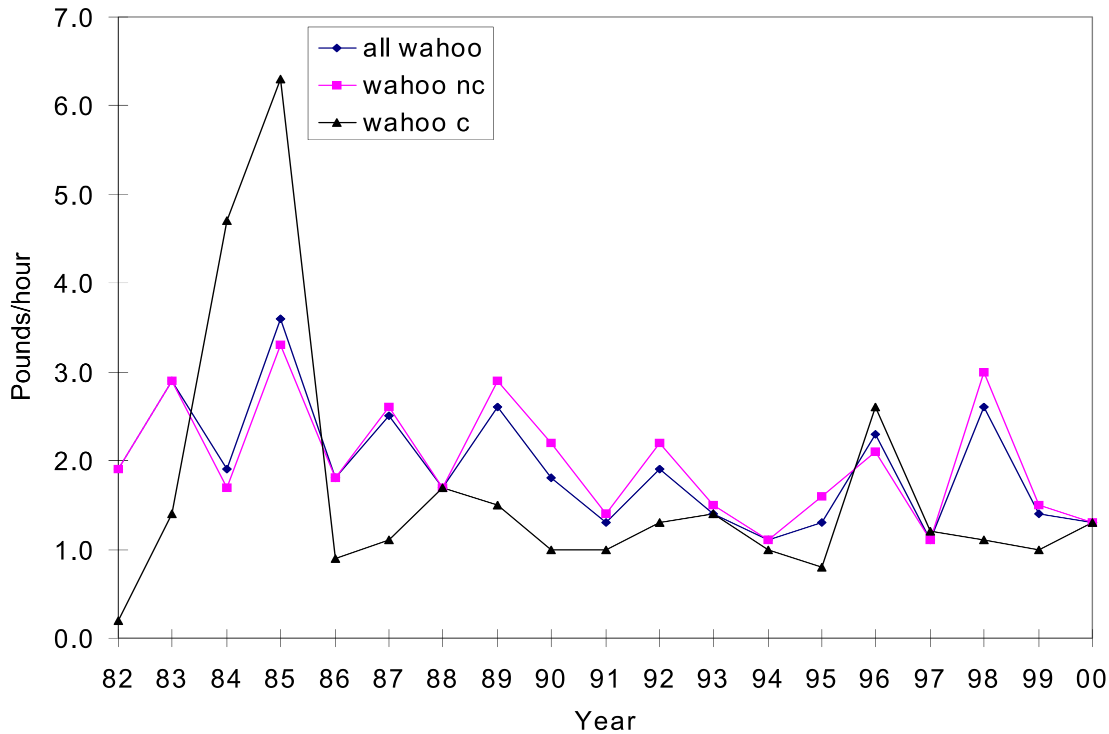
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. In 2000, the catch rate for mahimahi non-charters and mahimahi charters decreased 50% and 23%.

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
83	5.00	5.00	5.80
84	0.90	0.60	5.00
85	2.00	2.00	2.10
86	2.70	2.80	2.20
87	2.30	2.30	1.90
88	5.90	6.10	4.70
89	1.90	2.10	1.20
90	2.90	3.20	2.30
91	9.40	11.00	5.70
92	2.00	2.30	1.50
93	5.40	5.40	5.50
94	3.00	3.20	2.60
95	5.70	6.40	4.10
96	5.00	5.20	4.70
97	4.50	4.50	4.50
98	4.30	4.10	5.10
99	2.90	3.00	2.60
00	1.6	1.5	2.0
Average	**3.7**	**3.9**	**3.8**
Std. Deviation	**2.0**	**2.3**	**2.1**

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



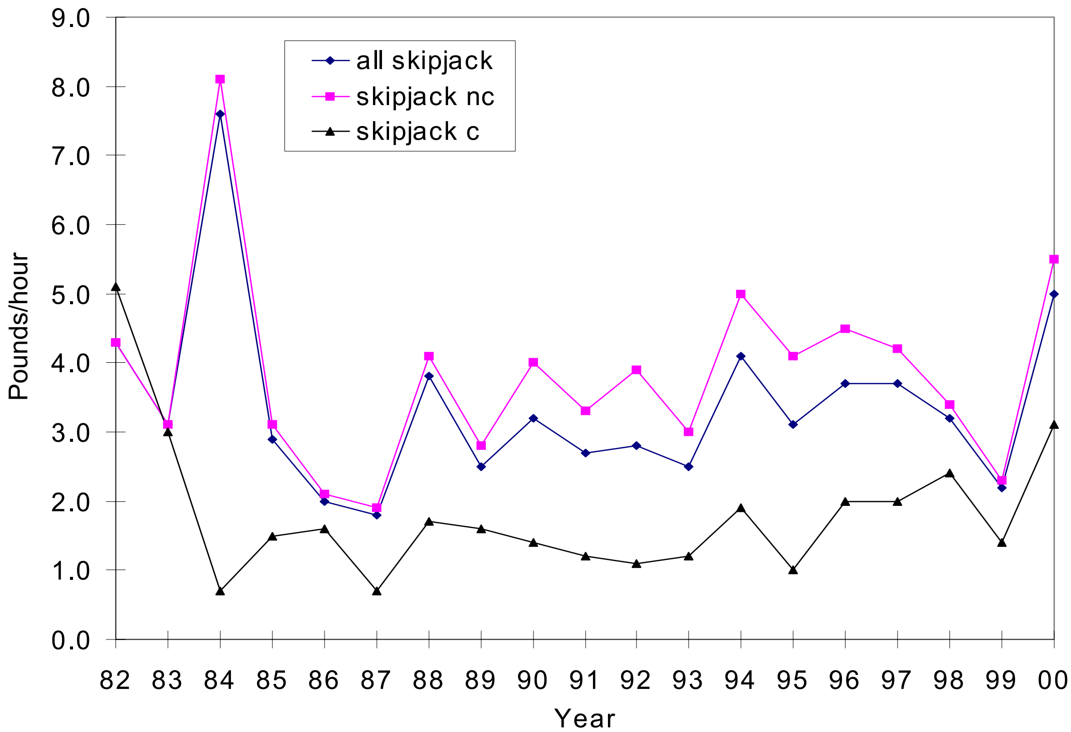
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. In 2000, the catch rate for wahoo non-charter decreased 13% while charters increased 30%.

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
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
Average	**1.9**	**2.0**	**1.7**
Std. Deviation	**0.7**	**0.7**	**1.5**

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



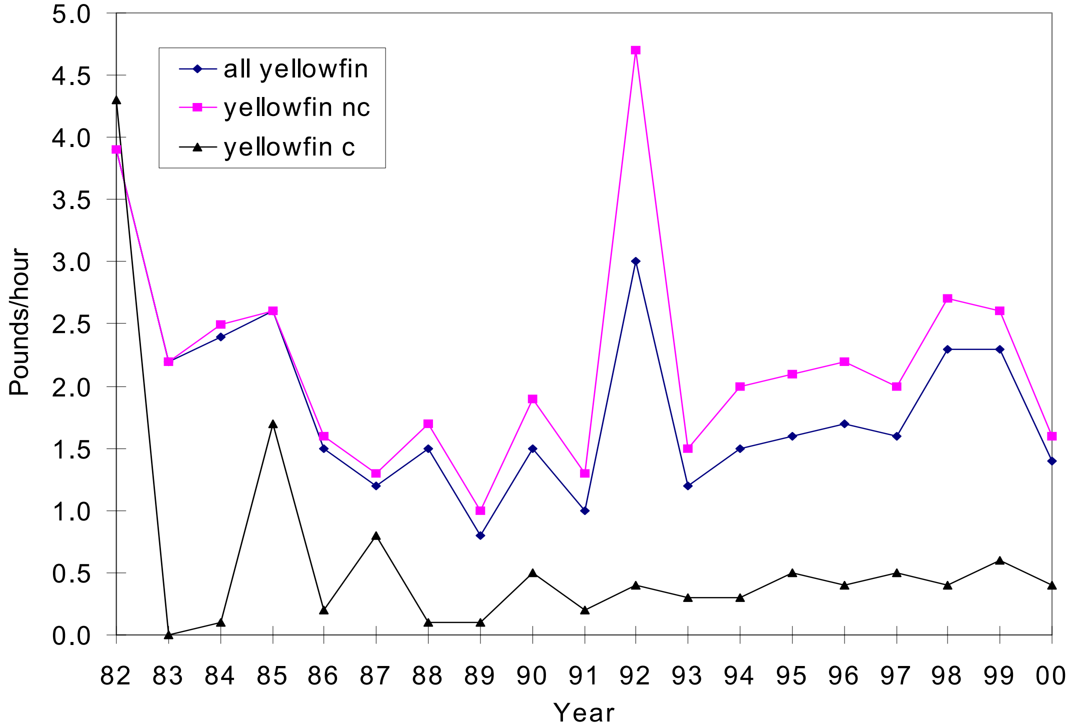
Interpretations: The wide fluctuations in CPUE for skipjack tunas are probably due to the high variability in the year to year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. Compared with 1999, the catch rate for non-charter CPUE and charter CPUE increased 139% and 121%.

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
83	3.10	3.10	3.00
84	7.60	8.10	0.70
85	2.90	3.10	1.50
86	2.00	2.10	1.60
87	1.80	1.90	0.70
88	3.80	4.10	1.70
89	2.50	2.80	1.60
90	3.20	4.00	1.40
91	2.70	3.30	1.20
92	2.80	3.90	1.10
93	2.50	3.00	1.20
94	4.10	5.00	1.90
95	3.10	4.10	1.00
96	3.70	4.50	2.00
97	3.70	4.20	2.00
98	3.20	3.40	2.40
99	2.20	2.30	1.40
00	5.0	5.5	3.1
Average	**3.4**	**3.8**	**1.8**
Std. Deviation	**1.3**	**1.4**	**1.0**

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



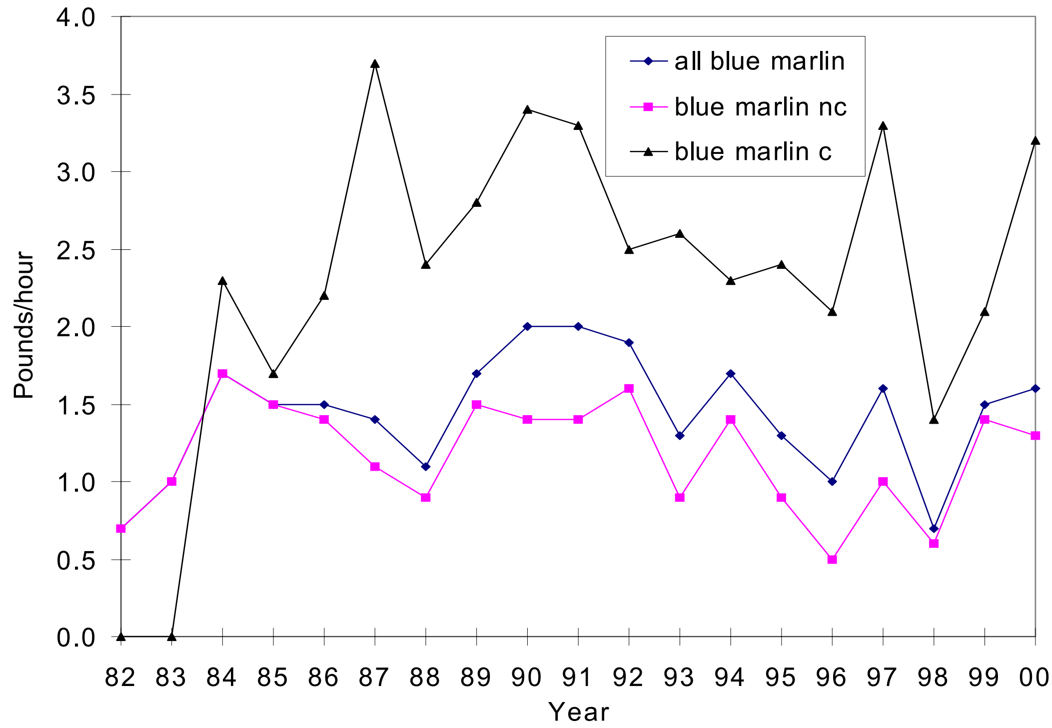
Interpretations: The wide fluctuations in CPUE for yellowfin tunas are probably due to the high variability in the year to year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. Compared with 1999, the catch rate for non-charter yellowfin tuna and charter yellowfin tuna decreased 38% and 33%.

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
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
Average	**1.9**	**2.2**	**0.6**
Std. Deviation	**0.8**	**0.9**	**1.0**

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



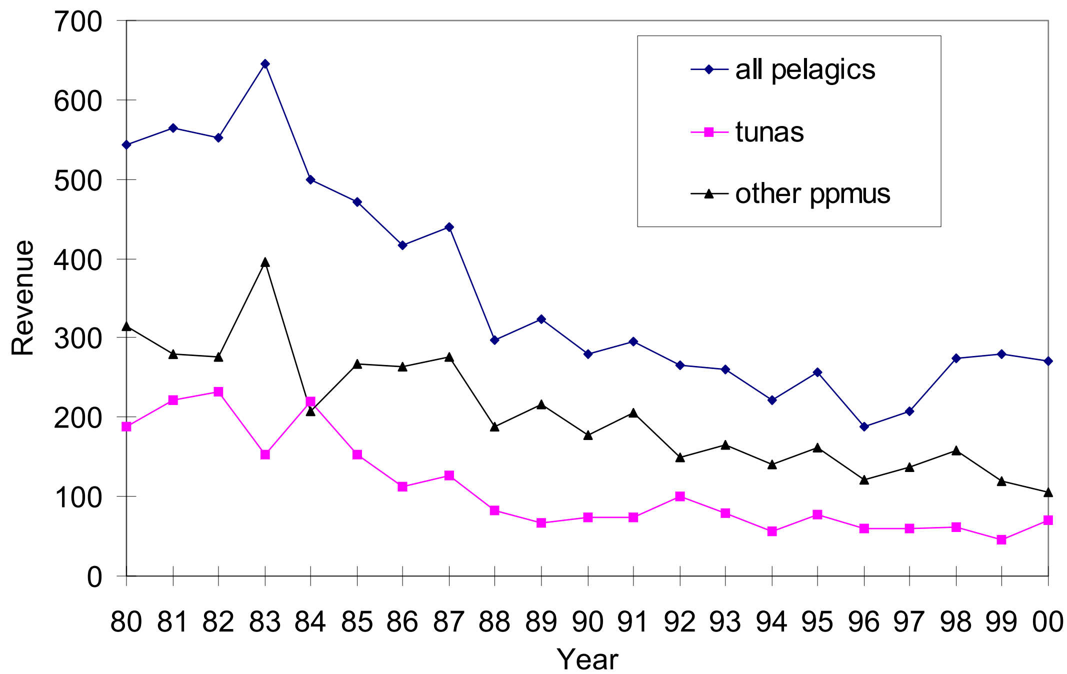
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year to year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch 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 1999, non-charter catch rate decreased 7% while charter catch rate increased 52% 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
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
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



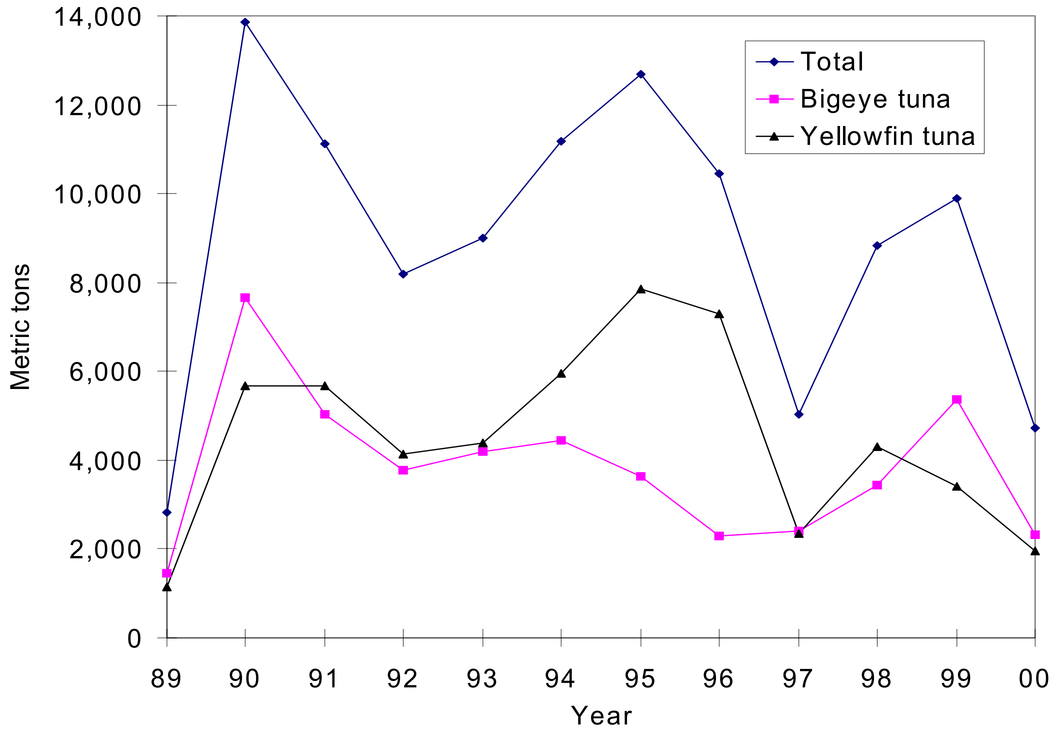
Interpretation: There has been a general decrease in the adjusted revenue per trip for all pelagics, tunas and other PPMUS over the past 19 years. In 2000, adjusted revenue per trip decreased 3% and 12% for all pelagics and for other PPMUS while increasing 54% for tunas. Care must be taken in interpreting 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	544	50	189	84	315
1981	181	565	71	222	89	280
1982	186	553	78	233	93	277
1983	224	646	53	153	137	395
1984	189	500	83	219	78	207
1985	185	472	60	153	105	267
1986	168	416	45	112	107	264
1987	185	440	53	127	116	276
1988	132	297	37	83	83	188
1989	159	324	32	66	107	217
1990	157	280	42	74	99	177
1991	183	296	45	73	127	205
1992	181	265	69	101	102	149
1993	192	260	59	80	122	166
1994	192	222	48	56	121	141
1995	234	257	70	77	146	161
1996	179	188	57	60	115	121
1997	199	208	58	60	131	137
1998	264	275	60	62	152	159
1999	273	279	45	46	117	120
2000	270	270	71	71	106	106
Average		**360**		**110**		**206**
Std. deviation		**137**		**60**		**76**

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



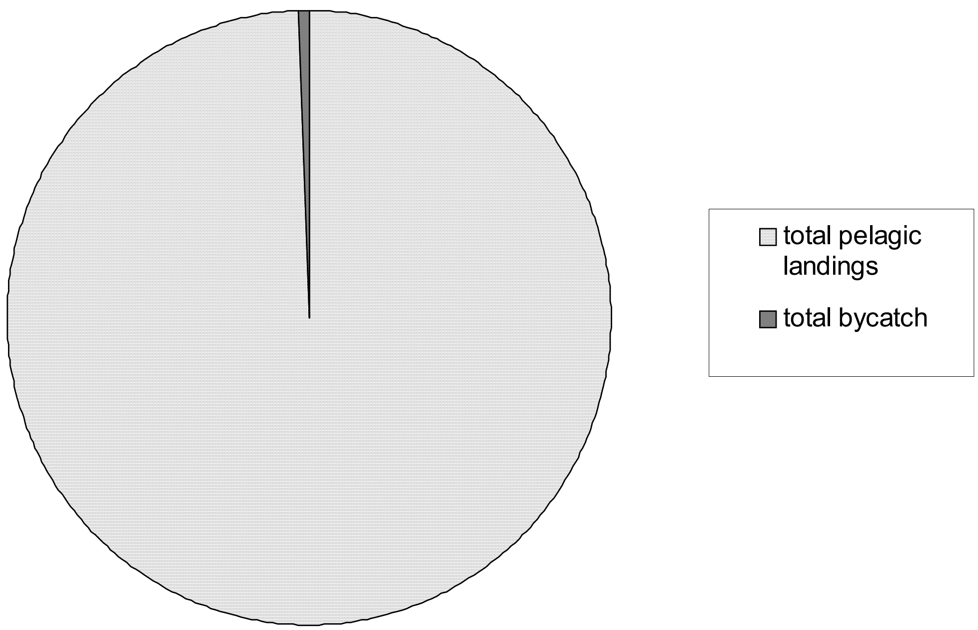
Interpretation: Annual landings from a primarily foreign longline fishing fleet have ranged up to 13,851 tons since the fishery began in the late 1980's. These vessels fish primarily outside Guam's EEZ, yet tranship their catch from Guam. Compared with 1999, total longline landings, bigeye landings and yellowfin tuna landings decreased 52%, 57%, and 43%.

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.

Year	Foreign Longline Landings Total (tons)	Bigeye tuna (tons)	Yellowfin tuna (tons)
89	2,829	1,455	1,145
90	13,851	7,657	5,681
91	11,114	5,033	5,686
92	8,181	3,760	4,122
93	9,003	4,200	4,379
94	11,175	4,454	5,965
95	12,687	3,643	7,846
96	10,449	2,300	7,281
97	5,031	2,399	2,334
98	8,817	3,430	4,290
99	9,902	5,360	3,404
00	4721	2318	1955
Average	**8,980**	**3,834**	**4,507**
Standard Deviation	**3,331**	**1,692**	**2,082**

Figure 14. Guam annual estimated bycatch landings: total pelagic landings and total bycatch

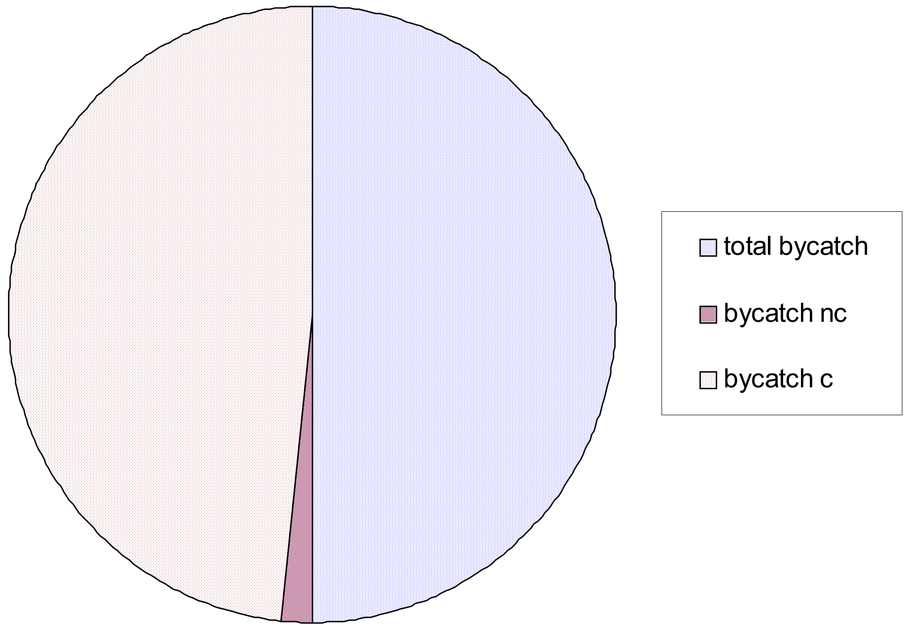


Interpretation: Total bycatch is very small compared to the total pelagic landings of 616,617 pounds. Total bycatch is approximately 0.5% of the total pelagic landings or 3,258 pounds and consist of two species: skipjack tuna and blue marlin.

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.

Figure 15. Guam annual estimated bycatch landings: total bycatch, bycatch nc, and bycatch c



Interpretation: Bycatch for non-charters is 4% (117 pounds) of the total bycatch while bycatch for charters is 96% (3,141 pounds). Bycatch species for non-charters consist only of skipjack tuna while bycatch species for charters consist only of blue marlin. A high percentage, approximately 98%, of the bycatch species were released alive.

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

Hawaii's commercial pelagic catch[1], which is dominated by the longline fishery, has remained stable since 1995 following recovery from the loss of the Honolulu tuna cannery in the early 1980s. Albacore catch by longline, handline, and other gear types increased by 460% from 1992 to 1997, its peak. This represented both landings by the longline fishery and by distant-water albacore vessels off-loading in Hawaii. Albacore landings subsided substantially in 2000 while bigeye tuna was within its recent ranges. Yellowfin landings were their highest since 1995.

Inflation-adjusted ex-vessel revenue for all pelagic gears combined has been relatively stable over the past four years, reflecting changes in species composition and prices.

Overall, longline catch decreased substantially in 2000 (down by 15% compared to 1999) in substantial part due to the effect of Court-ordered measures to decrease the likelihood of interactions between the fishery and sea turtles. Nonetheless, longline landings continued to represent almost 80% of the total commercial catch of pelagics in Hawaii. Landings by the now small aku boat (pole-and-line skipjack tuna) fleet reached an historic low in 2000. However pelagic landings of the troll, handline, and other gears have a 30 year growth trend (averaging 12% growth per annum since 1970), although landings in 2000 were slightly less than in 1999.

Handline catch in 2000 was slightly above its 30 year average but decreased by almost the same amount as it increased in 1999, suggesting that 1999 was an anomaly based on high catches of albacore. Troll catch in 2000 from the main Hawaiian Islands was roughly at its 10 year average. Landings by other pelagics gears were at a record and greater than those identified for MHI handline.

Effort in the longline fishery in 1999 and 2000 was directed toward tunas to the exclusion of swordfish (with resultant changes in catch composition). The number of active longliners declined from 1991 to 1996 as a number of vessels left Hawaii for U.S. mainland fisheries. In the latter part of 1997, 15 longline vessels migrated to California and fished mainly swordfish for the remainder of the year. However, in 1998 and 1999, the number of longline vessels off-loading in Hawaii increased as vessels from California and the East coast again based themselves out of Honolulu. The number of longline vessels active in the fishery was at its highest point in 2000 since 1994 until the impact of the Court-ordered closures late in the year. Twenty one vessels

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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).

operated out of California in 2000, most of which also had Hawaii limited entry permits. The total number of longline trips out of Hawaii has nevertheless not varied substantially over the past eight years.

Probably the most significant change over the past several years has been the shift of longline effort out of swordfish into tuna. The number of swordfish-directed trips has declined from 319 in 1993 to just 65 trips in 1999 and 37 in 2000 and early in 2001 shallow-set targeting swordfish was prohibited entirely. Meanwhile tuna-directed trips have increased from 542 to 814 trips over the same period.

A number of fishery management issues were significant in 1999 and 2000. Of these, the prohibition of targeting swordfish by the Hawaii longline fishery was the most dramatic. These measures were the outgrowth of a suit filed by the Center for Marine Conservation and the Turtle Island Restoration Network against NMFS on February 1999, charging that the longline industry was a threat to the survival of the leatherback and loggerhead Pacific populations. There followed a series of Court injunctions and area closures until the development by NMFS of an Environmental Impact Statement for the Pelagic Fisheries completed in April 2001. At the same time, NMFS issued an ESA Section 7 consultation on longline-turtle interactions and implemented follow-up regulations on an emergency basis. Final action is expected later this year (2002).

Shark finning by longline and other vessels led to State of Hawaii passage of a law in 2000 prohibiting landing shark fins in the state without the associated carcass. A similar Federal law was passed later in 2000.

Considerable research effort is being directed toward the interactions problem by National Marine Fisheries Service (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 has not been taken on this amendment.

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 U.S. National Marine Fisheries Service (NMFS) Honolulu Laboratory longline logbooks and joint NMFS and HDAR marketing monitoring.[2] Explicit data on the recreational fishery 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 Hawaii anglers. Several recent JIMAR research reports

[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.

give some idea of the relationship between commercial and recreational pelagic fishing, but accurate estimates of total recreational participation and catch, remain absent.[3] The NMFS Marine Recreational Fisheries Statistical Survey has reinitiated operations in Hawaii following a 20 year gap with the first full year of fielding expected in 2002. The combined telephone-creel intercept survey is being conducted in conjunction with the Hawaii Division of Aquatic Resources. 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.

The Council's annual report module for Hawaii was prepared using "final" 1999 and 2000 NMFS data and preliminary 2000 HDAR data. Final HDAR commercial catch reports for 2000, which comprise the troll, handline, pole-and-line, and other gears data, became available after the bulk of this report was completed. These data will be updated in the next year's report.

Total landings in the troll, handline and other gears used in the CPUE analyses do not necessarily equal overall landings tables by gear type presented earlier in the report due to distinct compilations based on separate versions of the HDAR data sets.

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 was provided by Reginald Kokubun, HDAR. HDAR commercial catch data used in the NMFS time-series were compiled by Frank Cabacungan, NMFS.

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[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.

Hawaii commercial marine license information[4]

Every fisherman, including crew members on commercial fishing vessels, who takes any marine species for commercial purposes is required by the State to have a Commercial Marine License (CML) and, unless specifically exempted[5], is required to submit a catch report monthly to HDAR.

A total of 3,876 fishermen were licensed by the State of Hawaii in calendar year 1999, of which 2,786 were required to file monthly catch reports. As of April 2000, HDAR had received 31,987 monthly reports (91.5% of the 34,964 monthly reports expected based on the number of license holders and the number of months in 1999 in which they held their licenses).

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 it indicates what they consider to be their primary fishing method.

Primary fishing method	**Number of licenses required to report**	
	1999	**2000**
Trolling	1,572	1,464
Longline	546	553
Ika shibi & palu ahi	199	190
Bait boat (aku boat)	62	41
Total pelagic	2,379	2,248
Total all methods	3,876	3,609

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

5 Only one person per vessel or fishing trip is required to submit a catch report. This person is usually, but not always, the captain. (The captain may or may not be the vessel owner.) Crew members are generally not required to submit catch reports.

Tables

Figures

Table 1. Hawaii domestic commercial catch, revenue and prices[6], 1999-2000.

	1999			2000		
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	6,900	13,000	1.89	6,500	12,800	1.96
Blue marlin	1,400	1,400	1.01	1,200	1,600	1.36
Striped marlin	900	1,200	1.34	500	800	1.75
Other billfish	600	500	0.85	400	500	1.20
Mahimahi	1,300	2,800	2.12	1,600	3,200	1.95
Ono (wahoo)	1,000	1,700	1.83	700	1,700	2.31
Opah (moonfish)	1,200	1,400	1.15	700	1,100	1.60
Sharks (whole wgt)	1,100	400	0.33	600	200	0.42
Sharks fins	5,200	1,200	0.00	2,800	600	0.00
Other pelagics	300	500	1.40	400	600	1.73
Non-Tuna PMUS Subtotal	**19,900**	**24,100**	**1.21**	**15,400**	**23,100**	**1.52**
Albacore	4,000	4,400	1.10	2,300	3,400	1.46
Bigeye tuna	6,200	20,400	3.29	6,200	21,500	3.46
Bluefin tuna	20	150	7.50	10	90	10.75
Skipjack tuna	1,900	2,300	1.18	1,700	2,100	1.20
Yellowfin tuna	4,000	8,100	2.03	5,000	12,700	2.55
Tuna PMUS Subtotal	**16,120**	**35,350**	**2.19**	**15,210**	**39,790**	**2.61**
TOTAL all pelagic species	**36,020**	**59,450**	**1.65**	**30,610**	**62,890**	**2.06**

[Data Source: Imported from P8700xn1.xls (4/24/01) as compiled by NMFS].

