Pelagic Fisheries of the Western Pacific Region

2007 Annual Report

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Cover photo:

Hawaii longline limited entry vessel *Captain Silver* leaves Kewalo Basin in the early morning. Photo by Council Staff

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2007 Annual Report

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for the

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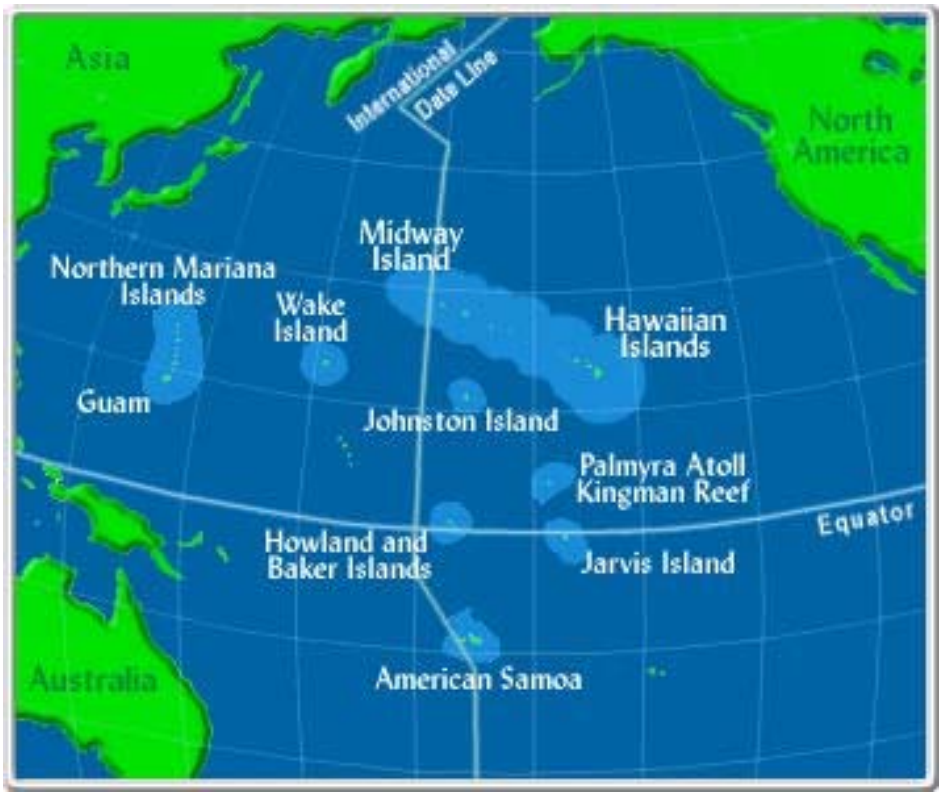
I. Introduction

A. Background to the Annual Report

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).



Map of the Western Pacific Region

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 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.

This report contains fishery performance data from each of the four island groups through 2004, 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.

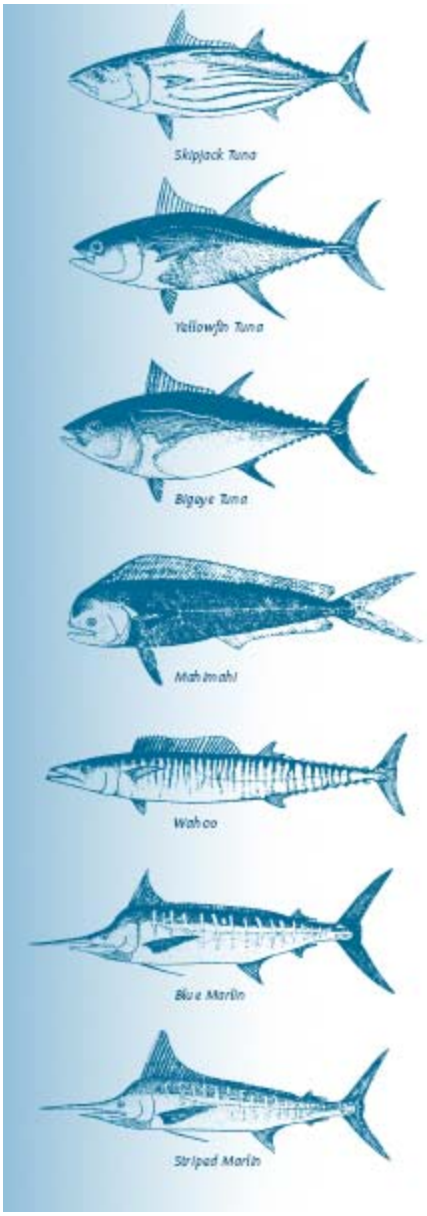
- Territory of American Samoa, Department of Marine and Wildlife Resources
- Territory of Guam, Division of Aquatic and Wildlife Resources
- Territory of Guam, Department of Commerce
- State of Hawaii, Division of Aquatic Resources
- Commonwealth of the Northern Mariana Islands, Division of Fish and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

A list of the Pelagic Plan Team members during 2006 and persons responsible for compilation of this report are included in Appendix 1.

[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.

B. The Pelagic Species of the Western Pacific Region

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*).



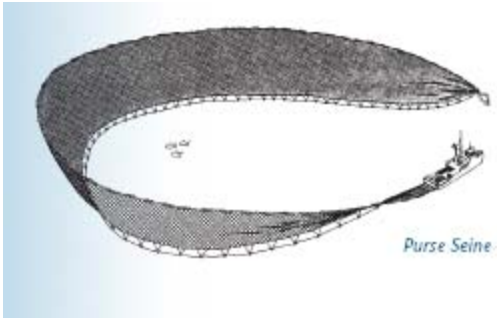
The previous MUS shark listing used to include oceanic species of the families *Alopiidae, Carcharinidae, Lamnidae, Sphynidae*. However, this could be construed to mean all members of these four shark families, which would also include nearshore and demersal sharks. The Pelagics Plan Team recommended 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).

Table 1. Names of Pacific Pelagic Management Unit Species

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

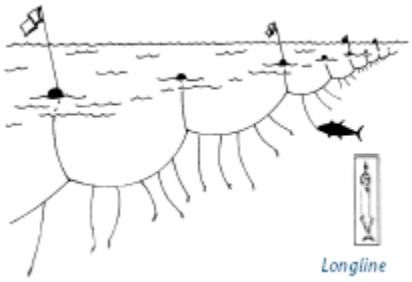
C. Pelagic Gear Types and Fisheries of the Western Pacific Region

U.S. pelagic fisheries in the Western Pacific Region are, with the exception of purse seining, primarily variations of hook-and-line fishing. These include longlining, trolling, handlining and pole-and-line fishing.



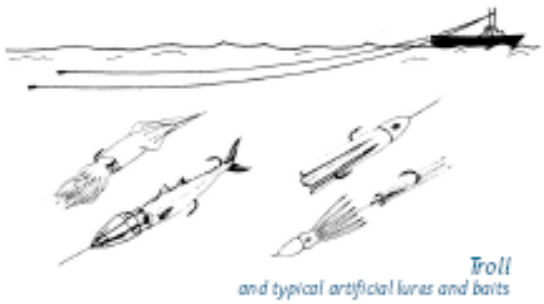
The largest fishery in terms of tonnage of fish landed is the U.S. purse-seine fishery, with catches of skipjack, yellowfin and bigeye tuna, amounting to 87,994 mt. However, this fleet has been decreasing in size from a peak in 1984 of 61 vessels to 14 vessels in 2004. Catches of blue marlins by this fishery are relatively small, amounting to about 40 mt.

The U.S. fleet of albacore trollers, based at West Coast ports, amounts to about 500 vessels, fishing primarily in the temperate waters of the North Pacific and landing in 2003 about 17,000 mt of fish. Some vessels from this fleet also fish seasonally for albacore in the South Pacific, catching on average between 1,000 and 2,500 mt of albacore. Marlins and other billfish are negligible fraction of the catch.



U.S. longline vessels in the Western Pacific Region are based primarily in Hawaii and American Samoa, although Hawaii-based vessels targeting swordfish have also fished seasonally out of California. The Hawaii fishery, with about 125 vessels targets a range of species, with vessels setting shallow longlines to catch swordfish or fishing deep to maximize catches of bigeye tuna.

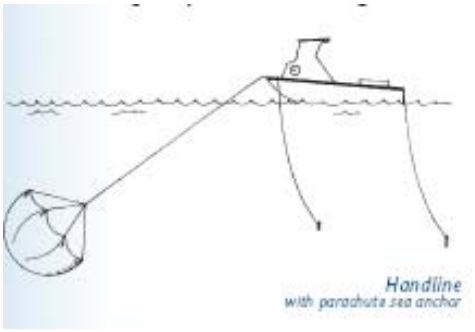
Catches by the Hawaii fleet also include yellowfin tuna, mahimahi (dorado), wahoo, blue and striped marlins, opah (moonfish) and monchong (pomfret). The Hawaii fishery does not freeze its catch, which is sold for the fresh fish and sashimi market in Hawaii, Japan and the U.S. mainland. The American Samoa fleet of about 50 vessels fishes almost exclusively for albacore tuna, which is landed to two tuna canneries in American Samoa. The combined landings from the two fisheries in 2003 amounted to 14,743 mt, with about two-thirds of landings coming from the Hawaii fishery. In 2003, the combined landings of blue and striped marlins from the longline fishery amounted to 374 and 542 mt respectively.



Trolling and, to lesser extent, handline fishing for pelagics is the largest commercial fishery in terms of participation, although it catches annually a relative modest volume of fish amounting to about 3,000 mt. Part of this catch is made by charter or for-hire fishing vessels. There are 1,494 troll vessels and 156 handline vessels in Hawaii, 73 troll vessels in the Northern Mariana Islands, 343 troll vessels in Guam, and 20 troll

vessels in American Samoa. Troll and handline catches are dominated by yellowfin and bigeye tuna in Hawaii and by skipjack in Guam, the Northern Mariana Islands and American Samoa. Other commonly caught troll catches include mahimahi, wahoo and blue marlin. About 85 percent of the troll landings are made by Hawaii vessels. In 2003, the combined catches of blue and striped marlins by these fisheries amounted to 207 and 28 mt respectively.

Troll fishing for pelagics is the commonest recreational fishery in the islands of the Western Pacific Region. The definition of recreational fishing, however, continues to be problematic in a region where many fishermen who are fishing primarily for recreation may sell their fish to cover their expenses. Hawaii's recreational fishery landings amount to about 8,000 mt annually, based on surveys of fishermen, with blue marlins catches ranging from 400 to 600 mt. Recreational or non-commercial landings from boats in Guam, American Samoa and the Northern Mariana Islands amount to about 170 mt, of which about 30 mt is blue marlin.



Tuna fisheries in the Pacific Ocean as a whole catch about 2.7 million mt of fish, with U.S. fisheries catching about 5 percent of the total. Most of the catch is taken by fleets of high seas longliners and purse seiners from countries such as Japan, Taiwan, Korea and the nations of Central and South America. More recently, Pacific Island countries such as Papua New Guinea have grown in importance in terms of their large scale purse-seine and longline fisheries. Small scale artisanal longlining is also conducted in Pacific Island countries like Samoa and in South America, where there are thousands of small scale longline vessels fishing in coastal waters.

II. Development and Description of the Fisheries of the Western Pacific Region

A. American Samoa

The islands of American Samoa are an area of modest productivity relative to areas to the north and west. The region is traversed by two main currents: the southern branch of the westward-flowing South Equatorial Current during June - October and the eastward-flowing South Equatorial Counter Current during November - April. Surface temperatures vary between 27°-29° C and are highest in the January - April period. The upper limit of the thermocline in ocean areas is relatively shallow (27° C isotherm at 100m depth) but the thermocline itself is diffuse (lower boundary at 300m depth).

1. Traditional and Historical Pelagic Fisheries

Small-scale longline: Most participants in the small-scale domestic longline fishery are indigenous American Samoans with vessels under 50 ft in length, most of which are alia boats under 40 ft in length. The stimulus for American Samoa's commercial fishermen to shift from troll or handline gear to longline gear in the mid-1990s (see Figure 10) was the fishing success of 28' alia catamarans that engaged in longline fishing in the EEZ around Independent Samoa.

Following this example, the fishermen in American Samoa deploy a short monofilament longline, with an average of 350 hooks per set, from a hand-powered reel (WPRFMC, 2000). An estimated 90 percent of the crews working in the American Samoa small-scale alia longline fleet are believed to be from Independent Samoa. The predominant catch is albacore tuna, which is marketed to the local tuna canneries (DMWR 2001).

***Large-scale longline*:** American Samoa's domestic longline fishery expanded rapidly in 2001. Much of the recent (and anticipated future) growth is due to the entry of monohull vessels larger than 50 ft in length. The number of permitted longline vessels in this sector increased from three in 2000 to 30 by March 21, 2002 (DMWR, unpubl. data). Of these, five permits (33 percent of the vessel size class) for vessels between 50.1 ft - 70 ft and five permits (33 percent of the vessel size class) for vessels larger than 70 ft were believed to be held by indigenous American Samoans as of March 21, 2002 (T. Beeching, DMWR, pers. comm to P. Bartram, March 2002). Economic barriers have prevented more substantial indigenous participation in the large-scale sector of the longline fishery. The lack of capital appears to be the primary constraint to substantial indigenous participation in this sector (DMWR 2001).

While the smallest (less than or equal to 40 ft) vessels average 350 hooks per set, a vessel over 50 ft can set 5-6 times more hooks and has a greater fishing range and capacity for storing fish (8-40 mt as compared to 0.5-2 mt on a small-scale vessel). Larger vessels are also outfitted with hydraulically-powered reels to set and haul mainline, and modern electronic equipment for navigation, communications and fish finding. Most are presently being operated to freeze albacore onboard, rather than to land chilled fish. Three vessels that left Hawaii after the swordfish longline fishery closure are operating in the American Samoa tuna longline fishery under new ownership. It does not appear that large numbers of longliners from Hawaii are relocated in American Samoa. Instead, large vessels have participated in the American Samoa longline fishery from diverse ports and fisheries, including the US west coast (6), Gulf of Mexico (3), and foreign countries (4 now under U.S. ownership) (O'Malley and Pooley, 2002).

Distant-water purse seine fishery: The US purse seine fleet operating in the central and western Pacific uses large nets to capture skipjack, yellowfin and bigeye tuna near the ocean surface, in free-swimming schools and around fish aggregation devices (FADs) deployed by the fleet. These vessels often land their catches at canneries based in American Samoa. These large vessels (200-250 ft length) could not be economically operated for longline fishing but some former participants in the U.S. purse seine fishery have acquired more suitable vessels and participated in the American Samoa-based longline fishery (NMFS 2001

Distant-water jig albacore fishery: Domestic albacore jig vessels also supply tuna to the canneries in American Samoa. Since 1985, about 50-60 US vessels have participated in the high-seas troll fishery for albacore. This fishery occurs seasonally (December through April) in international waters at 35°-40° S latitude. The vessels range in length from 50 to 120 feet, with the average length about 75 feet (Heikkila 2001). They operate with crews of 3-5 and are capable of freezing 45-90 tons of fish (WPRFMC 2000).

Troll and handline fishery: From October 1985 to the present, catch and effort data in American Samoa fisheries have been collected through a creel survey that includes subsistence and recreational fishing, as well as commercial fishing. However, differentiating commercial troll fishing activity from non-commercial activity can be difficult.

Recreational fishing purely for sport or pleasure is uncommon in American Samoa. Most fishermen normally harvest pelagic species for subsistence or commercial sale. However tournament fishing for pelagic species began in American Samoa in the 1980s, and between 1974 and 1998, a total of 64 fishing tournaments were held in American Samoa (Tulafono 2001). Most of the boats that participated were alia catamarans and small skiffs. Catches from tournaments are often sold, as most of the entrants are local small-scale commercial fishermen. In 1996, three days of tournament fishing contributed about one percent of the total domestic landings. Typically, 7 to 14 local boats carrying 55 to 70 fishermen participated in each tournament, which were held 2 to 5 times per year (Craig et al. 1993).

The majority of tournament participants have operated 28-foot alia, the same vessels that engage in the small-scale longline fishery. With more emphasis on commercial longline fishing since 1996, interest in the tournaments has waned (Tulafono 2001) and pelagic fishing effort has shifted markedly from trolling to longling (see Figure 11). Catch and release recreational fishing is virtually unknown in American Samoa. Landing fish to meet cultural obligations is so important that releasing fish would generally be considered a failure to meet these obligations (Tulafono 2001). Nevertheless, some pelagic fishermen who fish for subsistence release fish that are surplus to their subsistence needs (S. Steffany, pers. comm. to Paul Bartram, Sept. 15, 2001).

American Samoa has been unable to develop a significant tourist industry that could support charter fishing (Territorial Planning Commission/Dept. of Commerce, 2000). Nor is American Samoa known for producing large game fish. Few, if any, charter boats are in operation (Tulafono 2001), so no data are collected specifically for the charter fishing sector.

2. Pelagic Fisheries Development

American Samoan dependence on fishing undoubtedly goes back as far as the peopled history of the islands of the Samoan archipelago, about 3,500 years ago (Severance and Franco 1989). Many aspects of the culture have changed in contemporary times but American Samoans have retained a traditional social system that continues to strongly influence and depend upon the culture of fishing. Centered around an extended family (`aiga) and allegiance to a hierarchy of chiefs (matai), this system is rooted in the economics and politics of communally-held village land. It has effectively resisted Euro-American colonial influence and has contributed to a contemporary cultural resiliency unique in the Pacific islands region (Severance et al. 1999).

American Samoa has a small developing economy, dependent mainly on two primary income sources: the American Samoa Government, which receives income and capital subsidies from the Federal government, and the two fish canneries on Tutuila (BOH 2002). These two primary income sources have given rise to a third: a services sector that derives from and complements the first two. In 1993, the latest year for which the ASG has compiled detailed labor force and

employment data, the ASG employed 4,355 persons (32.2 percent of total employment), followed by the two canneries with 3,977 persons (29.4 percent) and the rest of the services economy with 5,211 persons (38.4 percent). As of 2000, there were 17,644 people 16 years and older in the labor force, of which 16,718, or 95%, were employed (American Samoa Census 2000).

The excellent harbor at Pago Pago and certain special provisions of U.S. law form the basis of American Samoa's largest private industry, fish processing, which is now more than forty years old (BOH 1997). The territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. American Samoan products with less than 50 percent market value from foreign sources enter the United States duty free (Headnote 3(a) of the U.S. Tariff Schedule). The parent companies of American Samoa's fish processing plants enjoy special tax benefits, and wages in the territory are set not by Federal law but by recommendation of a special U.S. Department of Labor committee that reviews economic conditions every two years and establishes minimum wages by industry.

The ASG has estimated that the tuna processing industry directly and indirectly generates about 15 percent of current money wages, 10 to 12 percent of aggregate household income and 7 percent of government receipts in the territory (BOH 2000). On the other hand, both tuna canneries in American Samoa are tied to multinational corporations that supply virtually everything but unskilled labor, shipping services and infrastructure facilities (Schug and Galeai 1987). Even a substantial portion of the raw tuna processed by Star-Kist Samoa is landed by vessels owned by the parent company. The result is that few backward linkages have developed, and the fish-processing facilities exist essentially as industrial enclaves. Furthermore, most of the unskilled labor of the canneries is imported. Up to 90 percent of cannery jobs are filled by foreign nationals from Western Samoa and Tonga. The result is that much of the payroll of the canneries "leaks" out of the territory in the form of overseas remittances.

Harsh working conditions, low wages and long fishing trips have discouraged American Samoans from working on foreign longline vessels delivering tuna to the canneries. American Samoans prefer employment on the U.S. purse seine vessels, but the capital-intensive nature of purse seine operations limits the number of job opportunities for locals in that sector as well. However, the presence of the industrial tuna fishing fleet has had a positive economic effect on the local economy as a whole. Ancillary businesses involved in reprovisioning the fishing fleet generate a significant number of jobs and amount of income for local residents. Fleet expenditures for fuel, provisions and repairs in 1994 were estimated to be between $45 million and $92 million (Hamnett and Pintz 1996).

The tuna processing industry has had a mixed effect on the commercial fishing activities undertaken by American Samoans. The canneries often buy fish from the small-scale domestic longline fleet based in American Samoa, although the quantity of this fish is insignificant compared to cannery deliveries by the U.S. purse seine, U.S. albacore and foreign longline fleets. The ready market provided by the canneries is attractive to the small boat fleet, and virtually all of the albacore caught by the domestic longline fishery is sold to the canneries. Nevertheless, local fishermen have long complained that a portion of the frozen fish landed by foreign longline

vessels enters the American Samoa restaurant and home-consumption market, creating an oversupply and depressing the prices for fresh fish sold by local fishermen.

Local fishermen have indicated an interest in participating in the far more lucrative overseas market for fresh fish. To date, however, inadequate shore-side ice and cold storage facilities in American Samoa and infrequent and expensive air transportation links have been restrictive factors.

Using information obtained from industry sources for a presentation to the American Samoa Legislature (Faleomavaega 2002), canning the 3,100 mt of albacore landed in American Samoa by the domestic longline fishery in 2001 is estimated to have generated 75 jobs, $420,000 in wages, $5 million in processing revenue and $1.4 million in direct cannery spending in the local economy. Ancillary businesses associated with the tuna canning industry also contribute significantly to American Samoa's economy. The American Samoa government calculates that the canneries represent, directly and indirectly, from 10% - 12% of aggregate household income, 7% of government receipts and 20% of power sales (BOH 2000).

American Samoa's position in the industry is being eroded by forces at work in the world economy and in the tuna canning industry itself. Whereas wage levels in American Samoa are well below those of the US, they are considerably higher than in other canned tuna production centers around the world. To remain competitive, U.S. tuna producers are purchasing more raw materials, especially pre-cooked loins, from foreign manufacturers. Tax benefits to US canneries operating in American Samoa have also been tempered in recent years by the removal of a provision in the US tax code that previously permitted the tax-free repatriation of corporate income in US territories. Trends in world trade, specifically reductions in tariffs, are reducing the competitive advantage of American Samoa's duty-free access to the US canned tuna market (Territorial Planning Commission/Dept. of Commerce, 2000).

Despite the long history of the tuna canning industry in American Samoa, processing and marketing of pelagic fish by local enterprises has not yet developed beyond a few, short-term pilot projects. However, the government's comprehensive economic development strategy (Territorial Planning Commission/Dept. of Commerce, 2000) places a high priority on establishing a private sector fish processing and export operation proposed to be located at the Tafuna Industrial Park.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of American Samoa:

AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

AMENDMENT 11 (effective May 24, 2005) established a limited access system for pelagic longlining in EEZ waters around American Samoa with initial entry criteria based on historical participation in the fishery.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

FRAMEWORK MEASURE 1 (effective March 1, 2002) established an area seaward of 3 nm out to approximately 50 nm around the islands of American Samoa in which fishing for PMUS is prohibited by vessels greater than 50 feet in length overall that did not land PMUS in American Samoa under a federal longline general permit prior to Nov. 13, 1997.

B. Guam

Generally, the major surface current affecting Guam is the North Equatorial Current, which flows westward through the islands. Sea surface temperatures off Guam vary between 80.9° – 84.9° F, depending on the season. The mixed layer extends to depths between 300-400 ft (Eldredge 1983).

1. Traditional and Historical Pelagic Fisheries

Guam's pelagic fisheries consist of primarily small, recreational, trolling boats that are either towed to boat launch sites or berthed in marinas and fish only within local waters, either within

the EEZ around Guam or on some occasions in the adjacent EEZ waters around the Northern Mariana Islands.

Domestic annual pelagic landings in Guam have varied widely, ranging between 322,000 and 937,000 lbs in the 23-year time series. The 2004 total pelagic landings were approximately 691,366 lbs, an increase of 36% compared with 2003. Of this total, it is estimated that 285,545 lbs were sold for a total ex-vessel revenue of $433,911 (WPRFMC 2005).

Landings consisted primarily of five major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), bonita or skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and Pacific blue marlin (*Makaira mazara*). Other minor pelagic species caught include rainbow runner (*Elagatis bipinnulatus*), great barracuda (*Sphyraena barracuda*), kawakawa (*Euthynnus affinis*), dogtooth tuna (*Gymnosarda unicolor*), double-lined mackerel *(Grammatorcynus bilineatus*), oilfish (*Ruvettus pretiosus*), and three less common species of barracuda. Sailfish and sharks were also known to be caught during 2004 but these species were not encountered during offshore creel surveys.

There are wide year-to-year fluctuations in the estimated landings of the five major species. 2004 mahimahi catch increased more than 134% from 2003, and reached the highest level since 1998. Wahoo catch totals increased 83% from 2003, and were the sixth highest total during the 23 year recording period. Pacific blue marlin landings decreased 28% from 2003, and were 24% below the 23 year average. Supertyphoon Pongsona's direct hit on Guam in December 2002 and subsequent negative impact on fishing during the first quarter of 2003 probably account for the low numbers of mahimahi caught during 2003. Participation and effort generally increased in 2004 with the number of trolling boats up by eight percent (WPRFMC 2005)

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from 193 in 1983 to 469 in 1998. This number decreased until 2001, but then began increasing, and has been increasing since. There were 401 boats active in Guam's domestic pelagic fishery in 2004. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of Guam's pelagic fishery is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews. These operations were responsible for 22 percent of all domestic pelagic fishing trips from Guam in 2004 (WPRFMC 2005). Figure 15 provides the estimated annual total domestic pelagics catch in Guam.

2. Pelagic Fisheries Development

Fishing in Guam continues to be important not only in terms of contributing to the subsistence needs of the Chamorro people but also in terms of preserving their history and identity. Fishing assists in perpetuating traditional knowledge of marine resources and maritime heritage of the Chamorro culture.