Interpretation: Total commercial pelagic catch in Hawaii decreased by 15% in 2000 while revenue increased by 6%. Ex-vessel prices for the major species rose, probably from improvements in Hawaii's economy following the recession of the 1990s and from the lower supply of some species; albacore prices rose 22%, bigeye prices 6%, yellowfin prices 22%, and swordfish prices 12%. Swordfish and bigeye tuna continue to dominate pelagic catch in Hawaii, although swordfish landings fell slightly, but yellowfin landings were particularly strong in 2000.

Blue marlin catch remained lower for the third straight year. Other catches were within the usual

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

ranges, except for shark (estimated whole weight) which had increased continuously since 1993 through 1999 due to the market for shark fins but tailed off substantially in 2000 due to the ban on landing fins.

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, 1999-2000

Gear	Pounds Caught (x 1,000)	Pounds Sold (x 1,000)	Ex-vessel Revenue (x $1,000)	Average Price ($/lb)
1999				
Longline	28,324	28,324	47,391	1.67
Aku Bait boat	1,309	1,307	1,669	1.28
MHI Trolling[7]	3,002	2,469	4,628	1.54
MHI Handline[8]	2,368	2,268	4,125	1.74
Other[9]	1,055	889	1,573	1.49
TOTAL	**36,058**	**35,257**	**59,386**	**1.65**
2000				
Longline	23,803	23,803	50,153	2.11
Aku Bait boat	694	690	1,081	1.56
MHI Trolling	2,798	2,375	5,359	1.92
MHI Handline	1,414	1,385	3,321	2.35
Other	1,776	1,722	2,915	1.64
TOTAL	**30,485**	**29,975**	**62,829**	**2.06**

[Data Source: Imported from GAS00b (4/26/2001) and P8700xn1.xls (4/24/01).]

Interpretation: Total longline catch declined substantially in 2000 (- 16%) with the majority of the loss being in shark fins (- 50%).

Pelagic handline catch in the Main Hawaiian Islands (MHI) increased substantially in 1999 but reported landings in 2000 were substantially smaller.[10] MHI trolling decreased marginally. Fishing effort and catch rates require closer examination for proper interpretation (see later in this report).

Aku bait boat (pole-and-line skipjack tuna) decreased substantially to a fifty year low.

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.

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

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

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

10 In some previous years there has been late reporting for tuna handline catch.

Table 3a. Hawaii longline catch and revenue, 1999-2000.

Species	1999 Catch (x 1,000 lb)	1999 Revenue (x $1,000)	2000 Catch (x 1,000 lb)	2000 Revenue (x $1,000)
Blue marlin	786	920	692	872
Striped marlin	802	1,099	441	793
Swordfish (round weight)	6,831	12,913	6,502	12,744
Other billfish	533	466	385	418
Mahimahi	679	1,276	721	1,233
Ono (wahoo)	343	618	246	528
Opah (moonfish)	1,210	1,392	693	1,109
Sharks (round weight)	6,300	1,480	3,295	861
Other	342	481	268	468
Non-Tuna PMUS Subtotal	**17,826**	**20,645**	**13,243**	**19,026**
Albacore	3,250	3,803	2,026	2,999
Bigeye	5,990	20,008	5,788	20,779
Bluefin	24	151	8	86
Skipjack	219	167	206	122
Yellowfin	1,042	2,595	2,506	7,016
Tuna PMUS Subtotal	**10,525**	**26,724**	**10,534**	**31,002**
TOTAL	**28,351**	**47,369**	**23,777**	**50,028**

[Data Source: Imported from LL00ryi1.xls (4/21/2001)]

Interpretation: *Changes in aggregate species composition should be qualified by reference to changes in longline trip type (see following table).*

Overall longline catch grew substantially in the mid-1990s with 1998 being the peak year. However total landings declined substantially in 2000, primarily due to the decline in shark landings but most other species also showed declines. Although litigation-related regulation affected the swordfish component of the fleet in 2000, the total number of trips has been stable over the past 8 years as more tuna-target trips were taken.

Catch of bigeye tuna decreased slightly in 2000 but remains the largest percentage of the total tuna catch. Yellowfin catch more than doubled in 2000 to a level roughly equivalent to its 1990 and 1997 peaks (yellowfin tends to show high inter-annual variability).

More detailed information on longline catch and effort statistics is included in the NMFS annual report on the fishery compiled by Russell Ito, Honolulu Laboratory.

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 1998 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[11], 1999-2000

Species	1999				2000			
	All Trips	Swordfish Trips	Mixed Trips	Tuna Trips	All Trips	Swordfish Trips	Mixed Trips	Tuna Trips
Blue marlin	0.26	0.23	0.51	0.21	0.22	0.14	0.48	0.18
Striped marlin	0.75	0.61	0.99	0.71	0.39	0.53	0.75	0.33
Swordfish	1.99	14.62	8.60	0.16	1.83	14.46	11.03	0.11
Mahimahi	2.32	4.72	6.04	1.49	2.85	8.45	11.95	1.32
Moonfish	0.65	0.01	0.24	0.76	0.35	0.01	0.09	0.39
Ono (wahoo)	0.54	0.24	0.35	0.59	0.38	0.08	0.13	0.43
Sharks	4.58	19.10	10.52	2.93	3.92	13.85	10.65	2.64
Albacore	3.52	4.40	3.26	3.53	1.96	2.21	1.56	2.02
Bigeye tuna	4.20	1.85	3.82	4.38	3.68	2.13	3.30	3.77
Yellowfin tuna	0.89	0.72	0.89	0.90	1.89	0.51	1.03	2.06
Number of trips	**1,137**	**65**	**296**	**776**	**1,103**	**37**	**252**	**814**
Number of hooks set	**19,115,654**	**669,509**	**3,033,494**	**15,412,651**	**20,267,926**	**419,212**	**2,665,206**	**17,008,309**
Number of lightsticks	**813,849**	**263,868**	**532,363**	**27,618**	**715,975**	**144,907**	**562,504**	**18,359**

Data Source: NMFS longline logbook summaries (4/21/2001).

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

Interpretation: This table shows the substantial difference in interpretation that categorization of CPUE by trip type can make. Swordfish trips have twice the swordfish CPUE as Mixed trips, while swordfish is a small incidental catch in Tuna trips. The aggregate (All Trips) CPUE figures are not good indicators of catchability or abundance, although they do indicate the relative importance of particular species within the fishery as a whole.

Swordfish trip CPUE for swordfish was stable in 2000 although the number of swordfish-target trips has declined markedly (and by 2001 shallow-set targeting of swordfish was prohibited). Mixed trip CPUE for swordfish increased substantially (28%) although the number of mixed trips was lower in 2000 (down by 15%).

CPUEs for albacore (all trip types) decreased substantially (which may either be due to inter-annual availability or changes in fishing location) while CPUEs for bigeye on tuna trips declined by 15%. CPUEs for yellowfin (all trip types) doubled, again showing the inter-annual variation typical of this species.

CPUE of shark (primarily blue shark) declined for each trip type although this may reflect reporting problems due to the decreased incentive to retain sharks.

CPUEs for blue and striped marlin were lower for 2000. Mahimahi was less available on tuna trips (deep set) but more available on mixed trips and the remaining swordfish trips. Ono (wahoo) were less available on all trip types. Moonfish were substantially less available on tuna trips (their primary source).

More detailed information on longline CPUE statistics is included in the NMFS annual report on the fishery compiled by Russell Ito, Honolulu Laboratory.

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 longline catch (number of fish caught) by area fished[12], 1999-2000.

Species	1999 All Locations	1999 MHI EEZ	1999 NWHI EEZ	1999 Outside of U.S. EEZs	2000 All Locations	2000 MHI EEZ	2000 NWHI EEZ	2000 Outside of U.S. EEZs
Blue marlin	4,936	1,709	1,059	1,857	4,509	1,557	418	1,772
Striped marlin	14,417	5,607	3,515	4,857	7,939	2,438	2,309	2,459
Swordfish	37,474	2,357	6,182	29,323	37,023	2,510	6,679	2,760
Mahimahi	44,399	11,654	4,316	27,743	57,775	17,586	6,458	32,529
Moonfish	12,399	5,161	1,431	5,629	7,036	2,759	750	3,079
Ono (wahoo)	10,278	2,579	763	5,435	7,751	1,201	224	4,410
Sharks	87,579	17,449	15,150	51,475	79,363	16,561	11,446	43,049
Albacore	67,303	23,805	6,261	35,659	38,775	5,952	2,969	22,088
Bigeye tuna	80,332	29,203	9,672	36,883	74,493	21,546	7,660	37,804
Yellowfin tuna	16,970	4,835	1,581	4,817	38,379	5,240	1,395	9,956
Trips[13]	**1,161**	**674**	**246**	**775**	**1,134**	**586**	**211**	**750**
Hooks (1,000s)	**19,116**	**6,552**	**2,881**	**9,106**	**20,267**	**5,736**	**2,049**	**9,467**
Lightsticks (1,000s)	**814**	**54**	**173**	**585**	**716**	**41**	**126**	**548**

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

[Data Source: NMFS longline logbook summaries (LLCS 4/21/2001)]

12 Only the three areas with the largest catch are tabled here. The balance reflects catch in U.S. possessions or catch where locations were not verified.

13 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) again increased by about 10% in 2000 representing the larger number of hooks per trip of tuna as compared to mixed and swordfish trips. Most fishing effort in 2000 was outside of the EEZ (200-mile zone), basically the same as in 1999. Fishing effort continued to shift away from NWHI (outside the 50 mile protected species zone). Fishing effort in the main Hawaiian Islands decreased rather substantially while fishing effort in the remote island areas (Palmyra, etc.) increased substantially.

Half of the bigeye tuna was again caught outside the U.S. EEZ this year, whereas it was primarily caught within the MHI or NWHI EEZs in earlier years. More than half the albacore is caught outside the EEZs. More than 50% of the yellowfin caught was in the Pacific remote island areas.

As would be expected, most swordfish was caught outside the EEZs. Blue marlin catch remained stable within and outside of the MHI but striped marlin catch fell by 50% with the loss being across all areas. However concern must continue to be raised about species identification of the marlins in the logbooks. The number of shark caught again decreased.

More detailed information on longline catch and effort statistics is included in the NMFS annual report on the fishery compiled by Russell Ito, Honolulu Laboratory.

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, 1987-2000.

	Non-Tuna PMUS					Tunas			
Year	**Swordfish**	**Blue marlin**	**Striped marlin**	**Mahimahi**	**Wahoo (ono)**	**Albacore**	**Bigeye**	**Skipjack (aku)**	**Yellowfin**
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**
Average	160	164	61	16	33	53	78	19	92
Standard Deviation	21.4	14.2	3.7	3.9	1.7	6.7	6.0	1.4	17.4

[Data source and Interpretation on following page]

[Data source: Imported from LL00ryi2.xls (4/21/2001)]

Interpretation: Analysis of any changes in size composition for species which are caught in multiple locations (e.g., MHI vs. out of the EEZ) is difficult without identification of the catch location. What is significant about the average sizes is the relatively slight change in average weight over time and the relatively small standard deviations for most species. Average swordfish weights were at their highest in 1999, while blue marlin were at the long-term average. Yellowfin average weight has been the lowest over the past two years since the modern longline fishery began, perhaps reflecting greater fishing effort in the remote island areas.

More detailed analysis of weight composition is found in NMFS annual longline monitoring reports.

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, 1987-2000.

	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**
Average	103	206	64	17	25	46	24	8	36
Standard Deviation	18.8	22.9	6.1	2.5	1.6	13.0	5.2	2.0	6.1

[Data source: annual GASyr.dbf (4/26/2001)]

Interpretation:

Most species are within their 13-year ranges although swordfish, striped marlin, and yellowfin tuna were at least 10% below their averages and there does appear to be a trend towards smaller swordfish in the troll-handline-other gear category (as opposed to the longline fishery where in average swordfish weights have increased over the duration of the fishery, primarily because fewer small sized swordfish are landed). Blue marlin was substantially larger in 1999 than in recent years and even more so in 2000, being the largest average size since 1989.

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), 1991-2000.

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**
Average	119	1,197	656	372	169
Standard Deviation	11	174	120	178	115

[Data Source: NMFS longline logbook summaries (LLCS 11/12/01)]

Interpretation: This table shows the decline in the number of longline trips in Hawaii from the moratorium on new entry in 1991 through 1994, at which time longline trip effort stabilized. The table also shows the dramatic shift from swordfish-targeted trips toward tuna (primarily bigeye tuna) and mixed trips in 1995, and the decline of swordfish-directed fishing effort. As a result of this shift, interpretation of longline catch statistics should reflect the changing nature of longline targeting practices.

Data**:** Data compiled by the NMFS Honolulu Laboratory's Fishery Monitoring & Economics Program from NMFS Federal logbooks. Type of trip is usually determined by interview with the vessel captain or occasionally by FMEP staff interpretation of salient characters from fishing vessel gear design, fishing 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), 1991-2000[14]

	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	9.5	1,871	26
1993	465	10.3	2,122	29
1994	430	10.0	2,814	26
1995	441	10.2	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	11.3	1,791	26
2000	**557**	**11.7**	**1,949**	**29**
Average	414	10.3	2,006	28
Standard Deviation	69	1.1	324	4

[14]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**	**11.1**	**674**	**13.3**	**879**	**15.5**
Average	299	9.7	430	9.9	768	13.3
Standard Deviation	76	1.1	106	2.0	98	1.2

	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**
Average	1,263	18.4	1,543	25.6	1,996	26.0
Standard Deviation	297	4.0	155	5.0	337	2.0

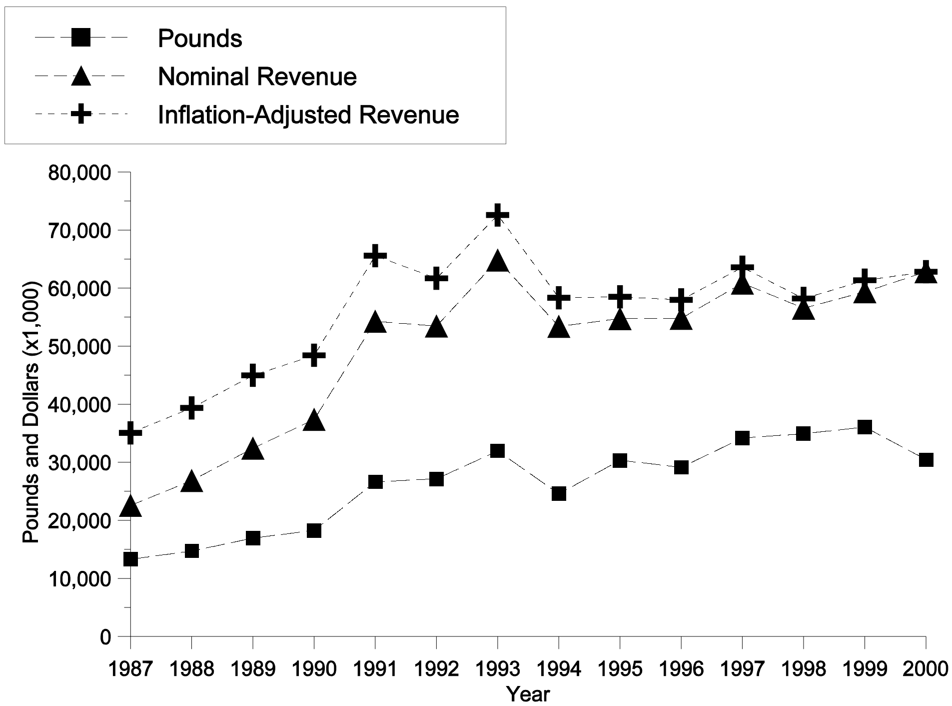
[Data Source**:** NMFS Honolulu Laboratory FMEP programming (11/11/01)]

Interpretation: These tables show an increase in the average miles to first set for all trip types, the highest on record for each. The number of days fishing is also above the average all trip types. The increase in maximum miles to first set may reflect the fact that more vessels are beginning their trips from California and landing in Hawaii. (Trips initiated in Hawaii but landed in California are not included in this data set.)

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 mid-1980s through 1993 and the general stabilization of landings and revenue since then. Gear-specific changes are considered in later figures.

Data information is on the following page.

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

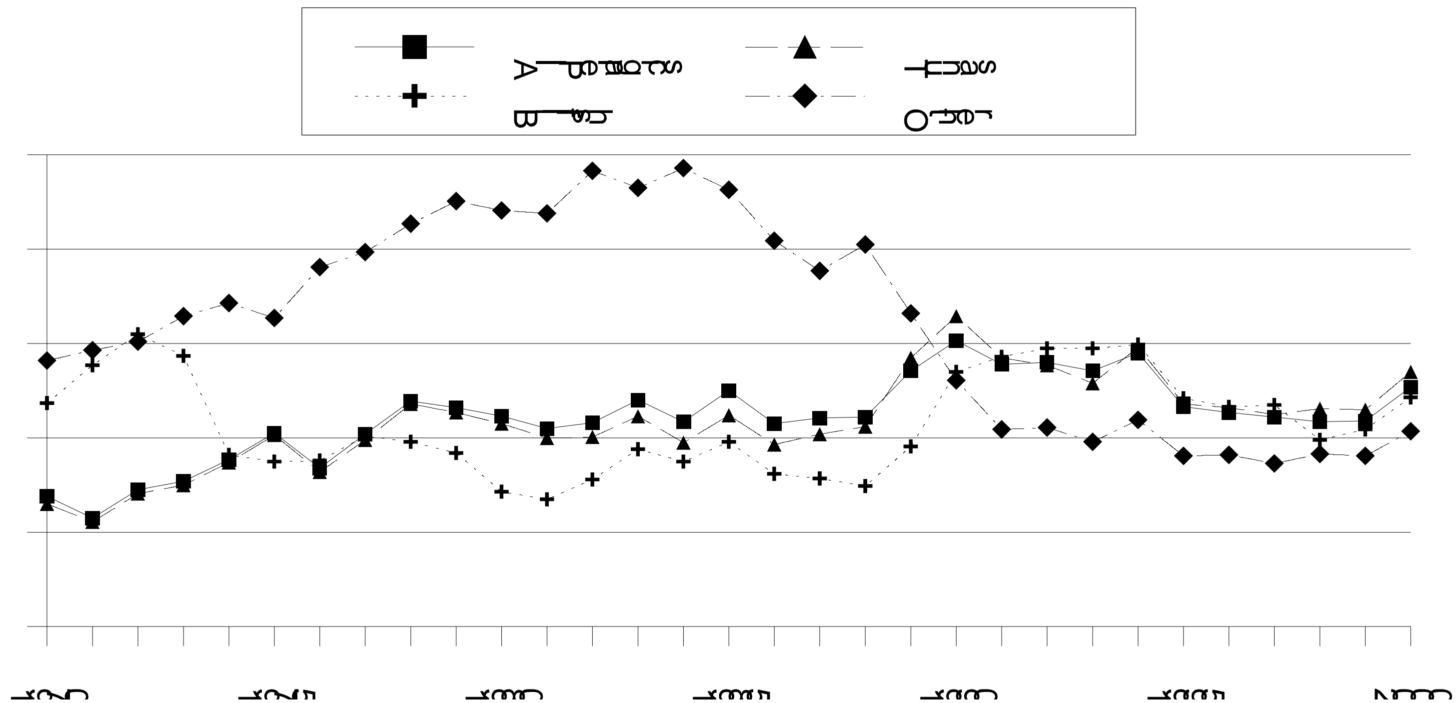
Year	Pounds (x 1,000)	Nominal Revenue (x$1,000)	Adjusted Revenue (x $1,000)	Honolulu Consumer Price Index (U)
1987	13,337	$22,597	$35,069	115.90
1988	14,733	$26,873	$39,362	122.80
1989	16,960	$32,442	$44,991	129.70
1990	18,291	$37,399	$48,430	138.90
1991	26,648	$54,306	$65,601	148.90
1992	27,156	$53,478	$61,700	155.90
1993	31,970	$64,863	$72,601	160.70
1994	24,584	$53,422	$58,343	164.70
1995	30,359	$54,773	$58,504	168.40
1996	29,157	$54,807	$57,989	170.00
1997	34,196	$60,879	$63,591	172.20
1998	34,930	$55,549	$58,226	171.60
1999	35,965	$59,157	$61,364	173.40
2000	**30,485**	**$62,829**	**$62,829**	**179.87**
Average	26,300	$49,500	$56,300	
Standard Deviation	7,400	$13,200	$10,200	

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 (Revenue*) is computed from the Honolulu consumer price index (HCPI) as: (Current year HCPI / data year HCPI) X (data year nominal ex-vessel revenue)[15]

[Data Source: P8700xn1.xls (4/24/01)]

[15] The same adjustment can be done on price data.

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 in 2000, as well as improved information on the status of swordfish in the Pacific – diminishing the weight of the boycott, improved demand for Hawaii's fresh pelagics.

Hawaii commercial pelagic prices, inflation-adjusted [16].

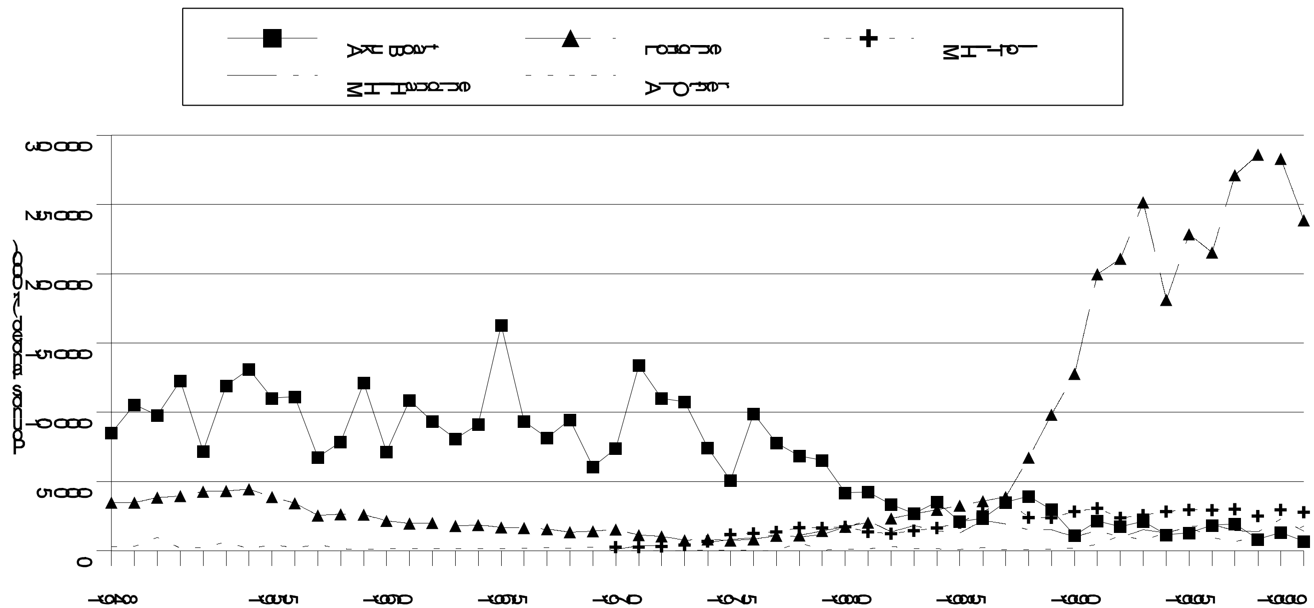
Year	All Pelagics	Tuna	Billfish	Other	HCPI
1970	$1.38	$1.30	$2.37	$2.82	40.90
1971	$1.15	$1.11	$2.77	$2.93	42.60
1972	$1.45	$1.41	$3.10	$3.02	44.00
1973	$1.54	$1.50	$2.87	$3.29	45.90
1974	$1.77	$1.74	$1.82	$3.43	50.80
1975	$2.05	$2.03	$1.75	$3.27	55.50
1976	$1.68	$1.64	$1.76	$3.81	58.30
1977	$2.04	$1.98	$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**	**179.87**
Average	2.21	2.18	2.16	3.24	
Std Deviation	0.44	0.49	0.52	1.06	

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 (CPI) 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: PPRICE.xls (4/21/2001)

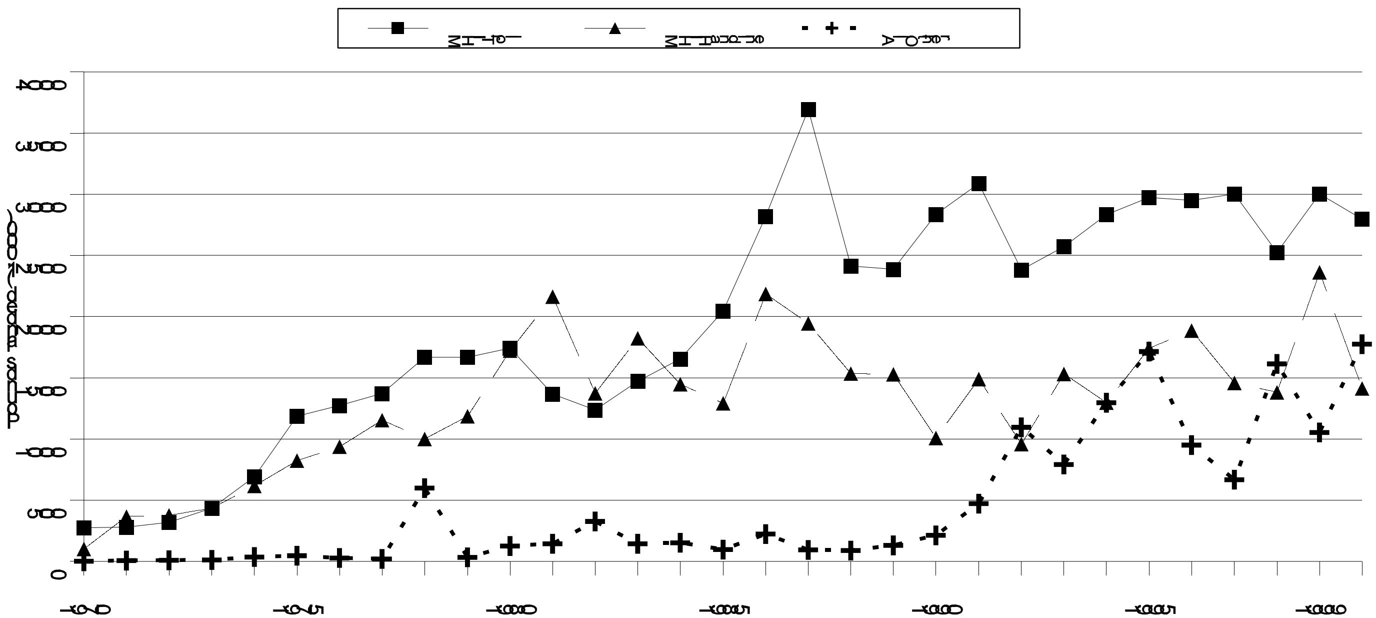
16 Each years' inflation-adjusted price data must be updated annually.

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



<u>Interpretation</u>: 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 issues, 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 now dominates pelagic landings and all other fisheries in the state.

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



Interpretation:

This figure provides a finer resolution for the troll, handline and other categories of pelagic landings in Hawaii. Commercial trolling in the main Hawaiian Islands remained in 2000 near its ten year average which is substantially above its thirty year average. Landings of main Hawaiian Islands handline tuna (ika shibi and palu ahi in the near-shore areas) increased dramatically (up 67% from 1998) to a 30 year high in 1999 but declined back to the average in 2000. The reason for the 1999 increase needs further explanation. Pelagic landings by other gears and by troll and handline from a variety of areas[17] have fluctuated substantially with 2000 being the highest on record. However total troll-handline-other pelagic landings combined in 2000 are only 10% above the ten year average.

Only 29,000 pounds of pelagics were caught by troll gear in the NWHI and less than 9,000 in other areas. However 918,000 pounds of pelagics were caught by handline in other areas (outside the NWHI and MHI), of which 308,000 pounds were recorded as bigeye tuna and 560,000 pounds as yellowfin.

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[17] Includes NWHI landings by these gear types, distant-water albacore trollers, and Cross Seamount handline when reported separately.

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)

			Pounds Caught			
Year	**Aku Boat**	**Longline**	**MHI Troll**	**MHI Handline**	**Other**	**Total Troll-Handline-Other**
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	**684**	**23,860**	**2,798**	**1,414**	**1,776**	**5,988**
Average 1948-present	**6,744**	**6,030**				**2,231**
Average 1970-present	**4,262**	**9,918**	**2,023**	**1,349**	**467**	**3,850**
Standard Deviation	**3,424**	**10,414**	**926**	**521**	**560**	**1,687**
Average 1990-present	**1,480**	**22,670**	**2,815**	**1,504**	**1,060**	**5,385**
Standard Deviation	**508**	**4,728**	**228**	**394**	**510**	**750**

[Data Source: HTOT00a..XLS (12/21/01) and P8700n1.XLS (4/24/01)]

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.

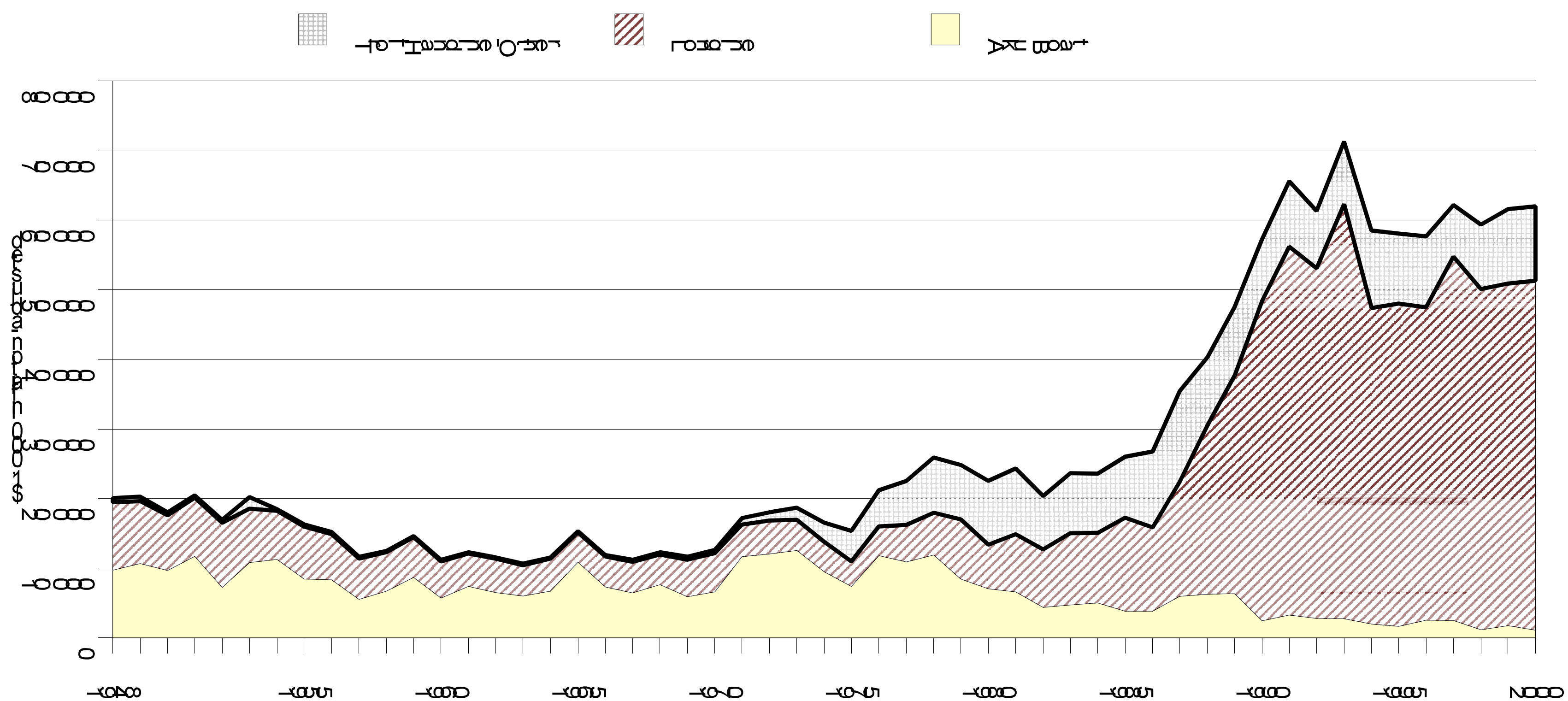
Gears are categorized in this report as follows:

- 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.



Interpretation: On an inflation-adjusted ex-vessel revenue basis, the dominance of the longline fleet beginning in the late 1980s is clearly shown. Approximately 80% of all commercial pelagics revenue comes from the longline fishery, compared to less than 30% in 1980. Longline revenue dipped significantly in 1994 as a number of vessels returned to the mainland U.S., but much of this decline has been subsequently recovered through tuna landings. Troll-handline-other pelagic landings were near their recent average and above all years except 1986 and 1987. These fisheries have shown substantial inter-annual variation over the past twenty years.

Data information on following pages.

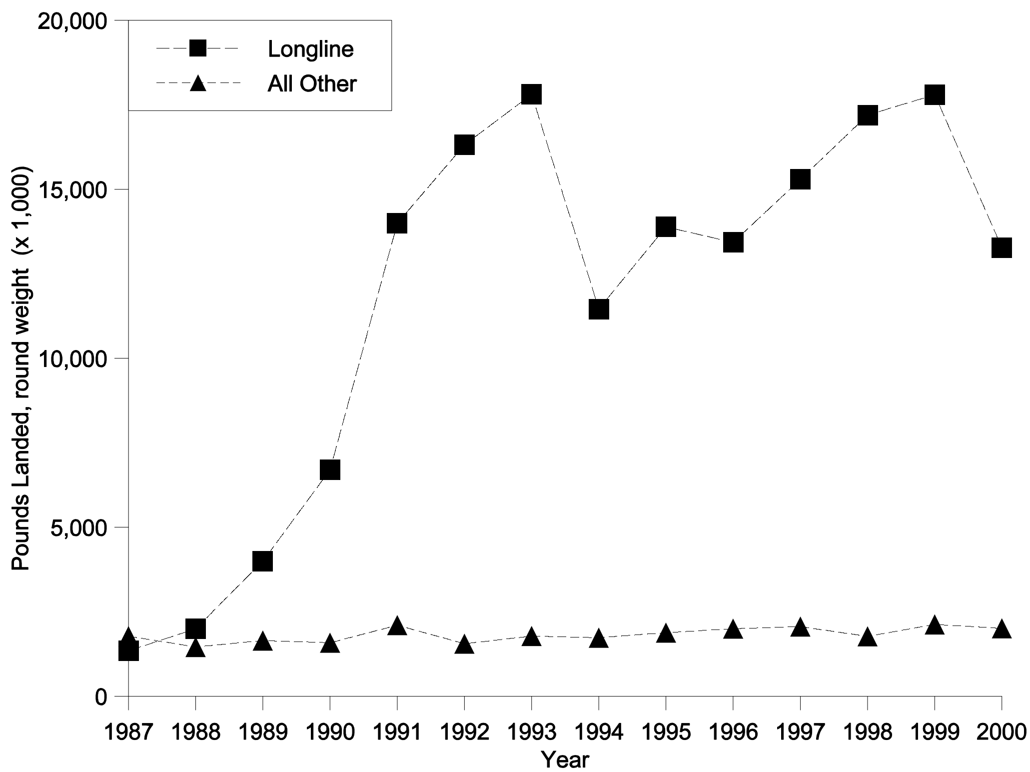
Hawaii commercial fishing revenue*, adjusted for inflation, 1948 - present. ($ x 1000)

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**
Average	6,782	16,528	4,687
Std. Deviation	3,278	17,883	4,439

[Data Source: HTOT00a.xls (4/21/2001)]
Data: Combination of HDAR commercial catch reports for non-longline gears and NMFS estimates for longline.

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



Interpretation: The chart shows the rapid rise in the longline fishery for swordfish in 1991-93, the decline in 1994 as swordfish longliners returned to the mainland U.S., stabilization in the subsequent five years as more vessels targeted swordfish again, and then the decline as emergency regulations to reduce longline-turtle interactions led to substantially diminished swordfish effort. The non-tuna PMUS includes the estimated round weight of pelagic sharks (e.g., blue sharks) which are caught incidentally and processed at-sea only for their fins. This amounted to approximately 36% of non-tuna longline landings in 1999 but much less in 2000 due to a new State law prohibiting the landing of shark fins. More information is obtainable from the species tables and from the NMFS annual report on the fishery (Ito, 2001).

The chart also shows the relative stability of non-tuna PMUS catch by all the other gears with 2000 landings being slightly above the long-term average.

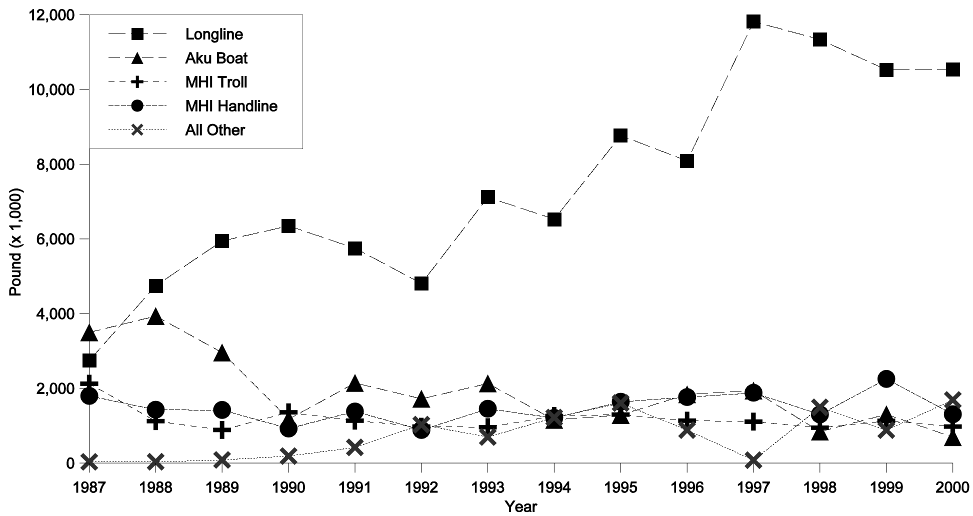
Hawaii commercial billfish and other non-tuna PMUS catch by gear type.

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**
Average	11,743	1,824
Standard Deviation	5,811	218

[Data Source: P8700xn1.xls (4/24/01)]

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

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



Interpretation: Since 1993, longline fishing effort increasingly has focused on tuna as a target species (as described in Ito, 1996). Aku boat landings continue their long term decline. MHI troll and handline landings of tuna in 2000 were within their recent ranges, but landings by other gears and by handline in other areas (i.e., outside the MHI) were at a record level.

The time-series now illustrates the fluctuating importance (or reporting) of all other gears, including NWHI trolling and handline, off-shore handline, and distant-water troll.

In 2000 most of the All Other tuna landings were primarily off-shore handline from the seamounts and NOAA weather buoys.

Hawaii commercial tuna catch by gear type.

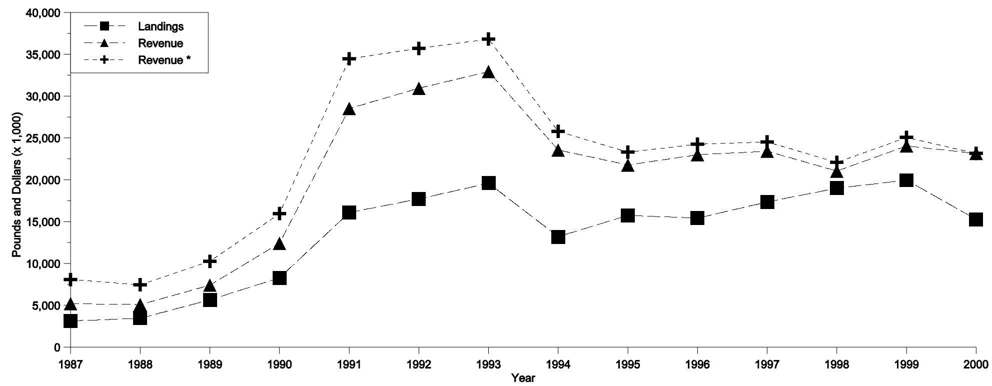
Pounds Caught (x 1,000)

Year	Longline	Aku Boat (pole & line bait boat)	MHI Troll	MHI Handline	Other
1987	2,750	3,501	2,127	1799	34
1988	4,750	3,936	1124	1428	36
1989	5,950	2,961	891	1423	87
1990	6,350	1,180	1,361	926	189
1991	5,750	2,147	1139	1383	424
1992	4,810	1,722	976	889	1031
1993	7,120	2,134	962	1455	700
1994	6,530	1,158	1263	1208	1222
1995	8,770	1,290	1301	1642	1607
1996	8,090	1,843	1,138	1768	886
1997	11,819	1,942	1,110	1883	80
1998	11,337	845	950	1,304	1495
1999	10,524	1309	1133	2,254	884
2000	**10,534**	**694**	**978**	**1,308**	**1692**
Average	7,506	1,904	1,175	1,476	741
Standard Deviation	2,758	974	308	370	611

[Data Source: P8700xn1.xls (4/24/01)]

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: Longline landings of swordfish decreased substantially in 2000, contributing substantially to the lowest non-tuna pelagic landings since 1993 (the peak of the longline fishery for swordfish). Ex-vessel (nominal) revenue decreased slightly in 2000, reflecting some off-setting effects of non-tuna ex vessel price increases.

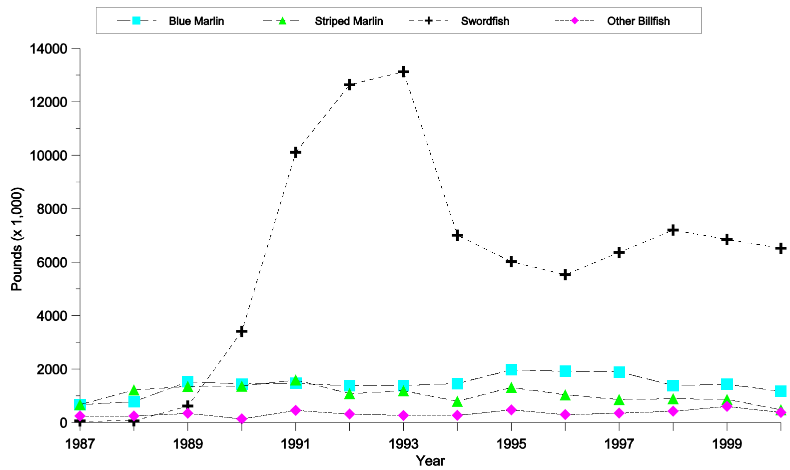
Hawaii billfish & other non-tuna PMUS catch and revenue, 1987 - present.

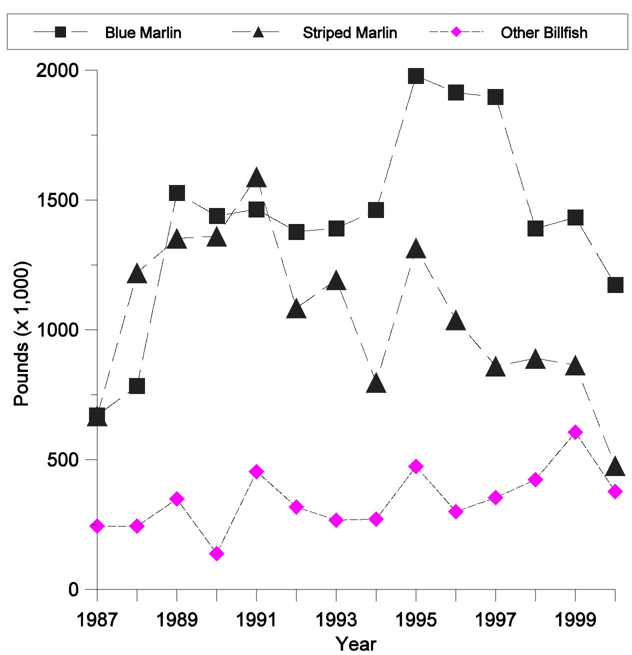
Year	Pounds (x1,000)	Nominal Revenue ($,1000)	Inflation-adjusted Revenue ($1,000)	HCPI
1987	3,126	5,207	8,082	115.9
1988	3,459	5,093	7,461	122.8
1989	5,648	7,410	10,278	129.7
1990	8,286	12,415	16,080	138.9
1991	16,105	28,530	34,470	148.9
1992	17,728	30,950	35,715	155.9
1993	19,599	32,939	36,874	160.7
1994	13,202	23,568	25,743	164.7
1995	15,750	21,772	23,259	168.4
1996	15,433	23,003	24,200	171.0
1997	17,362	23,420	24,467	172.2
1998	19,000	21,043	22,061	171.6
1999	19,954	24,053	24,955	173.4
2000	15,279	23,160	23,160	179.9
Average	13,567	20,183	22,629	
Standard Deviation	5,935	9,118	9,501	

[Data Source: P8700xn1.xls (4/24/01)]

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

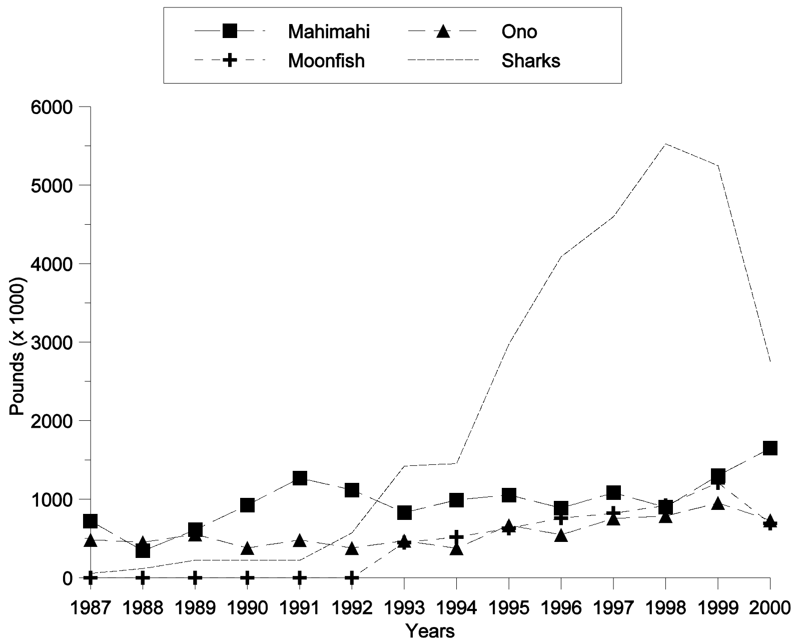
	Pounds Landed (x 1,000)			
Year	**Blue Marlin**	**Striped Marlin**	**Swordfish**	**Other Billfish**
1987	671	669	59	244
1988	784	1,220	65	244
1989	1,527	1,353	616	349
1990	1,439	1,361	3,411	138
1991	1,465	1,590	10,113	454
1992	1,378	1,085	12,644	318
1993	1,391	1,193	13,126	267
1994	1,461	798	7,008	271
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	**1,173**	**477**	**6,521**	**377**
Average	1,422	1,051	6,110	344
Standard Deviation	375	308	4,130	118

Interpretation**:** The swordfish component of the longline fishery rose rapidly in the early 1990s, with a significant decline subsequently as longline fishing effort shifted towards tuna. Despite the impact of regulations on swordfish effort late in 2000, swordfish landings actually held up quite well. Blue marlin landings were below the long-term average, reflecting smaller longline catch. Longline landings now make up roughly 60% of the total catch of blue marlin (up substantially from the 1980s but consistent throughout the 1990s). Striped marlin landings were substantially below the long-term average. The reason for this needs to be explored since most striped marlin is caught on longline gear targeting tuna.

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 100,000 pounds.

[Data Source: P8700xn1.xls (4/24/01)]

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



Interpretation: Landings for mahimahi were the highest since the longline fishery began its growth in 1987 but troll-handline-other still makes up over 50% of mahimahi landings. The same is true for ono (wahoo). Moonfish is caught almost exclusively by longline gear. The decline in shark landings reflect both the decline in swordfish targeting by longline vessels and the State law against landing shark fins which was passed in 2000.

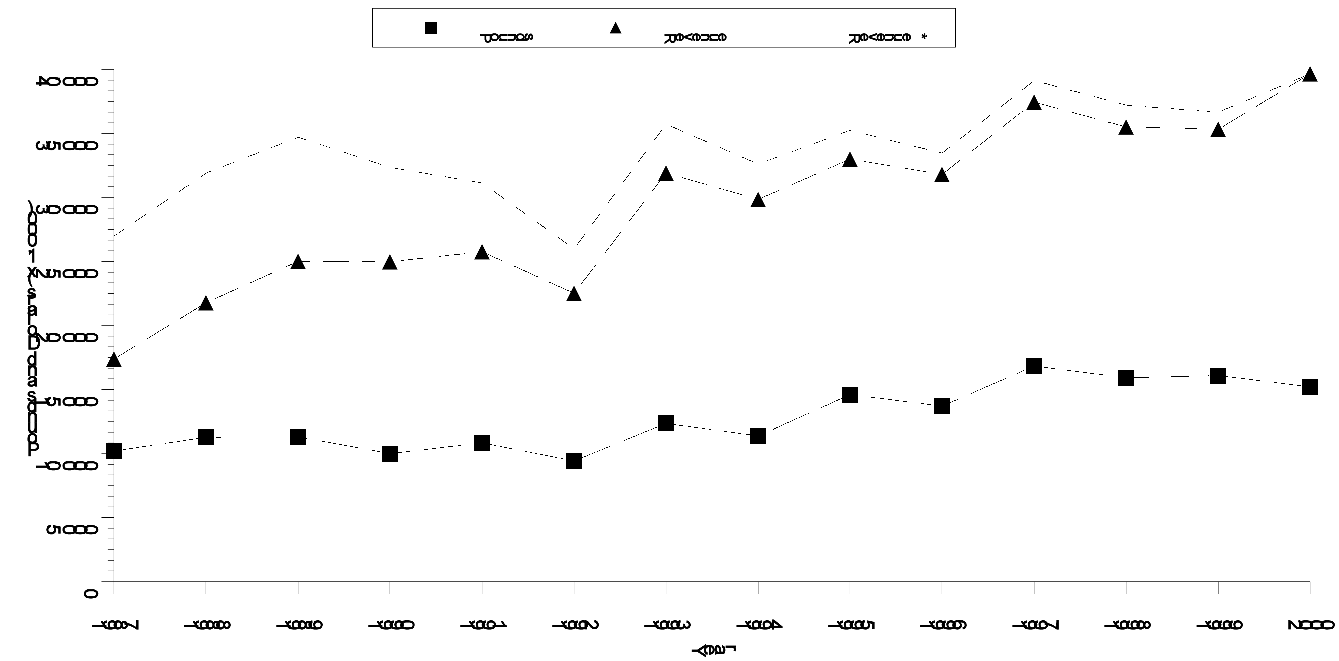
Hawaii commercial catch -- mahimahi, ono(wahoo), and sharks.

Year	Pounds (x 1,000)			
	Mahimahi	Ono	Moonfish	Sharks (Whole Wgt)
1987	722	484	0	57
1988	345	452	0	118
1989	612	553	0	224
1990	927	381	0	221
1991	1,271	482	0	222
1992	1,120	380	0	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
1988	900	787	922	5,527
1999	1,302	954	1,210	5,249
2000	**1,649**	**732**	**693**	**2,756**
Average	979	574	429	2,106
Standard Deviation	318	178	424	1,738

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 100,000 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: P8700xn1.xls (4/24/01)

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



Interpretation: Tuna landings in the Hawaii commercial fishery have been near record levels over the past five years (1965 being the highest year of the aku boat fishery) and the highest since the tuna cannery closed (1984).[1] Nominal and inflation-adjusted ex vessel revenue are also at record levels. Troll-handline-other landings of tuna were average for 2000.

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1 Total tuna landings were 14,700,000 pounds (sold) in 1970, of which over half was from the pole-and-line aku boat fleet. The record landings were in 1965 (16.3 million pounds).

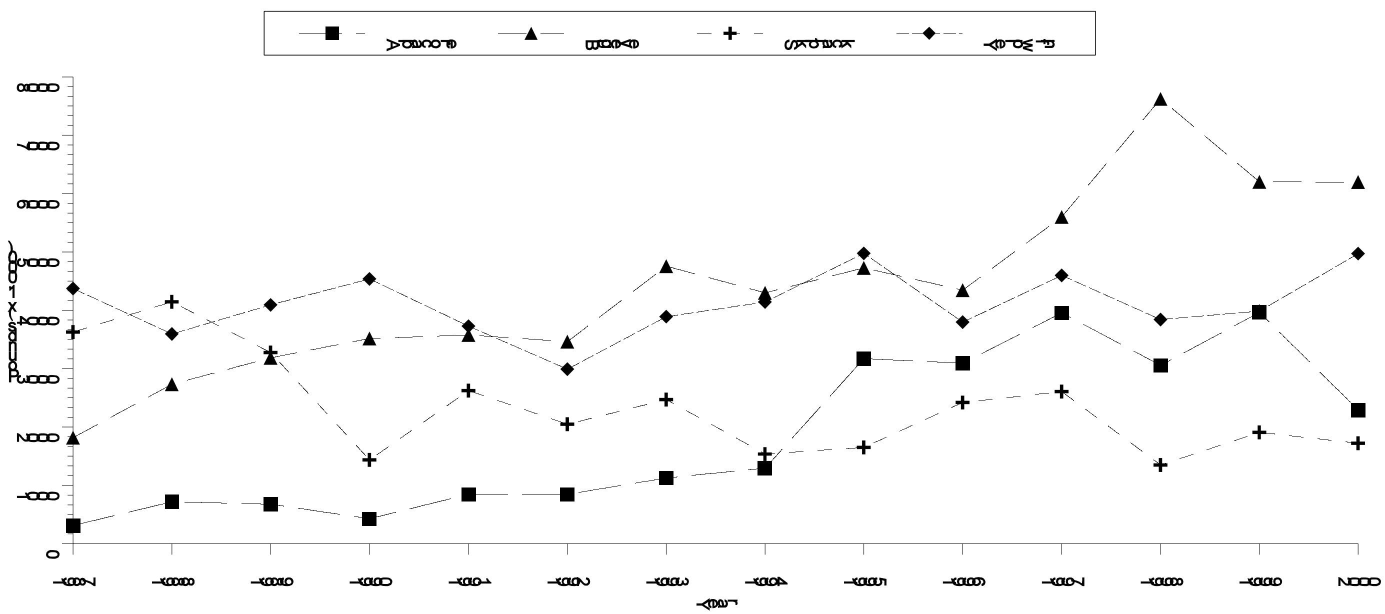
Hawaii tuna catch and revenue, 1987 - present

Year	Pounds Landed (x 1,000)	Nominal Revenue x $1,000	Inflation-adjusted Revenue x $1,000	HCPI
1987	10,211	17,390	26,993	115.9
1988	11,274	21,780	31,907	122.8
1989	11,312	25,032	34,721	129.7
1990	10,005	24,984	32,359	138.9
1991	10,843	25,776	31,142	148.9
1992	9,428	22,528	25,996	155.9
1993	12,371	31,924	35,738	160.7
1994	11,382	29,857	32,612	164.7
1995	14,609	33,001	35,255	168.4
1996	13,724	31,804	33,459	171.0
1997	16,834	37,460	39,135	172.2
1998	15,931	35,506	37,223	171.6
1999	16,104	35,333	36,657	173.4
2000	**15,206**	**39,669**	**39,669**	179.9
Average	12,802	29,432	33,776	155.3
Standard Deviation	2,532	6,618	4,029	20.7

[Data Source: P8700xn1.xls (4/24/01)]

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 100,000 pounds. Inflation-adjusted revenue bases previous year's revenues on the current year (1997) Honolulu consumer price index (HCPI).

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



<u>Interpretation</u>: Longline landings represent roughly 75% of all tuna landings in Hawaii, but a higher percentage of bigeye tuna (93%), 88% of albacore, but only 50% of yellowfin and 12% of skipjack tuna. Total bigeye tuna landings were stable in 2000 but less than their record landings in 1998 while landings of yellowfin tuna increased substantially. Albacore landings were their lowest since 1994.

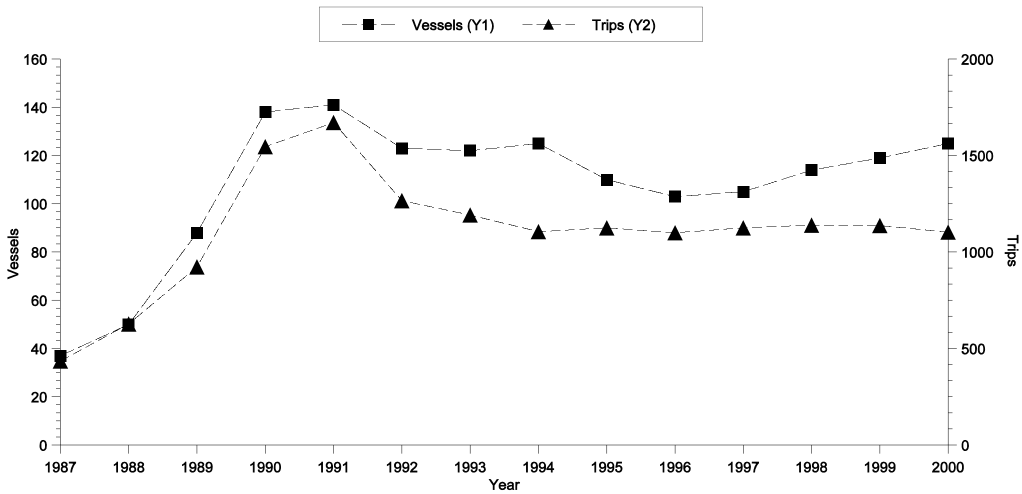
Species composition of Hawaii commercial tuna catch, 1987 - present.

Year	Pounds Landed (x 1,000)			
	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	**2,294**	**6,199**	**1,721**	**4,973**
Average	1,843	4,434	2,346	4,110
Standard Deviation	1,351	1,564	856	546

[Data Source: P8700xn1.xls (4/24/01)]

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 100,000 pounds.

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



Interpretation**:** Longline vessel activity in Hawaii in 2000 returned to the 1994 peak number of active vessels although the number of trips was lower than 1999 and any year since 1990 except for 1995. Regulatory changes affected vessel operating patterns substantially.

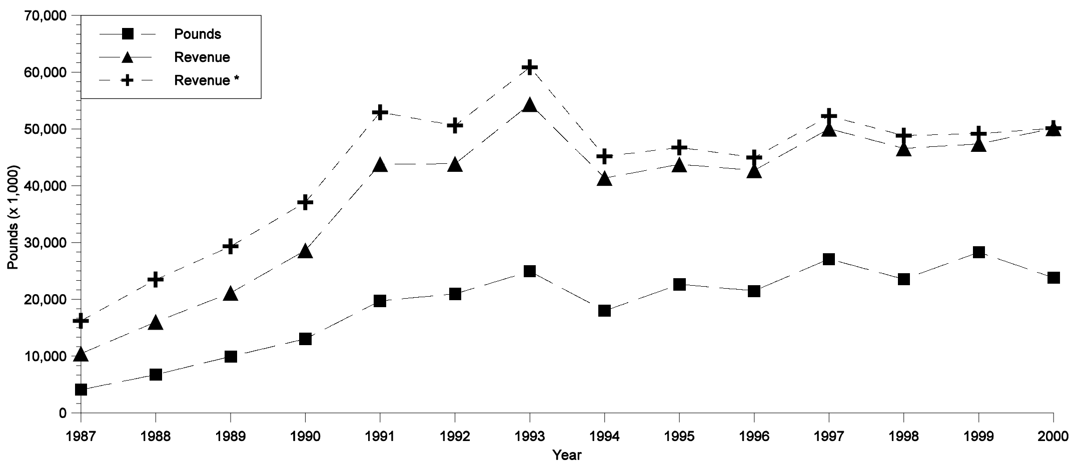
Hawaii longline vessel activity, 1987 - present.

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**
Average	107	1,107
Standard Deviation	29	300

[Data source: (LL00.xls RYI, 12/21/01)]

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 (Ito, 2001).

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



Interpretation: Hawaii longline landings have remained fairly stable since 1995, with the exceptional peak in 1997 but a significant decline in 2000. Most of the effort in the past several years has been directed at tunas, with bigeye and albacore providing the largest volume. Swordfish remains the largest single component, but only marginally more than bigeye tuna. However bigeye, because ex-vessel prices for bigeye are 75% higher than for swordfish, total longline revenue from bigeye is 65% greater. Albacore landings declined substantially in 2000 while yellowfin tuna landings increased substantially.

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	16,220	115.9
1988	6,750	16,050	23,513	122.8
1989	9,950	21,150	29,336	129.7
1990	13,050	28,650	37,107	138.9
1991	19,750	43,820	52,943	148.9
1992	20,980	43,875	50,629	155.9
1993	24,935	54,390	60,888	160.7
1994	17,998	41,373	45,191	164.7
1995	22,638	43,772	46,761	168.4
1996	21,522	42,754	44,979	171.0
1997	27,118	50,043	52,281	172.2
1998	23,562	46,594	48,848	171.6
1999	28,324	47,391	49,167	173.4
2000	**23,803**	**50,153**	**50,153**	**179.9**
Average	18,891	38,605	43,430	
Standard Deviation	7,576	13,773	12,481	

[Data Source: P8700xn1.xls (4/24/01)]

Data: Longline landings and ex vessel revenue estimates are compiled by the NMFS Honolulu Laboratory. They represent weight estimates using Federal logbooks (since 1991) and market monitoring average weight per fish and average price per pound. From 1987-1990, estimates rely on NMFS shoreside and market monitoring.