The importance of commercial fishing in Guam lies mainly in the territory's status as a major regional fish transshipment center and re-supply base for domestic and foreign tuna fishing fleets. Among Guam's advantages as a home port are well-developed and highly efficient port facilities in Apra Harbor; an availability of relatively low-cost vessel fuel; a well-established marine supply/repair industry; and recreational amenities for crew shore leave (Hamnett and Pintz 1996). In addition, the territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. Initially, the majority of vessels calling in Apra Harbor to discharge frozen tuna for transshipment were Japanese purse seine boats and carrier vessels. Later, a fleet of U.S. purse seine vessels relocated to Guam, and since the late 1980s, Guam has become an important port for Japanese and Taiwanese longline fleets. The presence of the longline and purse seine vessels has created a demand for a range of provisioning, vessel maintenance and gear repair services.

By the early 1990s, an air transshipment operation was also established on Guam. Fresh tuna is flown into Guam from the Federated States of Micronesia and elsewhere on air cargo planes and out of Guam to the Japanese market on wide-body passenger planes (Hamnett and Pintz, 1996). A second air transshipment operation that began in the mid-1990s is transporting to Europe fish that do not meet Japanese sashimi market standards.

Guam is an important re-supply and transshipment center for the international tuna longline fleet in the Pacific. However, the future of home port and transshipment operations in Guam depends on the island's ability to compete with neighboring countries that are seeking to attract the highly mobile longline fleet to their own ports. Trends in the number of port calls made in Guam by various fishing fleets reflect the volatility of the industry. The number of vessels operating out of Guam decreased by almost half from 1996 to 1997, and further declined in 1998 (Hamnett and Anderson 2000).

The Guam Department of Commerce reported that fleet expenditures in Guam in 1998 were about $68 million, and a 1994 study estimated that the home port and transshipment industry employed about 130 people (Hamnett and Pintz 1996). This industry constitutes an insignificant percentage of the gross island product, which was about $2.99 billion in 1996, and is of minor economic importance in comparison to the tourist or defense industries (Hamnett and Anderson 2000). Nevertheless, home port and transshipment operations make an important contribution to the diversification of Guam's economy (Hamnett and Pintz 1996). As a result of fluctuations in the tourism industry and cuts in military expenditures in Guam, the importance of economic diversification has increased.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of Guam:

AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

AMENDMENT 5 (effective March 2, 1992) created domestic longline vessel exclusion zones around the Main Hawaiian Islands (MHI) ranging from 50 to 75 nm and a similar 50 nm exclusion zone around Guam and its offshore banks.

AMENDMENT 6 (effective Nov. 27, 1992) specified that all tuna species are designated as fish under U.S. management authority and included tunas and related species as PMUS under the FMP. It also applied the longline exclusion zones of 50 nm around the island of Guam and the 25-75 nm zone around the MHI to foreign vessels.

AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.
In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

C. Hawaii

The archipelago's position in the Pacific Ocean lies within the clockwise rotating North Pacific Subtropical Gyre, extending from the northern portion of the North Equatorial Current into the region south of the Subtropical High, where the water moves eastward in the North Pacific Current. At the pass between the MHI and the NWHI there is often a westward flow from the region of Kauai along the lee side of the lower NWHI. This flow, the North Hawaiian Ridge Current (NHRC), is extremely variable and can also be absent at times. The analysis of 10 years of shipboard acoustic Doppler current profiler data collected by the NOAA Ship Townsend

Cromwell shows mean flow through the ridge between Oahu and Nihoa, and extending to a depth of 200 m. (J. Firing pers. comm.).

Imbedded in the mean east-to-west flow are an abundance of mesoscale eddies created from a mixture of wind, current, and sea floor interactions. The eddies, which can rotate either clockwise or counter clockwise, have important biological impacts. For example, eddies create vertical fluxes, with regions of divergence (upwelling) where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (downwelling) where the thermocline deepens. Sea surface temperatures around the Hawaiian Archipelago experience seasonal variability, but generally vary between 18°-28° C (64°-82° F) with the colder waters occurring more often in the NWHI.

A significant source of interannual physical and biological variation around Hawaii are El Niño and La Niña events. During an El Niño, the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll.

Physical and biological oceanographic changes have also been observed on decadal time scales. These low frequency changes, termed regime shifts, can impact the entire ocean ecosystem. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts (Polovina, 1996; Polovina et al., 1995). In the late 1980's an ecosystem shift from high carrying capacity to low carrying capacity occurred in the NWHI. The shift was associated with the weakening of the Aleutian Low Pressure System (North Pacific) and the Subtropical Counter Current. The ecosystem effects of this shift were observed in lower nutrient and productivity levels and decreased abundance of numerous species in the NWHI including the spiny lobster, the Hawaiian monk seal, various reef fish, the red-footed booby, and the red-tailed tropic bird (Polovina and Haight, 1999; Demartini et. al., 2002).

1. Traditional and Historical Pelagic Fisheries

Hawaii's pelagic fisheries, which include the longline, Main Hawaiian Islands troll and handline, offshore handline, and the aku boat (pole and line) fisheries; are the state's largest and most valuable fishery sector. The target species are tunas and billfish, but a variety of other species are also important. Collectively, these pelagic fisheries made approximately 23 million lbs of commercial landings with a total ex-vessel value of $48 million in 2003 (WPFMC 2003).

The largest component of pelagic catch in 2003 was tunas. Bigeye tuna was the largest component and has increased almost five-fold from its 1987 catch. Swordfish was the largest component of the billfish catch from 1990 through 2000, but was replaced by blue marlin in the next two years, and followed by striped marlin in 2003. Mahimahi was the largest component of the non-tuna and non-billfish catch though ono (wahoo) and moonfish catches rose to comparable levels.

2. Pelagic Fisheries Development

The most recent estimate of the contribution of the commercial, charter and recreational fishing sectors to the state economy indicated that in 1992, these sectors contributed $118.79 million of output (production) and $34.29 million of household income and employed 1,469 people (Sharma et al. 1999). These contributions accounted for 0.25% of total state output ($47.4 billion), 0.17% of household income ($20.2 billion) and 0.19% of employment (757,132 jobs). In contrast to the sharp decline in some traditional mainstays of Hawaii's economy such as large-scale agriculture the fishing industry has been fairly stable during the past decade. Total revenues in Hawaii's pelagic, bottomfish and lobster fisheries in 1998 were about 10% higher than 1988 revenues (adjusted for inflation) in those fisheries.

The Hawaii longline fishery is by far the most important economically, accounting for 77 percent of the estimated ex-vessel value of the total commercial fish landings in the state in 2003 (WPRFMC 2004).

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of Hawaii:

AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

AMENDMENT 3 (effective Oct. 14, 1991) created a 50 nm longline exclusion zone around the Northwestern Hawaiian Islands (NWHI) to protect endangered Hawaiian monk seals and also implemented framework provisions for establishing a mandatory observer program to collect information on interactions between longline fishing and sea turtles.

AMENDMENT 4 (effective Oct. 10, 1991, through April 22, 1994) established a three-year moratorium on new entry into the Hawaii-based domestic longline fishery and required Hawaii-based longline vessels to carry and use a National Marine Fisheries Service (NMFS)-owned vessel monitoring system (VMS) transmitter to ensure that they do not fish within prohibited areas.

AMENDMENT 5 (effective March 2, 1992) created domestic longline vessel exclusion zones around the Main Hawaiian Islands (MHI) ranging from 50 to 75 nm and a similar 50 nm exclusion zone around Guam and its offshore banks.

AMENDMENT 6 (effective Nov. 27, 1992) specified that all tuna species are designated as fish under U.S. management authority and included tunas and related species as PMUS under the

FMP. It also applied the longline exclusion zones of 50 nm around the island of Guam and the 25-75 nm zone around the MHI to foreign vessels.

AMENDMENT 7 (effective June 24, 1994) instituted a limited entry program for the Hawaii-based domestic longline fishery with transferable permits, a limit of 164 vessels, and a maximum vessel size of 101 feet in length overall.

AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

AMENDMENT 9 (under development since early 2000) would manage the harvest and retention of sharks in the Hawaii-based longline fishery.

AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks. Amendment 14 also contained measures to implement control dates for Hawaii's non-longline commercial pelagic vessels (70 FR 47781, see above) and purse seine and longline vessels (70 FR 47782, see above), as well as requirements for federal permits and reporting for Hawaii-based non-longline commercial pelagic vessels. NMFS disapproved the Amendment's international measures as premature given ongoing international negotiations as well as the development of a memorandum of understanding by the Councils and the Secretary of Commerce, in consultation with the Secretary of State, regarding participation in U.S. delegations and other issues. NMFS disapproved Amendment 14's domestic permit and reporting requirements as duplicative of existing requirements imposed by the State of Hawaii and stated that they were working with the State to improve their data collection and processing system. NMFS also noted that Amendment 14 met the requirements of the Magnuson-Act regarding overfishing of fisheries that have been determined to be subject to overfishing due to excessive international fishing pressure.

At the request of the Council NMFS issued a control date of March 16, 2007 to notify persons who entered the Hawaii-based pelagic charter fishery after that date that they would not necessarily be assured of continuing participation if a limited entry program was subsequently

implemented for their fishery. The control date was issued in response to concerns regarding significant expansion of the charter vessel fleet and its potential to impact billfishes and other pelagic species.

AMENDMENTS 9, 12 and 13 were intended to address issues which have now become moot due to changing circumstances, thus these amendment numbers may be used to designate future amendments.

FRAMEWORK MEASURE 2 (effective June 13, 2002) incorporated the terms and conditions of a Nov. 28, 2000, Biological Opinion issued by the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act to protect seabirds from longline fishing. These measures require Hawaii-based pelagic longline vessel operators to use blue-dyed bait, strategic offal discards and line shooters with weighted branch lines to mitigate seabird interactions when fishing north of 23° N. Also included was a requirement that all Hawaii-based longline vessel owners and operators annually attend a protected species workshop conducted by NMFS.

REGULATORY AMENDMENT 1 (effective June 9, 2002) incorporated the reasonable and prudent alternative of a March 2001 Biological Opinion issued by NMFS under section 7 of the Endangered Species Act. To mitigate interactions with sea turtles, this amendment prohibits shallow set pelagic longlining north of the equator by vessels managed under the FMP and closed waters between 0° and 15°N from April through May of each year to longline fishing. It also institutes sea turtle handling requirements for all vessels using hooks to target pelagic species in the region's EEZ waters.

REGULATORY AMENDMENT 2 (effective Oct. 4, 2002) established federal permit and reporting requirements for any vessel using troll or handline gear to catch PMUS in EEZ waters around the Pacific Remote Island Areas of Kingman Reef; Howland, Baker, Jarvis, Johnston and Wake Islands; and Palmyra and Midway Atolls.

REGULATORY AMENDMENT 3 (effective April 1, 2005) reopened swordfish longline fishing in Hawaii. The amendment requires vessels targeting swordfish to use mackerel type bait and 18/0 circle hooks. It also set an effort limit of 2,120 set per year and hard caps on loggerhead and leatherback turtles takes, which if reached would close the fishery for the remainder to the year.

REGULATORY AMENDMENT 5 (effective January 18, 2006) allowed operators of Hawaii-based longline vessels fishing north of 23 degrees north latitude, as well as those targeting swordfish south of 23 degrees north, to utilize side-setting to reduce seabird interactions in lieu of the seabird mitigation measures required by Framework Measure 1. Side-setting was tested on Hawaii-based longline vessels and found to be highly effective in reducing seabird interactions.

At the request of the Council NMFS published a temporary rule removing the delay in effectiveness for closing the Hawaii-based longline shallow-set swordfish fishery as a result of it having reached one of its turtle interaction limits (71 FR 14416). This rule was implemented as vessel communications had improved to the point that vessel operators could be immediately

notified of a closure, thus removing the possibility of exceeding a turtle limit during the notification period. This rule was effective March 20, 2006 through September 18, 2006.

REGULATORY AMENDMENT 6 (effective March 28, 2007) made the above temporary rule permanent.

REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

NMFS published a temporary rule effective March 20, 2006 through December 31, 2006 closing the Hawaii-based longline swordfish fishery for the remainder of the calendar year due to its having reached its annual limit of 17 interactions with loggerhead turtles.

D. Commonwealth of the Northern Marianas Islands

Generally, the major surface current affecting CNMI is the North Equatorial Current, which flows westward through the islands, however the Subtropical Counter Current affects the Northern Islands and generally flows in a easterly direction (Elgredge 1983). Depending on the season, sea surface temperatures near the Northern Mariana Islands vary between 80.9° – 84.9° F. The mixed layer extends to between depths of 300-400 ft (Eldredge 1983).

1. Traditional and Historical Pelagic Fisheries

The CNMI's pelagic fisheries occur primarily from the island of Farallon de Medinilla south to the island of Rota. Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet consists primarily of vessels less than 24 ft in length which usually have a limited 20-mile travel radius from Saipan.

The primary target and most marketable species for the pelagic fleet is skipjack tuna (67% of 2004 commercial landings). Yellowfin tuna and mahimahi are also easily marketable species but are seasonal. During their 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 which has kept market demand fairly high. Figure 13 presents historical data on pelagic landings in CNMI. It is estimated that in 2004, 68 fishery participants made 235,382 lbs of commercial landings of pelagic species with a total ex-vessel value of $466,490 (WPRFMC 2005b).

2. Pelagic Fisheries Development

Fishery resources have played a central role in shaping the social, cultural and economic fabric of the CNMI. The aboriginal peoples indigenous to these islands relied on seafood as their principal source of protein and developed exceptional fishing skills. Later immigrants to the

islands from East and Southeast Asia also possessed a strong fishing tradition. Under the MSA, the CNMI is defined as a fishing community.

In the early 1980s, U.S. purse seine vessels established a transshipment operation at Tinian Harbor. The CNMI is exempt from the Jones Act, which requires the use of U.S.-flag and U.S.-built vessels to carry cargo between U.S. ports. The U.S. purse seiners took advantage of this exemption by offloading their catch at Tinian onto foreign vessels for shipment to tuna canneries in American Samoa. In 1991, a second type of tuna transshipment operation was established on Saipan (Hamnett and Pintz 1996). This operation transships fresh tuna caught in the Federated States of Micronesia from air freighters to wide-body jets bound for Japan. The volume of fish flown into and out of Saipan is substantial, but the contribution of this operation to the local economy is minimal (Hamnett and Pintz 1996).

With the exception of the purse seine support base on Tinian (now defunct), the CNMI has never had a large infrastructure dedicated to commercial fishing. The majority of boats in the local fishing fleet are small, outboard engine-powered vessels. Between 1994-1998, the annual ex-vessel value of commercial landings of bottomfish and pelagic species has averaged about $473,900, which bottomfish accounts for about 28% of the total revenues (WPFMC 1999). Existing planning data for the CNMI are not suited to examining the direct and indirect contributions attributed to various inter-industry linkages in the economy. It is apparent, however, that fishing by the local small-boat fleet represents only a small fraction of the economic activity in the commonwealth.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of CNMI:

AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and

Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

E. Pacific Remote Island Areas

Due to its position near the equator, Baker Island lies within the westward flowing South Equatorial Current. Baker Island also experiences an eastward flowing Equatorial Under Current that causes upwelling of nutrient and plankton rich waters on the west side of the island (Brainard et. al 2005). Sea surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C.[1] Although the depth of the mixed layer in the pelagic waters around Baker Island is seasonally variable, average mixed layer depth is around 100 m (R. Moffit, PIFSC, pers. comm.).

Due to its position slightly north of the equator, Howland Island lies within the margins of the eastward flowing North Equatorial Counter Current and the margins of the westward flowing South Equatorial Current. Sea surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C.[2] Although the depth of the mixed layer in the pelagic waters around Howland Island is seasonally variable, average mixed layer depth is around 70 m – 90 m (R. Moffit, PIFSC, pers. comm.).

Due to its position below the equator, Jarvis Island lies within the South Equatorial Current which runs in a westerly direction. Sea surface temperatures of pelagic EEZ waters around Jarvis Island are often 28°- 30° C.[3] Although depth of the mixed layer in the pelagic waters around Jarvis Island is seasonally variable, average mixed layer depth is around 80 m (R. Moffit, PIFSC, pers. comm.).

Due to its relative proximity to the equator, Palmyra Atoll and Kingman Reef lie in the North Equatorial Countercurrent which flow in a west to east direction. Sea surface temperatures of pelagic EEZ waters around Palmyra Atoll are often 27°- 30° C.[4] Although the depth of the mixed layer in the pelagic waters around Kingman Reef is seasonally variable, average mixed layer depth is around 80 m (R. Moffit, PIFSC, pers. comm.).

[1] http://oceanwatch.pifsc.noaa.gov/
[2] http://oceanwatch.pifsc.noaa.gov/
[3] http://oceanwatch.pifsc.noaa.gov/
[4] http://oceanwatch.pifsc.noaa.gov/

Sea surface temperatures of pelagic EEZ waters around Johnston Atoll are often 27°- 30° C.[5] Although the depth of the mixed layer in the pelagic waters around Johnston Atoll is seasonally variable, average mixed layer depth is around 80 m (R. Moffit pers. comm.).

Sea surface temperatures of pelagic EEZ waters around Wake Island are often 27°- 30° C.[6] Although the depth of the mixed layer in the pelagic waters around Wake Atoll is seasonally variable, average mixed layer depth is around 80 m (R. Moffit, PIFSC, pers. comm.).

1. Traditional and Historical Pelagic Fisheries

As many tropical pelagic species (e.g. skipjack tuna) are highly migratory, the fishing fleets targeting them often travel great distances. Although the EEZ waters around Johnston Atoll and Palmyra Atoll are over 750 nm and 1000 nm (respectively) away from Honolulu, the Hawaii longline fleet does seasonally fish in those areas. For example, the EEZ around Palmyra is often visted by Hawaii-based longline vessels targeting yellowfin tuna, whereas at Johnston Atoll, albacore tuna is often caught in greater numbers than yellowfin or bigyeye tuna. Similarly, the U.S. purse seine fleet also targets pelagic species (primarily skipjack tuna) in the EEZs around some PRIA, specifically, the equatorial areas of Howland, Baker, and Jarvis Islands. The combined amount of fish harvested from these areas from the U.S. purse seine on average is less than 5 per cent of their total annual harvest.

2. Pelagic Fisheries Development

The USFWS prohibits fishing within the Howland Island, Jarvis Island, and Baker Island National Wildlife Refuge (NWR) boundaries. Currently, Howland Island and Baker Island are uninhabited. Currently the USFWS continues to manage Johnston Atoll as a National Wildlife Refuge, but does allow some recreational fishing within the Refuge boundary

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of the PRIAs:

AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

[5] http://oceanwatch.pifsc.noaa.gov/
[6] http://oceanwatch.pifsc.noaa.gov/

AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

REGULATORY AMENDMENT 2 (effective Oct. 4, 2002) established federal permit and reporting requirements for any vessel using troll or handline gear to catch PMUS in EEZ waters around the Pacific Remote Island Areas of Kingman Reef; Howland, Baker, Jarvis, Johnston and Wake Islands; and Palmyra and Midway Atolls.

III. The Current Status of Pelagic Fisheries of the Western Pacific Region

A summary of the total pelagic landings during 2007 in the Western Pacific and the percentage change between 2006 and 2007 is shown in Table 2.

Note: Total Pelagic Landings are based on commercial reports and/or creel surveys. "Other pelagics" includes Dogtooth Tuna, Rainbow Runner, Barracudas, Kawakawa, Pomfrets, Oilfish, and Misc Pelagic Fish categories

Table 2. Total pelagic landings in lbs in the Western Pacific Region in 2007

Species	Am Samoa	% change	Guam	% change	CNMI	% change	Hawaii	% change
Swordfish	17,956	-72.8					3,796,000	+47.1
Blue marlin	8,232	-82.1	18,994	-35	83	-94.1	837,000	-31.6
Striped marlin	826	-94.1					637,000	-55.7
Other billfish	2,757	-84.6	4,078	+34.5	83	-73.7	378,000	-9.6
Mahimahi (dolphinfish)	21,227	-57	258,260	+58.9	28,581	+66.4	1,650,000	+8.9
Wahoo	436,703	-30.1	44,354	-58.1	2,671	-14.3	842,000	-15.9
Opah (moonfish)	759	-88.2					1,223,000	+12.8
Sharks (whole wgt)	191	-92.5					417,000	+23.7
Albacore	11,748,400	+27.7					775,000	+1.2
Bigeye tuna	438,097	-0.8	830	---			13,726,000	+29.6
Bluefin tuna							1,000	0
Skipjack tuna	372,501	-20	156,651	+6.8	258,353	-2.8	1,002,000	-4
Yellowfin tuna	1,375,528	+26.3	47,833	+70.5	37,802	-10	3,473,000	+7.8
Other pelagics	7,346	+6.6	28,890	-16.6	10,423	-39.1	1,102,000	+7.2
Total	**14,429,522**	**+19.9**	**559,890**	**+9.7**	**337,995**	**-2.6**	**29,883,000**	**+13.7**

IV. 2007 Region-wide Pelagics Plan Team Recommendations

The Pelagics Plan Team met in Honolulu, Hawaii on April 29 – May 1, 2008 and did not make region-wide recommendations. Area specific recommendations are reported under each island area sub-section.

V. Data Modules

A. American Samoa

Introduction

The pelagic fishery in American Samoa is and has been an important component of the American Samoan domestic economy. Prior to 1995 the pelagic fishery was largely a troll fishery. Horizontal longlining was introduced to the Territory by Western Samoan fishermen in 1995. Local fishers have found longlining worthwhile as they land more pounds with less effort and use less gasoline for trips. Initially the vessels used in longlining were "alias". These are locally built, twin-hulled (wood with fiberglass or aluminum) vessels about 30 feet long, powered by 40HP gasoline outboard engines. Larger monohull vessels capable longer multi-day trips began joining the longline fleet soon after the alias. Monohull vessels now dominate the fleet and landings. The number of alias participating in the fishery has dropped to near zero at present. Commercial troll vessels have also declined. Federal longline logbooks were required during 1996. Two 50-mile area closures for vessels longer than 50 feet were implemented by WPREMC and NMFS during 2002; one surrounding Swains Island and one surrounding Tutuila and Anu'u Islands. Federal longline limited entry permits were issued during December of 2005. Albacore is the primary species caught longlining; the bulk of the longline catch is sold to the Pago Pago Canneries. Some of the catch is sold to stores, restaurants and local residents. Catch is also donated for family functions.

Pago Pago Harbor on the island of Tutuila is also a regional base for the trans-shipment and processing of tuna taken by domestic fleets from other South Pacific nations, the distant-waters longline fleets, and purse seine fleets. Purse seine vessels land skipjack, yellowfin and other tunas, with little albacore. Purse seine and non-US vessel landings are not included in this report.

Fishery Data History

Prior to 1985, only commercial landings were monitored. From October 1985 to the present, data was collected through a Boat-based creel survey including subsistence and recreational fishing as well as commercial fishing. In September, 1990 a Commercial Purchase (receipt book) System was instituted requiring all businesses in Samoa, except for the canneries, that buy fish commercially to submit to Department of Marine and Wildlife Resources (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 and to submit logs containing detailed data on each of their sets and the resulting catch. From 1996 to 1999, the logbooks submitted by the local longliners were edited in Samoa for any missing data and were then sent to the NMFS Honolulu Lab every week for further editing and data processing. Starting with 2000, logbook data was entered and maintained in Samoa and downloaded to NMFS in Hawaii periodically.

"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 boat-based creel survey data. WPacFIN staff has completed modifications to the Visual FoxPro data

processing system to address data concerns and better reflect the status of the Territory's pelagic fisheries. Changes are outlined below.

The data from 1982-1985 has been left unchanged from the Dbase IV Commercial Catch Monitoring System however data from 1986-2006 in this report has been re-expanded with the new Visual FoxPro data processing system. The report contains true annual expansions of the entire year's interviews across the entire year's sample days and are not sums of 12 monthly expansions. Note that there are some changes to the historical data due to the new re-expanded and adjusted data. As a result, the graph presentations have also changed.

One problem with the vessel creel survey was that spear fishing and bottom fishing trips are usually made 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 Boat-Based Creel Survey landings were replaced by Commercial Purchase System landings for species where the Commercial Purchase System landings exceeded the Vessel 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 Boat-Based creel survey expansion. Since the vessels involved in these unknown trips were 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 method assignment was done except for vessels engaging in multiple fishing methods at the same time. The fishing method for multiple-method vessels remained unknown. The number of unknown fishing trips was greatly reduced and the bottomfishing and spearfishing trips became better represented in the Boat-Based creel survey.

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

In July of 1999, in response to a problem with delinquent longline logs, the DMWR initiated a Daily Effort Census (DEC) program to monitor the local longline fleet. Using the Daily Effort Census form, containing all active longline vessels, data collectors monitor which boats are out longlining and which are in port. The DEC form is returned to DMWR for data entry at the end of each working day. Federal logbooks are submitted to DMWR by the following Monday after

each fishing trip. Warnings are issued to the fishermen that fail to submit logbook. More punitive measures are taken when warnings are not heeded.

Toward the end of 2000 many new multi-day trip boats joined the longline fleet making it hard to tell what they were doing when out of port. To solve this problem the longline logbook data is compared with reports from the canneries of fish unloaded to identify boats delinquent in their longline logs.

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 Boat-Based 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 Boat-Based 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 Boat-Based creel survey system was modified to calculate appropriate round weights from the length measurements using a standard regression formula.

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

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

Starting in 2001 the method of determining price/pound was revised. Before 2001 price/pound was determined by averaging Boat-Based creel survey data; sometimes resulting in 4-5 samples

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

2007 Summary - American Samoan Pelagic Fishery

Total landings data covers all fish caught and brought back to shore whether it enters the commercial market or not. Commercial landings covers that portion of the total landings that was sold commercially in Samoa both to the canneries and other smaller local business. The difference between Total landings and the Commercial landings is the recreational/subsistence component of the fishery.

Landings (pounds) - More than 14,500,000 pounds of pelagic species were landed by American Samoa vessels during 2007. More than 14,400,000 pounds were sold commercially. Longline vessels longer than 50 feet dominate the American Samoa total landings and commercial landings. Tunas account for over 13,900,000 pounds of landings (96%) by American Samoan vessels. Albacore is the major species landed (over 11,700,000 pounds; 81% of landings). Yellowfin, skipjack, and bigeye tunas plus wahoo contribute the bulk of the non-albacore landings (18%). Longline landings of albacore, wahoo, skipjack, and bigeye increased between 2006 and 2007; albacore landings increased 21%.