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

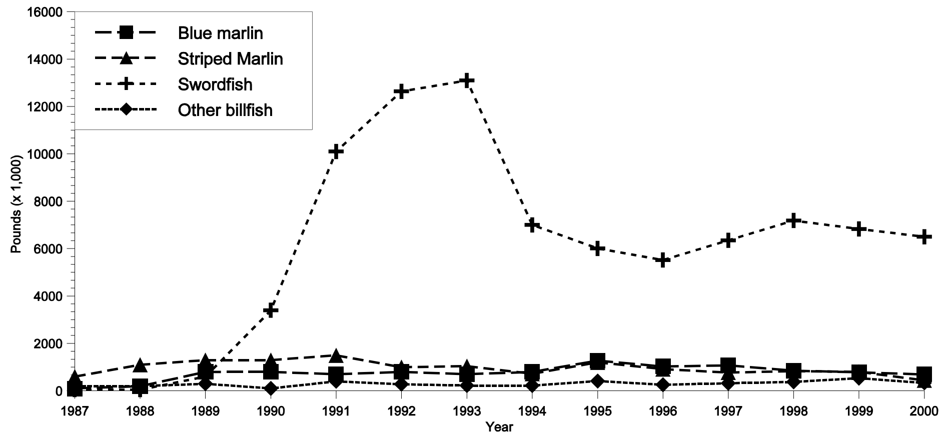
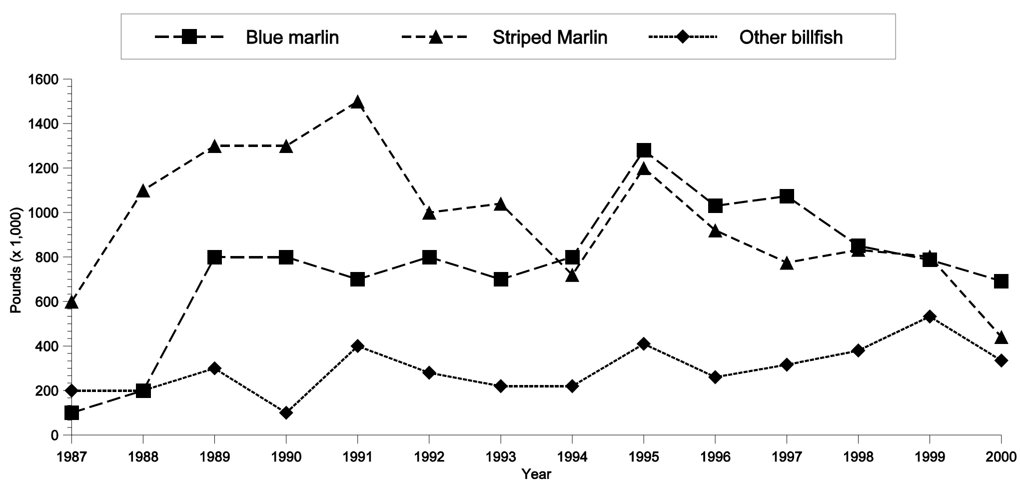


Figure 13c. Hawaii longline catch – marlins & other billfish, 1987 - present.



Interpretation: Total billfish catch (including swordfish) have been relatively stable the last few years but there were lower landings in 2000. Longline landings of blue marlin has declined over the past four years, as has striped marlin. Both are below their long-term averages. The dramatic decline in swordfish catch in 1994 represented a change in vessel targeting practices.* A subsequent figures shows the decline in swordfish-directed trips and the stability in accompanying catch per unit effort (CPUE). Nonetheless, swordfish remains the largest single species caught by the Hawaii longline fleet in terms of pounds caught. Most swordfish continues to be exported to the U.S. mainland. All other species are within their recent ranges and above their long-term averages. Swordfish catch was worth $13 million ex-vessel, while the other marlins were $2 million.

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

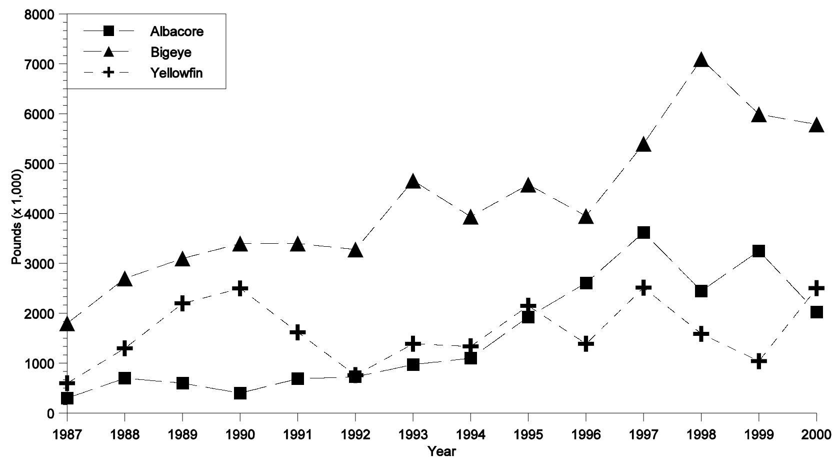
Year	Pounds Caught (x 1,000)			
	Blue marlin	**Striped marlin**	**Swordfish**	**Other billfish**
1987	100	600	50	200
1988	200	1,100	50	200
1989	800	1,300	600	300
1990	800	1,300	3,400	100
1991	700	1,500	10,100	400
1992	800	1,000	12,640	280
1993	700	1,040	13,100	220
1994	800	720	7,000	220
1995	1,280	1,200	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**
Average	758	967	6,096	297
Std Deviation	306	296	4,129	111

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

[Data source: P8700xn1.xls (4/24/01)]

* See the 1995 annual report for a full discussion of the 1994 swordfish CPUE.

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



<u>Interpretation:</u> Bigeye tuna and albacore have had substantial increases in landings since the longline fishery began its growth period in 1987 but landings were the lowest since 1995 for albacore. Yellowfin landings have fluctuated over the time span but experienced a two year decline in 1998 and 1999 yet reached almost record levels in 2000. Yellowfin tunas shows more inter-annual variation than other species. Some longline trips now target albacore (despite its relatively low price per pound). Longline tuna landings in 2000 were $31 million ex vessel, their highest on record.

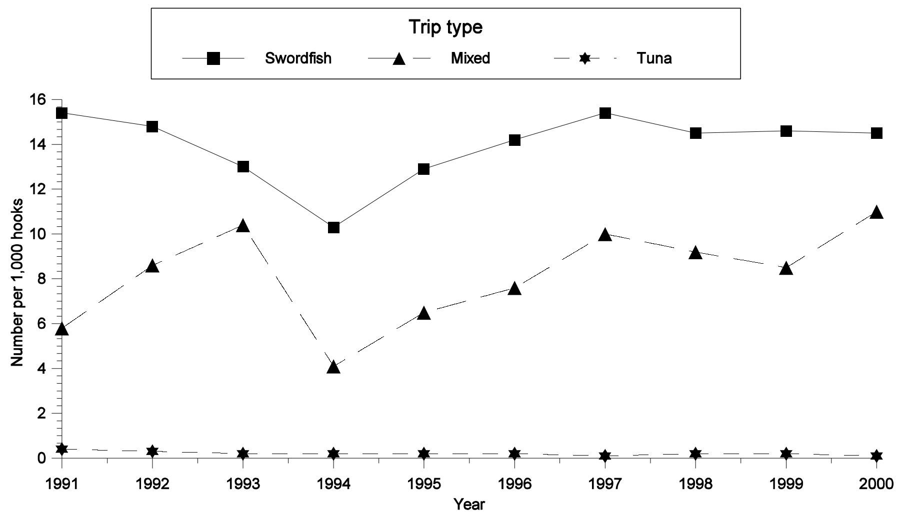
Hawaii longline catch -- tunas, 1987 - present.

		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**
Average	1,621	4,406	1,715	150	20
Standard	1,107	1,451	643	75	23

[Data Source: P8700xn1.xls (4/24/01)]

Data: Data are compiled from Federal logbooks and market monitoring information by NMFS Honolulu Laboratory and HDAR staff. Bluefin and skipjack tuna not recorded on chart due to small magnitudes.

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



Interpretation: Although *aggregate* swordfish CPUE has fallen consistently since 1993, this graph makes clear that there is a tremendous difference between aggregate CPUE (which does not take into account targeting), and trip-type CPUE.

Swordfish CPUE on trips which target swordfish declined from 1992 (the year after the Federal logbook program was initiated and shortly after the inception of the swordfish fishery in Hawaii), dipping dramatically in 1994. Swordfish CPUE has since recovered to its initial levels, although the amount of fishing effort is dramatically lower.

Mixed trip CPUE showed a much steeper decline in 1994, but a similar recovery. This may reflect changes in Mixed trip targeting behavior from techniques which would catch more swordfish to techniques which would catch more tuna.

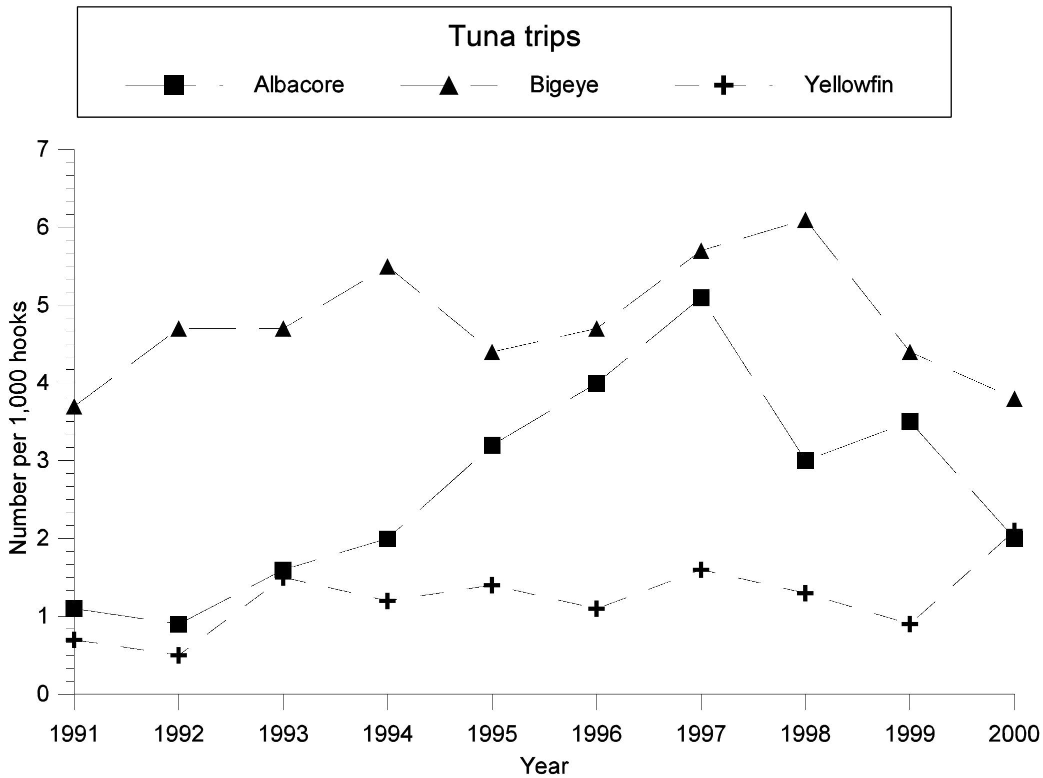
Swordfish CPUE by longline trip type, 1987 - present

Year	Swordfish CPUE (number caught 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**
Average	14.0	8.2	0.2
Standard Deviation	1.5	2.2	0.1

[Data source: LLCS annual output, NMFS HL]

Data: Longline catch rates are compiled from Federal logbooks. CPUE is *Number 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 (meaning either switching of target during the trip or the absence of an explicit target).

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



<u>Interpretation:</u> Tuna-trips provide the most realistic view of tuna species catch rates (CPUEs). Albacore is probably more targeted in the past four years than in previous years, but it appears to be more abundant as well. The dip in albacore CPUE in 2000 is not clearly explained. Bigeye catch rates fell to the lowest level since 1991, even though effort directed at bigeye has increased in the past few years. While it is possible that this reflects the learning curve of swordfish and mixed vessels beginning to set deep for bigeye, this two year decline does raise questions. Yellowfin tuna CPUE, on the other hand, was at its peak in 2000.

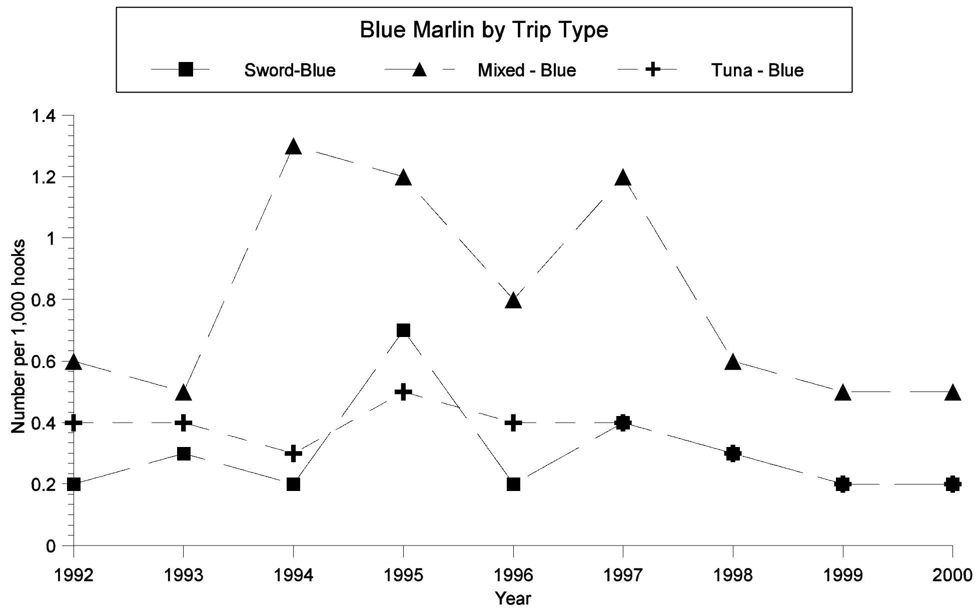
Tuna longline CPUE for tuna trips, 1987 - present

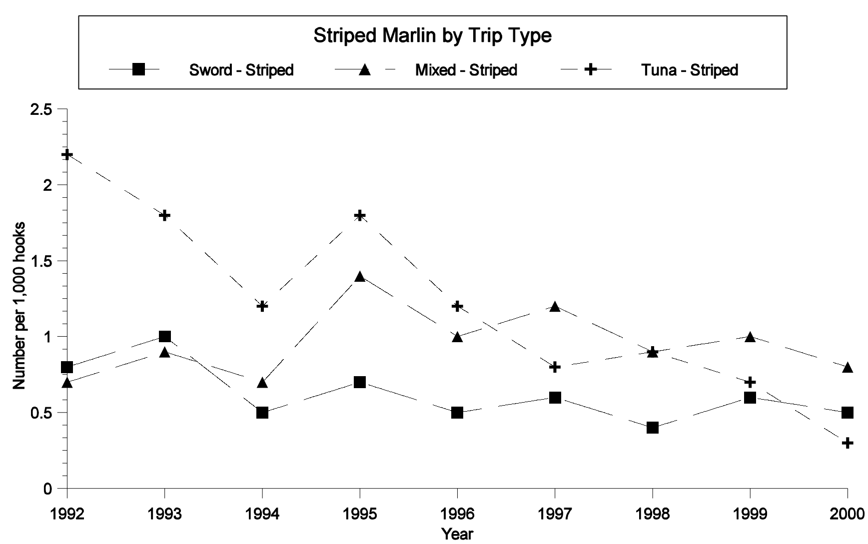
Year	Tuna-trip CPUE (number caught per 1,000 hooks) Albacore	Bigeye	Yellowfin
1991	1.1	3.7	0.7
1992	0.9	4.7	0.5
1993	1.6	4.7	1.5
1994	2.0	5.5	1.2
1995	3.2	4.4	1.4
1996	4.0	4.7	1.1
1997	5.1	5.7	1.6
1998	3.0	6.1	1.3
1999	3.5	4.4	0.9
2000	**2.0**	**3.8**	**2.1**
Average	2.6	4.8	1.2
Standard Deviation	1.3	0.8	0.5

[Data source: LLCS annual output, NMFS HL]

Data: Longline catch rates are compiled from Federal logbooks. CPUE is *Number 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 (meaning either switching of target during the trip or the absence of an explicit target).

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





Marlin longline CPUE by trip type, 1991 - present

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**
Average	0.3	0.8	0.3	0.6	1.0	1.2
Standard Deviation	0.1	0.3	0.1	0.2	0.2	0.6

Interpretation: Blue and striped marlin are caught on all three trip types but in different proportions. With the average longline trip setting roughly 1,000 hooks, these catch rates translate into approximately one blue marlin every five days and one striped marlin every other day. Blue marlin catch rates in 2000 were below their long-term average for all three trip types. The blue marlin do not appear to show any trend, but the striped marlin appear to show a declining trend, particularly as measure on tuna trips.

[Data source: LLCS output, NMFS HL]

Data: Longline catch rates are compiled from Federal logbooks. CPUE is *Number 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 (meaning either switching of target during the trip or the absence of an explicit target).

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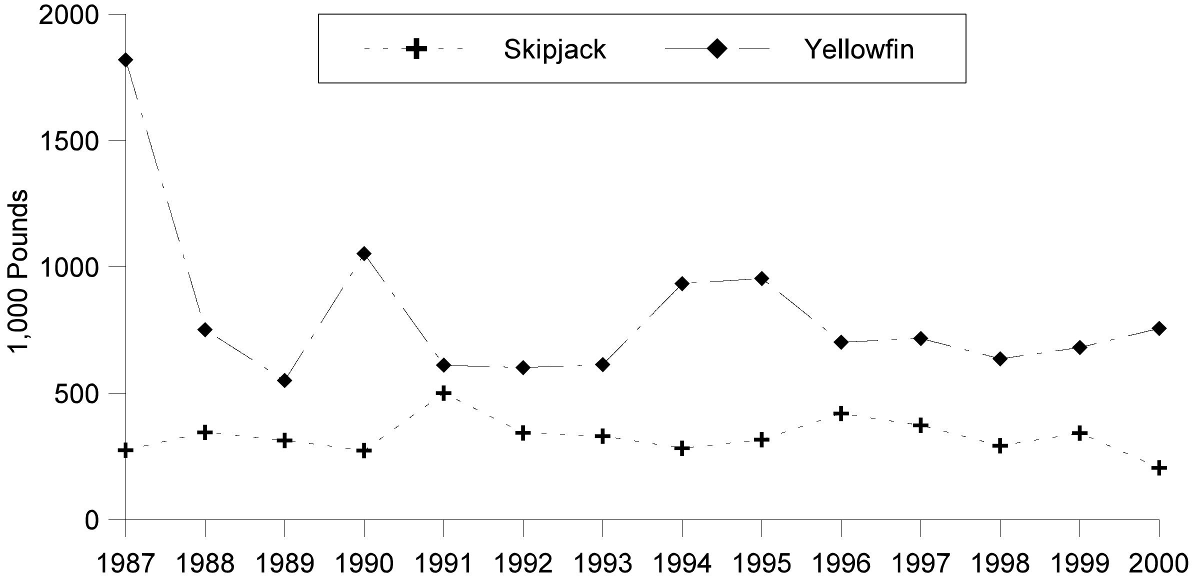
Figure 18. Main Hawaiian Islands troll catch – major species, 1987 - present.



Interpretation: Skipjack and yellowfin are the primary tuna species caught by commercial trolling vessels in Hawaii. Skipjack catch in 2000 was the lowest over the past 10-15 years while yellowfin catch has been below average for the last five years.

MHI Troll tuna catch, 1987 - present.

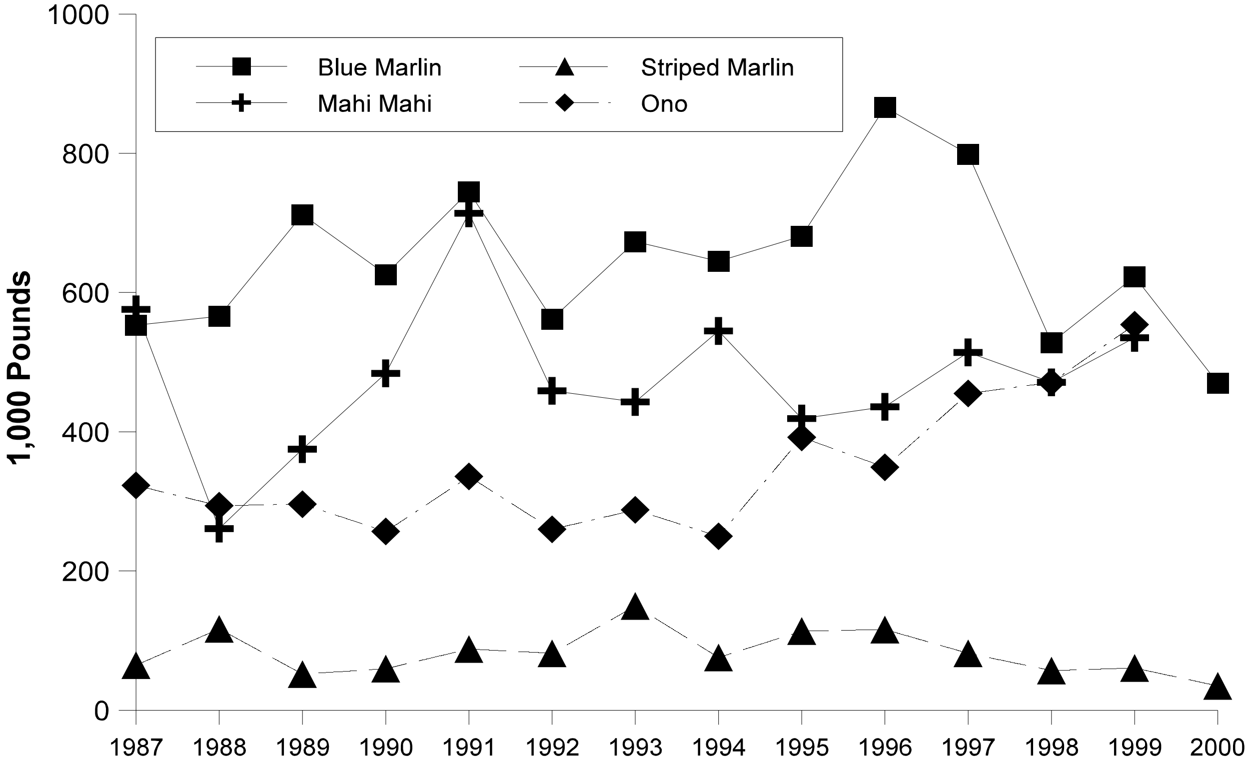
Year	1,000 Pounds caught					
Year	**Albacore**	**Bigeye**	**Skipjack**	**Yellowfin**	**Other Tuna**	**Total**
1987	1	11	275	1,820	19	2,126
1988	1	10	346	752	16	1,124
1989	1	11	314	551	14	891
1990	1	15	274	1,053	18	1,360
1991	2	11	501	612	14	1,139
1992	3	9	344	602	16	974
1993	3	4	331	614	11	963
1994	* 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	**5**	**6**	**205**	**757**	**7**	**980**
Average	11	8	330	813	12	1,174
Standard Deviation	22	3	71	325	5	308

* 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: Gas00b.dbf (4/26/2001) 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 since being monitored until this year. Both blue and striped marlin catch is down substantially in 2000 (see later section on small boat fishing effort and CPUEs for more interpretation). Mahimahi landings were near their highest. Ono had been on a five year increase through 1999 but declined to near the average in 2000. Swordfish is an inconsequential component of the Hawaii trolling catch.

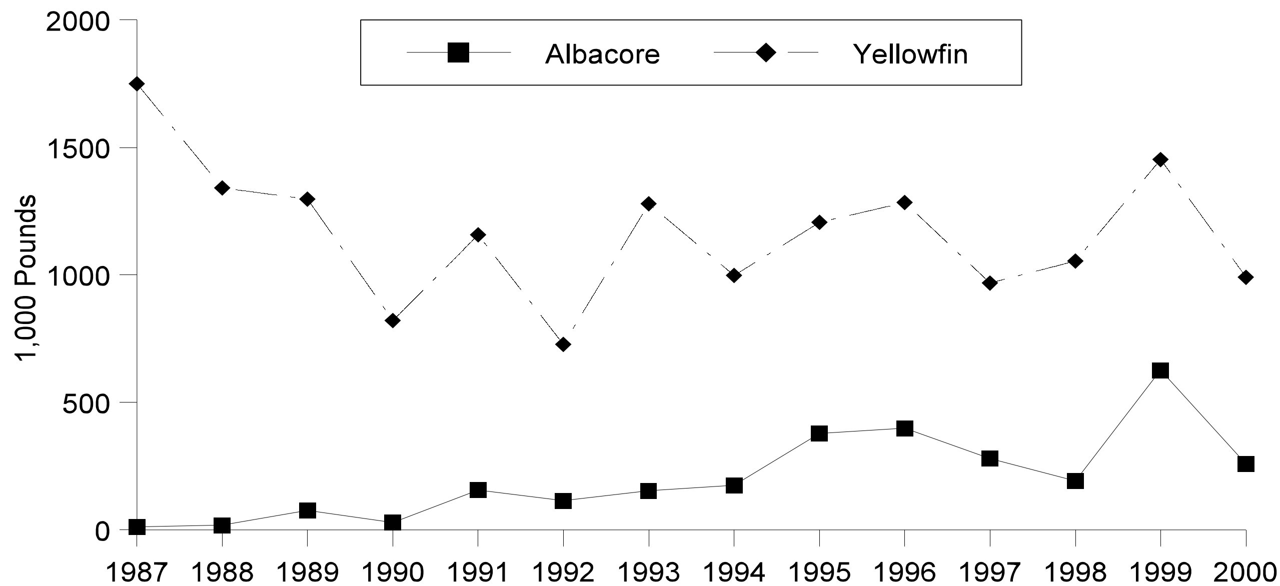
MHI Troll Billfish and non-Tuna catch, 1987-present.

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	**400**	**29**	**1**	**702**	**376**
Average	641	82	1	479	350
Std. deviation	119	32	1	108	91

[Data source: Gas00b.dbf (4/26/2001) 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 20 Main Hawaiian Islands handline catch (excluding distant seamounts) – major species, 1987 - present



Interpretation: MHI handline catch in 2000 appeared to decline substantially from 1999 for both albacore and yellowfin. However previous experience has indicated that there may be under-reporting of handline catches early in the year. Albacore catch peaked in 1999, three times above its long-term average, and even with the apparent decline in 2000, was still above its long-term average. Yellowfin, which fluctuates more year-to-year, was slightly below its long-term average in 2000.

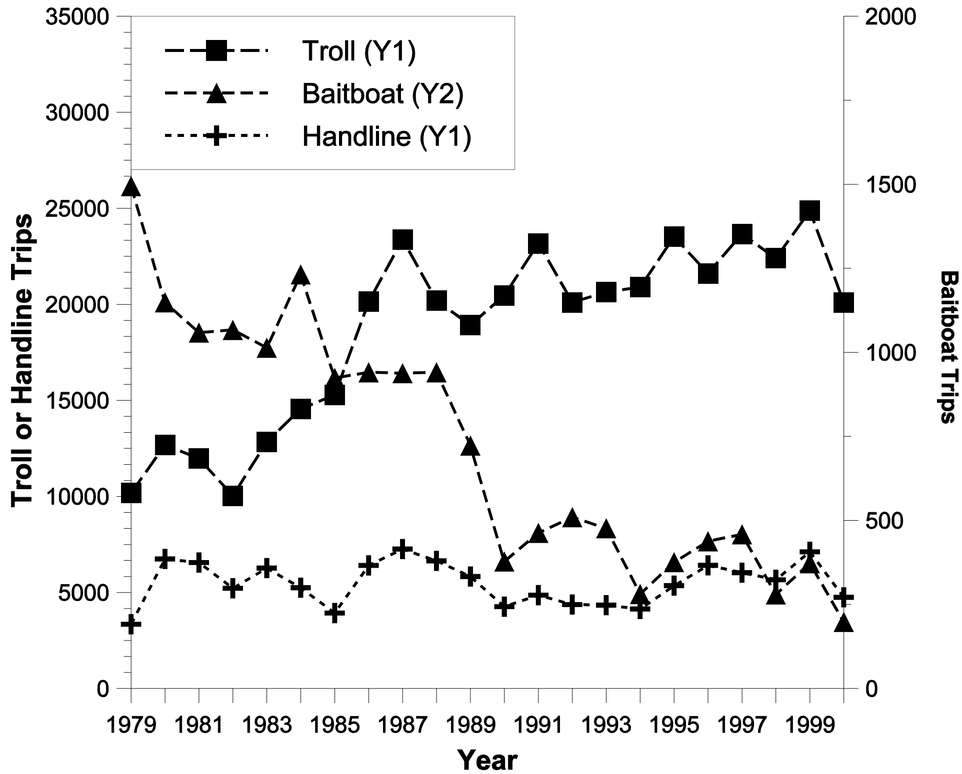
Main Hawaiian Islands handline catch (excluding distant seamounts) -- major species

	MHI Handline (1,000 Pounds Caught)					
Year	**Albacore**	**Bigeye**	**Skipjack**	**Yellowfin**	**Other**	**Total**
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**	**36**	**14**	**991**	**3**	**1,303**
Average	205	36	30	1,167	5	1,443
Standard Deviation	173	40	17	266	3	322

[Data source: Gas00b.dbf (4/26/2001) 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 the various handline gear codes in the State data, for fishing within the main Hawaiian Islands. The more distant off-shore seamounts (e.g., Cross) are excluded. However other 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 non-longline gears

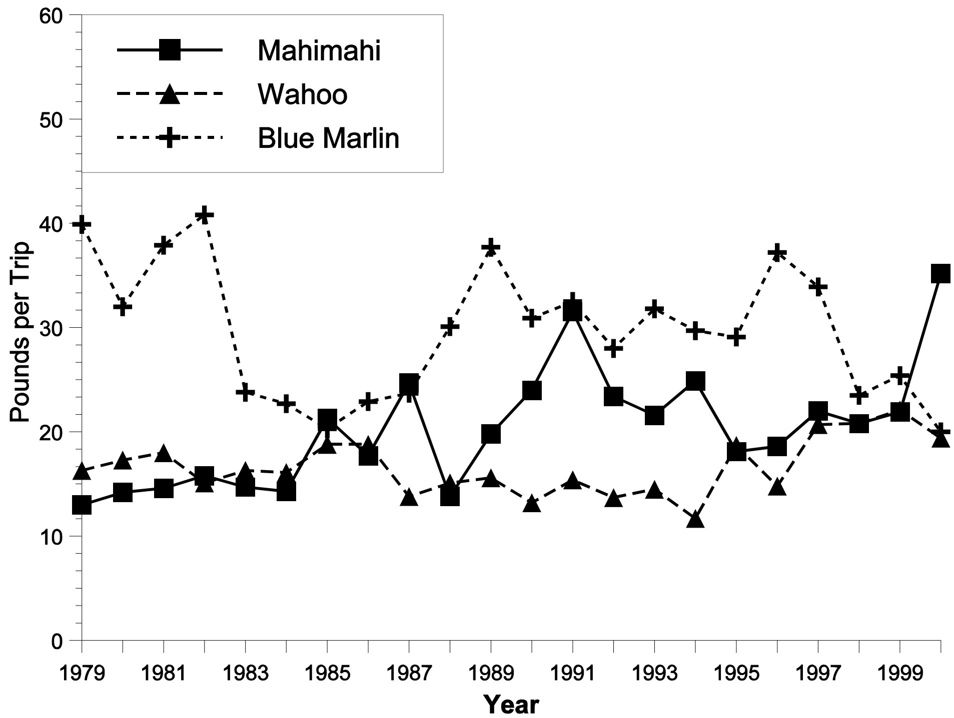


<u>Interpretation:</u> Trips by non-longline pelagic fishing vessels dropped in 2000. Commercial trolling activity has continued at a high level between 20,000 and 25,000 trips per year since 1986. The 2000 effort dropped to its lowest level in 8 years. After a low period in the late-1980's to mid-1990's, handline trips were relatively high from 1996 to 1999, but dropped to average in 2000. Baitboat activity reached a new record low in 2000, much below the long-term average. Only three vessels would be considered to be full-time vessels, while another five (including one in Haleiwa and one on Maui) were fishing only occasionally or were undergoing repairs. The once thriving akuboat fleet contiunues to fade away due to aging and losses of vessels.