Effort – A record number of longline hooks, over 17,500,000, were set by American Samoan vessels during 2007. Longline effort indicators increased between 2006 and 2007 (i.e. sets, hours fished, hooks set) while the number of longline vessels landing fish decreased 17 percent to 29 vessels. Participation by alias (1 active) in the longline fisheries decreased to beyond a data confidentiality trigger point. The number of boats trolling for pelagic species and the effective troll hours reached a record lows for the third consecutive year.

Pounds-Per-Hour Trolling – Pounds-per-hour (PPH) trolling increased 8% to 36.10 pph in 2007 for American Samoa's vessels. The 2007 PPH is the second highest (95%) to the peak 38 pph in 1988. Pounds per troll hour have generally been increased since 2001. Effective troll hours decreased by 19% to 726 in 2007 from 893 hrs in 2006.

Longline CPUE - The 2007 longline CPUE decreased by 1.6 (6%) from 27.5 fish-per-hour recorded for 2006. Total catch for tunas decreased by 0.7.The albacore catch rate dominates the 2007 tunas catch but decreased by 0.1 from 2006 27.5 CPUE. Skipjack fish per hour rate decreased by 0.9 from 3.2 in 2006. Yellowfin increased by 0.3 to 1.9 fish per hour. Non-tuna PMUS total catch rate also decreased by 0.9 (28%) to 2.3 fish-per-hour. Wahoo dominates the non-tuna catch rate at 1.0.

Fish Size – Albacore average weight-per-fish increased 1.4 pound (4%) to 38.4 pounds between 2006 and 2007 from the creel survey. The cannery samples show an increase of 2.1 pounds (6%) to 36.3 pounds in 2007. Skipjack increased by 0.4 to 12 pounds from the cannery samples; but decreased to 6.8 pounds from the creel survey Average weight-per-fish for Yellowfin and Bigeye tunas decreased in the cannery samples but increased in the creel survey samples.

Revenues – Inflation-adjusted revenues for Tunas increased by more than $2.3 millions (17%) to approximately $13.8 millions in 2007. It is the second highest adjusted revenue for Am. Samoa in the 26year history. The highest ever is $16.6 million in 2002. For the Non-tuna PMUS, the adjusted revenue decreased by $368,381; 35% down from the peak revenue of $566,636 in 2006.

Bycatch – Longline bycatch by all boats totaled 9.5 percentages in 2007. Skipjack tunas dominate tuna bycatch percentages. Oilfish and all sharks dominate Non-tuna PMUS percentages of bycatch.
A total of 43,743 fish were released by longline vessels in 2007. Skipjack tunas top the number of releases for Tunas at 9,900 fishes. Non- tuna PMUS releases were dominated by Oilfish – 9,000 and all sharks 6,660 fishes.

Conclusion - Longline fishing by large monohull vessels (>50ft and >70ft) dominate American Samoa's pelagic fishery. Alia longline fishing boats continue to decline. During most of 2007, only one Alia participated in the longline fishery. Two Alias actively participated in the trolling fishery. Increased adjusted revenue (17%) and increased pelagic landings for Tunas (96%) in 2007 are positive indicators that these remaining Am. Samoa longline fishing vessels will remain and the pelagic fishery will continue. The pelagic appears healthy by considering the increased adjusted revenue for Tunas and the increased adjusted revenue per-trolling- trip for all species, for Tunas and Non-tuna PMUS. Hopefully these positive indicators will awake new interests for the Alias pelagic fishery.

2007 Recommendations:

1. Include annual landings time-series for swordfish figure. Done As Figure 10
2. American Samoan commercial-pelagic biologist position

2006 Recommendations and current status:

1. The Pelagic Plan Team recommends that American Samoa DMWR and NMFE PIFSC explore the potential for a fisheries scientist to be stationed in American Samoa due to the importance of the local longline fishery which catches between 8 and 15 million lbs annually.

2006 Plan Team Action Items

1. The PPT recommends that the pelagics Anual Report American Samoa module include a graph showing the albacore CPUE by monohull longline vessels operating in the American Samoa longline fishery. Included as figure 21.

2. The PPT recommends the folllowing format changes to the 2007 American Samoa pelagics annual report module:
    a. Include standardized length frequency plots from cannery sampling data for albacore, yellowfin, skipjack and bigeye tunas plus wahoo for 2001, 2002, 2003, 2004, 2005, and 2006; Same length groups and axis arranged vertically by species.), not included
    b. Include released fish numbers plot over time, excluding sharks, per example shown by Figure A-1
    c. Include graph of beyond 50-mile longline CPUE and size per fish tables, CPUE similar to Figure 21. Size-per-fish plot included as shown by Figures A-2A and A-2B
    d. Include numbers of fish used to calculate catch-per-1000 hooks in Tables 6A, 6B, 6C and 6D. Include number of fish used to calculate size-per-fisg in Tables 7A and 7B. not included

3. The PPT recommends the following additional analysis for the 50 mile large pelagic vessel closure in the 2007 American Samoa pelagics annual report module:
    a. Disaggregate Swains and Tutuila as shown by Table A-1
    b. Include in annual report a new column for grand-fathered vessels when fishing inside 50-mile lne. (Chair indicated: This action item may have to be deleted as it would probably result in illustrating confidential information due to <3 operators.) not included

2005 Recommendations and current status:

1. The Pelagics Plan Team recommends that the National Marine Fisheries Service (NMFS) or the PFRP (Pelagic Fisheries Research Program) perform a study on the spatial and temporal dynamics of longline fishing around American Samoa. Some of the analyses in the American Samoa module suggest fishery interactions may be occurring, and the concentration of fishery effort in the American Samoa fishery now exceeds anything previously seen in Council managed fisheries. A PFRP funded project will conduct the analyses outlined in this recommendation.

2. The Pelagics Plan Team recommends that more collaborative research and management initiatives be developed between the American Samoa Department of Marine and Wildlife Resources (DMWR) and the Western Samoa Fisheries Division, given that the combined landings from both longline fisheries produce about 30% of the albacore caught in the southern Pacific Ocean, and may be representative of the stock as a whole. The Council contacted the Samoa Fisheries Division in August 2003 and received a favorable response in September 2003 about collaborative approach to longline research and management. Note also that the PFRP project mentioned above includes collaboration with Samoa's Fisheries Division.

3. The Pelagics Plan Team recommends holding informative workshops for boat-owners and fishermen explaining to them the importance of obtaining this information, how to

accurately fill in the information and benefits they can receive through accurately filling out this information e.g longline logbook. NMFS-PIRO has conducted protected species workshops in American Samoa which included instruction on logbook completion.

4. The Pelagics Plan Team recommends that NMFS fund an observer program for the American Samoa longline fishery. A priority for the observer program in American Samoa should be the documentation of the condition and disposition of all fish released from longline fisheries. The Pelagics Plan Team recognizes that there may be an issue with the large percentage of releases of species in this expanding fishery. It will be important to document or estimate how many of these releases are alive. Although less reliable than observer data, logbook data could provide such information, especially if the observer program is slow to start. An observer program will be implemented when the American Samoa limited entry program is finalized in 2004. Trials with observers on three longline trips were completed by PIRO in 2003.

5. The Plan Team recommends NMFS or PFRP to conduct research on post-release mortality of bycatch species in the American Samoa longline fishery using archival tags. Some observations are being conducted with albacore caught by alia catamarans to assess the internal condition of albacore retrieved alive.

Plan Team Action Items

1. The Pelagic Plan Team recommends that DMWR continue to develop their GIS mapping capability of the American Samoa longline catch, effort and CPUE data.
2. The Pelagic Plan Team recommend that WPacFIN develop a time series of vessels by size classes as per the four size classes used in the limited entry amendment for the 2005 Pelagic Plan Team annual meeting. Done as Figures 14-A and 14-B

Table 1. American Samoa 2007 estimated total landings by pelagic species by gear type.

Species	LongLine Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack tuna	366,031	10,395	46	376,471
Albacore	11,748,470	0	0	11,748,470
Yellowfin tuna	1,367,600	7,352	115	1,375,068
Kawakawa	0	125	7	132
Bigeye tuna	438,066	31	0	438,097
Tunas (misc)	359	0	0	359
TUNAS SUBTOTALS	13,920,526	17,903	168	13,938,597
Mahimahi	30,706	665	0	31,371
Black marlin	619	0	0	619
Blue marlin	84,549	175	0	84,724
Striped marlin	1,651	0	0	1,651
Wahoo	435,984	769	109	436,863
All sharks	3,462	0	234	3,696
Swordfish	27,904	0	0	27,904
Sailfish	2,246	4	0	2,250
Spearfish	1,518	0	0	1,518
Moonfish	6,322	0	0	6,322
Oilfish	884	0	29	913
Pomfret	863	0	0	863
NON-TUNA PMUS SUBTOTALS	596,709	1,613	373	598,694
Barracudas (misc)	1,010	253	602	1,865
Rainbow runner	23	77	122	221
Dogtooth tuna	0	17	739	756
Pelagic fish (misc)	1,346	4,334	6	5,686
OTHER PELAGICS SUBTOTALS	2,379	4,681	1,469	8,528
TOTAL PELAGICS	**14,519,613**	**24,196**	**2,010**	**14,545,819**

Interpretation: More than 14.5 million pounds of pelagic species were landed in American Samoa during 2007. Longline fishing dominated (99.8%) pelagic landings during 2007 for American Samoa. Over 11.7 million pounds of albacore dominated (81%) the longline caught pelagic species landings in American Samoa during 2007 followed by yellowfin (9%), bigeye (3%) and wahoo (3%) skipjack (2%) tunas. Wahoo (435,984 pounds) dominated the non-tuna Pelagic Management Unit Species (PMUS) landings for American Samoa during 2007. Blue marlin about 84.5 thousands lbs Nearly 28,000 pounds of swordfish were landed in American Samoa during 2007. The 2007 American Samoa troll landings were mostly skipjack (10,395 lbs 43%) and yellowfin (7,352 lbs; 30%) tunas; other top troll-landings categories included miscellaneous species (18%) wahoo (3%) and mahimahi (2.7%)

Calculations: "Longline Pounds" total landing estimates are from the boat-creel survey for the alia longliners. These boat-creel survey landing estimates are augmented with longline logbook data from the larger longliners. 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 includes pelagic species not caught by longlining or trolling such as barracuda, rainbow runner and dogtooth tuna, caught with bottomfishing or spearfishing methods. In addition, the "All Sharks species categorizes all species of sharks that could and could not be identified by the fishermen.

Table 2. American Samoa 2007 estimated commercial landings, value and average price by pelagic species.

	Longline			Troll/Non-Longline		
Species	**Pounds**	**Value($)**	**$/LB**	**Pounds**	**Value($)**	**$/LB**
Skipjack tuna	362,885	$203,038	$0.56	9,616	$8,738	$0.91
Albacore	11,748,400	$11,776,591	$1.00	0	$0	
Yellowfin tuna	1,367,569	$1,297,546	$0.95	6,959	$15,087	$2.17
Kawakawa	0	$0		98	$139	$1.41
Bigeye tuna	438,066	$488,540	$1.12	31	$46	$1.50
TUNAS SUBTOTALS	13,916,919	$13,765,716	$0.99	16,704	$24,010	$1.44
Mahimahi	20,697	$37,649	$1.82	530	$997	$1.88
Black marlin	507	$507	$1.00	0	$0	
Blue marlin	7,619	$7,618	$1.00	613	$462	$0.75
Striped marlin	826	$784	$0.95	0	$0	
Wahoo	435,984	$265,628	$0.61	719	$1,052	$1.46
All sharks	147	$74	$0.50	44	$22	$0.50
Swordfish	17,956	$48,248	$2.69	0	$0	
Sailfish	2,250	$3,127	$1.39	0	$0	
Moonfish	759	$1,062	$1.40	0	$0	
Oilfish	13	$8	$0.60	29	$17	$0.60
Pomfret	521	$1,126	$2.16	0	$0	
NON-TUNA PMUS SUBTOTALS	487,279	$365,831	$0.75	1,935	$2,549	$1.32
Barracudas (misc)	613	$1,468	$2.39	772	$1,756	$2.27
Rainbow runner	23	$48	$2.10	181	$402	$2.23
Dogtooth tuna	0	$0		756	$1,704	$2.25
Pelagic fish (misc)	0	$0		4,340	$10,849	$2.50
OTHER PELAGICS SUBTOTALS	636	$1,516	$2.38	6,049	$14,711	$2.43
TOTAL PELAGICS	**14,404,834**	**$14,133,062**	**$0.98**	**24,688**	**$41,271**	**$1.67**

Interpretation More than 14.4 million pounds of pelagic species are estimated to have been sold in American Samoa during 2007; 99.4 % of the estimated total pelagic-species landings. Longline fishing dominated (99.8 %) pelagic landings during 2007 for American Samoa. Over 11.7 million pounds of albacore dominated (81 %) the longline caught pelagic-species commercial landings in American Samoa during 2007 followed by yellowfin over 1.3 million

lbs, bigeye (438,066 lbs) and skipjack (362,885 lbs) tunas. Wahoo (435,984 pounds) dominated the non-tuna Pelagic Management Unit Species (PMUS) commercial landing estimates for American Samoa during 2007. More than 20,000 pounds of mahimahi and 17,956 lbs of swordfish were landed in American Samoa during 2007. The estimated 2007 American Samoa commercial troll landings were mostly skipjack (9,616; lbs 39%) and yellowfin (6,959 lbs; 28%) tunas and miscellaneous species (4,340 lbs; 17.6%).

More than 14.1 million dollars worth of pelagic species were landed in American Samoa during 2007. Longline fishing dominated (99.6 %) the value of pelagic landings during 2007 for American Samoa. Over 11 million dollars worth of albacore dominated (83 %) the value of longline caught pelagic species in American Samoa during 2007 followed by yellowfin over $1.2 million, bigeye ($488,540); and skipjack ($203,038) tunas. Wahoo ($265,828), swordfish ($48,248) and mahimahi ($37,649) were the top-value non-tuna Pelagic Management Unit Species (PMUS) for American Samoa during 2007. The highest value troll landing categories for 2007 in American Samoa were yellowfin tuna ($15,087), miscellaneous species ($10,849) and skipjack tuna ($8,738).

Troll and non-longline fish were generally higher or at least equal value to longline caught fish, except for barracudas misc. The higher value may reflect that the troll caught fish are from near port and require very limited transport, where as longline fish are often stored and brought from greater distances. Swordfish ($2.69) and mahimahi ($1.82) were the highest longline values per pound. Wahoo averaged $0.61 per pound during 2007 in American Samoa. Longline caught tunas averaged $0.91 per pound in American Samoa during 2007

Calculation: Estimated commercial landings, value and price/pound calculations are the same as those described for Table 1 and in greater detail in the Fishery Data History section above. The Troll/Non-Longline category in Table 1 includes pelagic species not caught by longlining such as barracuda, rainbow runner and dogtooth tuna, caught with bottomfishing or spearfishing methods.

Table 3A-1. Longline Effort by American Samoan Vessels during 2007.

	All Vessels
Boats	29
Trips	377
Sets	5,919
1000 Hooks	17,552
Lightsticks	9,478

Table 3A-2. Number of fish kept by American Samoa longline vessels during 2007.

Species	All Vessels
Skipjack tuna	30,444
Albacore	321,227
Yellowfin tuna	31,932
Bigeye tuna	13,729
Tunas (misc)	20
TUNAS SUBTOTALS	397,352
Mahimahi	1,352
Black marlin	1
Blue marlin	619
Striped marlin	35
Wahoo	14,277
All sharks	51
Swordfish	219
Sailfish	31
Spearfish	33
Moonfish	138
Oilfish	47
Pomfret	97
NON-TUNA PMUS SUBTOTALS	16,900
Barracudas (misc)	42
Pelagic fish (misc)	29
OTHER PELAGICS SUBTOTALS	71
TOTAL PELAGICS	**414,323**

Table 3B. Number of fish released by American Samoan longline vessels during 2007.

Species	All Vessels
Skipjack tuna	9,961
Albacore	663
Yellowfin tuna	1,969
Bigeye tuna	1,800
Tunas (misc)	25
TUNAS SUBTOTALS	14,418
Mahimahi	897
Black marlin	10
Blue marlin	3,008
Striped marlin	467
Wahoo	3,291
All sharks	6,667
Swordfish	184
Sailfish	422
Spearfish	753
Moonfish	495
Oilfish	9,006
Pomfret	817
NON-TUNA PMUS SUBTOTALS	26,017
Barracudas (misc)	387
Pelagic fish (misc)	2,921
OTHER PELAGICS SUBTOTALS	3,308
TOTAL PELAGICS	**43,743**

Interpretation – Table 3A-1 lists 29 vessels landed pelagic species in American Samoa during 2007. The vessels conducted a total of 377 fishing trips that accomplished 5919 longline sets, while using 17,552,000 hooks and 9478 lightsticks during 2007. Table 3A-1 values were used to calculate that on average for longline vessels landing in American Samoa during 2007:

13 trips and 204 sets were made per boat
605,241 hooks and 327 lightsticks were used per boat
15.7 sets were made, 46,557 hooks were set, and 25 lightsticks were used per trip
2965 hooks and 1.6 lightsticks were used per set

More than 320,000 individual albacore were kept by longline fishermen landing in American Samoa during 2007; these calculate to 77 percent of the fish kept by these fishermen. Over 30,000 skipjack, about 32,000 yellowfin, over 13,000 bigeye tunas were also kept by longline fishermen landing in American Samoa during 2007. Over 14,000 Wahoo, 1,352 mahimahi, and 219 swordfish were also kept by longline fishermen landing in American Samoa during 2007.

Less than 2000 individuals were kept for each of the other pelagic-species categories during 2007.

More than 9,900 skipjack tuna, 6,600 all sharks and about 9,000 oilfish were released by longline fishermen landing pelagic-species in American Samoa during 2007; these three species make up 59% of the total released individuals. Tuna release rates was highest for skipjack at 69% of the total tuna released followed by yellowfin at 14% and bigeye at 12.4%. The non-tuna Pelagic Management Unit Species (PMUS) were most often released by pelagic longline fishermen landing in American Samoa during 2007. Oilfish at 34.6%, all sharks at 25.6%, wahoo at 12.3% and blue marlin 11.5% were the most released of the total released for non-tuna PMUS. Fish can be released for various reasons including quality, handling and storage difficulties, and marketing problems. Investigation into the reasons for releasing of pelagic species are recommended because of the high release rate for many non-tuna PMUS and releases of some tuna.

Calculation: These values are sums of Longline Logbook data for all of the longline vessels in Samoa. The kept values for sharks include those that were finned. All species of sharks entered in the Longline Logs are combined in the All Sharks species. Rays and Sunfish are included in the Misc Pelagic Fish species. A trip is a unique combination of vessels and return dates where the return date is in the current year.

Table 4. **American Samoa 2007 longline effort and catch by boats > 50' long inside and outside of restricted areas less than 50 miles from shore**

EFFORT

	Boats > 50' Inside	Boats > 50' Outside
Boats	16	27
Trips	31	166
Sets	157	5,575
1000 Hooks	474	17,027

CATCH (Number of Fish)

Species	Boats > 50' Inside	Boats > 50' Outside
Skipjack tuna	1,602	38,782
Albacore	7,803	313,163
Yellowfin tuna	1,242	31,717
Bigeye tuna	246	15,211
Tunas (misc)	0	45
TUNAS SUBTOTALS	10,893	398,918
Mahimahi	145	1,756
Black marlin	0	11
Blue marlin	43	3,571
Striped marlin	5	486
Wahoo	661	16,753
All sharks	302	6,416
Swordfish	7	392
Sailfish	2	435
Spearfish	3	783
Moonfish	3	620
Oilfish	84	8,968
Pomfret	8	906
NON-TUNA PMUS SUBTOTALS	1,263	41,097
Barracudas (misc)	21	406
Pelagic fish (misc)	28	2,921
OTHER PELAGICS SUBTOTALS	49	3,327
TOTAL PELAGICS	**12,205**	**443,342**

Interpretation: Boats less than 50 feet are not included in this table for confidentiality reasons. Number of vessels (43), participated in 197 fishing trips. 16 and 31 trips inside and 27 and 166 trips outside the restricted areas. Longline sets and hooks set were dominated (over 97 percent) by boats greater than fifty feet setting outside restricted areas. The ratio of total pelagic catches (numbers of fish) by the larger boats (outside/inside+outside) the restricted areas are greater than

97 percent. Albacore continues to be the most (70.4% of the total pelagics) commonly caught species inside and outside of the 50 mile areas regardless of boat size.

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

13 deg 30 min S latitude x 170 deg 50 min W longitude
13 deg 30 min S latitude x 167 deg 25 min W longitude
15 deg 13 min S latitude x 167 deg 25 min W longitude
15 deg 13 min S latitude x 171 deg 39 min W longitude

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

10 deg 13 min 11 sec S latitude x 170 deg 20min W longitude
11 deg 48 min S latitude x 170 deg 20min W longitude
11 deg 48 min S latitude x 171 deg 50min W longitude
10 deg 23 min 30 sec S latitude x 171 deg 50min W longitude

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

A trip is defined as a unique pair of boats and return dates where the return date is in the current year. A trip is considered inside of the 50 mile areas if any of its sets are in the 50 mile areas.

There are three vessels over fifty feet in length who are allowed to fish inside of the 50 mile restricted zones because they were longline fishing before 11/13/97 and are grandfathered in. Their sets are in the **Boats > 50' Outside** category regardless of where they actually fished.

Table 5A. American Samoa 2007 bycatch percentages for longline vessels

Species	All Boats
Skipjack tuna	24.7
Albacore	0.2
Yellowfin tuna	5.8
Bigeye tuna	11.6
Tunas (misc)	55.6
TUNAS SUBTOTALS	3.5
Mahimahi	39.9
Black marlin	90.9
Blue marlin	82.9
Striped marlin	93.0
Wahoo	18.7
All sharks	99.2
Swordfish	45.7
Sailfish	93.2
Spearfish	95.8
Moonfish	78.2
Oilfish	99.5
Pomfret	89.4
NON-TUNA PMUS SUBTOTALS	60.6
Barracudas (misc)	90.2
Pelagic fish (misc)	99.0
OTHER PELAGICS SUBTOTALS	97.9
TOTAL PELAGICS	**9.5**

Interpretation Table 5A: Longline tunas bycatch rates was highest for skipjack at 24.7 percent followed by bigeye at 11.6 percent. Tunas (misc) amounted to 55.6%.The non-tuna Pelagic Management Unit Species (PMUS) took most percentages of bycatch by pelagic longline fishermen landing in American Samoa during 2007. Wahoo at 8.6, swordfish at 15, and mahimahi at 51 percent were released the least for non-tuna PMUS. Fish can be released for various reasons including quality, handling and storage difficulties, and marketing problems. Investigation into the reasons for releasing of pelagic-species by longline fishermen are recommended because of the high release rate for many non-tuna PMUS and releases of some tuna.

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

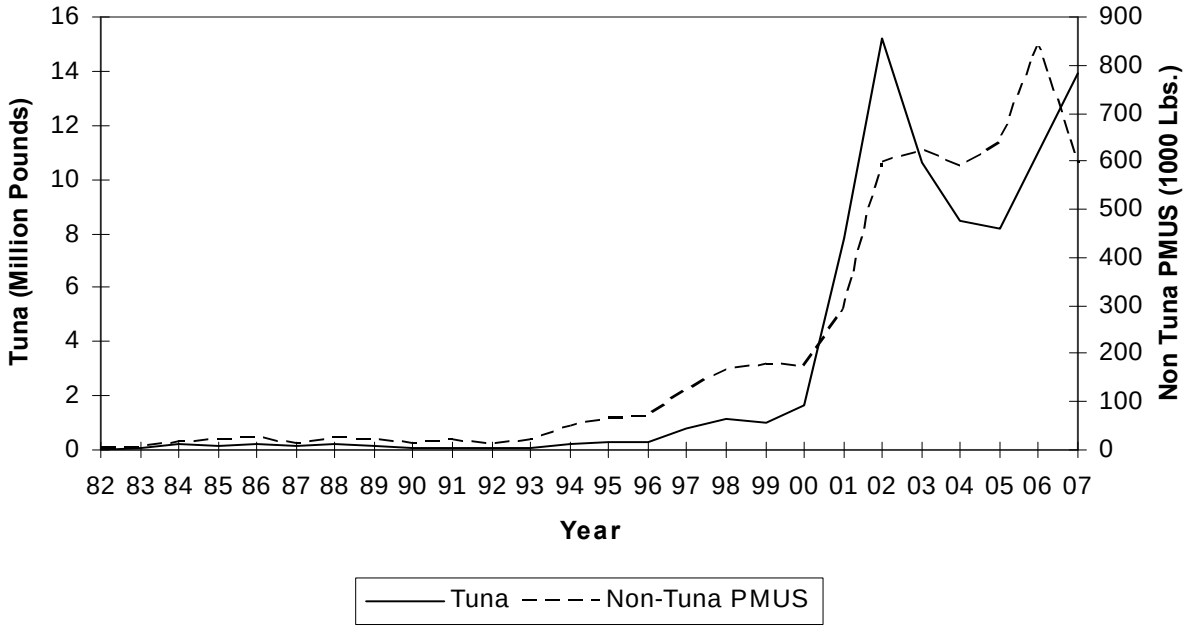
Table 5B. American Samoa 2007 Trolling Bycatch

	Bycatch						Interviews		
Species	Alive	Dead Inj	Unk	Total	Catch	%BC	With BC	All	%BC
All Species (Comparison)					1479	0.000	0	175	0.00

Interpretation: There was no bycatch recorded from 2007 for trolling only; 175 interviews were conducted with 1479 pelagic fish landed; and no fish returned at sea: Using fishermen's reports at the dock may not accurately reflect the number of fish returned at sea.

Calculation: The Trolling Bycatch table is obtained from creel survey interviews. The Bycatch numbers are obtained by counting fish on interview forms for purely troll trips with a disposition of bycatch. Bycatch is reported by fishermen when interviewed at the landing site in response to questions from the data collector; bycatch are fish thrown back at sea by the fishermen. The catch for all species is included for comparison and is obtained by counting all fish listed on the same interview forms. The number of interviews is a count of the purely trolling interview forms.

Figure 1. American Samoa annual estimated total landings of Tuna and Non-Tuna PMUS

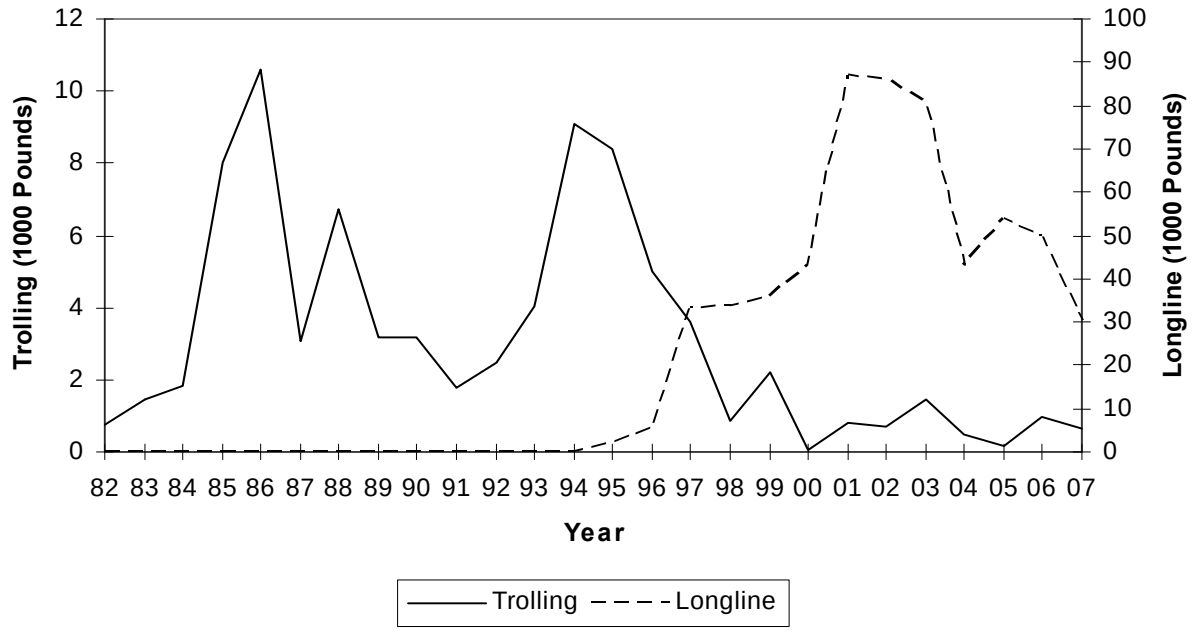


Interpretation: Total landing estimates exceeded 13.9 million pounds for tuna and 590,000 pounds for non-tuna Pelagic Management Unit Species (PMUS) by American Samoa vessels during 2007. Tuna landing estimates increased about 2.9 million pounds (+21 %) relative to 2006 estimates; non-tuna PMUS landing estimates decreased by 242,469 pounds (-29 %) relative to 2006 estimates. Estimated tuna landings peaked over 15 million pounds during 2002 and decreased through 2005. The estimated 2007 American Samoa tuna landings are the second highest recorded in the 26 year data record; 91.8% of the highest annual landings estimate from 2002. Estimated non-tuna PMUS landings have generally been increasing overtime; 2007 is the fourth highest estimates for non-tuna PMUS in the 26 year record.

Calculation: Estimated total landings for Tunas and Non-Tuna PMUS were calculated by summing the total landings for the species in these categories as defined by Table 1.

Year	Pounds Landed	
	Tuna	Non Tuna PMUS
1982	23,042	2,106
1983	90,057	4,806
1984	198,961	15,121
1985	107,659	19,686
1986	191,928	24,035
1987	144,122	10,899
1988	207,084	23,462
1989	173,518	20,720
1990	81,652	10,487
1991	72,664	21,522
1992	102,020	12,530
1993	47,428	19,620
1994	190,295	48,154
1995	288,105	64,252
1996	318,457	68,721
1997	800,704	123,418
1998	1,160,080	163,618
1999	1,007,323	179,089
2000	1,678,168	174,499
2001	7,850,050	295,004
2002	15,182,858	595,498
2003	10,588,972	619,596
2004	8,473,867	589,728
2005	8,211,821	636,640
2006	11,005,653	841,163
2007	13,938,597	598,694
Average	**3,159,042**	**199,349**
Std. Dev.	**4,826,623**	**257,989**

Figure 2. American Samoa annual estimated total landings of Mahimahi by gear.

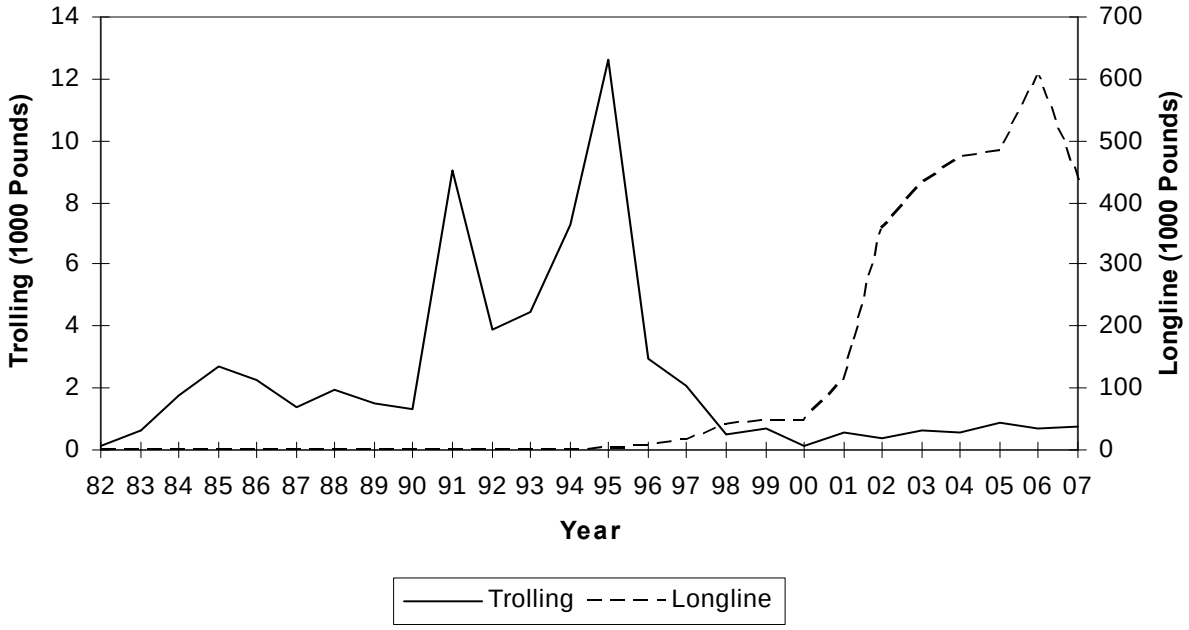


Interpretation: Estimated landings of mahimahi decreased 19,360 pounds (-38%) during 2007 to 31,371 pounds. Longline gear dominates the mahimahi estimated landings. Estimated mahimahi longline landings decreased by 19,033 pounds (-38%) between 2006 and 2007 to 30,706 pounds. Estimated mahimahi troll landings also decreased by 327 pounds (-33%) between 2006 and 2007 to 665 pounds. Estimated mahimahi longline landings peaked during 2001 at 87,100 pounds and again in 2002 at 85,900 pounds. Estimated 2007 mahimahi longline landings are 35% of the 2001 peak value and 3,669 pounds below the running average estimate. Estimated troll landings of mahimahi peaked in 1986 at 10,600 and 1994 at 9,100 pounds. The 2007 estimated mahimahi troll landings are 7.3% of the 1994 peak estimate and 2,470 lbs (79%) below the running average troll landings estimate of 3,135 pounds. The estimated 2007 troll landings of mahimahi were 327 lbs less than the 2006 estimates..

Calculation: The estimated total annual landings of mahimahi are listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	777
1983	0	1,443
1984	0	1,844
1985	0	8,011
1986	0	10,603
1987	0	3,051
1988	0	6,736
1989	0	3,201
1990	0	3,166
1991	72	1,796
1992	0	2,464
1993	215	4,029
1994	101	9,088
1995	2,373	8,377
1996	5,420	5,022
1997	33,343	3,624
1998	33,458	843
1999	35,909	2,193
2000	43,037	66
2001	87,114	786
2002	85,952	680
2003	80,345	1,434
2004	42,985	458
2005	53,614	168
2006	49,739	992
2007	30,706	665
Average	**34,375**	**3,135**
Std. Dev.	**29,596**	**2,968**

Figure 3. American Samoa annual estimated total landings of Wahoo by gear.



Interpretation: Estimated landings of wahoo decreased by 169,088 lbs (28%) between 2006 and 2007. Longline gear dominates the wahoo landings at 435,984 lbs.(99.8%) compare to 769 lbs (0.2%) from trolling. However, estimated wahoo troll landings increased by 100 pounds between 2006 and 2007 from 658 to 769 pounds.

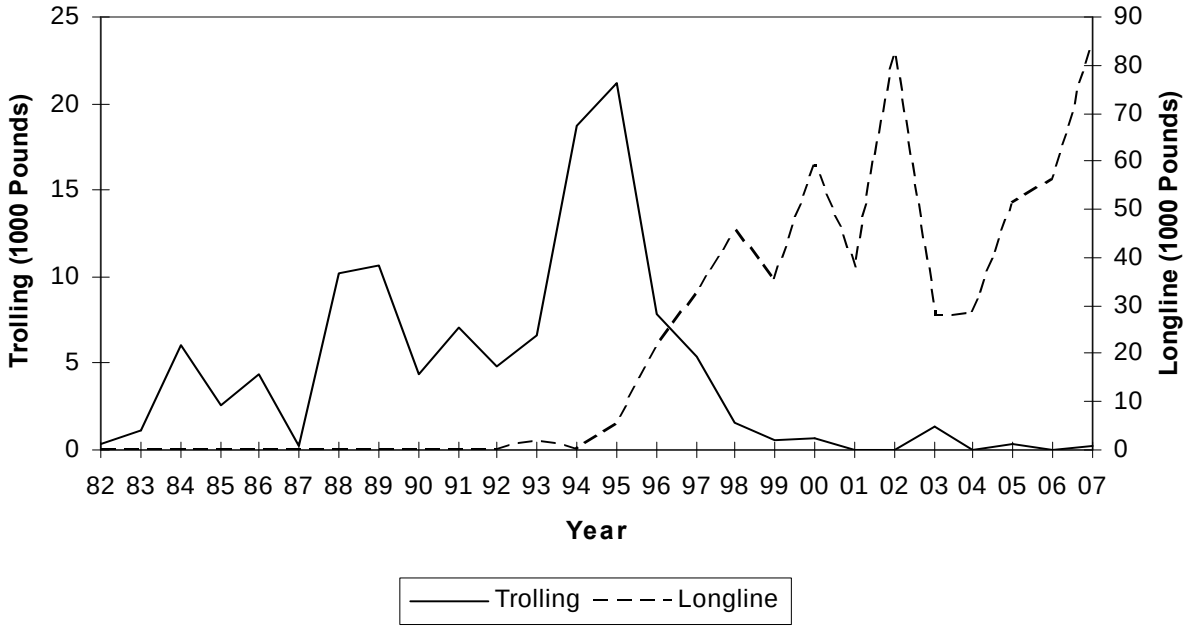
The 2007 estimated wahoo longline landings are the fourth highest estimates to the 2006 highest peak ever in the 26 year record.

Estimated troll landings of wahoo peaked in 1995 at 12,600 pounds. The 2007 estimated wahoo troll landings are 6% of the 1995 peak estimate and 1,600 pounds (67%) below the running average troll landings.

Calculation*:* The estimated total annual landings of wahoo are listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	114
1983	0	632
1984	0	1,777
1985	0	2,678
1986	0	2,294
1987	0	1,395
1988	84	1,962
1989	0	1,489
1990	0	1,332
1991	360	9,007
1992	0	3,895
1993	533	4,445
1994	0	7,262
1995	1,642	12,603
1996	6,922	2,955
1997	15,776	2,075
1998	40,405	487
1999	48,303	685
2000	47,432	140
2001	114,517	588
2002	358,227	351
2003	428,591	612
2004	473,246	535
2005	483,611	851
2006	605,183	658
2007	435,984	769
Average	**153,041**	**2,369**
Std. Dev.	**209,450**	**2,936**

Figure 4. American Samoa annual estimated total landings of Blue Marlin by gear.

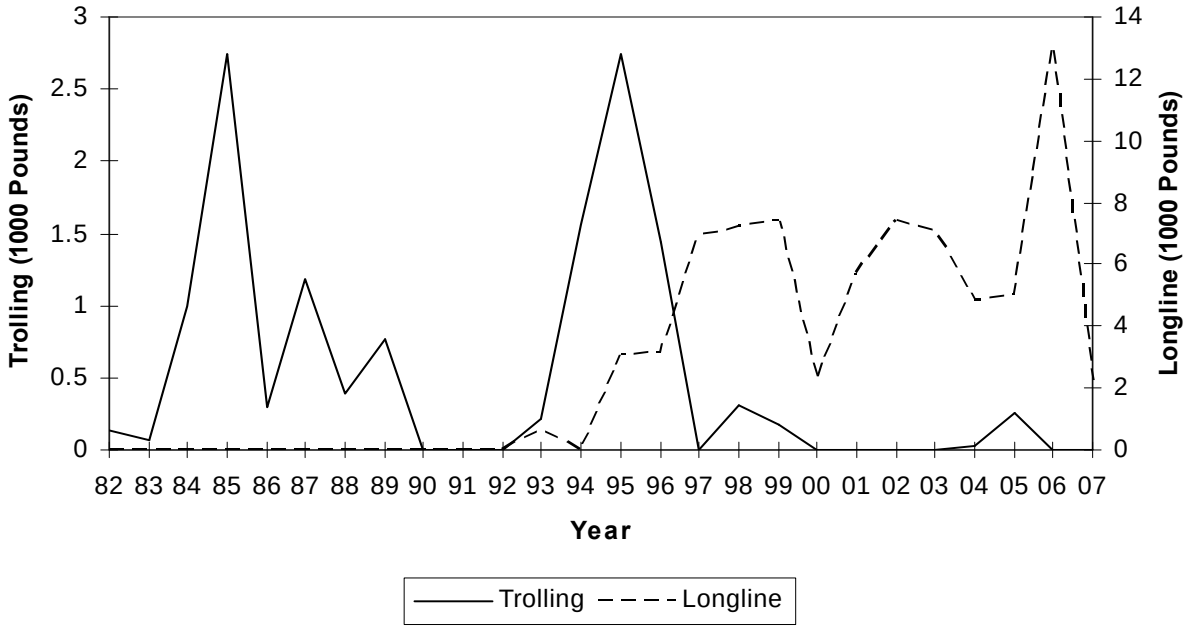


Interpretation: Estimated blue marlin landings increased by 28,642 pounds (34%) to 84,724 between 2006 and 2007. Blue marlin estimated landings for 2007 is the highest ever. 1982 landing was the highest during the last 25year record. No blue marlin landings by trolling were recorded for 2006. For 2007 175lbs is recorded. Trolling landings of blue marlin dropped to near zero in the 6-years after record landings of 1995, and have remained near zero. All 2006 estimated blue marlin landings were by longline vessels. Estimated blue marlin longline landings increased by 34% (28,467lbs) between 2006 and 2007 to 84,549 lbs. and 1,914lbs higher than the 2002 all-time high. Currently longline vessels and trollers may be fishing different areas. From 1995 to 2000 when longline and troll vessels were both landing blue marlin, many more alia longline vessels were fishing and may have overlapped fishing areas with trollers.

Calculation: The estimated total annual landings of blue marlin are listed for longline and trolling fishing methods as explained for Table 1 and Table 2. The average and standard deviation for the Longline Method is calculated from 1993 onward.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	315
1983	0	1,083
1984	0	6,097
1985	0	2,574
1986	0	4,353
1987	0	265
1988	0	10,217
1989	0	10,680
1990	0	4,336
1991	0	7,096
1992	0	4,865
1993	2,193	6,586
1994	0	18,665
1995	5,339	21,241
1996	21,669	7,867
1997	32,371	5,380
1998	45,440	1,592
1999	34,981	590
2000	59,519	623
2001	37,777	0
2002	82,635	0
2003	27,811	1,344
2004	28,441	0
2005	51,094	306
2006	56,082	0
2007	84,549	175
Average	**37,993**	**4,471**
Std. Dev.	**25,128**	**5,528**

Figure 5. American Samoa annual estimated total landings of Sailfish by gear.

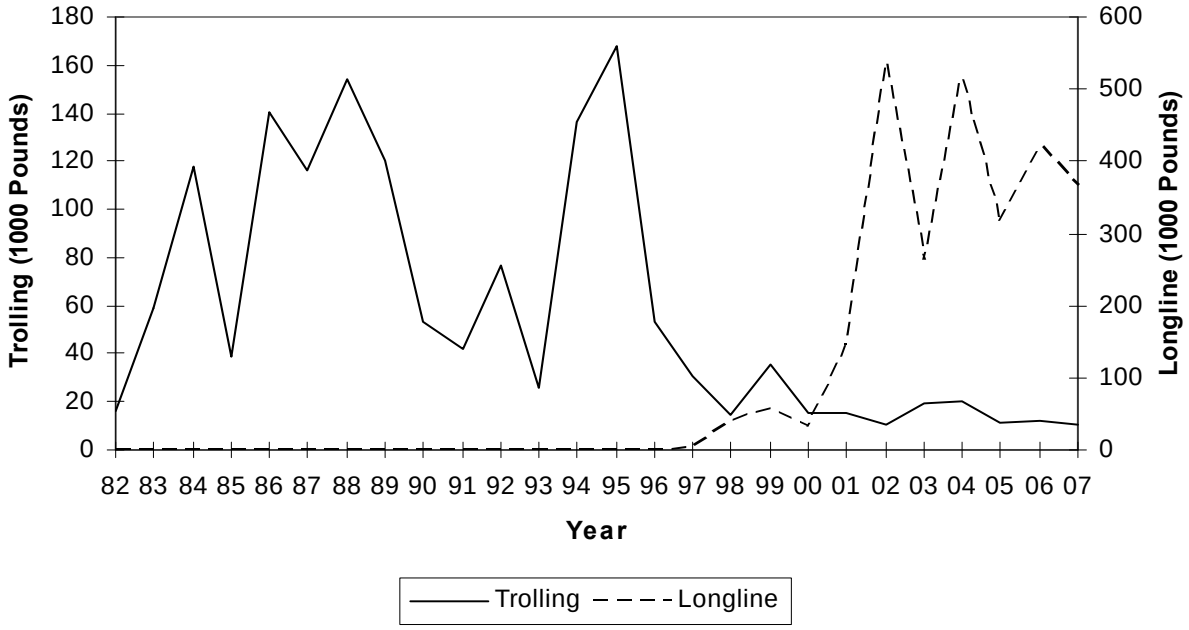


Interpretation: Estimated landings of sailfish decreased by 83% (10,829lbs) in 2007. Longline landings between 2006 and 2007 decreased by 10,833lbs (82.8%) 2006 recorded the highest, 13,079 lbs, in 26 years. All 2006 sailfish landings were by longline vessels and zero landing for trolling. 2007 recorded an estimated a 4lbs landings. Troll landings have remained near zero since a peak during 1995 much like blue marlin.

Calculation: The estimated total annual landings of sailfish are listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	127
1983	0	74
1984	0	989
1985	0	2,744
1986	0	296
1987	0	1,188
1988	0	394
1989	0	767
1990	0	0
1991	0	0
1992	0	0
1993	626	218
1994	0	1,561
1995	3,078	2,743
1996	3,146	1,444
1997	6,907	0
1998	7,185	314
1999	7,424	184
2000	2,269	0
2001	5,705	0
2002	7,389	0
2003	7,100	0
2004	4,826	31
2005	5,036	262
2006	13,079	0
2007	2,246	4
Average	**5,068**	**513**
Std. Dev.	**3,229**	**790**

Figure 6. American Samoa annual estimated total landings of Skipjack Tuna by gear.



Interpretation: Estimated total landings of skipjack tuna decreased by 57,971 pounds (13.3%) from 434,397lbs in 2006 to 376,426 lbs in 2007. Estimated longline landings of skipjack tuna decreased by 13%, 56,246lbs, from 422,277lbs in 2006 to 366,031lbs in 2007. Estimated skipjack longline landings have been peak in 2002 and 2004 with landings above 500,000lbs.

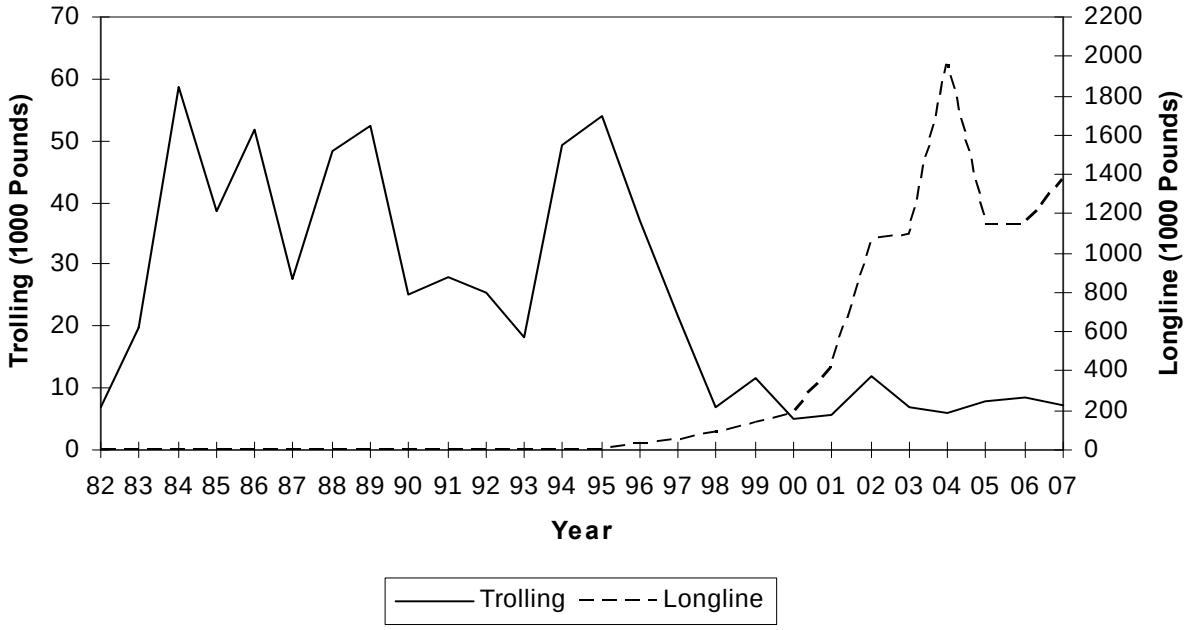
Estimated troll landings of skipjack tuna also decreased by 14%, 1,725lbs, from 12,120 lbs landed in 2006 and 10,395lbs in 2007. 1995 shows the highest landings in the trolling landing history then it gradually decreasing up to 2007. Number of trolling vessels, (Fig. 12), trips (Fig. 13) and hours (Fig. 16) decreased while skipjack pounds per trolling hour (Figure 18) increased slightly 3.7% between 2005 and 2006. Decreased effort and increases in pounds-per-hour do not fully account for the increase in skipjack troll landings; skill of fishermen remaining in the active fleet, sampling errors, and increases in catchability are possible causes.

This species is characterized by a large stock size, fast growth, early maturity and high fecundity.

Calculation: The estimated total annual landings of skipjack tuna is listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	15,877
1983	0	58,997
1984	0	117,693
1985	0	38,902
1986	0	140,127
1987	0	116,505
1988	0	153,893
1989	0	120,171
1990	0	53,376
1991	345	42,150
1992	0	76,319
1993	539	25,459
1994	103	136,786
1995	160	167,998
1996	440	53,096
1997	2,541	30,434
1998	40,596	14,822
1999	56,171	35,171
2000	32,144	15,660
2001	145,781	15,170
2002	538,386	10,839
2003	263,695	19,464
2004	517,189	20,470
2005	313,608	11,234
2006	422,277	12,120
2007	366,031	10,395
Average	**158,824**	**58,197**
Std. Dev.	**193,390**	**50,906**

Figure 7. American Samoa annual estimated total landings of Yellowfin Tuna by gear.