<u>Data:</u> Data compiled from HDAR commercial catch reports (preliminary as of April 2001) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

	Number of Trips		
Year	**Troll**	**Baitboat**	**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	**20,105**	**198**	**4,749**
Average	18,716	714	5,491
Standard Deviation	4,694	371	1,126

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

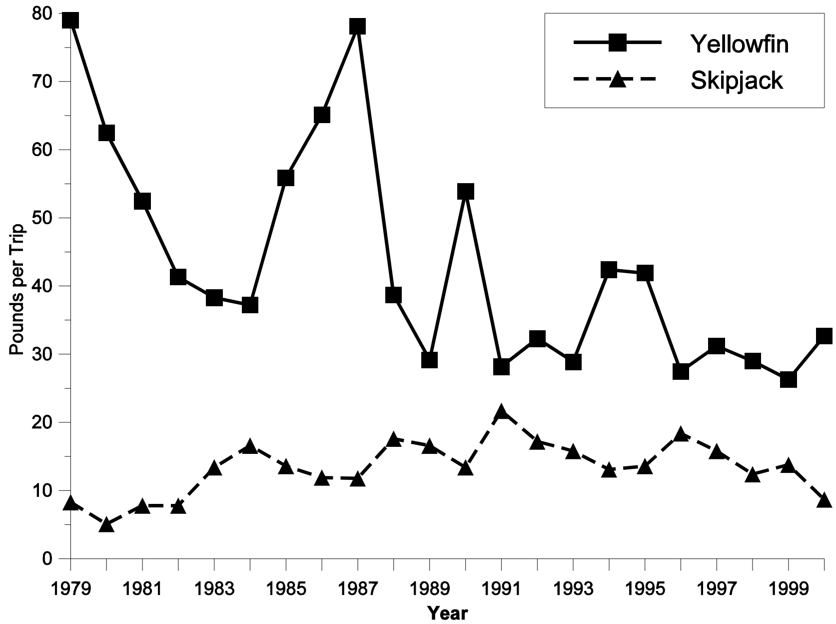


Interpretation: The troll catch rates for non-tuna species were highly variable. The mahimahi catch rate reached a record high, well above the long-term average. The wahoo catch rate dropped from the peak in 1999, but remained above the long-term average. The blue marlin catch rate dropped to a new low and was below the long-term average. Reported troll mahimahi landings were 707,265 pounds (+29.6% from 1999), wahoo 390,348 pounds (-29.1%), and blue marlin 401,630 pounds (-36.6%).

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2001) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

Year	Pounds Caught per Trolling Trip		
	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	**35.2**	**19.4**	**20.0**
Average	20.3	16.6	29.7
Standard Deviation	5.7	2.7	6.4

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

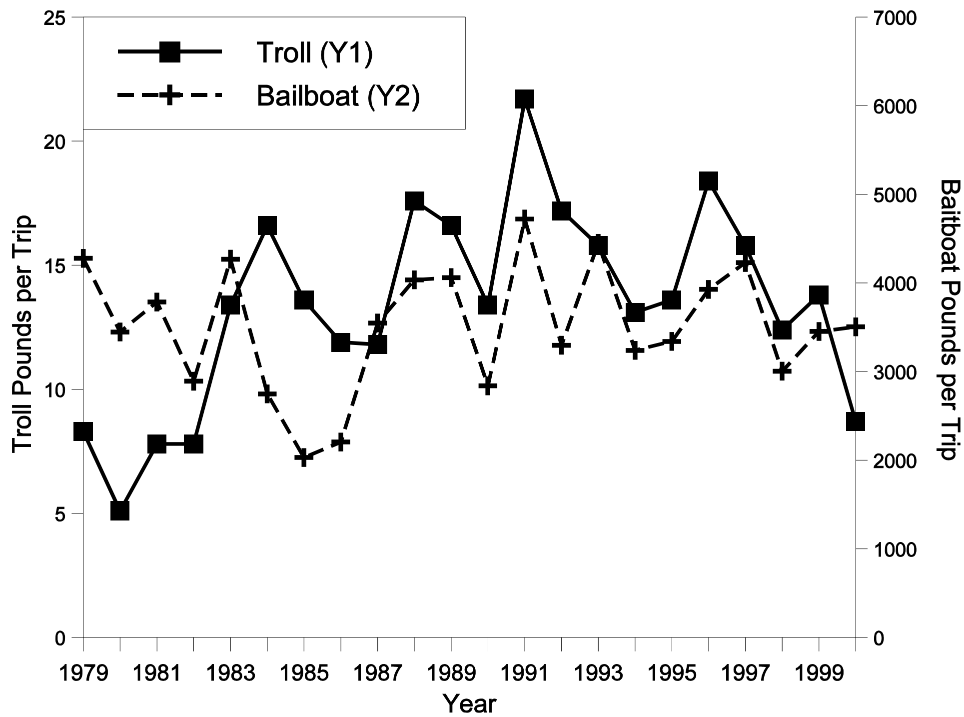


Interpretation: The troll yellowfin tuna catch rate was higher than 1999. The 1996-1999 catch rates echo a period of low catch rates in 1991-1993. The skipjack catch rate dropped to its lowest point since 1982 and was below the long-term average. Skipjack were considered to be in low abundance through much of 2000 and landings were much lower. Reported troll landings were 657,628 pounds for yellowfin (+0.45% from 1999) and 174,583 pounds for skipjack (-49.3%).

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2001) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

	Pounds per Trolling Trip	
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**	**8.7**
Average	43.3	13.4
Standard Deviation	15.9	4.0

Figure 23b. Baitboat & commercial trolling catch per trip -- skipjack tuna

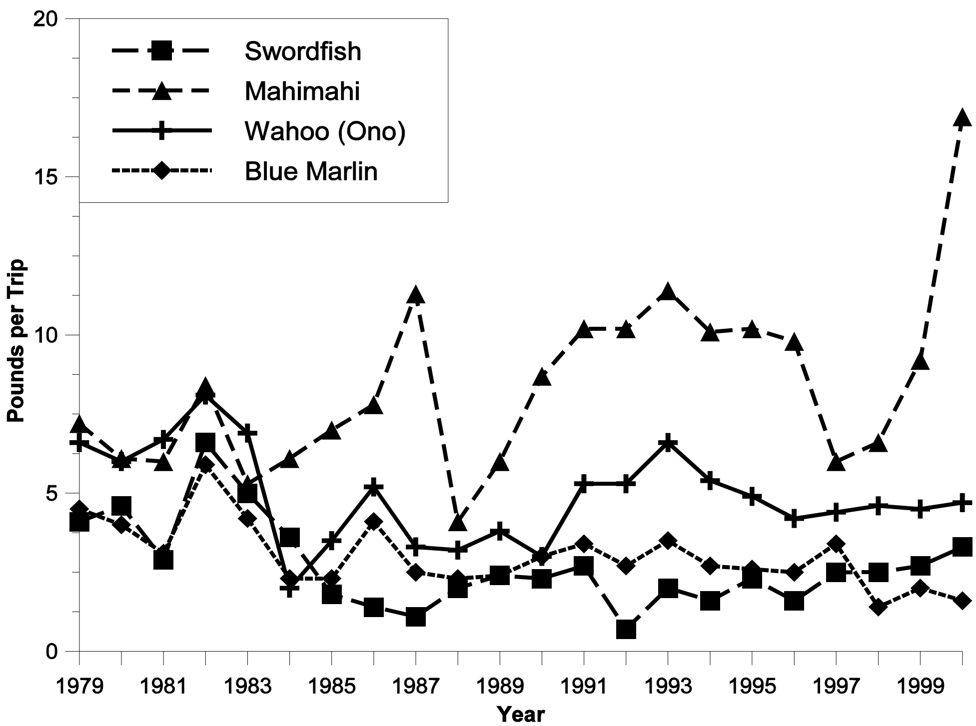


Interpretation: This figure shows the generally close correspondence of baitboat and trolling catch rates for skipjack once the level of cannery catch declined substantially, beginning in the mid-1980s. However, the trolling catch rate dropped to an almost record low level in 2000, while the baitboat catch rate remained about the same. HDAR reports show the baitboats landing 694,166 pounds of skipjack tuna in 2000, a substantial 46% decrease from 1999 (1,287,976 pounds). This can probably be explained by the 47% decline in baitboat effort and generally low abundance of skipjack. Unlike most segments of the pelagic fleet, HDAR catch reports for the baitboat fleet are usually complete by this time of the following year (April).

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2001) using unique license number-date combinations for species caught > 0 (i.e., does not include zero catch trips). 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

	Pounds Skipjack Caught per Trip	
Year	**Trolling**	**Baitboat**
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	**8.7**	**3,506**
Average	13.4	3,432
Standard Deviation	4.0	722

Figure 24. Combined commercial handline catch per trip -- swordfish, mahimahi, ono (wahoo), & blue marlin

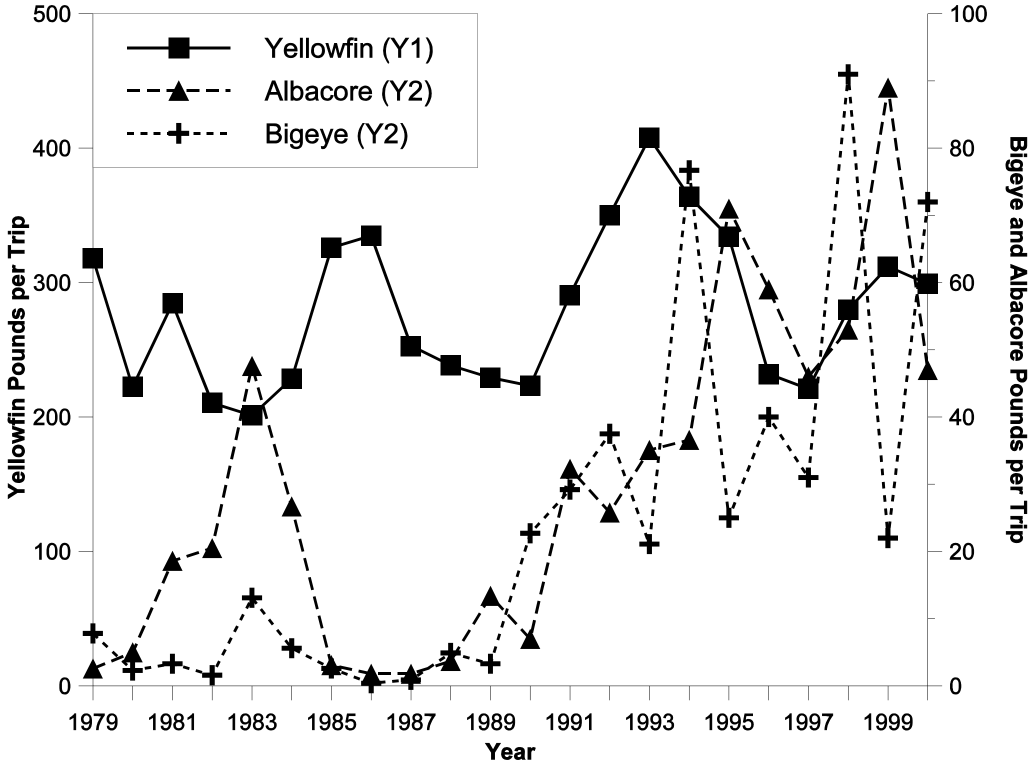


Interpretation: Swordfish and wahoo (ono) catch rates in the handline fishery remained generally within their long-term averages. However, the mahimahi catch rate reached a new record peak, mirroring the peak in trolling. The blue marlin catch rate was below the long-term average, continuing the trend begun in 1998. Reported handline swordfish landings were 15,641 pounds (-18.3% from 1999), mahimahi 80,261 pounds (+22.9%), wahoo 22,307 pounds (-30%), and blue marlin 7,572 pounds (-46.4%). These numbers tend to change substantially when more complete data are available later. Non-tuna species are usually a minor component of the handline fishery landings.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2001) 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 all areas. 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

Pounds Caught per Handline Trip				
Year	**Swordfish**	**Mahimahi**	**Wahoo**	**Blue marlin**
1979	4.1	7.2	6.6	4.5
1980	4.6	6.1	6.0	4.0
1981	2.9	6.0	6.7	3.1
1982	6.6	8.4	8.1	5.9
1983	5.0	5.3	6.9	4.2
1984	3.6	6.1	2.0	2.3
1985	1.8	7.0	3.5	2.3
1986	1.4	7.8	5.2	4.1
1987	1.1	11.3	3.3	2.5
1988	2.0	4.1	3.2	2.3
1989	2.4	6.0	3.8	2.4
1990	2.3	8.7	3.0	3.0
1991	2.7	10.2	5.3	3.4
1992	0.7	10.2	5.3	2.7
1993	2.0	11.4	6.6	3.5
1994	1.6	10.1	5.4	2.7
1995	2.3	10.2	4.9	2.6
1996	1.6	9.8	4.2	2.5
1997	2.5	6.0	4.4	3.4
1998	2.5	6.6	4.6	1.4
1999	2.7	9.2	4.5	2
2000	**3.3**	**16.9**	**4.7**	**1.6**
Average	2.7	8.4	4.9	3.0
Standard Deviation	1.4	2.8	1.5	1.0

Figure 25. Combined commercial handline catch per trip -- yellowfin, albacore and bigeye tunas

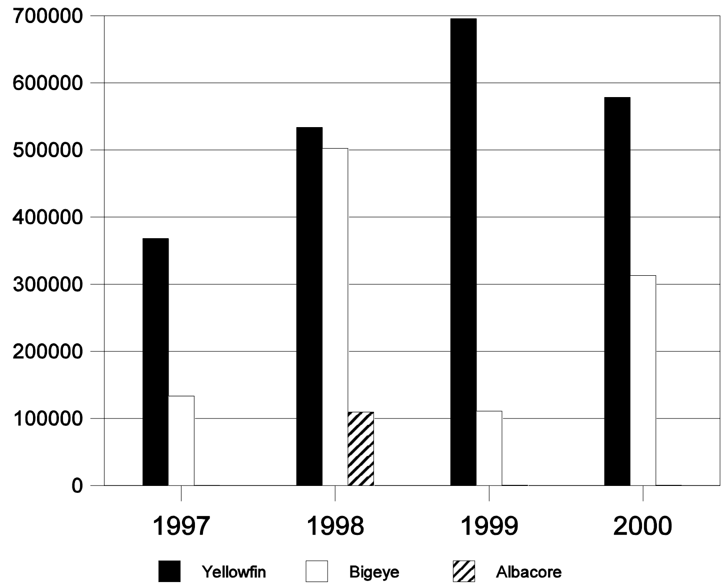


Interpretation: The catch rates for the three tuna species have been somewhat variable. The yellowfin tuna catch rate remained about the same from 1996-2000, after a period of high catch rates from 1991-1995, but similar to the 1987-1990 period. The albacore catch rate rose to an record peak in 1999 but dropped to an average level in 2000. After revision of the 1999 data, the bigeye catch rate dropped in 1999 from the peak in 1998, but rose to well above average in 2000. Reported preliminary 2000 handline landings were down for yellowfin and albacore from the revised 1999 data; 1,419,965 pounds (-36%) for yellowfin and 223,262 pounds (-65%) for albacore. But, reported bigeye landings increased to 343,621 pounds (+123%). These will change when 2000 revised data are reported next year. However, the bigeye landings still seem low and may indicate problems in species identification.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2001) 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 all areas. 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

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	**299**	**47**	**72**
Average	280	29	23
Standard Deviation	58	25	26

Figure 26. Offshore Tuna Handline Landings and Other Data



Interpretation**:** Landings of major species from the offshore tuna handline fleet are shown in the graph. The table below also shows the number of trips reported, catch rates, and the percent contribution of offshore handline landings to the total combined handline landings. 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. Part of the reported yellowfin landings may actually be bigeye, due to species mis-identification. Most of the tuna landed in this fishery are small, smaller than the sizes usually caught in the "inshore" tuna handline fleet which works closer to the islands. Observers have reported that most of the small tuna landed are actually bigeye. Also, completeness of reporting remains a problem as the revised data available in the year will show substantial changes from the preliminary figures reported here.

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.

The revised data for 1999 indicate that yellowfin landings increased, while bigeye landings decreased. 2000 reported data show a decrease in yellowfin landings and a increase in bigeye landings. Catch rates for both yellowfin and bigeye increased. Albacore was insignificant. However, the differences between preliminary 1999 (reported in 2000) and revised 1999 data (reported in 2001) are very large. It's likely that revised 2000 data to be reported in next year's annual report will also show a similar change.

Data: Data compiled from HDAR commercial catch reports (preliminary as of April 2001) 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). 1999 data were updated with more complete data available in 2001. Non-commercial data are not available.

		Yellowfin			Bigeye			Albacore		
Year	**Trips**	**Pounds**	**%hl**	**lb/trip**	**Pounds**	**%hl**	**lb/trip**	**Pounds**	**%hl**	**lb/trip**
1997	137	367,860	28	2,685	133,393	70	974	0	0	0
1998	211	533,363	34	2,528	502,425	97	2,381	109,537	37	898
1999	184	695,869	31	3,143	110,971	72	603	383	<0.1	2.1
2000	**161**	**578,360**	**40**	**3,592**	**313,039**	**91**	**1,944**	**155**	**<0.1**	**1.0**

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 only 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 2000, about 82% of all registered boats participated in some form of fishing activity. Sixty-three vessels were identified as being 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 1999. 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 is 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).

Two commercial fishing licenses were issued in 2000, three in 1999, three in 1998, and four in 1997. These vessel primarily targeted bottom fish, and landing pelagics incidentally.

Tables

page

Figures

page

Table 1. NMI 2000 commercial pelagic landings, revenues and price

Species	Landings (lb.)	Revenue ($)	Ave. Price ($/lb)
Misc. tunas	1,208	2,148	1.78
Skipjack tuna	112,311	207,338	1.85
Yellowfin tuna	14,139	28,486	2.01
Subtotal Above Tunas	**127,658**	**237,972**	**1.88**
Dogtooth tuna	1,919	3,673	1.91
Mahimahi	5,859	12,796	2.18
Marlin	2,886	4,670	1.62
Wahoo	3,278	7,674	2.34
Subtotal Other PPMUS	**13,942**	**28,813**	**2.01**
Troll fish	3,960	6,069	1.53
Barracuda	196	373	1.91
Rainbow runner	1,124	2,531	2.25
Subtotal Misc.	**5,280**	**8,973**	**1.90**
All Pelagics	**146,880**	**275,758**	**1.93**

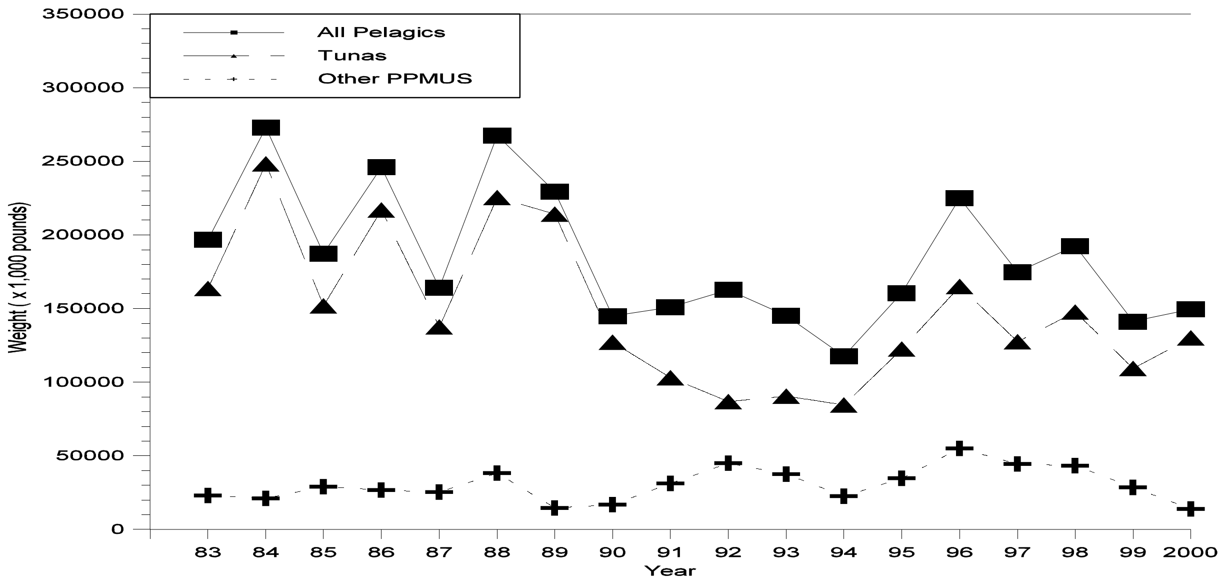
Interpretation: Skipjack landings increased by 24% or over 26,000 pounds in 2000. Skipjack tuna continues to dominate the pelagic landings, comprising around 75 % of the (commercially receipted) industry's pelagic catch. Yellowfin tuna and mahimahi were still ranked second and third in total landings during 2000. Mahimahi landings decreased by 43% in 2000 while yellowfin landings also decreased by 28% from 1999 figures. 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 increased slightly more than 5,000 pounds or 4% in 2000.

The highest average price of identified pelagic species was $2.34/lb for Wahoo, which is down 5% from the 1999 high of $2.47/lb. The lowest priced species remained marlin at $1.62/lb, which decreased 3% from 1999. In 2000, Dogtooth tuna decreased in value by 18% over the1999 price of $2.32/lb to $1.91/lb. The average price per pound for Skipjack tuna, the species with the greatest landings, decreased by 1% from $1.88/lb in 1999 to $1.85/lb in 2000. Skipjack revenue increased 23% from $159,584 in 1999 to $207,338 in 2000.

Blue Marlin, which again brought the lowest average price in 2000, is taken primarily by charter boat. The catch of Blue Marlin remained relatively the same from 2,833 pounds in 1999 to 2,886 pounds in 2000. Other recreational fishers also catch marlin during scheduled fishing tournaments. Although not generally regarded as a high quality food fish, marlin sashimi is sold in local restaurants and hotels. It is also served in public institutions. 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

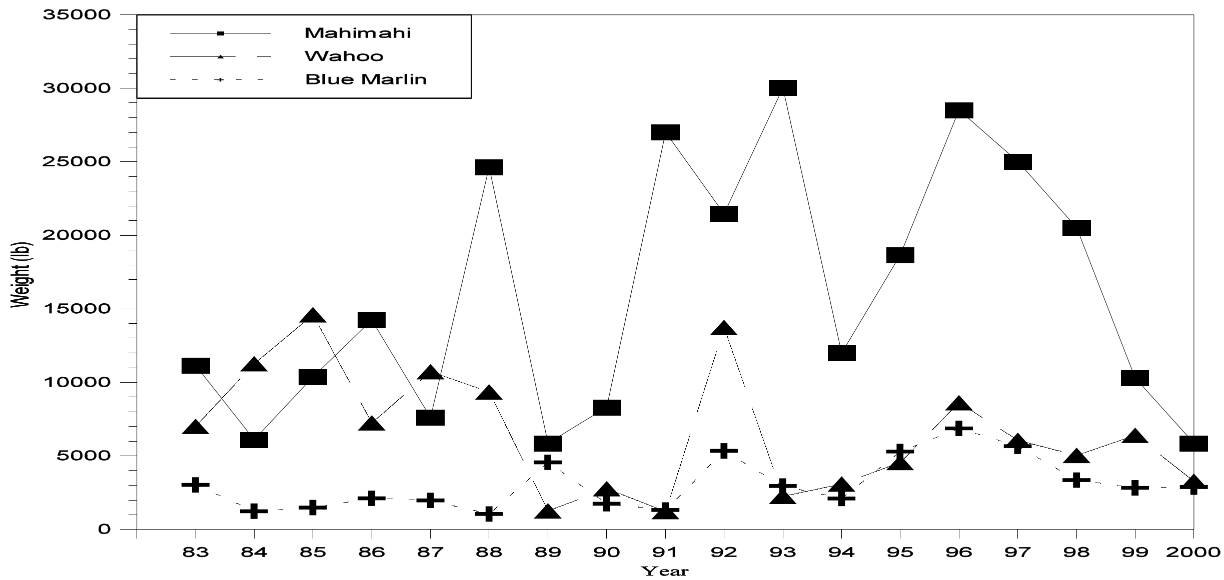


Interpretation: Total weight of pelagics landed in 2000 increased by 6% from 1999 level. Tuna landings have also increased by 16% or nearly 20,000 pounds. Landings recorded in the "Other PPMUS" category decreased by 14,000 pounds or 51% from 1999 figures.

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**
Average	**184,951**	**147,404**	**30,708**
Standard Deviation	**45,860**	**49,854**	**11,544**

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



Interpretation: Mahimahi landings decreased by 43% from 10,305 pounds in 1999 to 5,895 pounds in 2000. 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.

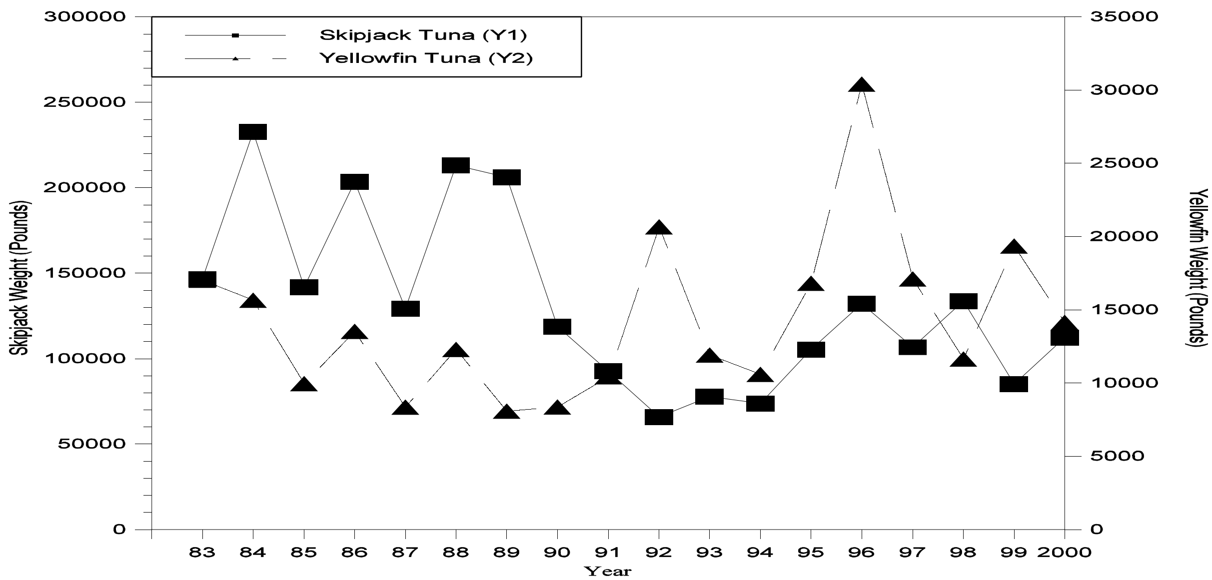
From 1983 to 1988, wahoo landings were somewhat consistent and did not fall below 7,000 lbs., but in 1989 landings notably declined by 86% and remained at depressed levels until the dramatic increase in landings during 1992. Following the near-record 1992 landings, the 1993 wahoo landings again decreased by 84%, falling below the mean. Wahoo landings in 2000 decreased by 3,117 pounds or 49% over the 1999 landings.

The Blue Marlin landing for 2000 was 2,886 pounds which is only a slight increase from the 1999 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.

Year	Total Commercial Landings (lb)		
	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**
Average	**15,980**	**6,583**	**3,102**
Standard Deviation	**8,502**	**4,112**	**1,740**

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. In comparison to 1999, skipjack landings for the year 2000 increased by 24%.

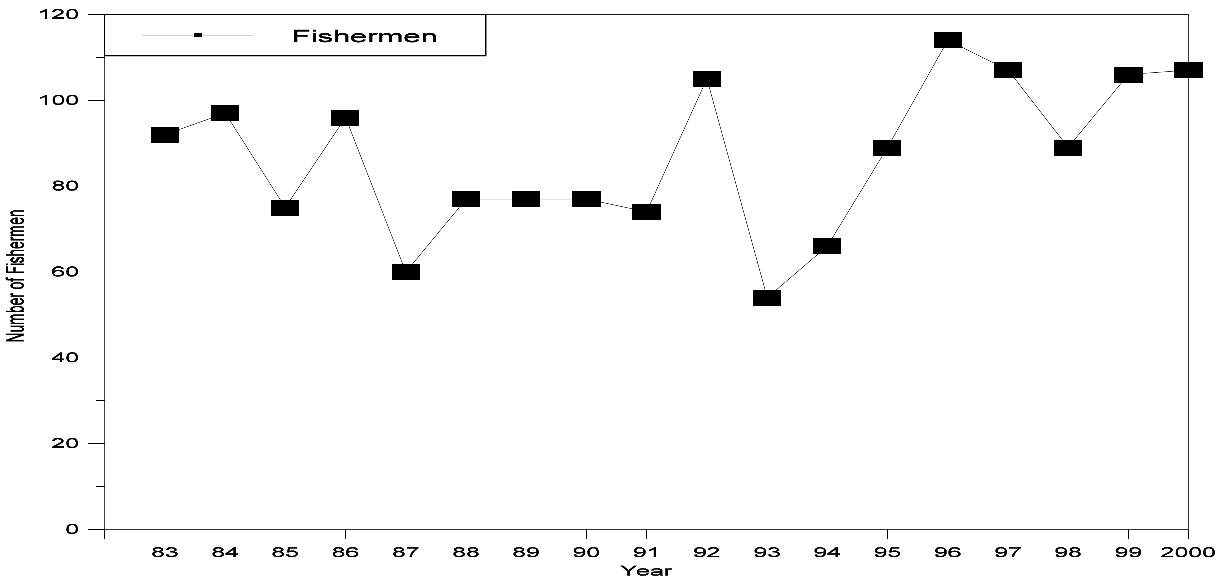
Schools of skipjack tuna have historically been common in near shore waters, providing an opportunity to catch numerous fish with a minimum of travel time and fuel costs. Skipjack is readily consumed by the local populace, primarily as sashimi.

Although more highly prized than skipjack, yellowfin tunas 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 in 2000 of 14,139 pounds indicates a 28% decrease from the 1999 landings of 19,599 pounds.

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**
Average	**132,108**	**14,247**
Standard Deviation	**50,877**	**5,546**

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



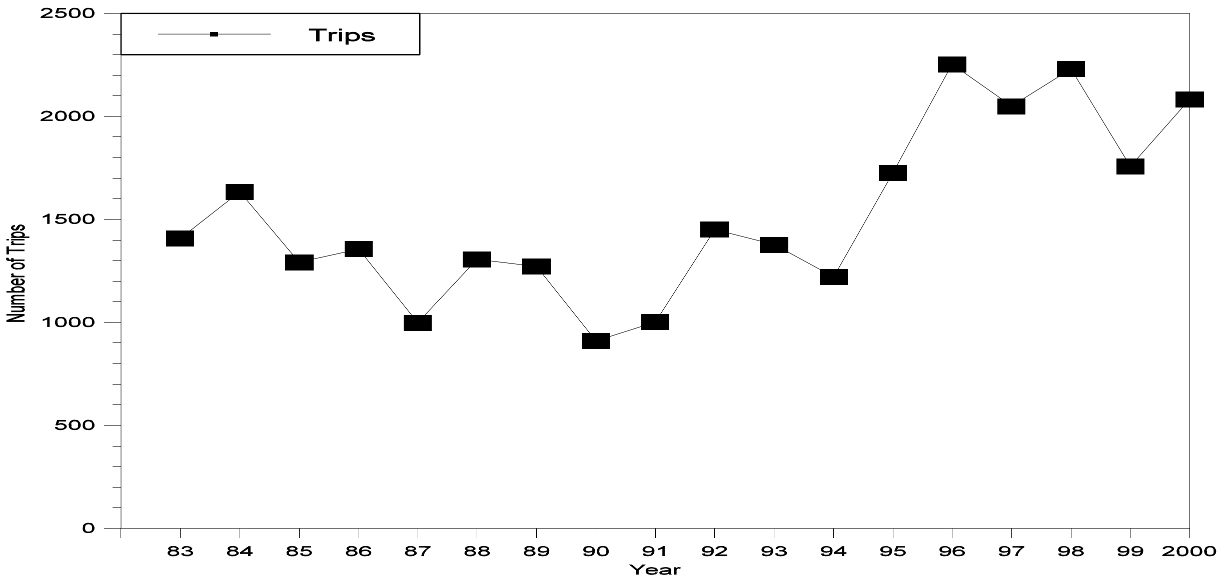
Interpretation: The number of fishers (boats) making commercial pelagic landings was relatively constant from 1988-91 compared to earlier years, but a record high number was recorded for 1992. Part of the increase in 1992 was attributable to the influx of new fishing boats as a result of money obtained 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 in 2000 remained consistent with 1999.

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**
Average	87
Standard Deviation	18

Figure 5. NMI number of trips catching any pelagic fish

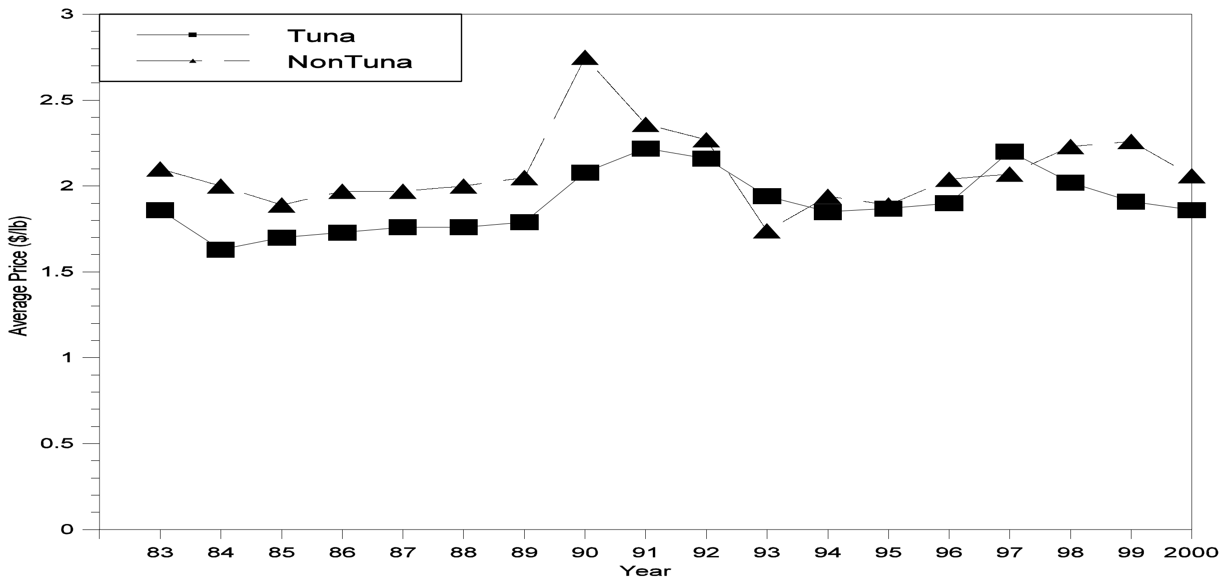


Interpretation: The number of pelagic trips increased in 2000 by 16% from 1,762 in 1999 to 2,084. Although the number of pelagic trips rose in 1998, the decrease in 1999 figures may be caused by the refusal of vendors to participate in the Ticket System.

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**
Average	**1,519**
Standard Deviation	**419**

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 6% from 1998 to 1999 and decreased 5% for 2000.

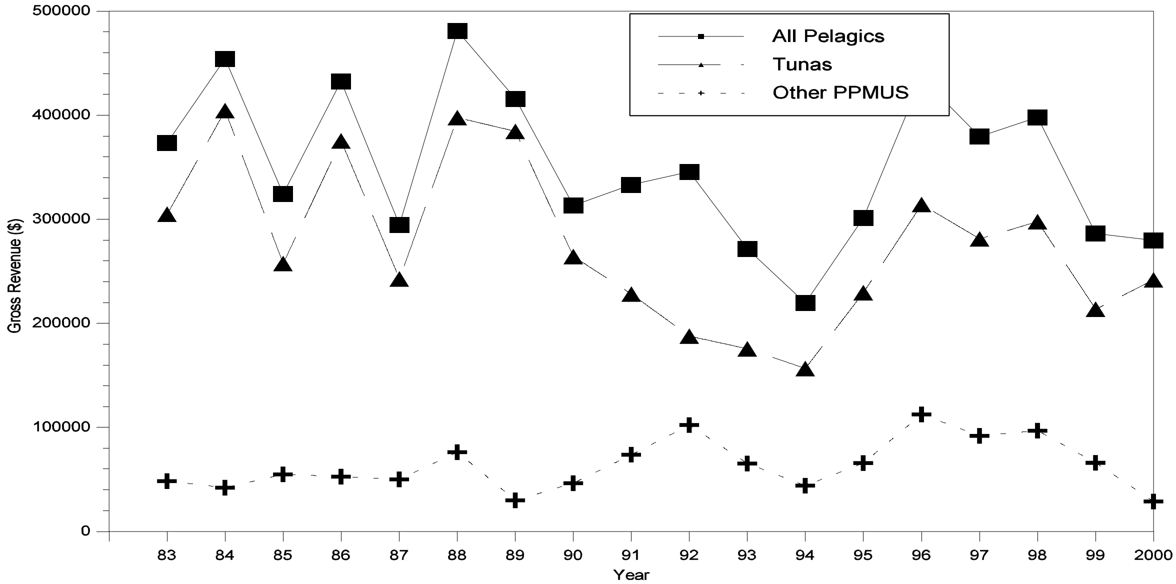
For 1999, the average price of "Other PPMUS" has remained stable in comparison to 1998 rates. However, in 2000 a decreased of 10% was recorded on the inflation-adjusted price.

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	140.9	0.99	1.88	1.12	2.12
1984	153.2	0.95	1.66	1.15	2.02
1985	159.3	1.02	1.72	1.14	1.91
1986	163.5	1.75	1.75	1.22	2.00
1987	170.7	1.14	1.79	1.27	1.99
1988	179.6	1.20	1.79	1.35	2.02
1989	190.2	1.29	1.82	1.48	2.08
1990	199.3	1.56	2.11	2.07	2.79
1991	215	1.80	2.25	1.92	2.40
1992	232.9	1.91	2.20	2.01	2.31
1993	243.17	1.78	1.96	1.59	1.75
1994	250	1.75	1.87	1.83	1.96
1995	254.47	1.80	1.89	1.81	1.91
1996	261.98	1.89	1.92	2.02	2.06
1997	265.	2.20	2.22	2.02	2.09
1998	264.2	2.02	2.06	2.23	2.28
1999	267.8	1.91	1.95	2.26	2.30
2000	**273.2**	**1.86**	**1.86**	**2.06**	**2.06**
Average	215.80	1.60	1.93	1.81	2.11
Standard Deviation	46.22	0.39	0.18	0.41	0.23

Figure 7. NMI annual commercial adjusted revenues



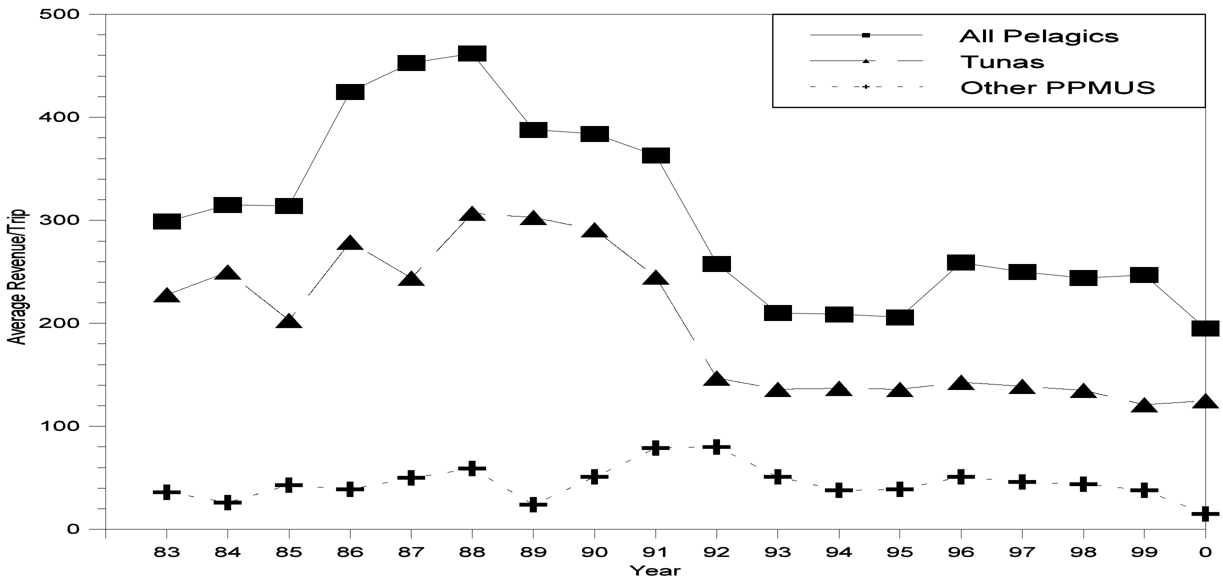
Interpretation: The erratic fluctuations of the inflation-adjusted revenues for Tunas and for All Pelagics prior to 1990 is most likely due to the annual variations in skipjack tuna landings (see Fig. 3) which completely dominated the tuna category and the "All Pelagic" category.

The tunas' inflation-adjusted revenues increased by 12%, while data indicates a decrease of 56% for the "Other PPMUS" inflation-adjusted revenues for the year 2000.

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.

		Revenues ($)					
		All Pelagics		Tunas		Other PPMUS	
Year	CPI	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	140.9	198,710	377,549	162,240	308,256	25,770	48,963
1984	153.2	264,203	462,355	235,262	411,709	24,503	42,880
1985	159.3	195,372	328,225	155,171	260,687	33,162	55,712
1986	163.5	267,013	437,901	231,745	380,062	32,631	53,515
1987	170.7	190,150	298,536	156,634	245,915	32,333	50,763
1988	179.6	327,260	487,617	270,679	403,312	51,950	77,406
1989	190.2	299,142	421,790	276,671	390,106	21,635	30,505
1990	199.3	235,520	317,952	198,775	268,346	34,968	47,207
1991	215.	271,030	338,788	185,662	232,078	60,031	75,039
1992	232.9	305,927	351,816	166,235	191,170	90,627	104,221
1993	243.17	249,136	274,050	161,100	177,210	60,001	66,001
1994	250.	207,124	221,623	147,940	158,296	41,548	44,456
1995	254.47	289,740	304,227	220,633	231,665	63,264	66,427
1996	261.98	431,560	440,191	311,271	317,496	111,445	113,674
1997	265	379,620	383,416	281,291	284,104	91,988	92,908
1998	264.2	398,086	406,048	297,906	303,864	96,956	98,895
1999	267.8	280,670	286,283	209,552	213,743	64,689	65,983
2000	**273.2**	**279,826**	**279,826**	**241,978**	**241,978**	**28,874**	**28,874**
Average	215.8	281,672	356,566	217,264	278,889	53,688	64,635
Standard Deviation	46.22	68,916	74,528	53,962	77,787	28,105	24,844

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

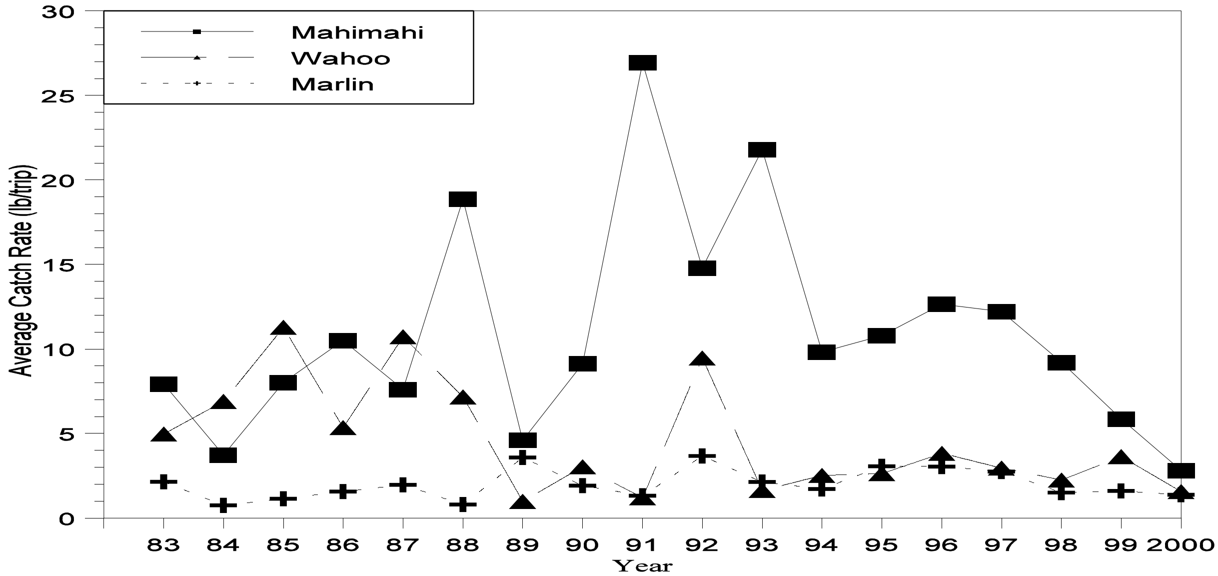


Interpretation: The inflation-adjusted revenues per trip for "All Species" and "Other PPMUS" indicates a decrease of 31% and 63%, while "Tunas" decreased by 4% in 2000. The current year values for all categories were below their respective 18 year means.

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	140.9	159	302	121	230	19	37
1984	153.2	183	321	145	254	15	27
1985	159.3	189	318	122	205	26	44
1986	163.5	262	430	172	283	24	40
1987	170.7	292	459	157	247	32	51
1988	179.6	315	469	209	311	40	60
1989	190.2	279	394	218	308	17	24
1990	199.3	289	390	219	296	39	52
1991	215	295	369	199	249	64	81
1992	232.9	228	262	130	150	71	82
1993	243.17	192	212	125	138	47	51
1994	250	197	211	129	138	36	39
1995	254.47	198	208	130	137	37	39
1996	261.98	256	261	141	144	51	52
1997	265	250	253	139	141	46	46
1998	264.2	244	249	135	138	44	45
1999	267.8	247	252	121	124	37	38
2000	**273.2**	**173**	**173**	**119**	**119**	**14**	**14**
Average	215.8	236	307	152	201	37	46
Standard Deviation	46.22	48	92	36	71	16	17

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



Interpretation: The 2000 mahimahi catch rate decreased by 52% from 1999, 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.

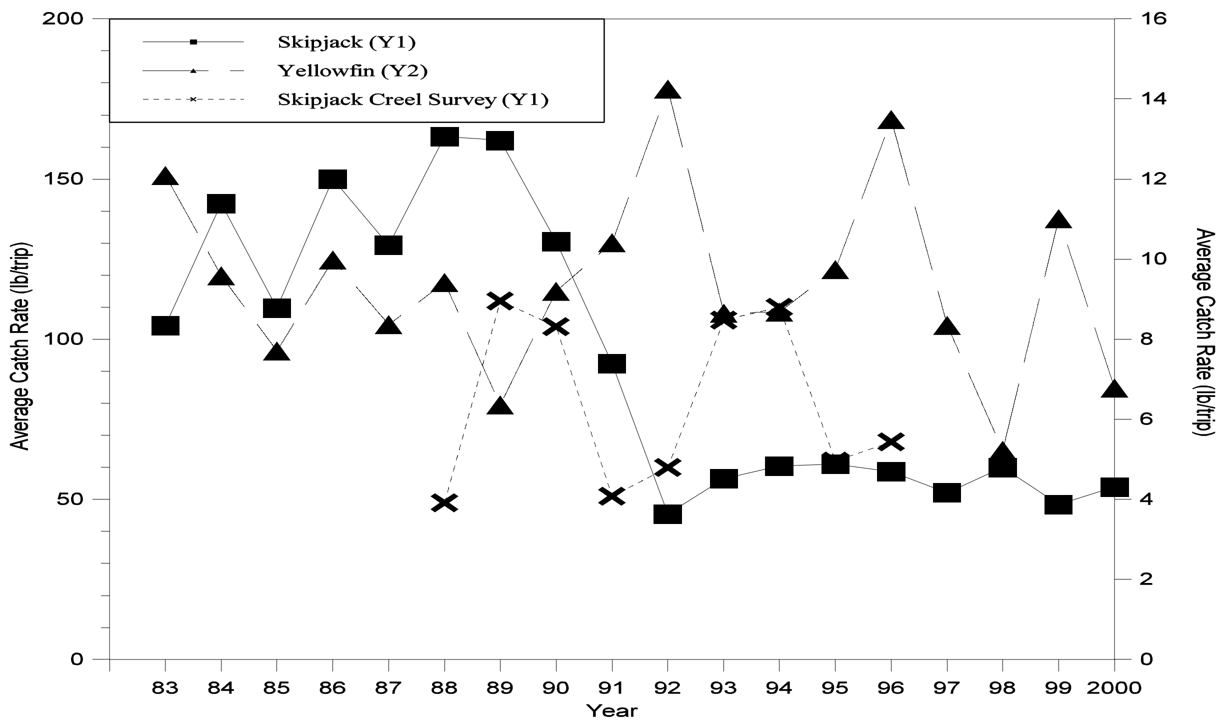
Prior to the 1989 record low, wahoo catch rates rivaled those for mahimahi. Wahoo catch rates have generally never regained those historical levels. The 2000 catch rate decreased by 57% from 1999, and remained less than the eighteen-year mean of 4.81lb/trip.

Marlin catch rates decreased by 14% from 1999 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**
Average	10.96	4.57	2.01
Standard Deviation	6.31	3.27	0.89

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 2000 of 53.89 lbs/trip is an increase of 10% in comparison with the 1999 catch rate of 48.35. Despite several analyses, no explanation of these differences has been satisfactory to the plan team, but the discrepancy prevents any conclusion regarding a trend in skipjack tuna catch rates. 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%. 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**
Average	93.36	9.41
Standard Deviation	43.17	2.32

Appendix 5

International

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 fishery and 1999 for the longline and pole-and-line fisheries.

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

The 1999 purse-seine fishery

Vessels

The purse seine fleet comprised 223 vessels in the 1999 WCPO fishery. The fleet structure was 159 distant-water vessels, 31 domestic Pacific Island vessels and 33 domestic non-Pacific Island vessels.

Catch

The 1999 catch of 1,033,000 mt was comprised of: skipjack – 781,000 (76% of the total), yellowfin – 218,000 (21%) and bigeye – 35,000 (3%). The catch in 1999 was a decline of ~10% from the record catch in 1998, though catch rates (CPUE) remained high. The decline is partly due to some voluntary reduction in fishing effort related to the historically low cannery prices.

Catches for the Pacific Islands domestic purse-seine fleets continue to increase. Catch estimates in 1999 were 125,000 mt, a significant proportion (12%) of the WCPO purse seine catch.

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 throughout 1999. Most of the fleets moved westward in 1999 compared to 1998; however the US fleet remained east of the other fleets and fished almost exclusively on drifting FADs.

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

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	566,385	448,956	14,121	1,029,462
1990	674,387	444,110	16,844	1,135,341
1991	833,491	446,017	17,108	1,296,616
1992	787,540	473,663	24,872	1,286,075
1993	662,217	466,627	22,329	1,151,173
1994	791,843	436,761	39,861	1,268,465
1995	858,407	408,881	50,377	1,317,665
1996	848,201	368,067	68,972	1,285,240
1997	800,372	515,958	83,254	1,399,584
1998	1,071,652	519,237	53,378	1,644,267
1999	1,039,919	503,959	77,511	1,621,389
Average	409,530	299,589	19,515	728,635
STD Deviation	325,746	136,579	22,321	471,630

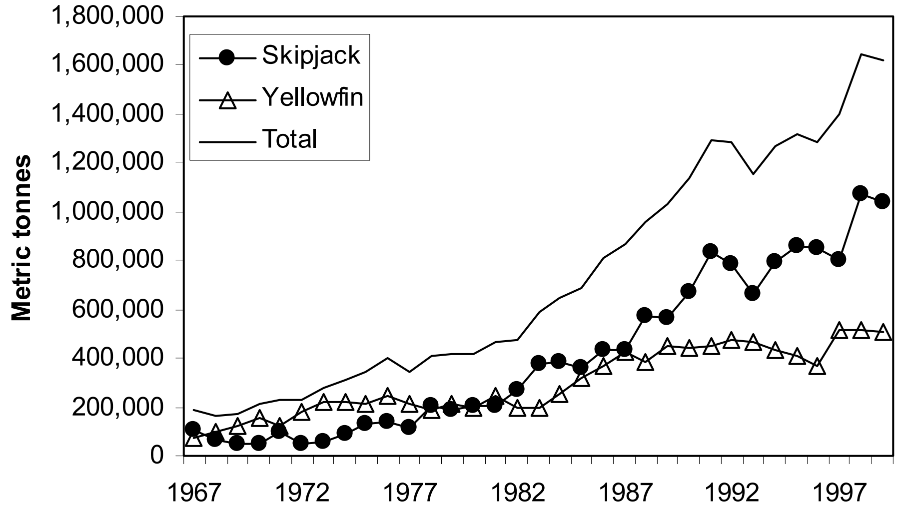


Figure 1. Total purse seine catch of skipjack and yellowfin tuna in the Pacific Ocean, 1967–1999. Source: SPC & IATTC.

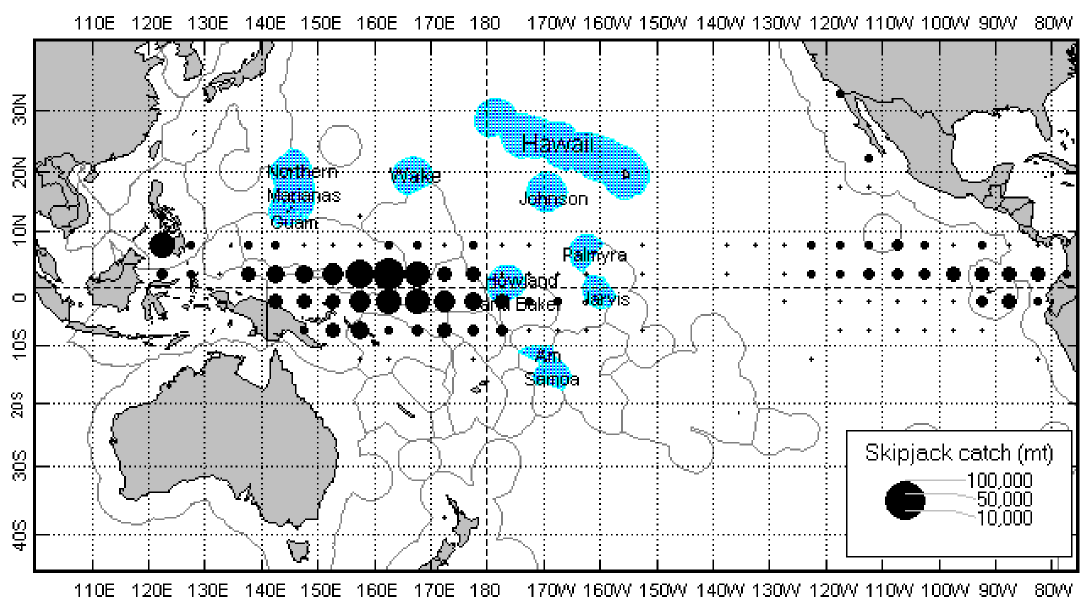


Figure 2. Distribution of total purse seine skipjack catch in 1999.

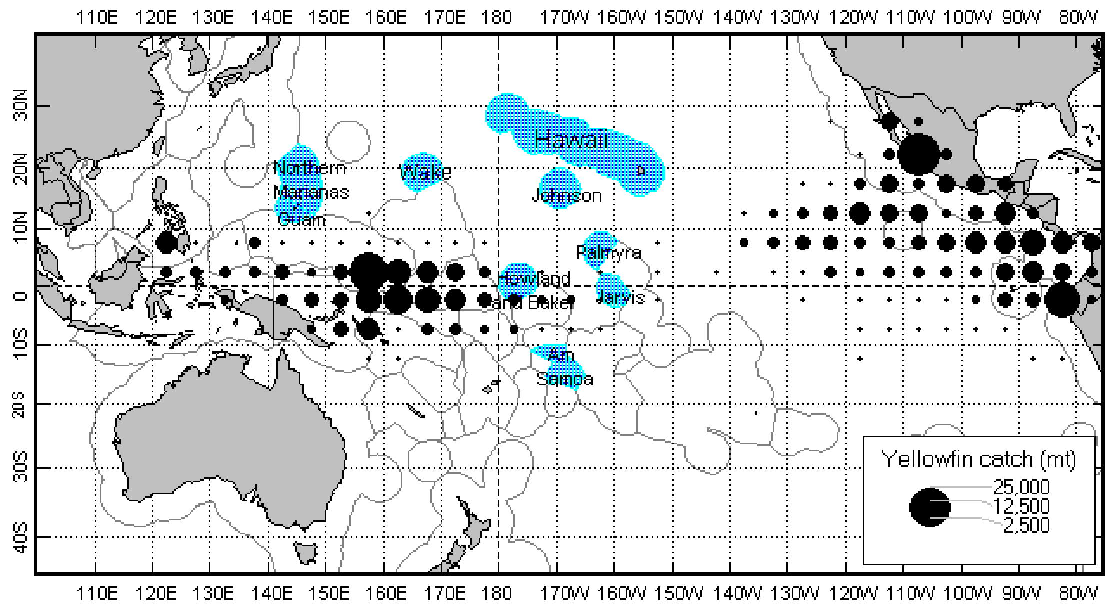


Figure 3. Distribution of total purse seine yellowfin catch in 1999.

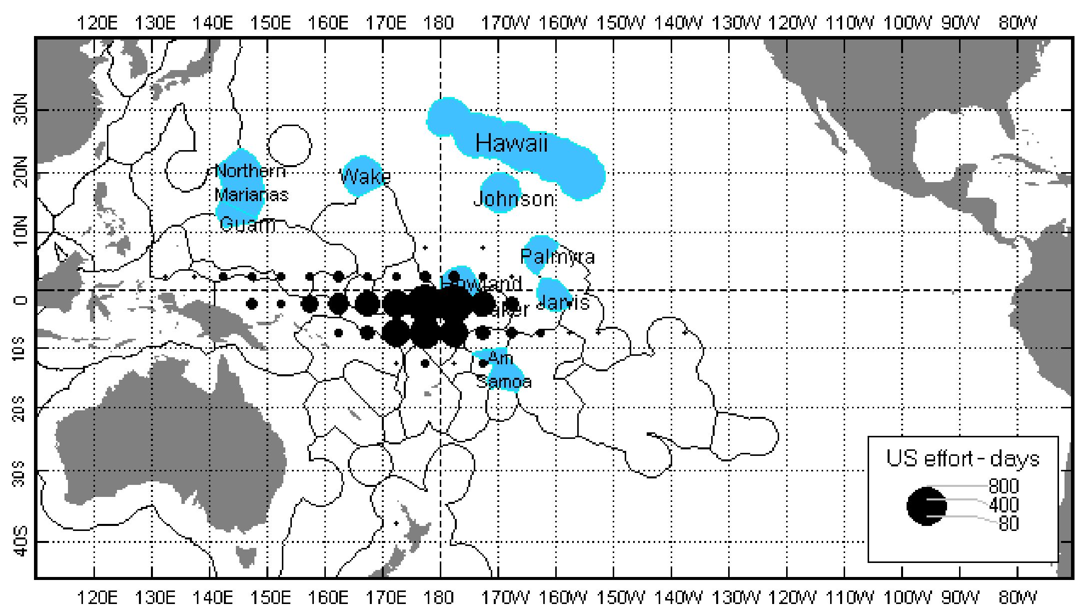


Figure 4. Distribution of United States purse seine effort in 2000.

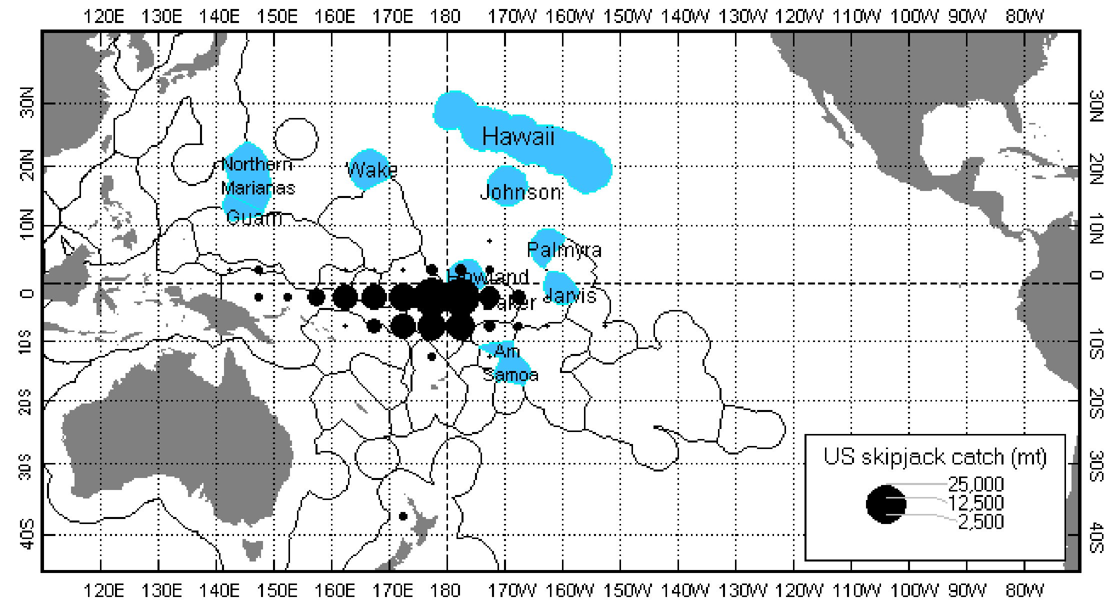


Figure 5. Distribution of United States purse seine skipjack catch in 2000.