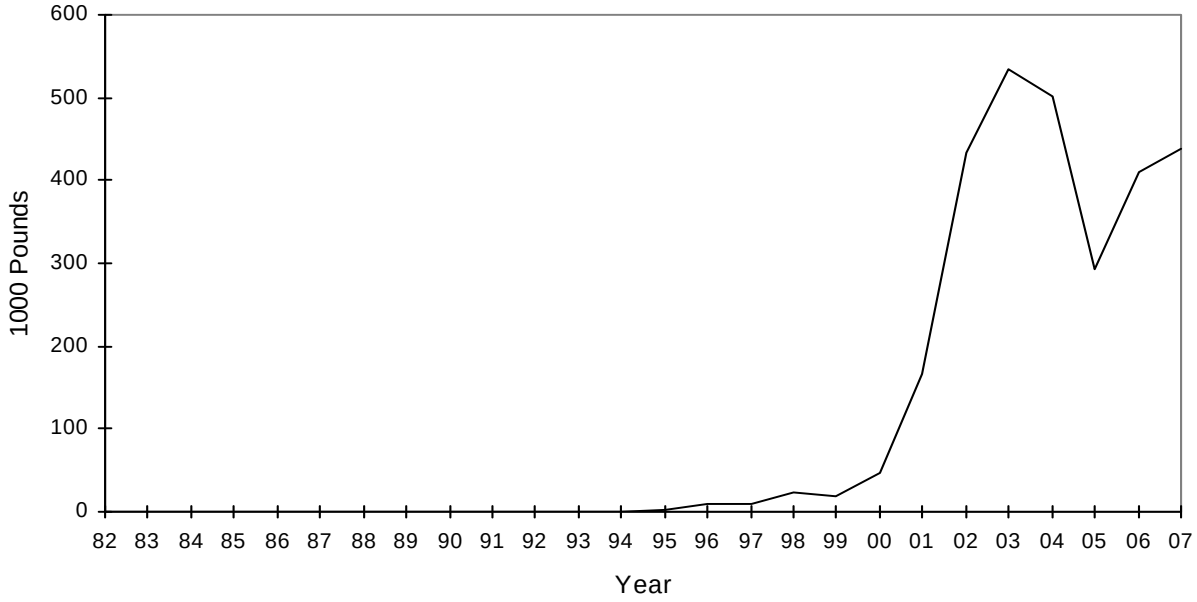
Interpretation: Estimated total landings of yellowfin tuna increased by 15.6%, 218,019lbs, from 1,156,933lbs in 2006 to 1,374,952lbs in 2007 Longline gear dominates the estimated yellowfin tuna landings for American Samoa vessels. Estimated longline landings of yellowfin tuna increased 219,160 lbs (16%) to 1,367,600 pounds in 2007 from 1,148,440lbs in 2006 Estimated troll landings of yellowfin tuna decreased by 13%, 1,141 lbs in 2007.

Estimated yellowfin tuna longline landings peaked during 2004 at 1,960,000 pounds; yellowfin longline landings in 2007 is the second highest in the 26 year history.
Estimated troll landings of yellowfin tuna peaked between 51,600 and 59,000 four times between 1984 and 1995. The 2007 estimated yellowfin tuna troll landings is more than three times below the estimated running average.

Calculation: The estimated total annual landings of yellowfin tuna is listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	7,038
1983	0	19,789
1984	0	58,704
1985	0	38,586
1986	0	51,693
1987	0	27,467
1988	1,775	48,316
1989	129	52,350
1990	0	25,172
1991	262	28,052
1992	0	25,421
1993	2,662	18,262
1994	1,717	49,423
1995	4,053	54,043
1996	25,782	37,052
1997	48,486	21,682
1998	92,462	6,763
1999	140,061	11,566
2000	190,041	4,892
2001	414,157	5,573
2002	1,069,454	11,794
2003	1,095,254	6,953
2004	1,962,962	5,827
2005	1,142,927	7,742
2006	1,148,440	8,493
2007	1,367,600	7,352
Average	**435,411**	**24,616**
Std. Dev.	**597,464**	**17,945**

Figure 8. American Samoa annual estimated total landings of Bigeye Tuna by longlining.

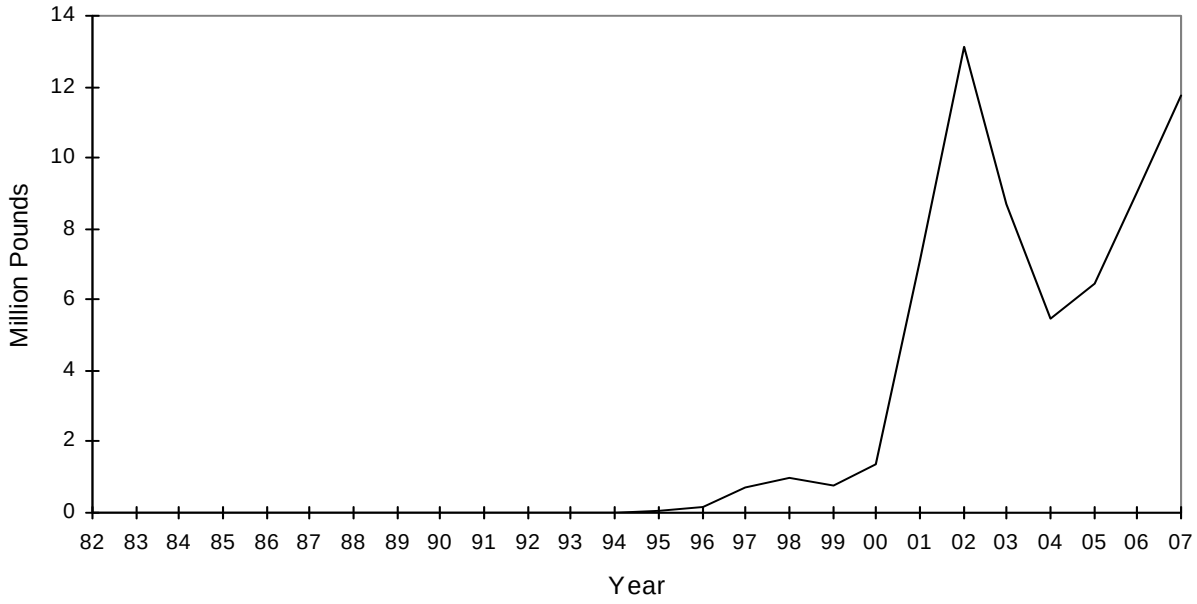


Interpretation: Estimated total longline landings of bigeye tuna in 2007 is more than 438,000 pounds. Estimated longline landings of bigeye tuna increased 27,000 pounds (+6%) to 438,000 pounds between 2006 and 2007.
Estimated bigeye tuna longline landings peaked during 2003 at 534,300 pounds; estimated 2007 landings are 82% of the 2003 peak value.

Calculation: The estimated total annual landings of bigeye tuna is listed for longline fishing method as explained for Table 1 and Table 2. The average and standard deviation for the Pounds caught is calculated from 1991 onward.

Year	Pounds
1982	0
1983	0
1984	0
1985	0
1986	0
1987	0
1988	0
1989	0
1990	0
1991	0
1992	0
1993	100
1994	0
1995	2,191
1996	8,738
1997	8,797
1998	22,287
1999	19,254
2000	47,484
2001	165,420
2002	432,426
2003	534,343
2004	501,181
2005	293,667
2006	411,065
2007	438,066
Average	**169,707**
Std. Dev.	**204,630**

Figure 9. American Samoa annual estimated total landings of Albacore by longlining.

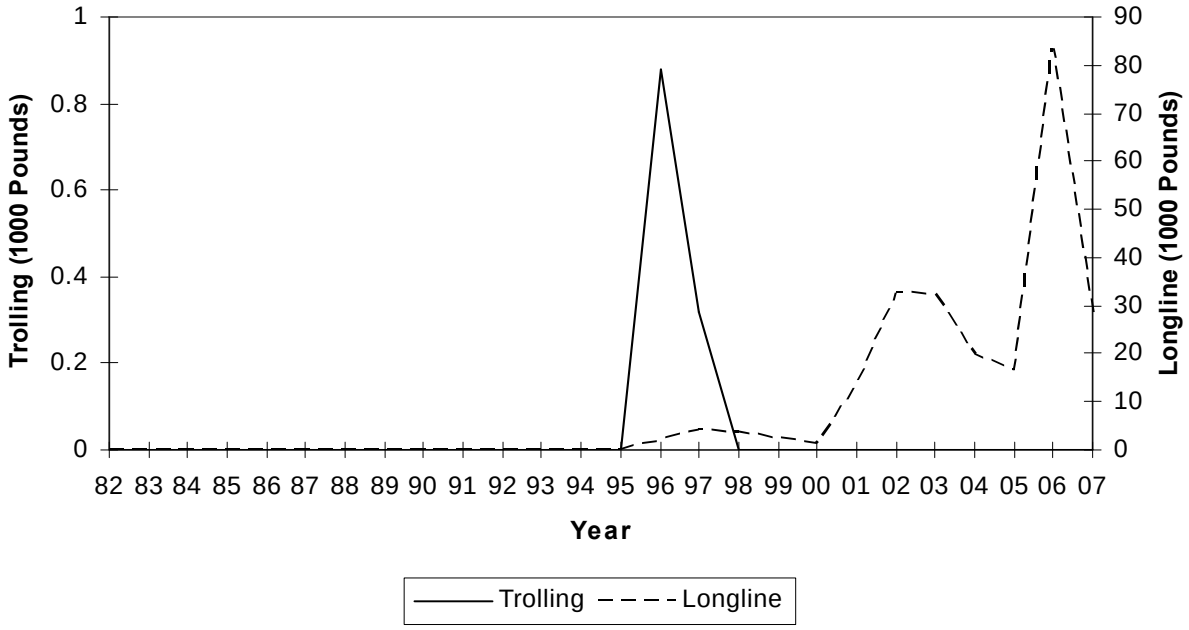


Interpretation: Estimated total albacore longline landings in 2007 is more than 11.7 million pounds. The 2007 estimated albacore landings increased by more than 2.7 million pounds (30%) than the 2006 value. The 2007 estimate is the second highest landing in the 26-year record It is about 1.3 million pounds less than the 13 million pound peak value of 2002. The 2007 albacore landings estimate continues an increasing trend since 2004 and an overall upward trend since 1995 when longline fishing expanded in the American Samoa fleet. Since the longline fishery initially began, it has been the most commonly used method of fishing for pelagic species.

Calculation: The estimated total annual landings of albacore tuna is listed for the longline fishing methods. The average and standard deviation is calculated from 1988 onward.

Year	Pounds
1982	0
1983	0
1984	0
1985	0
1986	0
1987	0
1988	1,875
1989	244
1990	0
1991	1,730
1992	0
1993	34
1994	1,609
1995	58,954
1996	191,094
1997	688,135
1998	983,015
1999	744,980
2000	1,387,811
2001	7,103,791
2002	13,119,436
2003	8,666,905
2004	5,465,521
2005	6,442,053
2006	9,002,404
2007	11,748,470
Average	**3,280,403**
Std. Dev.	**4,340,970**

Figure 10. American Samoa annual estimated total landings of Swordfish by gear.

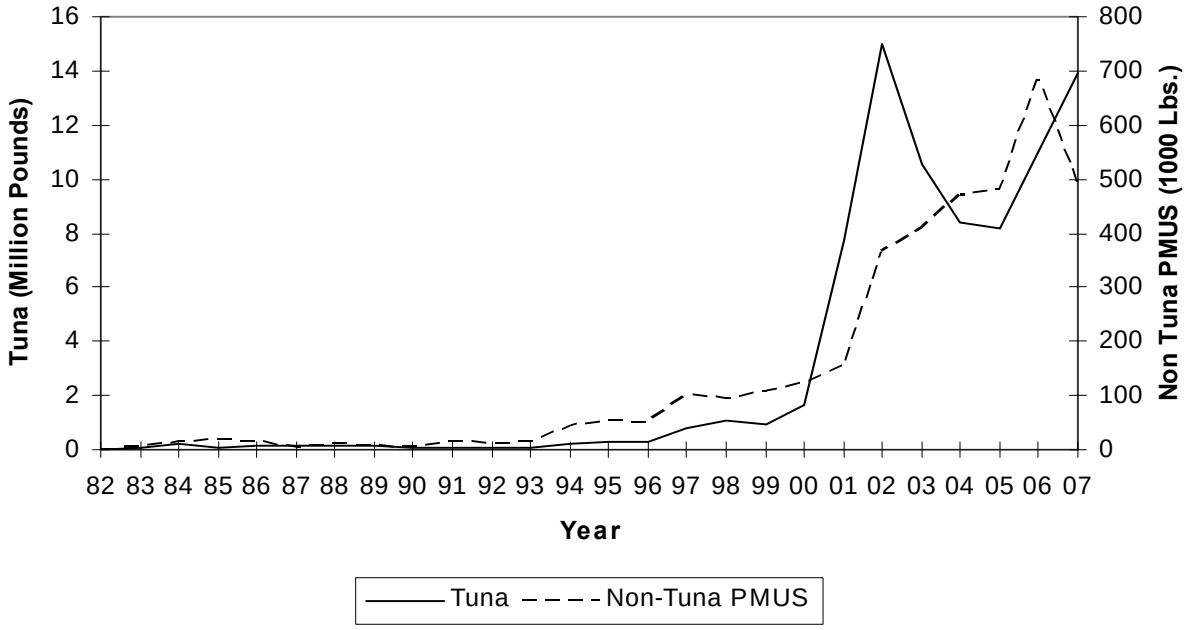


Interpretation:
More than 27,900 pounds of swordfish is estimated to have landed in Am. Samoa in 2007. This estimate is from longline only since there was zero landing from trolling gear in 2007 and the past nine years. The 2007 estimate is 55,700 pounds less than the 83,600 pounds landed in 2006; a 66% decrease.

Calculation: The estimated total annual landings of swordfish are listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	0
1983	0	0
1984	0	0
1985	0	0
1986	0	0
1987	0	0
1988	0	0
1989	0	0
1990	0	0
1991	0	0
1992	0	0
1993	0	0
1994	0	0
1995	0	0
1996	2,070	884
1997	4,031	320
1998	3,712	0
1999	2,260	0
2000	1,145	0
2001	13,146	0
2002	32,760	0
2003	32,143	0
2004	19,851	0
2005	16,499	0
2006	83,659	0
2007	27,904	0
Average	**19,932**	**46**
Std. Dev.	**22,354**	**178**

Figure 11. American Samoa annual commercial landings of Tunas and Non Tuna PMUS.



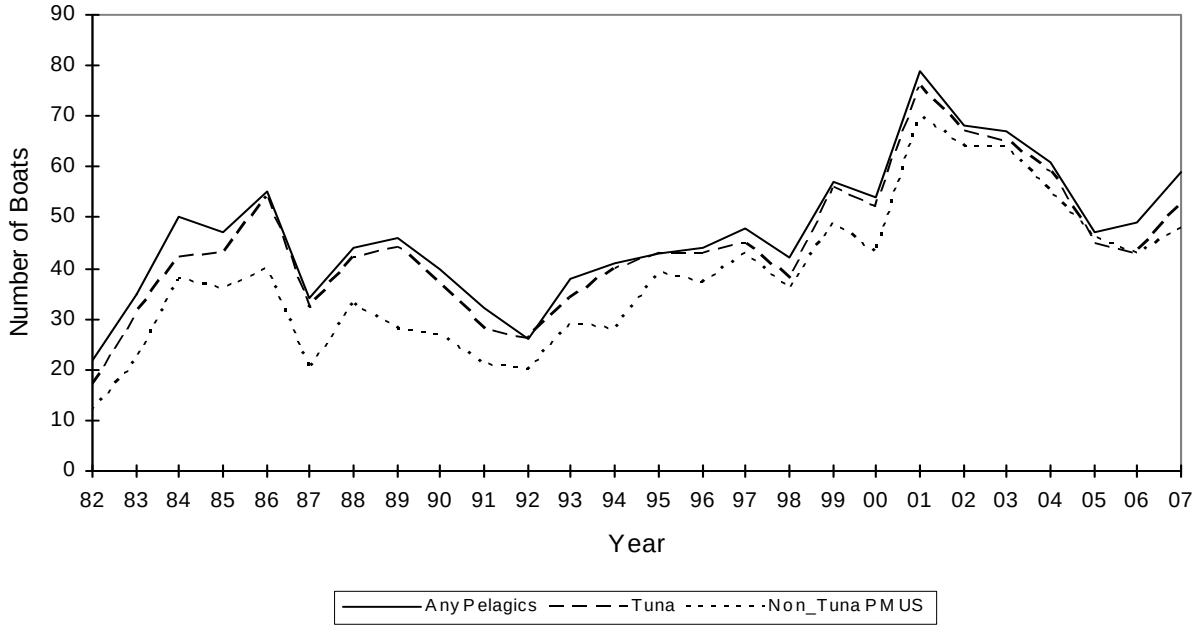
Interpretation: Estimated total commercial landings by American Samoa vessels are more than 14.4 million pounds. Commercial landings for tuna is more than 13.9 million pounds; 97% of the total landings. Estimated 2007 commercial landings of non-tuna Pelagic Management Unit Species (PMUS) by American Samoa's vessels Total commercial landings for 2007 increased 2.7 million pounds (23%) to 14.4 million pounds. Commercial landing for tuna increased 3million pounds (18%) to 13.9 million pounds. Tuna commercial landing in 2007 is second highest to the highest peak of 15 million pounds in 2002 of the 26-year record.

Estimated commercial landings of non-tuna Pelagic Management Unit Species (PMUS) in 2007 is 3% of the total commercial landing. Non-tuna commercial landing decreased by 194,000 pounds (39%) between 2006 and 2007

Calculation: Estimated commercial landings for Tunas and Non-Tuna PMUS were calculated by summing the commercial landings for the species these categories as defined by Table 2.

Year	Pounds Landed	
	Tuna	Non Tuna PMUS
1982	22,065	1,515
1983	85,069	4,441
1984	196,100	13,458
1985	99,987	17,515
1986	170,981	15,378
1987	132,316	4,843
1988	172,788	12,110
1989	114,671	8,240
1990	56,573	3,623
1991	58,038	15,453
1992	97,874	11,230
1993	43,803	14,547
1994	189,013	41,337
1995	281,256	54,985
1996	312,199	50,995
1997	798,539	101,299
1998	1,114,700	94,933
1999	949,355	109,152
2000	1,640,058	123,015
2001	7,781,751	152,629
2002	15,003,985	364,413
2003	10,524,510	409,207
2004	8,434,561	471,201
2005	8,163,803	481,256
2006	10,985,382	684,153
2007	13,933,623	489,214
Average	**3,129,346**	**144,236**
Std. Dev.	**4,805,002**	**196,008**

Figure 12. Number of American Samoa boats landing any pelagic species, tunas and non-tuna PMUS.



Interpretation: The number of American Samoan vessels landing tuna and the number landing non-tuna Pelagic Management Unit Species (PMUS) increased by 10 and by 5 respectively in 2007. The number of boat landing any pelagics also increased by 10 in 2007. and it continues an increasng trend since 2005. The highest number of boats landing any pelagic, tuna and non-tuna PMUS was 79, 76, and 70 respectively during 2001. Since the peak in 2001,the number of American Samoan vessels landing any pelagic in 2007 has decreased by 20;for tuna it is decreased by 23 and for non-tuna PMUS, it is decreased by 22.

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.

	Number of Boats Landing		
Year	**Any Pelagics**	**Tuna**	**Non-Tuna PMUS**
1982	22	17	12
1983	35	31	22
1984	50	42	38
1985	47	43	36
1986	55	54	40
1987	34	32	20
1988	44	42	33
1989	46	44	28
1990	40	37	27
1991	32	28	21
1992	26	26	20
1993	38	34	29
1994	41	40	28
1995	43	43	39
1996	44	43	37
1997	48	45	43
1998	42	38	36
1999	57	56	49
2000	54	52	43
2001	79	76	70
2002	68	67	64
2003	67	65	64
2004	61	59	55
2005	47	45	46
2006	49	43	43
2007	59	53	48
Average	**47**	**44**	**38**
Std. Dev	**13**	**13**	**14**

Figure 13. **Number of American Samoa boats landing any pelagic species by longlining, trolling and all Methods.**

Interpretation: The number of American Samoan vessels landing pelagic species using longline gear decreased slightly to 29 in 2007 from 31 boats in 2006. The slight decrease shows a declining trend to the number of boat participating in longline fishing.

The number of American Samoan longline vessels has decreased by 33 (53%) since the peak count of 62 in 2001. The trolling vessels increased by 10 (53%) to 19 vessels which is same as the number of boats during the peak year.

The number of American Samoan vessels landing pelagic-species caught by any method also increased by 10 from the 49 boats in 2006. But since 2001, the number of boats using any method decreased to 59 in 2007.

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

	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	55	0	49
1987	34	0	32
1988	44	4	42
1989	46	1	43
1990	40	0	36
1991	32	2	27
1992	26	0	26
1993	38	4	33
1994	41	5	40
1995	43	5	41
1996	44	12	37
1997	48	21	32
1998	42	26	24
1999	57	29	36
2000	54	37	19
2001	79	62	19
2002	68	58	16
2003	67	49	20
2004	61	41	18
2005	47	36	9
2006	49	31	9
2007	59	29	19
Average	**47**	**23**	**30**
Std. Dev.	**13**	**20**	**12**

added to the count of interviewed boats from the offshore creel survey in the Any Method and Longlining columns. The average and standard deviation for the number of boats using Longlining is calculated from 1988 onward.

Figure 14A. Number of permitted and active longline fishing vessels in the A (< 40 foot) and D (> 70.1 foot) size classes

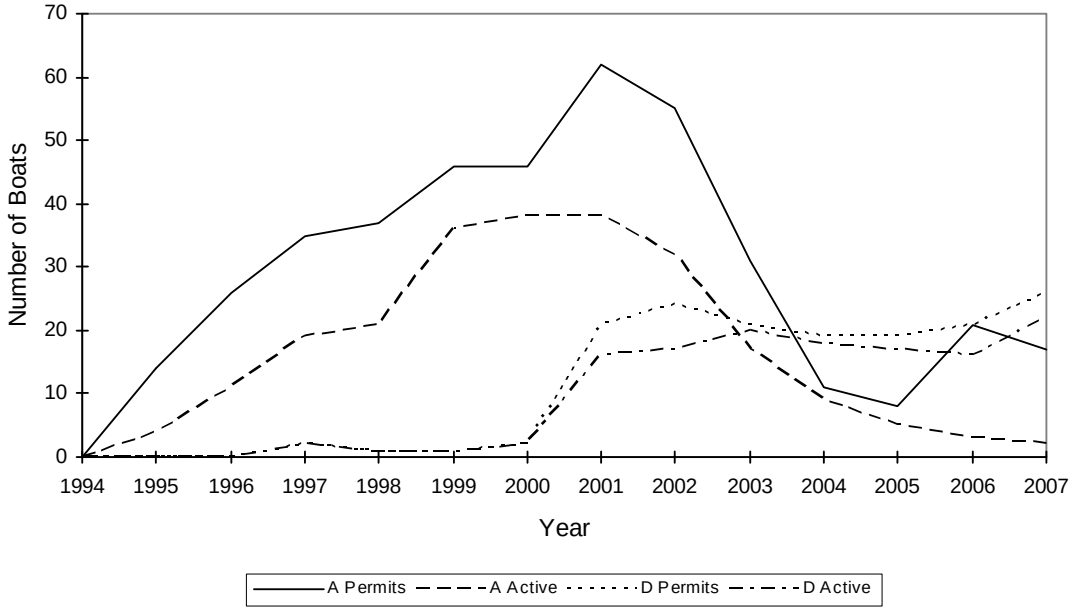
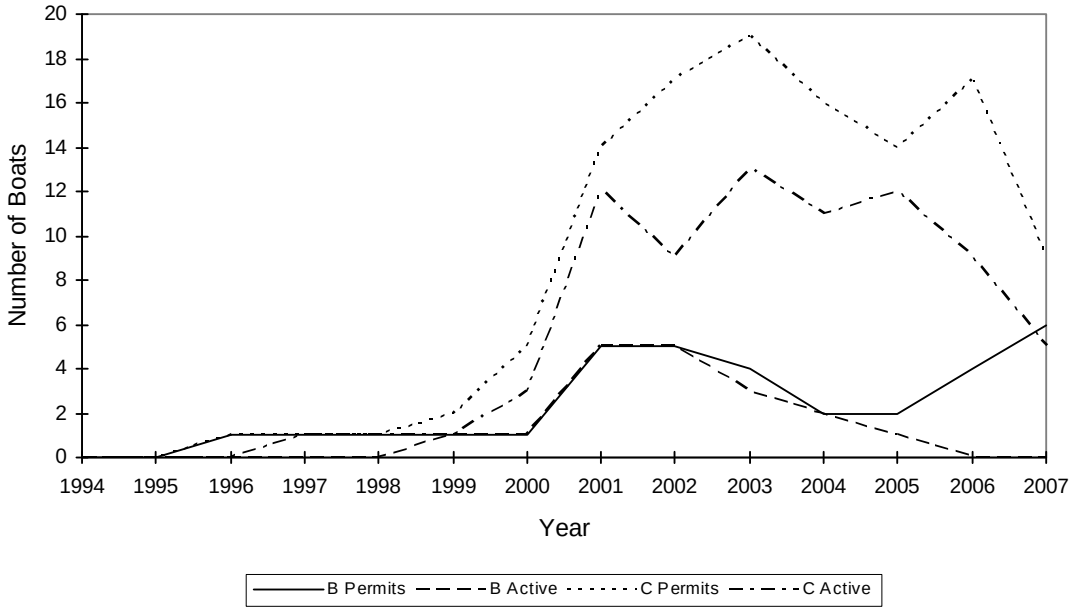


Figure 14B. Number of permitted and active longline fishing vessels in the B (40.1 to 50 foot) and C (50.1 to 70 foot) size classes



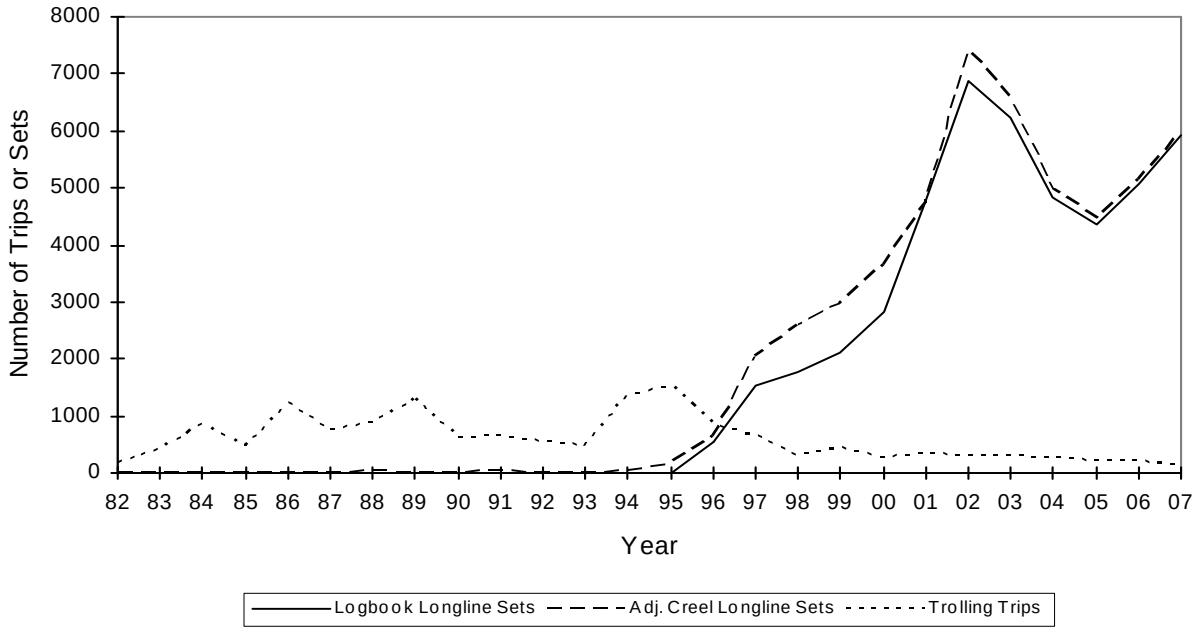
Interpretation: 2007 shows only two, from 17 permitted, Class A (<40ft) boats were active in longline fishing. Local longline alias fall in this Class. The 2007 count shows a continuous declining trend since the 38 peak count in 2001. No boat in the Class B was active in 2007. From 9 boats permitted in the Class C, 5 were active. The number of Class C boats decreased to 5 in 2007 from the 9 in 2006. Class D >70ft boats dominated longline fishing in 2007 with 22 active from 26 permitted. Number of Class D boats increased to 22 in 2007 from 16 in 2006 Longer boats (Class C and D) seem to dominate longline fishing

Calculation: For 2006 the number of permits are the actual number of Limited Entry Longline Permits issued for each size class late in 2005. For earlier years the number of permits are the number of federal general longline permits issued for each vessel size category. For the C and D size classes the number of permits may include those for Hawaiian permitted boats landing their fish in American Samoa. The number of active boats are those that have submitted longline logs or have been interviewed in the boat-based creel survey after a longline fishing trip during the year. Boats in the boat-based creel survey are not counted as active if they are interviewed using only fishing methods other than longlining such as bottomfishing or trolling.

The range of dates that constitutes a year of activity is skewed to be in line with when the longline permits are issued and expire which is around Feb. 25th. The active year of 1996 is from February 25, 1996 to February 24th 1997. This applies through 2004. The active year 2005 is from February 25, 2005 to December 31, 2005. The active year of 2006 is the calendar year and the active year of 1995 is from January 1, 1995 to February 24th 1996. This causes the number of active vessels to be slightly different from other counts of longline vessel activity based on the calendar year.

	Class A < 40 Feet		Class B 40.1 - 50 Feet		Class C 50.1 - 70 Feet		Class D > 70 Feet	
Year	Permits	Active	Permits	Active	Permits	Active	Permits	Active
1994	0	0	0	0	0	0	0	0
1995	14	4	0	0	0	0	0	0
1996	26	11	1	0	1	0	0	0
1997	35	19	1	0	1	1	2	2
1998	37	21	1	0	1	1	1	1
1999	46	36	1	1	2	1	1	1
2000	46	38	1	1	5	3	2	2
2001	62	38	5	5	14	12	21	16
2002	55	32	5	5	17	9	24	17
2003	31	17	4	3	19	13	21	20
2004	11	9	2	2	16	11	19	18
2005	8	5	2	1	14	12	19	17
2006	21	3	4	0	17	9	21	16
2007	17	2	6	0	9	5	26	22

Figure 15. Number of American Samoa fishing trips or sets for all pelagic species by method.



Interpretation: Longline sets increased by 850 (14%) in 2007 to 5919 as per logbook. The creel survey also reported an increase of 800 sets. 2007 longline sets are the third highest on record for both the logbook and creel counts.
The estimated number of troll trips decreased by 49 (25%) in 2007 to 146 trips. The 2007 decrease in troll trips is the fifth consecutive decline since 2001.

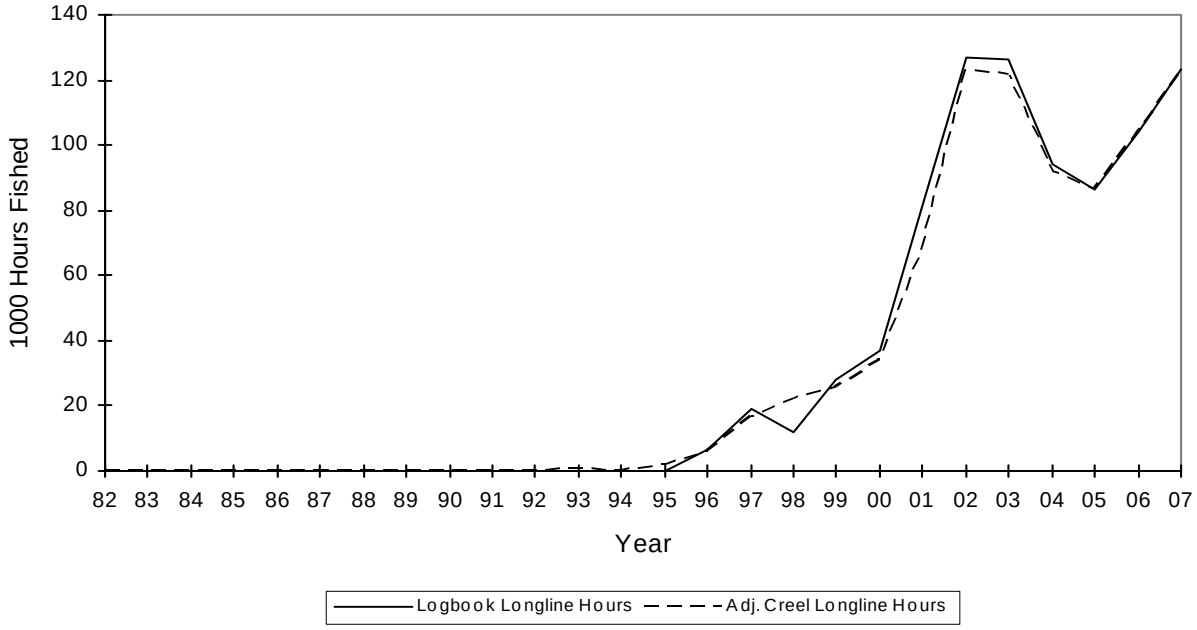
Calculation The number of Troll Trips is calculated by first subtracting the total longline pounds of Table 1 from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips, from the offshore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

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

		Longline Sets	
Year	Troll Trips	Logbook	Creel (Adj)
1982	177	0	0
1983	406	0	0
1984	853	0	0
1985	464	0	0
1986	1,241	0	0
1987	752	0	0
1988	875	0	31
1989	1,277	0	3
1990	612	0	0
1991	642	0	21
1992	549	0	0
1993	474	0	17
1994	1,355	0	20
1995	1,544	0	187
1996	843	528	656
1997	660	1,528	2,033
1998	316	1,754	2,582
1999	426	2,108	2,978
2000	285	2,814	3,650
2001	331	4,801	4,723
2002	291	6,872	7,433
2003	310	6,220	6,557
2004	275	4,850	4,974
2005	218	4,359	4,468
2006	195	5,069	5,153
2007	146	5,919	5,965
Average	**597**	**3,902**	**4,264**
Std. Dev.	**387**	**1,991**	**1,884**

Prior to 1997, the number of longline sets using creel survey data is the expanded number of longline fishing trips from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing trips from the offshore creel survey system for interviewed vessels plus the count of all of the sets entered in the longline logbook system for non-interviewed vessels. The average and standard deviation for Longline Sets from logbook data and creel data is calculated from 1996 onward for comparison.

Figure 16. Number of American Samoa hours fished for all pelagic species by longlining.



Interpretation: Longline hours-fished increased for both Lpgbook and Creel in 2007. Longline hours-fished from the logbook increased 18,900 hrs (15%) to 123,260 in 2007. Creel hours-fished shows similar increase of 18,470; a 15% increae.2007 hours-fished is third highest record.

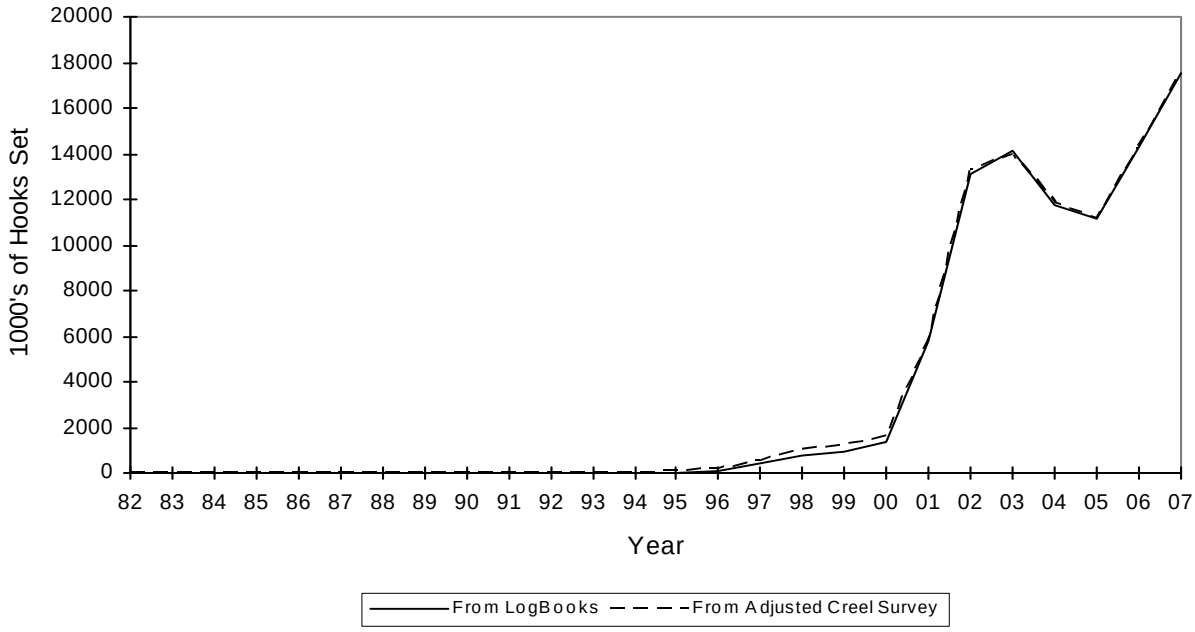
Calculation: The number of longline trip-hours using logbook data is obtained by summing the duration all of the sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats. The duration of a set is defined as from beginning of set time to the end of haul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

Prior to 1997, the number of longline trip-hours using creel survey data is the expanded number of longline fishing trip-hours from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing trip-hours from the offshore creel survey system for interviewed vessels plus the sum of the duration of the sets entered in the longline logbook system for non-interviewed vessels. The average and standard deviation for Hours Fished from logbook data and creel data is calculated from 1996 onward for comparison.

The hours fished reported by the Longline Logbook system in the early years before the large boats dominated the fishery is usually larger than that reported by the adjusted Creel Survey System because the logbook hours are calculated from actual beginning of set times and end of haul times while many trips in the offshore creel survey system are entered as "8 hours"

	Hours Fished	
Year	Longline Logbook	Longline Creel (Adj.)
1982	0	0
1983	0	0
1984	0	0
1985	0	0
1986	0	0
1987	0	0
1988	0	198
1989	0	17
1990	0	0
1991	0	164
1992	0	0
1993	0	299
1994	0	161
1995	0	1,860
1996	6,366	5,932
1997	19,065	16,924
1998	11,984	21,996
1999	27,708	25,807
2000	36,973	33,703
2001	81,291	67,734
2002	127,023	123,128
2003	126,265	121,621
2004	93,996	91,723
2005	86,332	86,098
2006	104,324	104,089
2007	123,266	122,561
Average	**70,383**	**68,443**
Std. Dev.	**44,991**	**43,413**

Figure 17. **Thousands of American Samoa longline hooks set from logbook and creel survey data.**



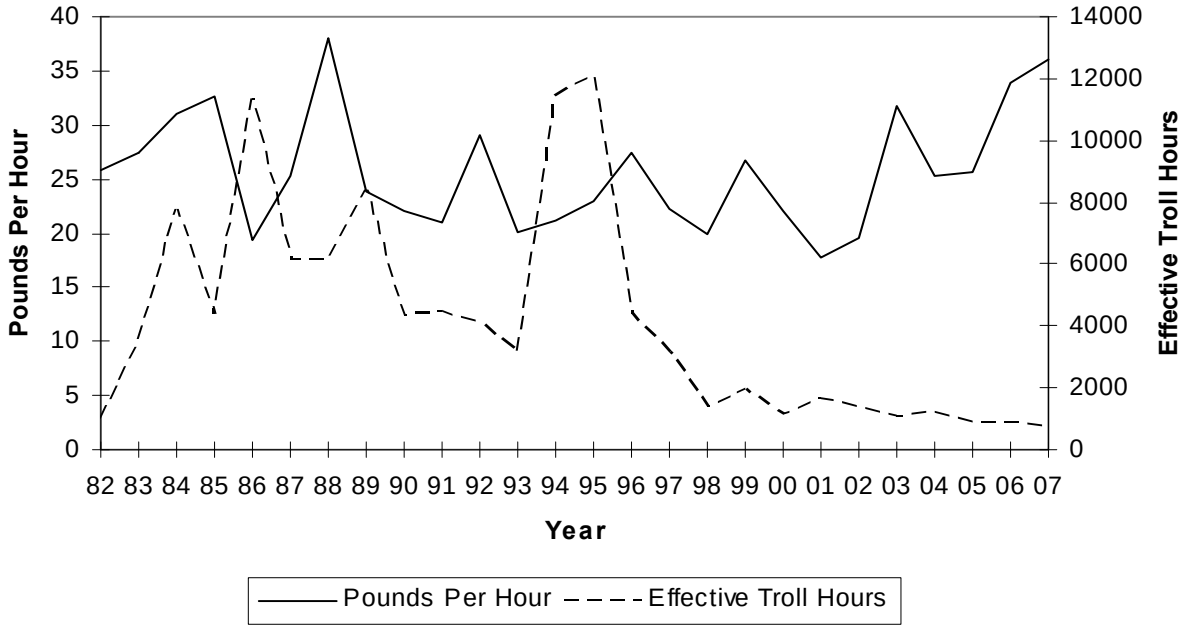
Interpretation: The number of hooks set by American Samoan longline vessels climbed over 3 million hooks (19%) to record high of 17.5 million hooks in 2007. The 2007 estimate is the highest in the 26- year history. The creel count is about the same as the logbook count for 2007.

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. The average and standard deviation for 1000's of Hooks from logbook data and creel data is calculated from 1996 onward for comparison.

	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	158
1997	419	517
1998	771	1,042
1999	915	1,229
2000	1,335	1,584
2001	5,795	5,808
2002	13,096	13,242
2003	14,165	13,990
2004	11,736	11,796
2005	11,128	11,173
2006	14,263	14,324
2007	17,552	17,585
Average	**7,606**	**7,704**
Std. Dev.	**6,377**	**6,301**

Figure 18. American Samoa pelagic catch per hour of trolling and number of trolling hours.



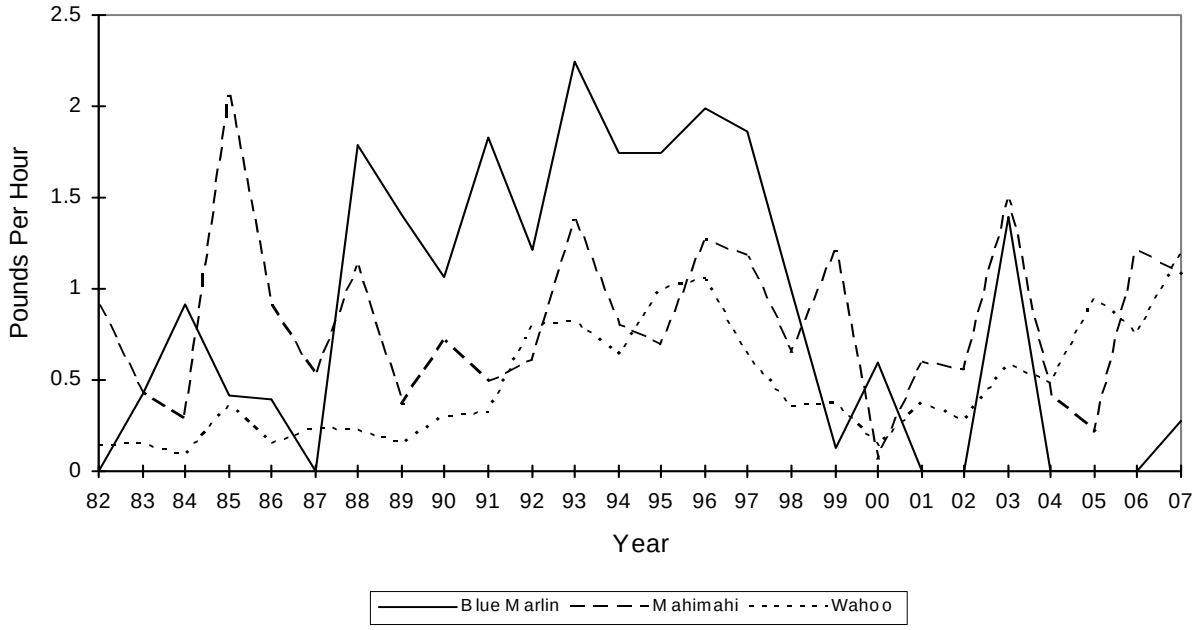
Interpretation: Trolling pounds-per-hour (PPH) increased nearly 3 PPH (8%) to 36.10 PPH. The 2007 PPH figure is the second highest in the 26-year record, 95% of the peak value from 1988. Pounds-per-troll hour has generally been increased since 2001. Effective troll hours decreased by 19% to 726 in 2007 from 893 hours in 2006.

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

Year	CPUE	Hours
1982	25.91	1,019
1983	27.41	3,513
1984	30.97	7,785
1985	32.59	4,394
1986	19.35	11,358
1987	25.34	6,182
1988	38.01	6,126
1989	23.87	8,425
1990	21.98	4,335
1991	20.96	4,482
1992	28.99	4,093
1993	20.08	3,169
1994	21.23	11,450
1995	22.93	12,114
1996	27.36	4,422
1997	22.31	3,159
1998	19.93	1,405
1999	26.81	1,971
2000	22.01	1,123
2001	17.72	1,661
2002	19.58	1,378
2003	31.78	1,044
2004	25.30	1,199
2005	25.61	899
2006	33.86	893
2007	36.10	726
Average	**25.69**	**4,166**
Std. Dev.	**5.39**	**3,437**

Figure 19. American Samoa trolling catch rates for Blue Marlin, Mahimahi, and Wahoo.

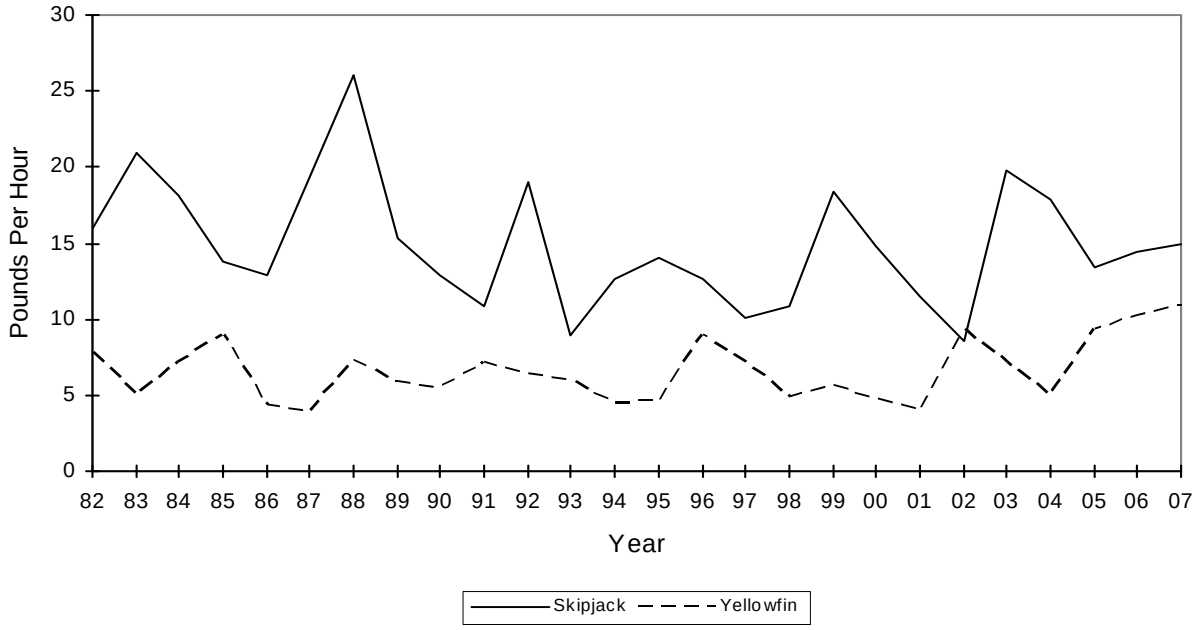


Interpretation: Blue marlin pounds-per-hour (PPH) trolling increased 0.28 PPH(after remaining at zero for three consecutive years; Mahimahi PPH decreased by 0.14 (-12%), to 1.07 pph in 2007 from 1.21 pph in 2006. Wahoo PPH shows an increase (36%)from 0.76 PPH in 2006 to 1.19pph in 2007.

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

	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	0.90	0.15
1987	0.00	0.52	0.23
1988	1.79	1.13	0.22
1989	1.40	0.36	0.15
1990	1.06	0.71	0.30
1991	1.83	0.49	0.32
1992	1.21	0.61	0.80
1993	2.25	1.38	0.82
1994	1.74	0.80	0.64
1995	1.74	0.69	1.00
1996	1.99	1.27	1.05
1997	1.86	1.18	0.63
1998	0.99	0.65	0.35
1999	0.13	1.21	0.37
2000	0.60	0.06	0.14
2001	0.00	0.60	0.37
2002	0.00	0.55	0.28
2003	1.39	1.49	0.59
2004	0.00	0.42	0.48
2005	0.00	0.21	0.95
2006	0.00	1.21	0.76
2007	0.28	1.07	1.19
Average	**0.86**	**0.82**	**0.48**
Std. Dev.	**0.76**	**0.45**	**0.32**

Figure 20. American Samoa trolling catch rates for Skipjack and Yellowfin Tuna



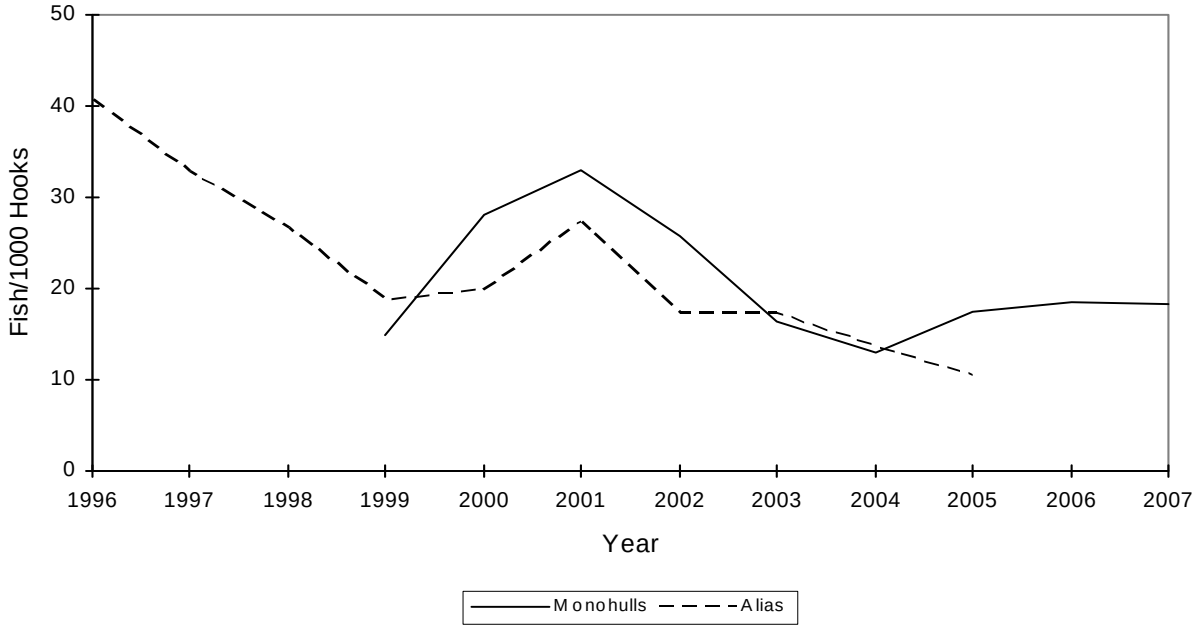
Interpretation: Estimated 2007 troll landings of skipjack and yellowfin tunas were 10,395 lbs and 7,356 pounds, respectively (Table 1). The pounds-per-troll-hour (PPTH) for skipjack in American Samoa increased 0.5 (31%) to 14.90 in 2007. Highest PPTH recorded is 26.00 in 1988.
The yellowfin tuna PPTH in American Samoa increased by 0.70 (6%) to a record high in 26 year of 10.90 The yellowfin tuna PPTH of 2007 continues an increasing trend from 2005.

Trolling regularly occurs closer to the islands of American Samoa, at different times, and targets different depths than longline fishing.