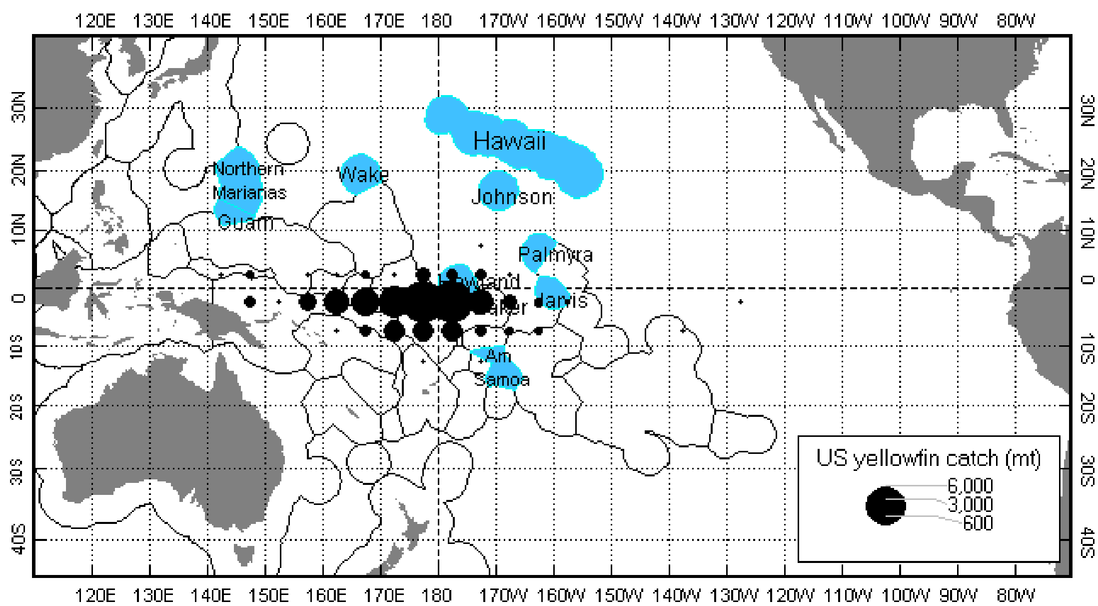


Figure 6. Distribution of United States purse seine yellowfin catch in 2000.

The 1999 longline fishery

Vessels

The diverse longline fleet in the WCPO was composed of roughly 4,700 vessels in 1999. 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 longline catch in the WCPO in 1999 was 185,000 mt, a decline of 4% from the 1998 catch. The 1999 longline catch was about 11% of the total catch in the WCPO; however, it is the most valuable of the pelagic fisheries. The overall species composition of the 1999 WCPO longline catch was 29% yellowfin, 41% albacore and 30% bigeye. The yellowfin catch of 53,000 mt was the lowest in 30 years and appears attributable in part to a 25% reduction in the number of Japanese distant-water vessels. As in previous years, most (>100,000 mt) of the 1999 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: SPC & NMFS, HL. 1999 data is incomplete for some species.

Year	Albacore	Bigeye	Northern Bluefin	Yellowfin	Black Marlin	Blue Marlin	Swordfish	Striped Marlin	Total
1962	50,990	78,406	1,863	66,363	2,229	18,797	11,216	22,507	252,370
1963	44,566	106,027	1,784	73,198	2,342	19,032	11,414	26,602	284,966
1964	38,418	74,716	862	62,166	1,876	13,989	8,615	39,524	240,165
1965	39,803	56,918	699	60,211	2,375	11,084	9,665	32,794	213,548
1966	64,442	64,861	418	67,123	2,172	10,497	11,615	27,351	248,479
1967	69,834	65,388	304	39,633	1,825	9,702	12,041	31,827	230,554
1968	53,721	57,744	232	51,152	1,883	9,469	11,477	39,418	225,096
1969	43,014	79,842	140	59,113	2,073	10,348	14,358	25,564	234,451
1970	49,487	65,787	94	67,080	1,607	12,691	10,329	35,416	242,492
1971	47,513	64,559	87	57,674	2,127	8,058	9,410	30,975	220,403
1972	49,590	81,729	56	67,390	1,884	9,334	9,102	20,922	240,007
1973	53,850	88,878	123	69,728	1,935	9,964	9,604	18,603	252,684
1974	44,617	75,529	49	64,102	1,620	8,946	8,693	18,559	222,116
1975	40,181	95,479	132	73,954	1,845	8,453	9,457	15,620	245,122
1976	42,135	115,613	187	86,635	1,056	8,526	11,254	16,136	281,541
1977	52,288	134,034	108	100,374	936	8,415	10,891	9,298	316,343
1978	48,485	119,994	233	119,984	1,624	9,837	10,888	9,735	320,779
1979	43,434	112,848	222	115,250	1,950	10,270	11,159	15,642	310,775
1980	46,685	112,445	56	130,623	1,652	10,856	17,675	17,581	337,573
1981	51,475	89,739	109	100,941	2,067	12,720	22,520	19,833	299,404
1982	46,141	88,539	325	93,624	2,277	13,070	19,150	20,595	283,722
1983	40,386	119,644	211	93,888	1,916	10,734	20,666	13,967	301,412
1984	36,060	112,956	427	80,252	1,524	13,076	16,329	11,604	272,227
1985	41,858	121,864	1,806	86,158	1,234	10,981	18,711	12,213	294,825
1986	45,827	153,886	78	84,579	1,248	12,816	20,469	16,554	335,458
1987	41,850	162,947	411	92,899	1,769	17,115	25,232	20,009	362,232
1988	45,890	114,266	127	94,180	2,585	15,293	24,290	18,158	314,790
1989	36,306	117,182	254	80,730	1,469	13,158	20,067	14,858	284,024
1990	38,935	156,401	71	102,295	1,803	11,382	18,339	11,048	340,274
1991	42,453	146,651	280	84,827	2,008	12,420	19,392	11,339	319,371
1992	49,912	132,877	586	85,108	1,944	13,420	21,175	9,710	314,732
1993	60,479	119,242	669	88,979	1,666	14,907	20,944	11,440	318,327
1994	63,787	125,179	714	91,828	1,587	16,474	18,100	12,530	330,199
1995	57,960	101,226	395	90,424	1,013	16,511	15,550	13,170	296,248
1996	61,701	86,142	950	83,160	771	11,595	14,697	8,396	267,412
1997	78,845	95,483	1,482	82,717	1,060	14,117	15,634	10,207	299,545
1998	81,860	96,139	86	70,226	595	5,283	14,194	5,773	274,156
1999	80,430	92,402	42	67,220	467	4,186	9,667	4,175	258,589
Average	50,663	102,199	460	81,205	1,749	12,168	15,004	19,159	281,221
STD deviation	11,966	28,201	516	19,051	435	2,926	4,983	8,767	39,678

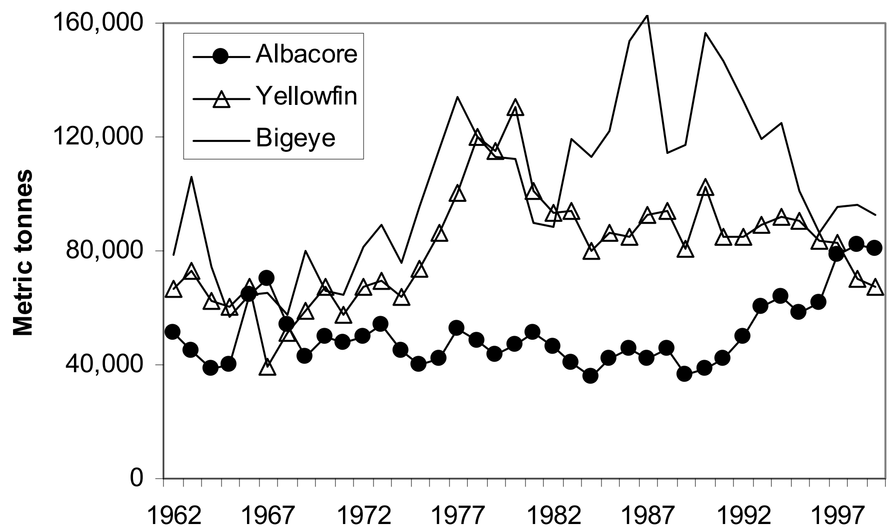


Figure 7. Reported longline tuna (albacore, yellowfin & bigeye) catches in the Pacific Ocean. Source: SPC & NMFS, HL.

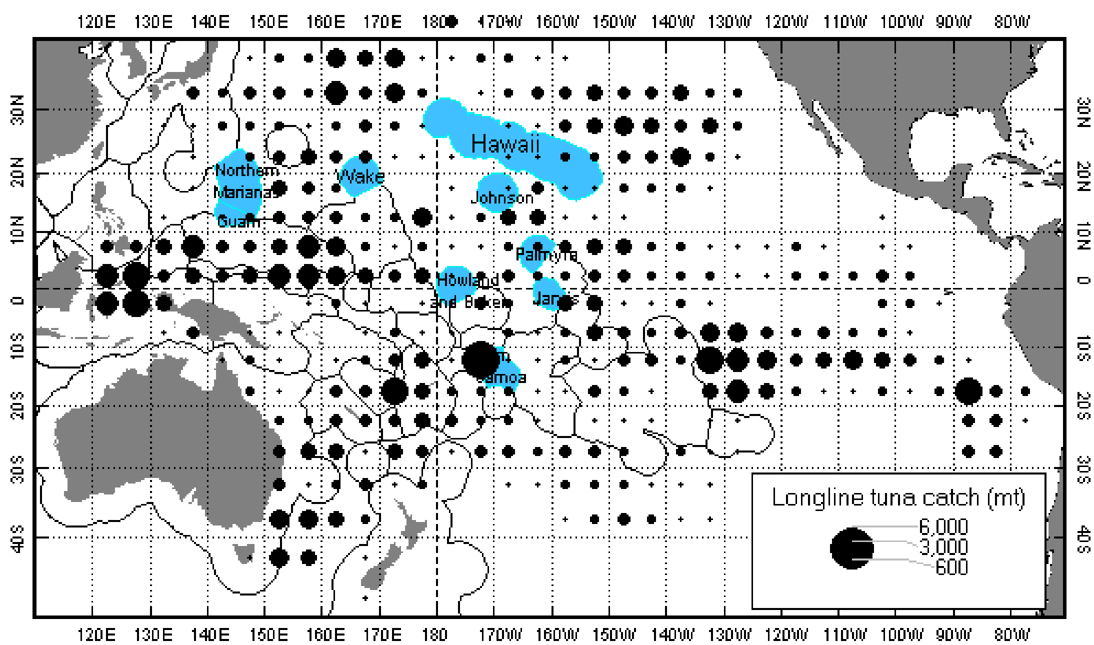


Figure 8. Distribution of all longline caught tuna species reported in 1999. Source: SPC & NMFS, HL.

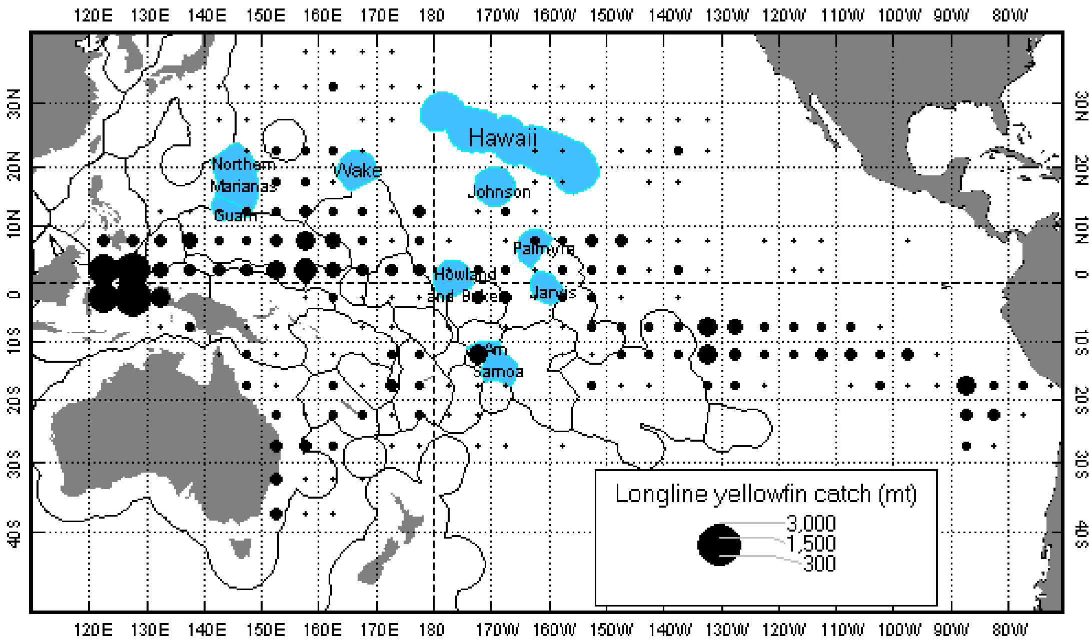


Figure 9. Distribution of longline catches of yellowfin tuna reported in 1999. Source: SPC & NMFS, HL.

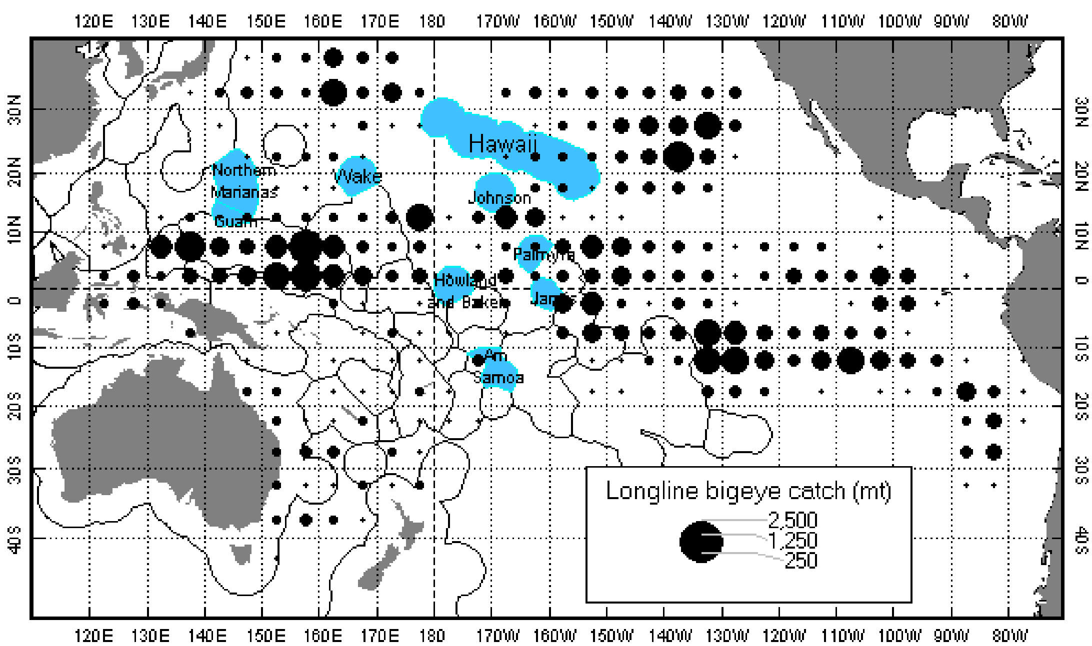


Figure 10. Distribution of longline catches of bigeye tuna reported in 1999. Source: SPC & NMFS, HL.

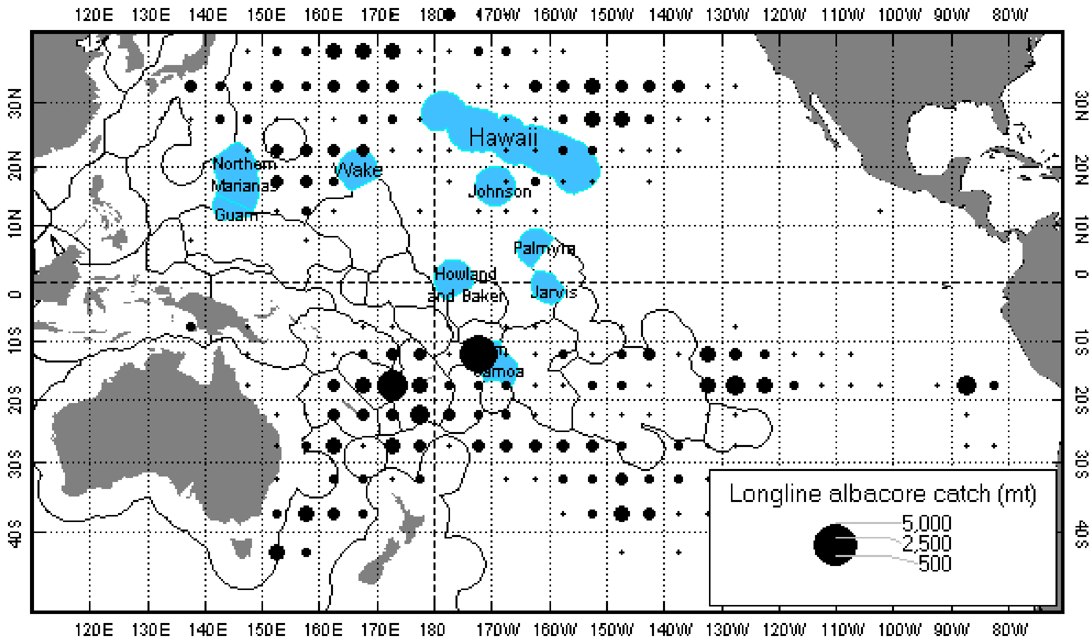


Figure 11. Distribution of longline catches of albacore tuna reported in 1999. Source: SPC & NMFS, HL.

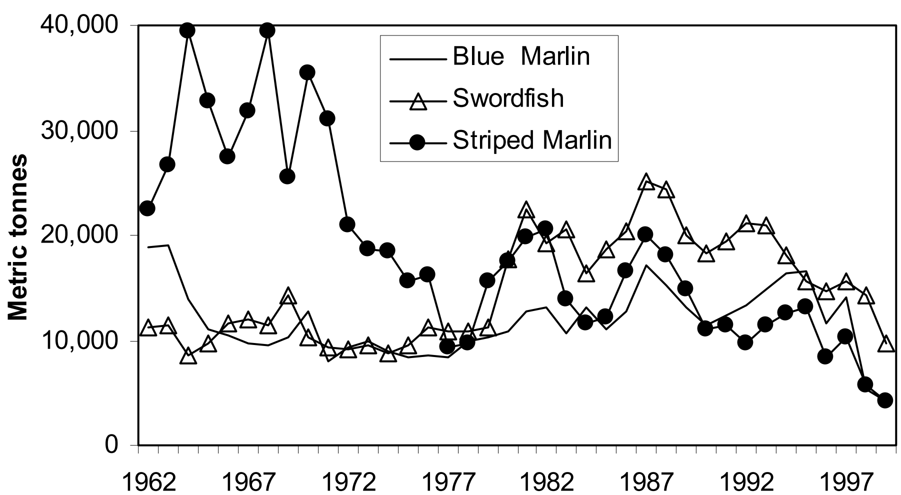


Figure 12. Reported longline billfish catches in the Pacific Ocean. Source: SPC & NMFS, HL.

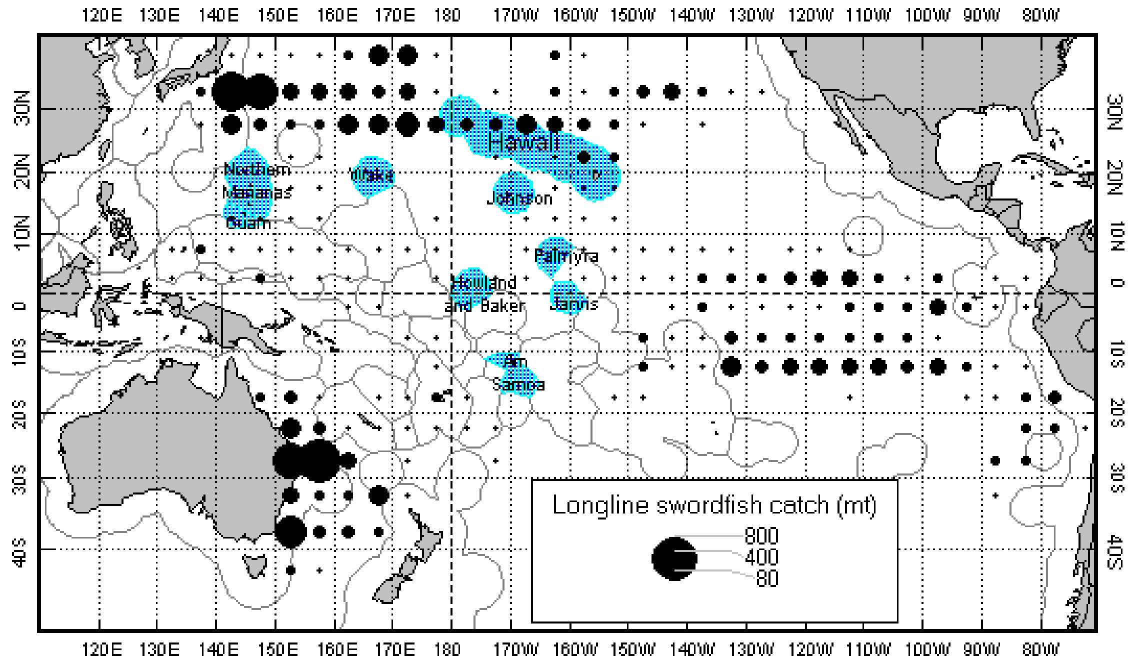


Figure 13. Distribution of longline catches of swordfish reported in 1999. Source: SPC & NMFS, HL.

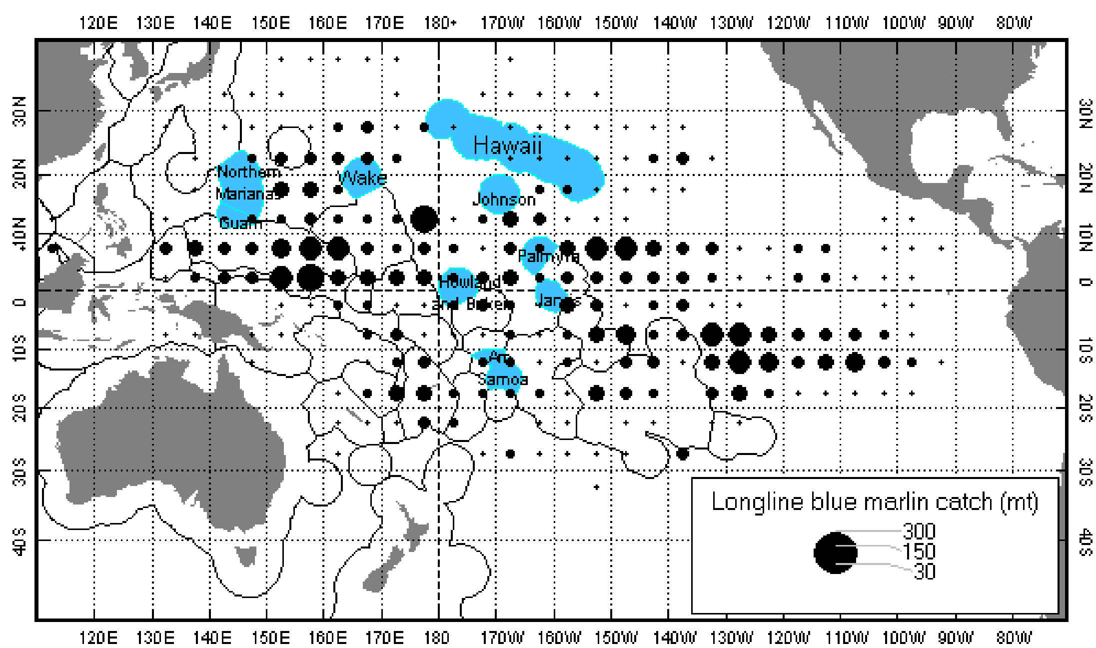


Figure 14. Distribution of longline catches of blue marlin reported in 1999. Source: SPC & NMFS, HL.

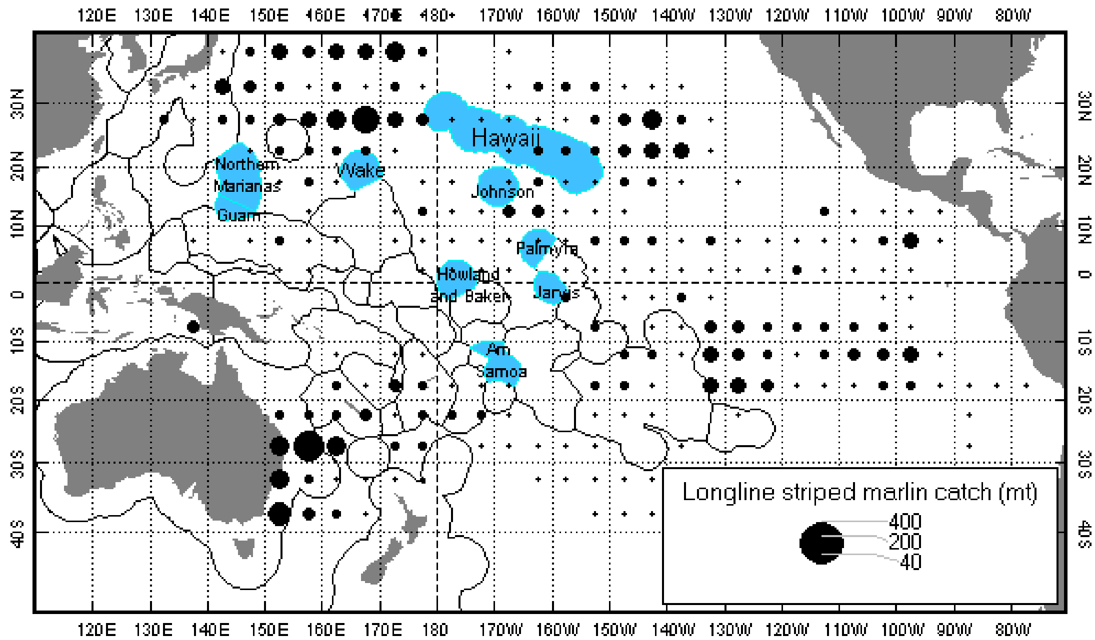


Figure 15. Distribution of longline catches of striped marlin reported in 1999. Source: SPC & NMFS, HL.

The 1999 pole-and-line fishery

Vessels

The pole-and-line fleet was composed of approximately 1,400 vessels in the 1999 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 1999 catch of 285,000 mt was composed of: skipjack – 241,000 (84% of the total), albacore – 29,000 (10%) taken by the Japanese coastal and offshore fleet in temperate waters of the north Pacific, yellowfin – 14,000 (5%) and small amounts of bigeye (3,000 mt, 1%). Catch estimates for 1999 were slightly higher than in 1998. By fleet, the Japanese offshore and distant-water fleet (120,000) and Indonesian fleet (86,000) accounted for most of the fishery catch. The catch by the Solomon Islands fleet was over 30,000 mt in 1999, the highest catch for this fleet since 1995.

Fleet distribution

The WCPO pole-and-line fishery has three components:
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,

1. seasonal sub-tropical skipjack fisheries in home waters of Japan (March–July) and Australia (March–May), and
2. a seasonal albacore/skipjack fishery northeast of Japan (June to November) occurs as an extension of the Japanese homewater fishery.

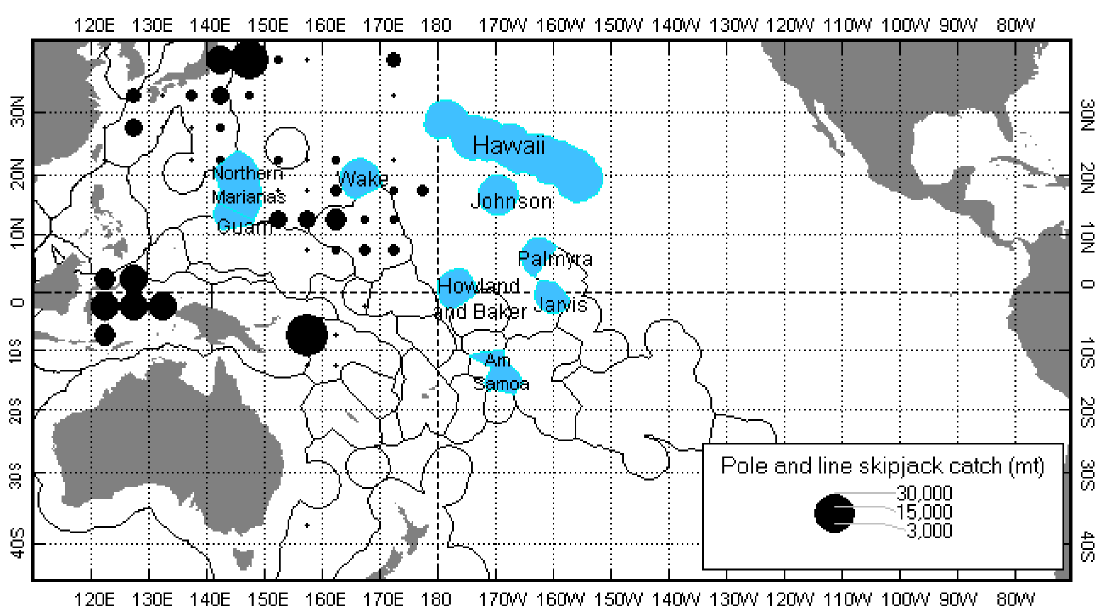


Figure 16. Distribution of pole-and-line catch of skipjack reported in 1999. Source: SPC.

Table 3. Total reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: SPC.

Year	Skipjack
1970	204,871
1971	192,047
1972	178,908
1973	261,854
1974	296,352
1975	231,637
1976	287,427
1977	301,859
1978	337,004
1979	289,425
1980	337,505
1981	302,254
1982	266,010
1983	304,837
1984	382,687
1985	251,776
1986	340,760
1987	264,704
1988	301,738
1989	289,690
1990	226,703
1991	290,958
1992	226,673
1993	273,796
1994	223,429
1995	276,682
1996	236,142
1997	229,008
1998	236,818
1999	243,019
Average	269,552
STD deviation	47,121

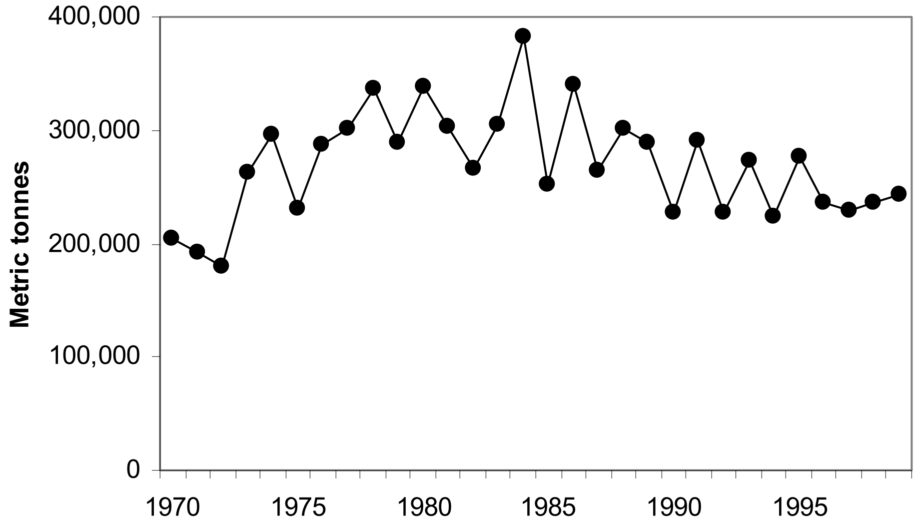


Figure 17. Reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: SPC.