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

	Pounds Caught Per Trolling Hour	
Year	**Skipjack**	**Yellowfin**
1982	15.90	7.80
1983	21.00	5.04
1984	18.10	7.20
1985	13.80	8.90
1986	12.90	4.31
1987	19.30	3.88
1988	26.00	7.30
1989	15.30	5.91
1990	12.90	5.53
1991	10.80	7.11
1992	19.00	6.32
1993	8.88	6.05
1994	12.60	4.49
1995	14.10	4.57
1996	12.70	8.98
1997	10.10	7.19
1998	10.80	4.89
1999	18.40	5.62
2000	14.80	4.67
2001	11.50	4.01
2002	8.59	9.37
2003	19.80	7.10
2004	17.90	5.00
2005	13.40	9.31
2006	14.40	10.20
2007	14.90	10.90
Average	**14.92**	**6.60**
Std. Dev.	**4.02**	**1.99**

Figure 21. American Samoa catch per 1000 hooks of Albacore by Alias and Monohull Vessels from Longline Logbook Data,



Interpretation:
No albacore tuna was caught by an alia longline vessel in 2007 and 2006. Monohulls landed 18.3 albacore tuna in 2007; a slight decrease of 0.1, from 18.4 albacore landed in 2006.

Calculation: These values are sums of the Longline Logbook albacore catch (number of fish kept+released) from the longline logs for the two types of longline vessels in Samoa, alias and monohulls, divided by the total number of hooks set by each type of vessel. The 2006 monohull value is the value for all vessels for confidentiality reasons.

	Number of Fish Per 1000 Hooks	
Year	Alias	Monohulls
1996	40.6	--
1997	32.8	--
1998	26.6	--
1999	18.8	14.8
2000	19.8	28.0
2001	27.3	32.9
2002	17.2	25.8
2003	17.3	16.4
2004	13.7	12.9
2005	10.3	17.4
2006	--	18.4
2007	--	18.3

Table 6A. American Samoa Catch/1000 Hooks for two sizes of longline vessels from 1996 to 1999

	1996	1997	1998	1999	
Species	**Alias**	**Alias**	**Alias**	**Alias**	**Monohulls**
Skipjack tuna	0.1	1.2	3.7	5.0	4.5
Albacore	40.6	32.8	26.6	18.8	14.8
Yellowfin tuna	6.5	2.7	2.2	6.7	2.1
Bigeye tuna	1.3	0.3	0.3	0.7	0.5
TUNAS SUBTOTALS	48.5	37.0	32.7	31.2	21.9
Mahimahi	2.3	2.2	1.7	2.2	0.3
Black marlin	0.0	0.1	0.0	0.2	0.0
Blue marlin	0.9	0.7	0.5	0.5	0.1
Wahoo	0.8	0.9	2.2	2.1	1.2
All sharks	0.7	0.1	0.1	0.1	1.2
Sailfish	0.2	0.2	0.1	0.0	0.1
Moonfish	0.0	0.1	0.1	0.1	0.0
NON-TUNA PMUS SUBTOTALS	4.9	4.3	4.7	5.1	2.9
Pelagic fish (misc)	0.0	0.0	0.2	0.3	0.2
OTHER PELAGICS SUBTOTALS	0.0	0.0	0.2	0.3	0.2
TOTAL PELAGICS	**53.4**	**41.3**	**37.7**	**36.6**	**25.0**

Table 6B. American Samoa Catch/1000 Hooks for two kinds of longline vessels from 2000 to 2002

	2000		2001		2002	
Species	**Alias**	**Monohulls**	**Alias**	**Monohulls**	**Alias**	**Monohulls**
Skipjack tuna	2.0	1.7	3.1	2.1	6.0	4.9
Albacore	19.8	28.0	27.3	32.9	17.2	25.8
Yellowfin tuna	6.2	3.1	3.3	1.4	7.1	1.3
Bigeye tuna	0.4	1.0	0.6	1.0	0.6	0.9
TUNAS SUBTOTALS	28.4	33.8	34.3	37.4	30.9	32.8
Mahimahi	1.7	0.4	3.4	0.5	4.0	0.6
Black marlin	0.1	0.1	0.1	0.0	0.0	0.0
Blue marlin	0.5	0.2	0.4	0.2	0.2	0.3
Striped marlin	0.1	0.3	0.0	0.1	0.1	0.0
Wahoo	1.2	1.0	1.5	0.6	2.7	1.0
All sharks	0.0	0.7	0.0	0.7	0.0	0.8
Swordfish	0.0	0.0	0.1	0.0	0.1	0.0
Spearfish	0.0	0.1	0.0	0.0	0.0	0.0
Moonfish	0.1	0.2	0.1	0.1	0.1	0.1
Oilfish	0.0	0.1	0.0	0.2	0.0	0.5
Pomfret	0.0	0.1	0.0	0.1	0.0	0.1
NON-TUNA PMUS SUBTOTALS	3.6	3.2	5.6	2.6	7.2	3.5
Barracudas (misc)	0.0	0.0	0.0	0.0	0.0	0.1
Pelagic fish (misc)	0.0	0.0	0.0	0.0	0.0	0.3
OTHER PELAGICS SUBTOTALS	0.0	0.0	0.1	0.1	0.0	0.3
TOTAL PELAGICS	**32.0**	**37.0**	**40.0**	**40.1**	**38.1**	**36.6**

Table 6C. American Samoa Catch/1000 Hooks for two kinds of longline vessels from 2003 to 2005

	2003		2004		2005	
Species	**Alias**	**Monohulls**	**Alias**	**Monohulls**	**Alias**	**Monohulls**
Skipjack tuna	4.7	2.9	3.0	3.9	1.0	2.7
Albacore	17.3	16.4	13.7	12.9	10.3	17.4
Yellowfin tuna	5.9	2.0	8.8	3.2	7.0	2.6
Bigeye tuna	1.6	1.1	0.8	1.3	1.0	0.9
TUNAS SUBTOTALS	29.5	22.4	26.2	21.2	19.3	23.7
Mahimahi	2.2	0.4	2.1	0.2	2.0	0.3
Blue marlin	0.2	0.2	0.1	0.2	0.2	0.2
Striped marlin	0.0	0.0	0.1	0.0	0.1	0.0
Wahoo	1.8	1.1	3.0	1.6	2.3	1.4
All sharks	0.3	0.8	0.1	0.9	0.0	0.7
Swordfish	0.1	0.0	0.1	0.0	0.1	0.0
Sailfish	0.1	0.0	0.0	0.1	0.1	0.1
Spearfish	0.1	0.0	0.0	0.1	0.0	0.0
Moonfish	0.1	0.1	0.1	0.1	0.1	0.1
Oilfish	0.3	0.5	0.0	0.7	0.0	0.3
Pomfret	0.1	0.1	0.0	0.1	0.0	0.1
NON-TUNA PMUS SUBTOTALS	5.2	3.3	5.7	3.8	4.8	3.1
Pelagic fish (misc)	0.2	0.2	0.0	0.1	0.0	0.1
OTHER PELAGICS SUBTOTALS	0.2	0.2	0.0	0.1	0.0	0.1
TOTAL PELAGICS	**34.8**	**25.8**	**32.0**	**25.2**	**24.2**	**26.8**

Table 6D. American Samoa catch/1000 Hooks for all longline vessels for 2006 and 2007

Species	2006 All Vessels	2007 All Vessels
Skipjack tuna	3.2	2.3
Albacore	18.4	18.3
Yellowfin tuna	1.6	1.9
Bigeye tuna	0.9	0.9
TUNAS SUBTOTALS	24.2	23.5
Mahimahi	0.4	0.1
Blue marlin	0.2	0.2
Wahoo	1.5	1.0
All sharks	0.5	0.4
Swordfish	0.1	0.0
Spearfish	0.1	0.0
Oilfish	0.5	0.5
NON-TUNA PMUS SUBTOTALS	3.2	2.3
Pelagic fish (misc)	0.0	0.2
OTHER PELAGICS SUBTOTALS	0.0	0.2
TOTAL PELAGICS	**27.5**	**25.9**

Interpretation: Total pelagics catch by all longline vessels in 2007 decreased by 1.6 (6%) to 25.9 fish from 27.5 fish in2006.Total catch for tunas also decrease by 0.7 (3%) to 23.5 in 2007. Albacore tuna dominates the total tuna catch although albacore catch decreased by 0.1 to 18.3 in 2007.Skipjack tuna catch also decreased by 0.9 (28%) to 2.3 in 2007; Yellowfin increased by 0.3 to 1.9; and bigeye remains the same at 0.9 as in 2006.

Non-tuna PMUS total catch also decreased by 0.9 (28%) to 2.3 in 2007. Wahoo dominates the non-tuna landings at 1.0 but a 0.5 decrease from 2006.

Calculation: These values are sums of the Longline Logbook catch (number of fish kept+released) from the longline logs for the two types of longline vessels in Samoa, alias and monohulls, divided by the total number of hooks set by each type of vessel. All species of sharks entered in the Longline Logs are combined in the All Sharks species category. Rays and Sunfish are included in the Misc Pelagic Fish category.

Table 7A. American Samoa estimated average weight per fish by species from the Offshore Creel Survey Interviews

	Creel Survey Annual Average Pounds per Fish											
Species	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Skipjack tuna	9.6	8.4	12.5	9.7	11.6	14.8	11.1	8.6	8.1	7.7	13.2	6.8
Albacore	39.9	44.0	45.7	42.6	45.1	44.8	45.5	38.7	37.8	36.8	37.0	38.4
Yellowfin tuna	37.9	44.2	45.9	33.1	38.1	31.3	28.0	17.7	34.7	33.8	19.1	38.0
Bigeye tuna	52.3	82.8	79.2	57.1	61.1	69.2	67.6	37.2	45.3	42.4	22.6	61.6
Mahimahi	26.2	25.6	23.3	22.3	24.8	19.7	19.3	20.4	21.7	19.0	17.4	21.3
Black marlin		148.3		101.9		67.2	31.9	90.0	103.0	88.2	115.8	89.5
Blue marlin	151.8	117.7	119.9	101.9	135.7	70.9	190.4	98.8	62.9	117.9	179.6	131.0
Wahoo	44.3	38.4	26.3	27.3	31.9	29.7	28.2	30.8	28.1	29.5	29.0	32.6
All sharks	112.3	96.8	69.3	38.0	39.5	68.8	68.5	62.4	71.7		41.6	65.0
Swordfish	150.0	100.0	212.6	12.0		59.4	23.4	117.4	37.7	26.0	34.3	95.1
Sailfish	88.4	70.7	67.0	61.8	39.1	42.0	33.8	57.6	44.9	49.5	45.2	60.4
Spearfish				46.0					46.0			
Moonfish		70.3	33.5	57.7	30.9	102.5	78.3	107.1	59.7	101.5	117.4	
Oilfish			12.7	10.0		23.9		11.1	7.8	1.9		5.9
Pomfret					16.5		8.2		8.2	2.3		8.2
Barracudas (misc)	13.5	14.6	15.3	11.0	13.1	7.6	9.2	8.8	10.4	11.0	8.3	9.9
Rainbow runner		14.0	17.5	6.5			16.1		6.9	8.8		10.1
Dogtooth tuna			10.0			15.6	40.8		16.2			
Pelagic fish (misc)	61.8	8.0	45.3									

Table 7B. American Samoa estimated average weight per fish by species from the Cannery Sampling Data

	Cannery Sampled Average Lbs. per Fish									
Species	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Skipjack tuna				16.8	11.3	9.9	13.6	13.1	11.6	12.0
Albacore	41.0	47.2	40.7	39.8	39.1	37.8	36.5	33.2	34.2	36.3
Yellowfin tuna				57.0	62.4	44.3	52.1	39.6	53.8	41.5
Bigeye tuna				40.6	46.7	37.4	35.9	31.5	33.5	31.8
Mahimahi				16.1	13.5	20.7	13.0	17.0	13.1	13.4
Black marlin				36.3						
Blue marlin								45.8		
Wahoo				30.6	30.7	30.0	27.4	31.6	30.7	29.8
Swordfish							72.3		90.3	
Sailfish					34.0			25.0	22.8	
Moonfish				147.6	117.5			95.5	34.7	
Pomfret				5.1	6.2			7.8		5.4
Rainbow runner					9.4		10.8			

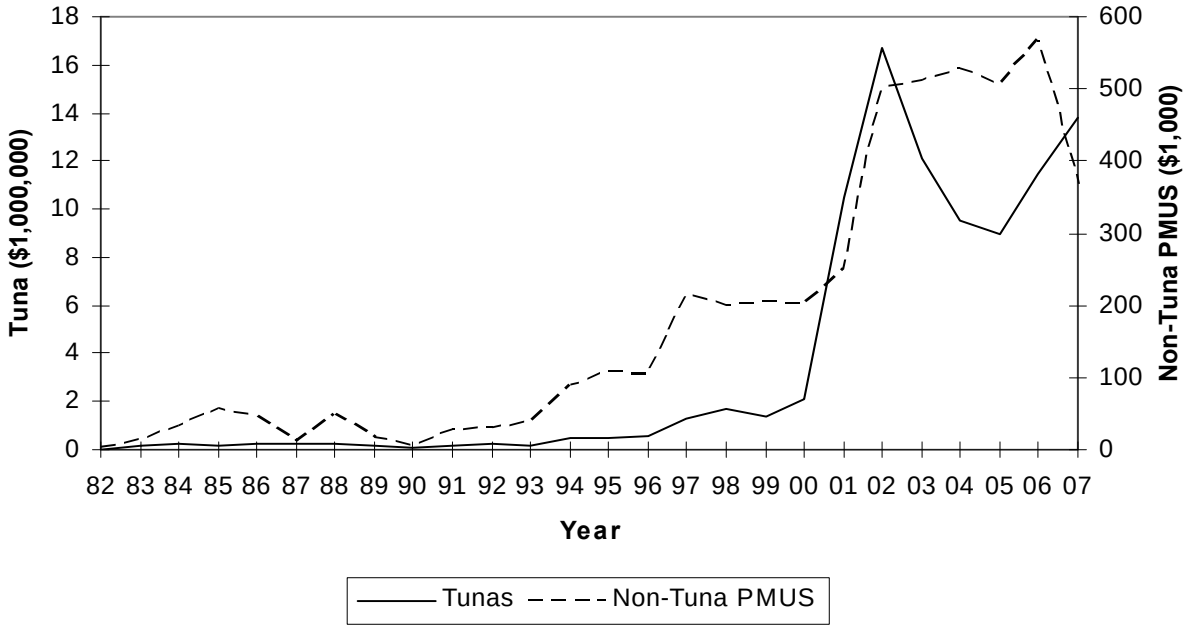
Interpretation: The table for cannery data represents the portion of the catch unloaded by larger vessels fishing further away from Tutuila while the table from the Creel Survey represents fish caught by alias near Tutuila.
Albacore weight-per-fish increased 1.4 (4%) to 38.4 lbs in creel interviews between 2006 and 2007. Albacore weight per fish in 2007 increased by 2.1 lbs (6%) to 36.3 pounds in cannery samples. Skipjack average weight per fish in cannery samples increased by 0.4 to 12.0 lbs in 2007.Yellowfin shows a 23% decrease (12.3lbs), to 41.5 lbs. Bigeye average weight also decreased by 1.7 (5%) to 31.8 pounds. Cannery sampled weight-per-albacore has consistently been smaller than creel samples. From the 2007 creel samples, skipjack tunas average weight decreased 6.4 pounds (48%) to 6.8 lbs; Yellowfin increased 18.9 lbs (50%) to 38 pounds; and Bigeye increased 39lbs (63%) to 66.6 pounds

In 1999 longline boats began landing their catches gilled and gutted to obtain higher prices at the canneries. It is possible that this new method could have an impact on size variation for the longline fishery.

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

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

Figure 22. American Samoa annual inflation-adjusted revenue in 2007 dollars for Tuna and non-Tuna PMUS.



Interpretation: Inflation-adjusted revenues for 2007 increased more than $2.3 million (17%) to over $13.7 million for tuna landed by American Samoa vessels. The increase in tuna revenue is the second highest inflation-adjusted tuna revenue for American Samoa in the 26-year history. Inflation-adjusted tuna revenue in 2002 was the highest peak ever at more than $16.6 million. The 2007 adjusted revenue is about 83% of the 2002 adjusted revenue.

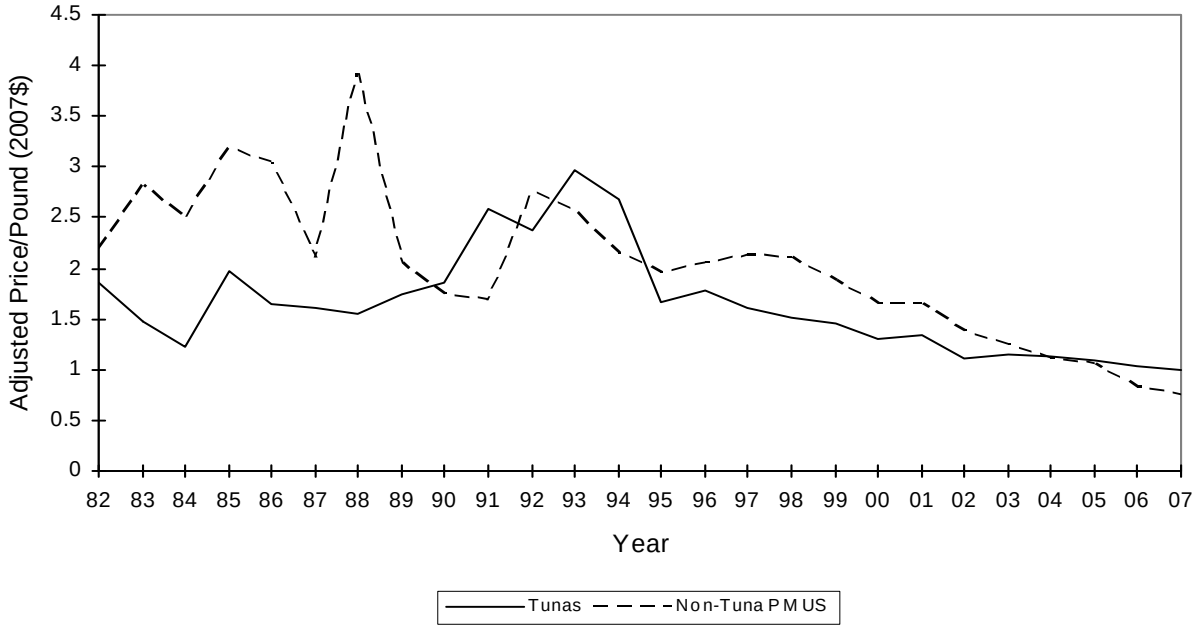
Inflation-adjusted revenues for non-tuna Pelagic Management Unit Species (PMUS) landed by American Samoa vessels decreased by about $ 198,000 (35%) to $368,381. The 2006 non-tuna PMUS revenue $566,636 is the highest recorded in the 26-year history.

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

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

		Revenue ($)			
		Tunas		Non-Tuna PMUS	
Year	CPI	Unadjust	Adjusted	Unadjust.	Adjusted
1982	100.0	$18,990	$40,923	$1,534	$3,306
1983	100.8	$58,561	$125,203	$5,828	$12,460
1984	102.7	$114,981	$241,345	$15,938	$33,454
1985	103.7	$95,157	$197,735	$26,800	$55,691
1986	107.1	$139,680	$281,036	$23,246	$46,770
1987	111.8	$110,076	$212,227	$5,270	$10,160
1988	115.3	$143,613	$268,413	$25,383	$47,442
1989	120.3	$111,425	$199,674	$9,425	$16,890
1990	129.6	$63,229	$105,150	$3,809	$6,335
1991	135.3	$94,363	$150,321	$16,344	$26,037
1992	140.9	$152,115	$232,736	$20,160	$30,844
1993	141.1	$85,052	$129,874	$24,435	$37,313
1994	143.8	$338,038	$506,720	$59,276	$88,855
1995	147.0	$318,724	$467,249	$73,093	$107,154
1996	152.5	$394,679	$557,682	$73,818	$104,305
1997	156.4	$930,649	$1,282,434	$156,099	$215,104
1998	158.4	$1,240,616	$1,688,478	$146,629	$199,562
1999	159.9	$1,018,884	$1,373,456	$151,918	$204,786
2000	166.7	$1,650,593	$2,134,216	$156,344	$202,153
2001	169.9	$8,293,554	$10,524,520	$196,985	$249,974
2002	172.1	$13,311,362	$16,665,826	$398,951	$499,487
2003	176.0	$9,890,688	$12,106,203	$417,726	$511,297
2004	188.5	$8,367,834	$9,564,434	$461,787	$527,822
2005	198.3	$8,209,756	$8,924,005	$465,470	$505,966
2006	204.3	$10,837,532	$11,433,596	$537,096	$566,636
2007	215.5	$13,789,726	$13,789,726	$368,381	$368,381
Average	**146.8**	**$3,068,457**	**$3,584,738**	**$147,759**	**$179,930**
Std. Dev.	**33.04**	**$4,602,269**	**$5,207,778**	**$172,111**	**$189,581**

Figure 23. American Samoa average inflation-adjusted price per pound for Tunas and Non-Tuna PMUS.



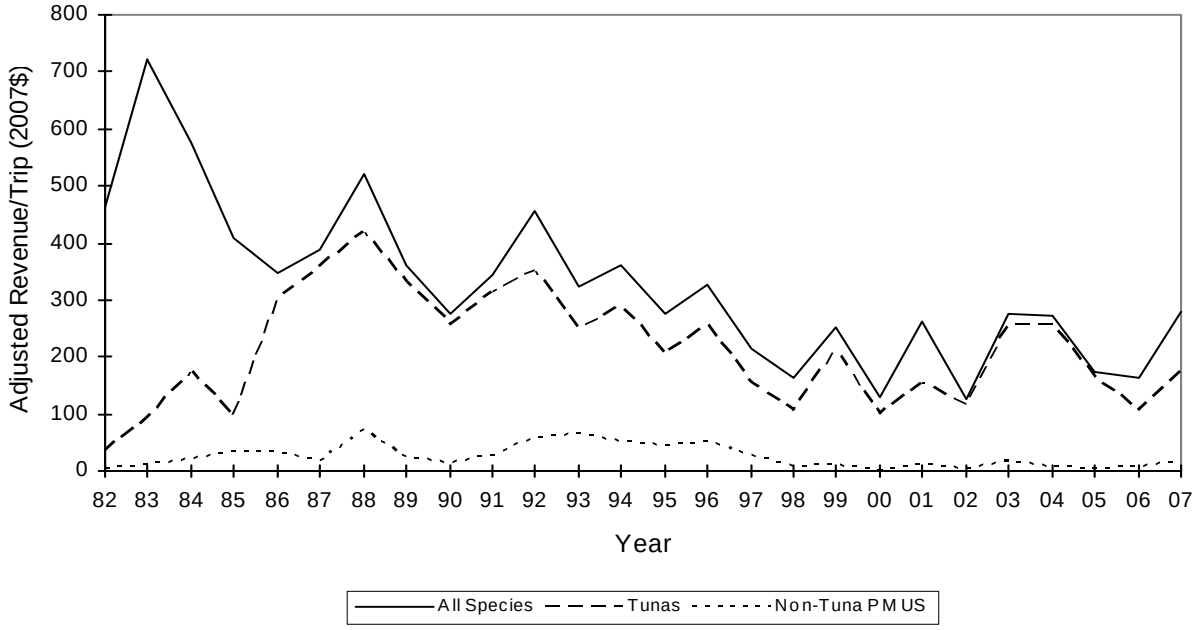
Interpretation: The average inflation-adjusted price-per-pound for tunas and non-tuna Pelagic Management Unit Species (PMUS) decreased and continued a long-term decline since 1998. The average price-per-pound for tuna in 2007 decreased by 5cents; and non-tuna PMUS average price decreased by 8 cents. Tuna price-per-pound peaked at $2.96 in 1993; and for non- tuna PMUS average peaked at $3.92 in 1988. The 2007 inflation-adjusted price-per-pound for tuna is the lowest ever and the same goes for non-tuna PMUS.

Calculation: The unadjusted price/pound for Tunas and Non-Tuna PMUS 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 2006 consumer price index (CPI) divided by the CPI for that year.