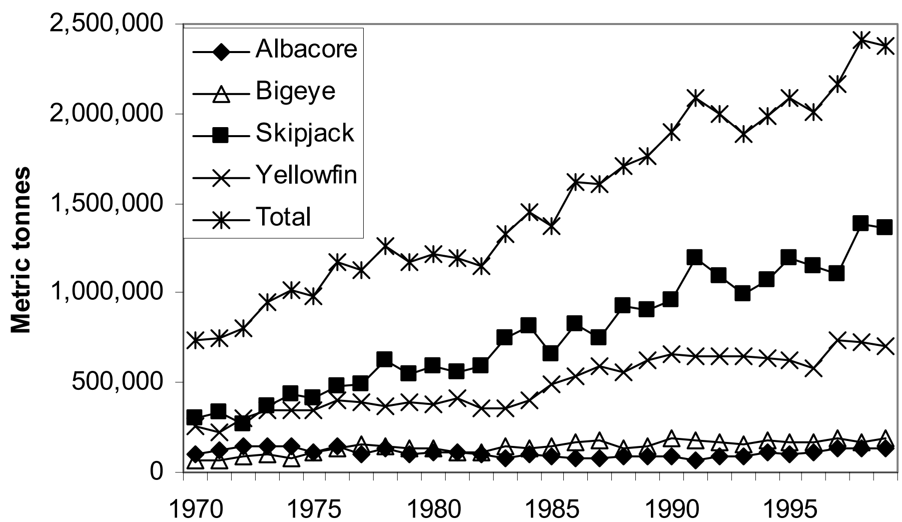


Figure 18. Estimated total annual catch of tuna species in the Pacific Ocean.

Table 4. Estimated annual catch (metric tonnes) of tuna species in the Pacific Ocean.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	101,342	70,675	298,212	261,687	731,916
1971	127,309	71,109	331,194	223,212	752,824
1972	143,488	90,092	269,297	299,686	802,563
1973	144,557	97,411	370,641	341,302	953,911
1974	147,554	83,566	434,227	347,989	1,013,336
1975	116,607	106,807	412,447	348,294	984,155
1976	149,706	134,672	484,144	398,325	1,166,847
1977	98,747	151,638	490,646	388,784	1,129,815
1978	135,836	140,434	620,360	366,337	1,262,967
1979	100,828	129,506	543,392	394,987	1,168,713
1980	107,870	136,420	589,206	383,754	1,217,250
1981	106,118	111,670	560,196	416,744	1,194,728
1982	99,308	106,641	590,015	355,021	1,150,985
1983	80,344	141,371	742,589	359,234	1,323,538
1984	95,624	136,102	812,727	403,098	1,447,551
1985	90,659	144,158	654,551	488,588	1,377,956
1986	82,057	172,680	822,590	536,676	1,614,003
1987	78,655	183,818	748,422	596,312	1,607,207
1988	84,613	133,189	923,524	561,833	1,703,159
1989	89,514	142,721	908,188	619,684	1,760,107
1990	89,607	186,019	965,148	656,262	1,897,036
1991	70,659	175,995	1,193,442	650,371	2,090,467
1992	92,080	166,746	1,092,551	650,561	2,001,938
1993	88,712	151,349	994,994	651,629	1,886,684
1994	111,574	177,261	1,066,232	634,272	1,989,339
1995	100,709	166,972	1,199,161	621,571	2,088,413
1996	108,928	171,201	1,144,131	584,301	2,008,561
1997	135,171	194,105	1,108,984	731,180	2,169,440
1998	138,817	163,641	1,388,315	720,756	2,411,529
1999	131,954	184,546	1,364,520	701,387	2,382,407
Average	108,298	140,751	770,802	489,795	1,509,645
STD deviation	23,273	35,342	327,210	151,796	495,979

Status of stocks based on summary statements of the Standing Committee on Tuna and Billfish (SCTB14) – Noumea, New Caledonia August 2001 **(www.spc.org.nc/OceanFish)**

SKIPJACK RESEARCH GROUP (SRG) – SUMMARY STATEMENT

Skipjack tuna are the most important tuna resource in the WCPO, in terms of contribution by weight to the total catch. In the past decade, skipjack catches have been approximately 1 million mt per year, contributing about 65 % of the total tuna catch in the area. The 2000 catch was about 1.2 million mt, which was only slightly less than the record catch in 1998 of 1.3 million mt. Purse seiners provided the majority of this catch (70 %) with 24% from pole-and-line fleets.

The CPUEs for purse seine and pole and line vessels have been highly variable. Nominal CPUEs for Japanese and USA purse seiners have shown nearly identical increasing trends for FAD sets and a decreasing trend for unassociated sets. Nominal CPUEs for Taiwan purse seiners, in contrast, have shown increasing trends for both unassociated and FAD sets. Korean purse seiners continue to set mostly on unassociated schools. The interpretation of CPUE trends was not possible because their standardisation was incomplete and on going.

Skipjack are concentrated in the tropical waters, but seasonally expand to subtropical waters north and south. Their fast growth, early maturity, high fecundity, spawning year around, relatively short life span, highly variable recruitment and few age classes on which the fishery is dependent makes the species unique among the main tuna species. Ongoing fisheries oceanographic studies have been continuing to provide a better understanding of environmental influences on the availability and productivity of skipjack in WCPO. They suggest a positive impact of El Nino on skipjack recruitment, particularly when followed shortly by La Nina, as occurred in 1998.

Tag based assessments from the early 1990’s suggested low to moderate exploitation at catch levels slightly lower than those in recent years. Recent results from MULTIFAN-CL, including tagging and other information from the northern part of the area, were consistent with the tag based assessments, but additionally, indicated that fishing mortality have been increasing since the early 1970s. Nevertheless, estimates of fishing mortality at age have been smaller than those of natural mortality. The impact of fishing on the total biomass of skipjack is estimated to be low, with estimates of recent recruitment and stock biomass being at historically high levels.

Future advances in the basic biology, data collection and stock assessment of skipjack should be encouraged to substantiate the knowledge required for the fisheries management of this economically and ecologically important species.

YELLOWFIN RESEARCH GROUP (YRG) – SUMMARY STATEMENT

Catches of yellowfin tuna represent the second largest component (23%) of the total catch of the four main target species in the WCPO. Yellowfin tuna are also 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 almost doubled to reach around 350,000 mt by 1990. Since this time yellowfin catches in the WCPO have varied between 320,000 and 480,000 mt with the catches during the last four years being at historical high levels, exceeding 420,000 mt during each year. Purse seine vessels harvest the majority of the yellowfin catch (46% by weight during 2000), while longline and pole-and-line fisheries caught 15% and 4% respectively and various other gears accounted for 35% (mostly eastern Indonesia and the Philippines).

Nominal catch rates of yellowfin for purse seine fleets are characterized by strong inter-annual variability but indicate no clear trend in the available time series of data. While it is suspected that variability in yellowfin catch rates may be associated with variation in environmental conditions associated with the El Nino Southern Oscillation cycle, catch rates for some fleets since the mid-1990s may have may benefited from efficiencies associated with the increased use of drifting FADs. Nominal catch rates of yellowfin for the Japanese longline fleet show a steady decline during the 1980s while catch rates for the Korean longline fleet displayed high inter-annual variability but no overall trend. However, nominal catch rates for both fleets reached historical lows in 1999 but recovered somewhat during 2000. After accounting for the increased targeting on bigeye tunas since the mid-1970s, standardized catch rates for the major longline fleets in most regions of the WCPO display large inter-annual variability but no overall long-term trend.

Biological research undertaken in recent years has lead to an improved understanding of age and growth and reproductive dynamics. However, further work is required to understand habitat preferences, trophic dynamics and the influences of recent increases in fishing efficiencies (e.g. the increased use of FADs) to help improve the standardization 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 10-20 percent below those in recent years. However, more recent assessments of the yellowfin stock using the MULTIFAN-CL model indicate that fishing mortality may have increased significantly since this time, largely as a result of catchability increases in the purse seine fisheries. While the overall estimates of fishing mortality-at-age remain considerably smaller than the corresponding estimates of natural mortality-at-age, the analyses indicate that recent recruitment may have declined significantly. This in turn has produced a significant decline of around 35% in overall stock biomass since 1997. Biomass levels in 2000 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 30% less than that which would have occurred in the absence of fishing. Attempts to estimate an MSY for yellowfin are currently hampered by uncertainty in the stock-recruit relationship and the age-specific exploitation patterns as well as other uncertainties in the stock assessment models. Depending on the assumptions used, estimates of MSY vary between 40% above to 40% below current catch levels.

The reasons for the large declines estimated to have occurred in recruitment in recent years remain unknown, though the possibility that the estimated declines in both recruitment and biomass in recent years may be associated with a shift to a lower productivity regime was discussed. Such a shift in productivity may have occurred in the past, as the significant increases in average annual recruitment and biomass estimated to occur after the mid-1970s might have been associated with a regime shift in oceanographic conditions in the Pacific around this time. Although there has been a dominance of La Nina conditions in recent years, it remains unknown at this time whether this is associated with a shift to new regime and whether or not the estimated recent declines in recruitment and biomass may be associated. However, if a shift to a lower productivity regime has occurred, it is possible that present catches may not be able to be maintained. Due to the short time-series on which they are based, estimates of stock parameters and stock conditions in the most recent years are the most poorly determined. As a result, additional research will be needed to determine the significance of the present results, especially in terms of future stock productivity. Until the uncertainties associated with present stock assessments are resolved, the Group recommends a precautionary approach, and that there be no further increases in fishing mortality (particularly on juvenile yellowfin) in the WCPO, and that the condition of the stock be closely monitored over the next few years.

The Group also recommends that current research on yellowfin stock assessments be continued as a matter of priority. This research will include (i) the acquisition of data required as input into the stock assessment models (particularly from the Philippines and Indonesia); (ii) a greater understanding of the trophic and ecosystem dynamics of yellowfin (particularly in relation to aggregating devices); (iii) a greater understanding of the habitat preferences of yellowfin; (iv) refinement of the methods used to standardise CPUE; and (v) further development of stock assessment models, particularly MULTIFAN-CL. In addition to this work, the Group also saw the need for additional large-scale tagging to provide information on yellowfin movement, natural mortality and exploitation rates to support future stock assessment analyses.

BIGEYE RESEARCH GROUP (BRG) – 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. Bigeye may comprise a single Pacific-wide stock and this is reflected in data collection and assessment approaches. The year 2000 total Pacific catch of bigeye was an estimated 208,173 mt, an historical high, with 115,264 mt (55%) and 92,909 (45%) mt taken in the WCPO and EPO respectively. The catch in the WCPO declined slightly compared to 1999, while the catch in the EPO increased. Purse seine catches of mostly larger bigeye in the EPO increased to record levels (69,745 mt); no year 2000 data were available on the EPO longline catch, which has however been declining steadily in recent years. The WCPO purse seine catch of bigeye, associated with the increasing use of FADs, remained high (28,843 mt) and combined with the largest longline catch yet recorded (67,792 mt), resulted in the highest bigeye catch on record for the WCPO. The Pacific total bigeye catch continues an upward trend since 1998.

Limited ecological and biological research has lead to improved understanding of some parameters e.g. age and growth, dynamics of aggregations etc. No new information was provided on environmental effects on catchability and stock productivity, although results of archival tagging work in progress are expected to provide useful information on the former and could be utilized in longline effort standardization.

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 drifting FADs (which have produced higher juvenile bigeye catches in recent years), are fished. Longline CPUEs since 1980 for the Japanese fleet, both nominal and standardized according to several habitat models, are relatively flat in the EPO but more variable in the WCPO. Over longer time periods i.e. since the beginning of the fishery, a much greater decline in these CPUEs is evident.

An elaboration of the collaborative Pacific-wide application of the integrated statistical MULTIFAN-CL model was presented, incorporating some new features and considerable additional data. Results should be regarded as preliminary, but indicate that recruitment shows considerable temporal variation, and been has declining, particularly in recent years in both the EPO and WCPO. Biomass also shows a declining trend over time and current levels (total and adult biomass) may be at around 50% of initial levels. The overall impact of fisheries on the population was considered moderate. Given however the importance of some key assumptions to model outputs e.g. standardized longline effort, it was recognized that further investigation regarding the appropriateness of these assumptions is required.

A preliminary application of the A-SCALA method to WCPO bigeye was also presented. The results were indicative of a larger impact of the fisheries on the stock than suggested by the MULTIFAN-CL analysis. The assessment indicated that the average fishing mortality has increased since 1980 due to an expansion of the purse seine fisheries. It further suggested that the decline in relative abundance was due to fishing rather than to a decline in recruitment. Analyses conducted during the meeting suggested that there is no fundamental difference in the MULTIFAN-CL and A-SCALA approaches. The differences in the results appear to be due largely to different assumptions and data used in the analyses. In particular, (i) the tagging data used in the MULTIFAN-CL analysis implies lower estimates of fishing mortality than those obtained in the A-SCALA analysis, which does not use the tagging data; and (ii) the levels of natural mortality assumed in the A-SCALA analysis are lower than those estimated in the MULTIFAN-CL analysis, which causes further divergence in the two sets of results. Further research is required to identify the most appropriate set of assumptions to use in future assessments. In this respect, additional tagging data accompanied by high tag-reporting rates for all fisheries would provide valuable information on bigeye tuna stock dynamics and exploitation

Given the continuing increase in Pacific bigeye catches in both surface and longline fisheries, indications of recent low recruitment and declining biomass, and possible significant fishery impacts on the stock, the Group reiterated its concern that the condition of the stock be closely monitored and that efforts to develop reliable assessments at Pacific-wide and regional level be regarded as a priority task. It was noted that concerns about bigeye stocks driven by similar factors are common to tuna fisheries in all areas and have already resulted in management interventions in most cases.

Recognizing the continuing concern of the SCTB about the status of bigeye tuna stocks in the WCPO, and recognizing the increasing catchability of juveniles of this species in surface fisheries, particularly those using FADs, SCTB 14 recommended that there be no increase in fishing mortality in surface fisheries on bigeye in the WCPO until uncertainties in the current assessments have been resolved.

The group recommended that the following research leading to improved stock assessment be continued in the following areas: (i) acquisition of more detailed catch / effort and size composition data from the fisheries of Indonesia and the Philippines (ii) improved/refined estimates of bigeye catches from WCPO purse seine fisheries (iii) improvement to effort standardization utilizing data from archival tagging and other studies providing information on habitat preferences (iv) investigations of key assumptions to stock assessment models and continued elaboration of the MULTIFAN-CL and other models (v) characterization of effective effort on juvenile bigeye taken mostly in association with FADs and (vi) large scale tagging to provide information on key parameters and to assist in discriminating between alternative hypotheses and model assumptions.

ALBACORE RESEARCH GROUP (ARG) – SUMMARY STATEMENT

Albacore caught in the South Pacific constitute a single stock. Longline, primarily catching adults, accounts for most albacore catches (88%) in the South Pacific with trolling catching the rest (12%). The total albacore catch, estimated at 47,308 mt in 2000, was greater than in 1999 (10% increase). In 2000 longline catches were 41,436 mt and troll catches were 5,750 mt. Longline catches of several South Pacific island States and territories, particularly Fiji, French Polynesia and Samoa, continue to increase and together contribute substantially to the total albacore catch. The combined albacore longline catch in 2000 by South Pacific Islands (17,171 mt) accounts for 41% of all albacore longline catches in the South Pacific. A substantial increase in catch to 2,918 mt (81% increase) was also reported for Canadian and USA troll vessels fishing the STCZ in the 1999/00 season relative to 1998/99. Troll caught albacore in the New Zealand EEZ are also estimated to have increased by 83% over the same period to 2,832 mt.

There has been no dedicated field research on albacore since the OFP research program in 1991/92. Biological data on albacore is regularly collected, however, in observer and port sampling programs in the region, although some of these data have not been compiled. Length frequency data from port sampling is a critical input to the length-based age-structured stock assessment model (MULTIFAN-CL). This model has been extended to cover the period 1962-2000 and can incorporate tag recovery information. Previous results from this model were believed to have been strongly influenced by a small number of tags recovered (135 recoveries). Model runs conducted with and without tagging data give similar results for recruitment but not for biomass trends or estimates of average fishing mortality. Results of the current MULTIFAN-CL model suggest a marked decline in recruitment and biomass in the mid-late 1970s and 1980s by about 50% that is followed by an increase in the 1990s. Results also suggest that biomass is largely distributed south of 10º S and that biomass may be driven by recruitment. An alternative stock production model using Taiwanese longline catch and effort data, raised to South Pacific wide coverage, gave broadly similar results with respect to trends in biomass, but attributed the change to fluctuations in the fishery. An investigation of the assumptions made in both models would assist in resolving the apparent discrepancies.

A number of areas requiring further work prior to the next SCTB meeting were identified. These areas include: incorporate data from additional fleets; review the adequacy of observer coverage; analyze longline data to determine if retention practices have changed in some fleets; develop extensions to the MULTIFAN-CL model; develop procedures for standardizing CPUE; improve estimates of effective effort; evaluate the need for further tagging; evaluate the use of reference points in assessing stock status using MULTIFAN-CL and other models; and work to agree on a standard model structure and diagnostics for evaluating models.

No information was presented to indicate a change in interpretation of stock status of South Pacific albacore. Although model results are considered uncertain, exploitation rates appear to be moderate and current catches are likely to be sustainable.

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). Further, recreational fishing in the US EEZs of remote Pacific islands, under Council jurisdiction such as Palmyra, may grow in importance if plans to turn this atoll into a wildlife refuge, eco-tourist and sportfishing destination are realized. A similar plan was successfully implemented during the mid-1990s at Midway Island, part of the Northwestern Hawaiian Islands and a former US Navy base.

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.

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 2001/January 2002 issue).

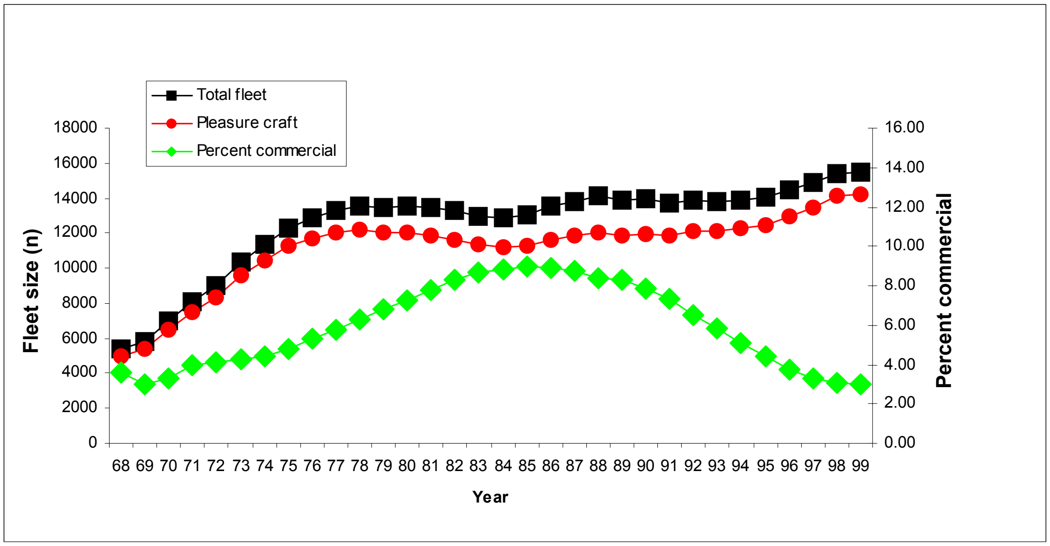


Figure 1. **Annual number of small vessel fleet registrations in Hawaii. Figure shows total fleet size, size of pleasure craft fleet, and percentage of vessels being registered for commercial fishing (Source Hawaii Division of Boating and Ocean Resources).**

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. According to Gerry Davis (Guam DAWR pers. comm.) four such clubs were founded in the past 20 years but none lasted for more than a 2-3 years. 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 is a charter boat fishery targeting primarily pelagic fish at Midway Atoll. A locally-based company operates five vessels used 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 are approximately seven small vessels maintained and used by Midway residents for recreational fishing. Of this total, three vessels engage primarily in offshore trolling for PMUS including yellowfin tuna, ono and marlin. All vessels fishing at Midway are required to file a float plan prior to a fishing trip and complete the "Midway Sports Fishing Boat Trip Log" upon completion of its trip. The US Fish and Wildlife Service has been compiling these catch data since1996.

At Palmyra Atoll, an island privately owned by The Nature Conservancy operates a 22 ft catamaran for offshore trolling and four small boats 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.

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. This ratio was then used to generate a total landings figure from total commercial catch data (WPacFIN web site, http://wpacfin.nmfs.hawaii.edu). The difference between the two being the unsold portion of the catch. 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	2000	34,301	3,521	1,654	4.82	524	45	8.59
Guam	2000	1,212,129	718,612	645,935	53.29	24,921	20235	81.19
Hawaii[1]	2000	13,909,678	NA	5,385,000	34.15	NA	NA	28.36
NMI	2000	513,481	87,564	61,052	11.89	7,395	2290	30.96

1. Hawaii recreational catch from NMFS Honolulu Laboratory. recreational fishing trips as a percent of total trips based on Hamilton & Huffman 1997

Initial estimates of recreational catch in the Western Pacific were presented in last years (1999) Pelagics Annual Report, However, the estimates for Guam, American Samoa and NMI were based on averages over the 1980s and 1990s, and contained some flawed assumptions.

Charter boat sportsfishing

Although charter fishing in Hawaii dates back to the late 1890s, the main period of charter fishing expansion followed WWII with the advent of mass tourism to Hawaii. In the early 1950s there were few charter vessels in the State of Hawaii with only seven vessels in Kona. By 1961 there were over 80 charter vessels in the State and this grew to over 180 charter vessels by the mid-to-late 1990s. Almost all charter fishing activity is directed at catching pelagic fish, and only a very minor level of charter vessel activity targets bottomfish.

Over the past 30 years there have been a number of studies on the Hawaii the charter fishing industry (Glazier 1999), the most recent being by Hamilton (1999). Further, since the late 1980s, the Hawaii Division of Aquatic Resources has categorized charter vessels separately from commercial troll fishers and therefore it is possible to report separately on the catch rates and catch composition of charter vessels 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 25% of their catch, with the majority of the target species being yellowfin, mahimhi, aku and ono. 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	94,161	3,052	blue marlin, skipjack, mahimahi, wahoo
Hawaii	490,930	7,154	mahimahi, yellowfin, wahoo, blue marlin
Northern Mariana Is	23,248	1,168	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 2000

Charter vessels			Commercial trollers		
Species	Landings (lb)	Percent	Species	Landings (lb)	Percent
Blue marlin	188,059	38.31%	Mahimahi	594,179	30.31%
Mahimahi	131,157	26.72%	Yellowfin	571,009	29.13%
Yellowfin	73,048	14.88%	Wahoo	342,308	17.46%
Wahoo	42,198	8.60%	Blue marlin	232,774	11.87%
Skipjack	17,380	3.54%	Skipjack	161,964	8.26%
Others	39,088	7.96%	Others	58,176	2.97%
Total	490,930	100.00%	Total	1,960,410	100.00%

Table 4. Comparison of species composition of landings made by Guam pelagic troll vessels versus commercial troll vessels in 2000

Charter vessels			Commercial trollers		
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Blue marlin	30,699	32.72%	Skipjack	243,668	44.85%
Skipjack	30,183	32.17%	Yellowfin	84,243	15.50%
Mahimahi	18,844	20.09%	Mahimahi	66,043	12.16%
Wahoo	10,392	11.08%	Wahoo	62,081	11.43%
Yellowfin	2,457	2.62%	Blue marlin	56,282	10.36%
Others	1235	1.32%	Others	31022	5.71%
Total	93,810	100.00%	Total	543,339	100.00%

In Hawaii there is considerable variation in charter vessel catches between the various islands (Table 4), with the largest charter vessel fishery based on the island of Hawaii. In 2000, charter vessel catches on the island of Hawaii accounted for almost 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 4. Charter vessel catches in Hawaii by island during 2000

Island	Charter catch in 2000	Percent
Hawaii	228,370	46.52%
Oahu	134,845	27.47%
Maui	96,083	19.57%
Kauai	27,971	5.70%
Molokai	3,661	0.75%
Lanai	0	0.00%
Total	490930	100.00%

Most charter vessel fishing on the island of Hawaii is conducted from Kona's small boat harbor at Honokohau, and over half the charter vessel catches comprise blue marlin (Table 5). Elsewhere, mahimahi dominate charter vessel landings, with blue marlin comprising between 6 and 34% of catches. Other important species in the charter vessel catches, depending on location, comprise yellowfin, wahoo, spearfish and skipjack.

Table 5. Composition of charter vessel catches in the Main Hawaiian Islands during 2000

Hawaii			**Kauai**		
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Blue marlin	127,506	55.83%	Mahimahi	7,538	26.95%
Yellowfin	40,820	17.87%	Wahoo	6,525	23.33%
Wahoo	21,105	9.24%	Yellowfin	4,996	17.86%
Mahimahi	17,875	7.83%	Blue marlin	3,342	11.95%
Shortnose spearfish	8,762	3.84%	Skipjack	2,313	8.27%
Others	12,302	5.39%	Others	3,257	11.64%
Total	228,370	100.00%	Total	27,971	100.00%
Oahu			**Molokai**		
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Mahimahi	62,625	46.44%	Mahimahi	1,619	44.22%
Yellowfin	25,051	18.58%	Skipjack	1,000	27.31%
Blue marlin	24,270	18.00%	Yellowfin	372	10.16%
Skipjack	10,054	7.46%	Blue marlin	228	6.23%
Wahoo	6,010	4.46%	Wahoo	214	5.85%
Others	6,835	5.07%	Others	228	6.23%
Total	134,845	100.00%	Total	3,661	100.00%
Maui			**Lanai**		
Species	**Landings (lb)**	**Percent**	**Species**	**Landings (lb)**	**Percent**
Mahimahi	41,500	43.19%			
Blue marlin	32,713	34.05%	No charter fishing data for Lanai		
Wahoo	8,344	8.68%			
Striped marlin	3,390	3.53%			
Shortnose spearfish	2,426	2.52%			
Others	7,710	8.02%			
Total	96,083	100.00%			

Council activities concerning recreational fishing

The Council convened four meeting of the Recreational Fishery Data Task Force during 2000. This Council advisory body was established in April 1999, following recommendations arising from the Council's Scientific and Statistical Committee in late 1998 that asked the Council to be more pro active in promoting the collection of recreational fishery data. The Task Force was instrumental during 2000 in getting agreement from the NMFS Office of Science and Technology to extended its Marine Fisheries Recreational Statistical Survey (MRFSS) to the State of Hawaii. This survey is the instrument used nationally be NMFS to estimate marine recreational fisheries landings and to monitor trends in marine recreational fishing. The two elements of the MRFSS survey, a phone survey to obtain fishing effort, and a creel intercept survey to obtain catches, were implemented during 2001 and will be reported on in more detail in the 2001 pelagics annual report.

The Task Force also supported a project developed by the National Marine Fisheries Service and the Council to consolidate information on recreational fisheries in Hawaii, and funded by the

University of Hawaii's Pelagic Fisheries Research Program. The project has two elements, an archive of all published and unpublished reports and papers on recreational fishing in Hawaii, and a database of catch and effort data from fishing tournaments conducted in Hawaii. The literature archive will allow users to review all the accumulated literature on recreational fishing in Hawaii and to download data contained in the various documents into tabular spreadsheet format. The fishing tournament database is intended to capture the large archive of fishing data from the various major fishing competitions hosted annually in Hawaii. Some of these such as the Hawaii International Billfish Tournament (HIBT) have been conducted over several decades and represent a substantial volume of fishing data, which to date has not been investigated. The project was formally initiated in 2001 and will be reported on in more detail in the 2001 pelagics annual report.

Finally the Council also participated in the recreational fishing symposium, ***RecFish 2000***, held from June 25-28 2000, and sponsored by National Marine Fisheries Service and the National Sea Grant College Program of the National Oceanic and Atmospheric Administration. The twin themes of the meeting were, Managing Marine Recreational Fisheries In the 21st Century and Meeting the Needs of Managers, Anglers and Industry. The Council made a presentation at this meeting on improving recreational fishery data collection in the Western Pacific Region.

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Appendix 7

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 2000. 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

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

[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, 1981-99

	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	NA	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<0.5
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
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

Table 4. Pacific coast real commercial exvessel revenues (1999)[1] from highly migratory species by state, 1981-99

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
					Revenues ($)						
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
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
California	7,487,569	0	0	N.A.	0	0	1,190	N.A.	N.A.	0	529
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

[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, and 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 turtle and the endangered Hawaiian monk seal and increasingly have focused on issues concerning fishery-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. In addition the Laboratory has been a major partner in a new initiative concerning marine debris.

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 biology and ecology, fishery management and performance, and protected species.

The following list of publications (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 2000 through September 2001)

Publications

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Administrative Reports

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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.

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Abstracts

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.

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Swimmer, J. Y., R. W. Brill, L. Mailloux, and C. Moyes.
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Appendix 9

The Pelagic Fisheries Research Program

The Pelagic Research Fisheries 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 PRFP 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 PRFP 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 2000

Biology projects:
- Pop-off satellite archival tags to chronicle the survival and movements of blue shark following release from longline gear.
- Developing biochemical and physiological predictors of long term survival in released blue sharks and sea turtles.
- Survivorship, migrations, and diving patterns of sea turtles released from commercial longline fishing gear, determined with pop-up satellite archival transmitters.
- Investigating the life history and ecology of opah and monchong.
- Trophic ecology and structured-associated aggregation behavior in bigeye and yellowfin tuna in Hawaiian waters.

Economics project:
- Regulatory impact analysis framework for hawaii pelagic fishery management.

Oceanography projects:
- Development of oceanographic atlases for pelagic and insular fisheries and resource management of the Pacific Basin.
- Incorporating oceanographic data in stock assessment of blue sharks and other species incidentally caught in the Hawaii-based longline fishery.

Statistics and modeling projects:

- Distributions, histories, and recent catch trends with six fish taxa taken as incidental catch by the Hawaii-based commercial longline fishery.
- Recreational fisheries meta data - preliminary steps.
- Incidental catch of non-target fish species and sea turtles: comparing Hawaii's pelagic longline fishery against others.

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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

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.