	Average Price/Pound ($)			
	Tunas		Non-Tuna PMUS	
Year	Unadjust.	Adjusted	Unadjust.	Adjusted
1982	$0.86	$1.85	$1.01	$2.18
1983	$0.69	$1.47	$1.31	$2.81
1984	$0.59	$1.23	$1.18	$2.49
1985	$0.95	$1.98	$1.53	$3.18
1986	$0.82	$1.64	$1.51	$3.04
1987	$0.83	$1.60	$1.09	$2.10
1988	$0.83	$1.55	$2.10	$3.92
1989	$0.97	$1.74	$1.14	$2.05
1990	$1.12	$1.86	$1.05	$1.75
1991	$1.63	$2.59	$1.06	$1.68
1992	$1.55	$2.38	$1.80	$2.75
1993	$1.94	$2.96	$1.68	$2.56
1994	$1.79	$2.68	$1.43	$2.15
1995	$1.13	$1.66	$1.33	$1.95
1996	$1.26	$1.79	$1.45	$2.05
1997	$1.17	$1.61	$1.54	$2.12
1998	$1.11	$1.51	$1.54	$2.10
1999	$1.07	$1.45	$1.39	$1.88
2000	$1.01	$1.30	$1.27	$1.64
2001	$1.07	$1.35	$1.29	$1.64
2002	$0.89	$1.11	$1.09	$1.37
2003	$0.94	$1.15	$1.02	$1.25
2004	$0.99	$1.13	$0.98	$1.12
2005	$1.01	$1.09	$0.97	$1.05
2006	$0.99	$1.04	$0.79	$0.83
2007	$0.99	$0.99	$0.75	$0.75
Average	**$1.08**	**$1.64**	**$1.28**	**$2.02**
Std. Dev.	**$0.31**	**$0.51**	**$0.31**	**$0.73**

Figure 24. American Samoa average inflation-adjusted revenue per trolling trip landing pelagic species



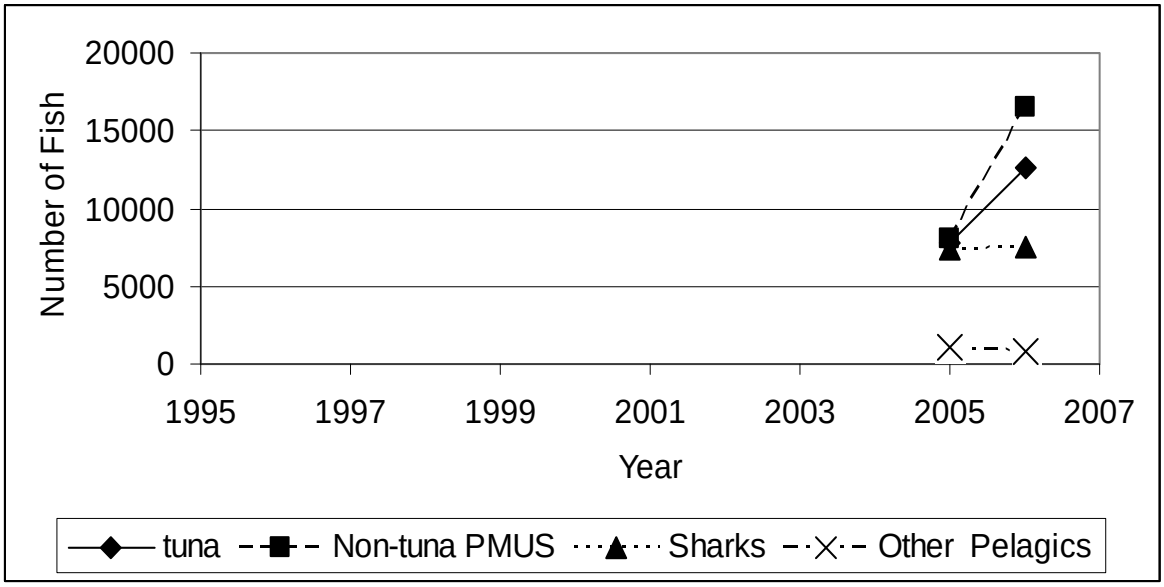
Interpretation: Tunas continue to dominate the inflation-adjusted revenues per trolling trip. The 2007 average inflation-adjusted revenue-per-troll-trip for tunas amounts to $174; an increase of $70 (40%) from $104 in 2006. Skipjack and Yellowfin are the primary tuna landings by trollers (Table 1). Inflation-adjusted revenue-per-troll-trip for all species increased $118 (42%) to $280 in 2007. Inflation-adjusted revenue-per-troll-trip for non-tuna Pelagic Management Unit Species (PMUS) also increased $11.6 (66%) to $17.6. The highest average per trolling trip estimated for tunas is $420 in 1988. The highest average for non-tuna is $72 during the same year. Mahimahi and Wahoo are the primary non-tuna PMUS landings for trollers (Table 1).

Calculation: The purely trolling interviews in the offshore creel survey system landing any of the species listed in Table 1 and selling part or all of their catch are first counted for the given year to get the number of trips. The unadjusted revenue/trip for Tunas and Non-Tuna PMUS is calculated by first summing the value of the species in these pelagic subgroups caught and sold by purely trolling methods and then dividing this by the number of pure trolling trips. The unadjusted revenue/trip for all species is the sum of the value of all species, in Table 1 or not, caught by the purely trolling trips that sold all or part of their catch 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 2003 consumer price index (CPI) divided by the CPI for that year.

	All Species		Tunas		Non-Tuna PMUS	
Year	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.
1982	$462	$214	$34	$16	$2.8	$1.3
1983	$722	$338	$92	$43	$11.1	$5.2
1984	$574	$274	$172	$82	$22.0	$10.5
1985	$408	$196	$97	$47	$32.8	$15.8
1986	$349	$173	$301	$150	$35.0	$17.4
1987	$388	$201	$356	$185	$17.5	$9.1
1988	$520	$278	$420	$225	$72.1	$38.6
1989	$362	$202	$332	$185	$22.4	$12.5
1990	$276	$166	$256	$154	$13.0	$7.8
1991	$342	$215	$313	$196	$27.1	$17.0
1992	$456	$298	$349	$228	$56.3	$36.8
1993	$322	$211	$247	$162	$63.7	$41.7
1994	$361	$241	$290	$194	$50.5	$33.7
1995	$274	$187	$204	$139	$43.5	$29.7
1996	$326	$231	$254	$180	$49.5	$35.0
1997	$215	$156	$152	$110	$27.1	$19.7
1998	$163	$119	$106	$78	$8.3	$6.1
1999	$252	$187	$212	$158	$10.0	$7.4
2000	$130	$100	$99	$76	$1.0	$0.8
2001	$261	$205	$153	$121	$11.3	$8.9
2002	$126	$101	$114	$91	$4.8	$3.8
2003	$277	$226	$255	$208	$17.1	$14.0
2004	$273	$239	$255	$223	$7.3	$6.4
2005	$175	$161	$163	$150	$4.7	$4.3
2006	$162	$154	$104	$99	$6.0	$5.7
2007	$280	$280	$174	$174	$17.6	$17.6
Average	**$325**	**$206**	**$212**	**$141**	**$24.4**	**$15.6**
Std. Dev.	**$138**	**$57**	**$98**	**$59**	**$19.8**	**$12.3**

Figure A-1. Number of Fish Released by American Samoan Longline Vessels (2006 Plan Team Action Item 4.2)



Interpretation - The number of fish released by American Samoan longline vessels increased over 13,000 (35%) between 2005 and 2006 to 37,440 fish. All categories increased except for the "other pelagics" group. The number of tuna released by American Samoan longline vessels increased over 4,700 (38%) between 2005 and 2006 to 12,611 tuna. The number of non-tuna Pelagic Management Unit Species (PMUS) released by American Samoan longline vessels increased over 8,400 (51%) between 2005 and 2006 to 16,500 fish. The number of sharks released by American Samoan longline vessels increased 167 (2%) between 2005 and 2006 to 7487 sharks. The number of other pelagic fish released by American Samoan longline vessels decreased 215 (-20%) between 2005 and 2006 to 842 fish

Calculation – These numbers are taken from longline released fish, Tables 3B, in the Pelagics Annual Report Modules. Source data listed below.

Year	Tuna	Non-tuna PMUS	Sharks	Other Pelagics
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2005	7830	8039	7320	1057
2006	12611	16500	7487	842

Figure A-2A Average Albacore Weight-per-fish for American Samoan Vessels

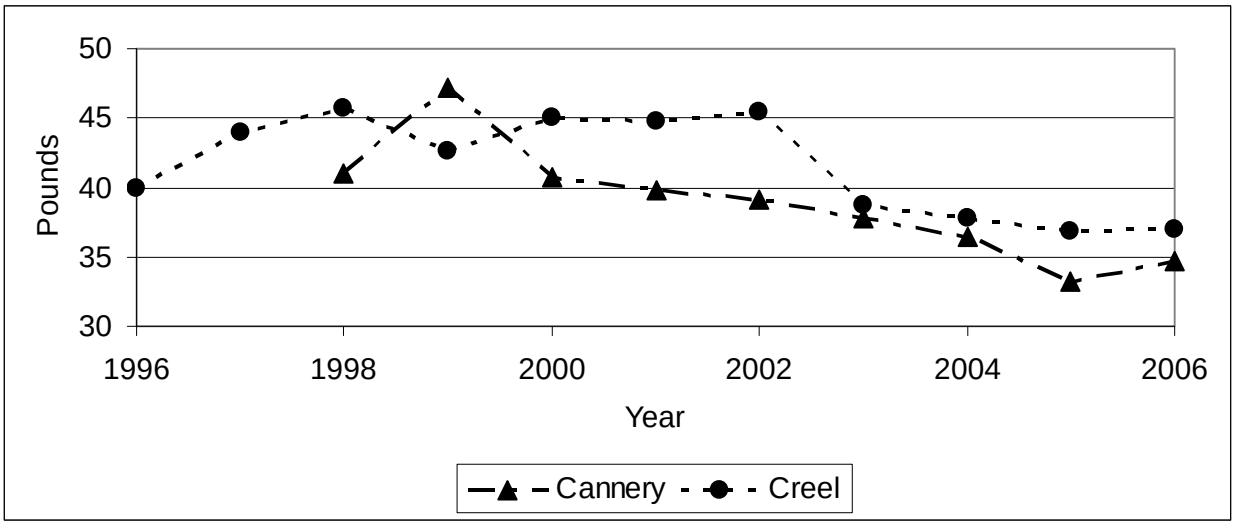


Figure A-2B Average Weight-per-fish for American Samoan Vessels

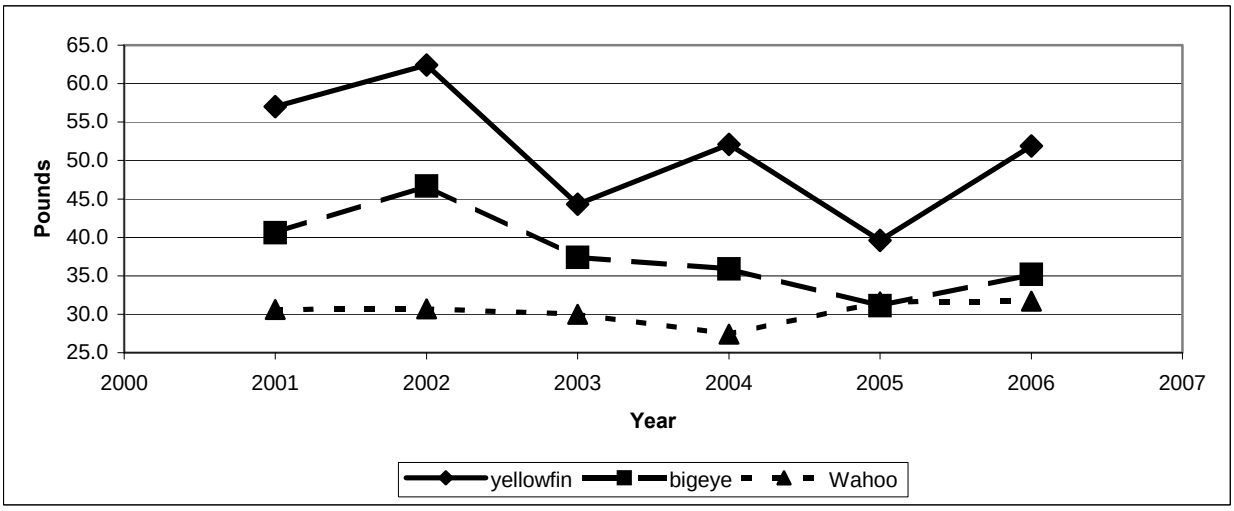


Table A-1. Geographic Distribution of Pelagic Catches by Management Area

	DMWR Boat Creel		Longline Logbook Catch Summaries						
Species	Tutuila Trolling	Manua	Inside Tutuila Area	Inside Swains Area	Restricted Area Total	Unrestricted USA EEZ	A. Samoa High Seas	A. Samoa Permits Total	Cook Cook I. Total
Skipkack tuna					1,406	44,446		45,852	
Albacore					5,367	257,712		263,079	
Yellowfin tuna					1,347	21,280		22,627	
Bigeye tuna					239	13,279		13,518	
Misc. tuna					0	36		36	
Tuna Subtotal					8,359	336,753		345,112	
Mahimahi					430	4,879		5,309	
Balck marlin					0	5		5	
Blue marlin					86	2,552		2,638	
Striped marlin					7	468		475	
Wahoo					554	20,874		21,428	
All sharks					155	7,368		7,523	
Swordfish					19	1,087		1,106	
Sailfish					24	778		802	
Spearfish					20	1,268		1,288	
moonfish					11	686		697	
Oilfish					176	6,341		6,517	
Pomfret					7	649		656	
Non-tuna PMUS Subtotal					1,489	46,955		48,444	
Misc. barracudas					5	234		239	
Misc. pelagic fish					18	633		651	
Other Pelagics Subtotal					23	867		890	
Total Pelagics			TBA	TBA	9,871	384,575	TBA	394,446	TBA

Interpretation- Most of the longline caught fish are captured outside the restricted areas. Sixteen vessels longer than 50-feet reported fishing coordinates within the 50-mile restricted zones for 75 of their sets. More than twice as many fish were caught by vessels over 50 feet than by vessels less than 50 feet inside the 50-mile restricted zones (i.e. on sets with coordinates reported inside the 50-mile restricted zones). Over 5000 albacore and skipjack tuna were captured on sets with reported coordinates within the 50-mile restricted zones; albacore and skipjack tuna were the majority (76%) of fish caught on these sets. The number of fish caught inside the restricted zones by all American Samoan vessels increased over 2100 (+28%) between 2005 and 2006 to 9871 fish. The number of fish caught outside the restricted fishing zones by all American Samoan vessels increased over 93,700 (+32%) between 2005 and 2006 to 93,791 fish. Some fishing on the high seas was rumored during 2006; the high seas catches were not available at drafting.

Calculation- These data are combinations of data not shown in Table 4; the figures include alias and other boats whose sets were inside or retrieved from within the restricted areas. Disaggregating of Swains Island and Tutuila Island data was an action item from the 2005 Pelagic Plan team meeting; Inclusion of US EEZ, Cook Islands EEZ and High Seas was mentioned during the 2006 Plan team meeting. A total count of longline caught fish is not included elsewhere in the 2006 report, because of the format and exclusion of Table 4.

Standardized Length-frequency Plots Cannery Data
2006 Plan Team Action Item 4.1
Albacore, yellowfin, skipjack and bigeye tunas plus wahoo for 2001, 2002, 2003, 2004, 2005, and 2006; Same length groups and axsis arranged verticall by species.

Table 2005.PTAI.4.4A Numbers of fish used to calculate catch-per-1000 hooks in Table 7
2006 Plan Team Action Item 4.4

Table 2005.PTAI4.4C Number of fish used to calculate size-per fish in tables 8A and 8B
2006 Plan Team Action Item 4.4

B. Guam

Introduction and Summary

Pelagic fishing vessels based on Guam are classified into two general groups: distant-water purse seiners and longliners that fish outside Guam's economic exclusive zone (EEZ) and transship through the island, and small, primarily recreational, trolling boats that are either towed to boat launch sites or berthed in marinas and fish only within local waters, either within Guam's EEZ or on some occasions in the adjacent EEZ of the Northern Mariana Islands. This annual report covers primarily the local, Guam-based, small-boat pelagic fishery.

The estimated annual pelagic landings have varied widely, ranging between 322,000 and 937,000 pounds in the 26-year time series. The 2007 total pelagic landings were approximately 559,891 pounds, an increase of 9.7% compared with 2006. Landings consisted primarily of five major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), bonita or skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and Pacific blue marlin (*Makaira mazara*). Other minor species caught include rainbow runner (*Elagatis bipinnulatus*), kawakawa (*Euthynnus affinis*), dogtooth tuna (*Gymnosarda unicolor*), double-lined mackerel *(Grammatorcynus bilineatus*), and oilfish (*Ruvettus pretiosus*). Sailfish and sharks were also caught during 2007. However, these species were not encountered during offshore creel surveys and was not available for expansion for this year's report. While sailfish is kept, sharks are often discarded as bycatch. In addition to the above pelagic species, approximately half a dozen other species were landed incidentally this year.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from 193 in 1983 to 469 in 1998. This number decreased until 2001, but has generally been increasing since that year. There were 370 boats involved in Guam's pelagic fishery in 2007, a decrease of 4% from 2006. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of the pelagic group is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews. Data and graphs for non-charters, charters, and bycatch are represented in this report.

There are general wide year-to-year fluctuations in the estimated landings of the five major pelagic species. Catch amounts for the five common species showed mixed changes from 2006 levels. 2007 mahimahi catch increased more than 58% from 2006, while wahoo catch totals decreased 62% from 2006, and Pacific blue marlin catch decreased 35% from 2006.

Aggregate landings of all pelagics, tuna, and non-tuna Pelagic Management Unit Species (PMUS) increased substantially in 2007 from 2006 levels. Landings of all pelagics increased 9.7%, with tuna PMUS increasing 10% and non-tuna PMUS increasing more than 9.9%. The number of trolling boats decreased by 4%, the number of trolling trips decreased by less than 1% and hours spent trolling decreased by almost 6%. Fewer boats making less trips may be a result of increasing gas prices, as fish were more abundant than the previous year. Trolling catch rates

(pounds per hour fished) showed a significant increase compared with 2006. Total CPUE was up 17%, with bonita, yellowfin, and mahimahi showing the greatest increases. Bonita CPUE increased by 14%, yellowfin CPUE increased by 89%, mahimahi CPUE increased by 68%, and equaled the highest CPUE in the 26 year data set.

Commercial landings and revenues decreased in 2006, with total adjusted revenues decreasing 24%. The adjusted average price for all pelagics decreased 9%, with tuna PMUS prices decreasing 13%, and non-tuna PMUS decreasing 8%. Adjusted revenue per trolling trip decreased 10% for all pelagics, decreased 6% for tuna PMUS, and decreased 12% for non-tuna PMUS. Commercial landings have shown a decreasing trend over the past six years. While some of this decrease may be attributed to major storm events of the past several years, the reason for the most recent decline may be the increased cost of fuel. The adjusted average price of pelagic species has declined each year for the past eight years while revenue per trolling trip has declined slightly over the same time period. Despite decreasing revenues with decreased commercial landings, pelagic fishing continues, as a majority of trollers do not rely on the catch or selling of fish as their primary source of income. Additionally, Guam law required the government of Guam to provide locally caught fish to food services in government agencies, such as Department of Education and Department of Corrections. In 2002, the government of Guam began implementing cost-saving measures, including privatization of food services. The requirement that locally fish be used for food services, while still a part of private contracts, is not being enforced. This has allowed private contractors to import cheaper foreign fish, and reduced the sales of vendors selling locally caught fish. This represented a substantial portion of sales of locally caught pelagic fish. The decrease in commercial sales seen following 2002 may be, in part, due to this change.

In October, 2005, one 35 foot boat began short lining for sharks at the southern banks, with the expectation to sell shark meat to Mexico. After this venture failed, the vessel tried vertical long lining, short lining, and deep bottom fishing, all without commercial success. The fisherman has since switched his operation to shallow bottom fishing at offshore banks.

The shortage of staff biologists has been significant in the past several years. DAWR staff biologists continue to oversee several projects simultaneously, while providing on-going training to ensure the high quality of data being collected by all staff. All fisheries staff are trained to identify the most commonly caught fish to the species level. New staff are mentored by biologists and senior technicians in the field before conducting creel surveys on their own.

The makeshift ramp at Ylig Bay provides access to boating and fishing resources along the windward coast of Guam. These fishing areas are not accessible most of the year due to rough seas, with most of the coast inaccessible for public shore-based fishing. However, as many as ten vehicles with trailers can be seen at Ylig during periods of calm weather. These fishermen are primarily trolling during the day, and bottom fishing and spear fishing during the evenings. Participation and effort at Ylig may be significant during the summer months when compared to the three offshore creel census sites. Also, a wave buoy deployed south of Ylig Bay is reported to aggregate pelagic fish. However, surveying this ramp remains challenging. Inadequate lighting, no public phone, return fishing times well after midnight, and other safety issues make

fishery data collecting challenging. A lack of freshwater for rinsing and large catches which can require substantial time to sample discourage fishermen from being interviewed as they prefer not to stay long after trailering their boats. Currently, creel census data cannot regularly be obtained at this site. An educational outreach and modifying current sampling techniques addressing all the above challenges is necessary before adding Ylig as a creel census site.
In December, 2006, a new launch ramp and facility was opened in Acfayan Bay, located in the village on Inarajan on the southeast coast of Guam. Monitoring of this ramp for pelagic fishing activity began at the start of 2007. In early 2007, this facility was damaged by heavy surf, and has yet to be repaired. Monitoring of this ramp is currently on hold until the ramp is repaired

Several factors in recent years have negatively affected trolling activity and may affect fishing activity in the future. The price of fuel has increased significantly; making it more costly to fish and also more attractive to sell fish to recoup costs. More than three/fourths of the FADS are offline, and difficulties with procurement have prevented timely redeployment of these systems. Trolling activity occurs regularly at FADs, and reported to have occurred significantly at offshore banks. At offshore banks, fishermen also reported more interaction with sharks.

2008 Recommendations

1. Explore the possibility of expanding the offshore survey to include Ylig. This opportunistic fishery can provide information on otherwise poorly known areas of Guam.
2. Expand the offshore monitoring program to include the new ramp at Acfayan bay
3. Streamline the procurement process to facilitate the redeployment of FADS

Table 1. Guam 2007 Creel Survey - Pelagic Species Composition

Species	Total Landing (Lbs)	Non-Charter	Charter
Skipjack Tuna	156,651	142,122	14,529
Yellowfin Tuna	47,833	44,649	3,184
Kawakawa	1,448	1,276	172
Albacore	0	0	0
Bigeye Tuna	830	830	0
Other Tuna PMUS	0	0	0
Tuna PMUS	**206,762**	**188,877**	**17,885**
Mahimahi	258,260	216,953	41,307
Wahoo	44,354	30,992	13,362
Blue Marlin	18,994	14,148	4,846
Black Marlin	0	0	0
Striped Marlin	0	0	0
Sailfish	4,078	3,669	409
Shortbill Spearfish	0	0	0
Swordfish	0	0	0
Oceanic Sharks	0	0	0
Pomfrets	1,195	1,195	0
Oilfish	6,632	6,632	0
Moonfish	0	0	0
Misc. Longline Fish	0	0	0
Non-tuna PMUS	**333,513**	**273,589**	**59,924**
Dogtooth Tuna	5,723	5,650	73
Rainbow Runner	5,042	4,831	211
Barracudas	8,850	8,659	191
Oceanic Sharks	0	0	0
Misc. Troll Fish	0	0	0
Non-PMUS Pelagics	**19,615**	**19,140**	**475**
Total Pelagics	**559,890**	**481,606**	**78,284**

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey data. This table includes several species of barracuda and the double-lined mackerel, species that may not be included in other tables in this report. Pelagic totals may slightly differ in those tables.

Table2: Guam 2007 Annual Commercial Average Price of Pelagic Species

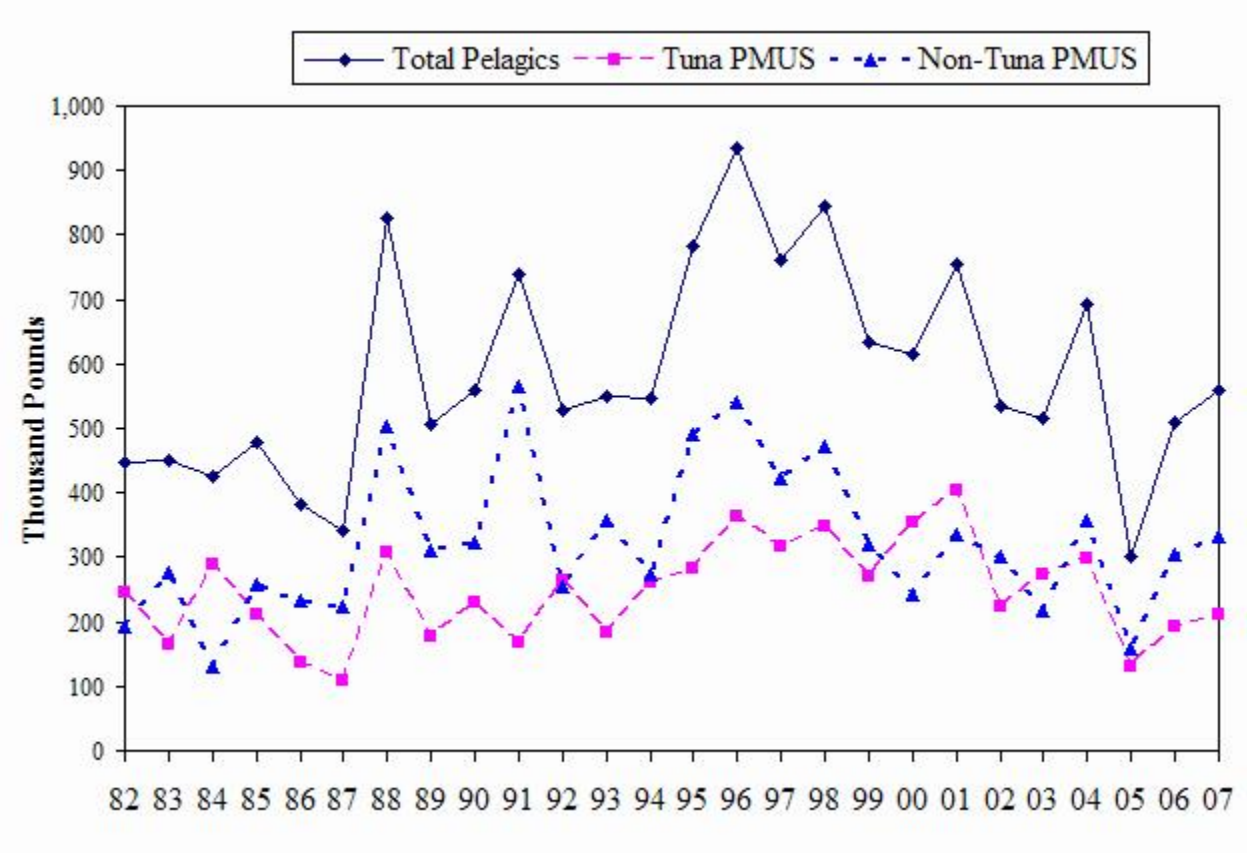
Species	Average Price ($/Lb)
Yellowfin Tuna	1.96
Bonita/skipjack Tuna	1.26
Tunas Subtotal	**1.48**
Monchong	2.25
Swordfish	2.50
Spearfish	1.25
Sailfish	1.42
Marlin	1.49
Wahoo	1.98
Mahi / Dolphinfish	**1.69**
Non-tuna **PMUS Subtotal**	1.70
Barracuda	1.75
Rainbow Runner	1.39
Dogtooth Tuna	**1.34**
Non-PMUS Pelagic **Subtotal**	1.44
Pelagic Total	**1.68**

Source: The WPacFIN-sponsored commercial landings system.

Table 3. Annual Consumer Price Indexes and CPI Adjustment Factors

Year	Consumer Price Index	CPI Adjust Factor
1980	134.0	4.37
1981	161.4	3.63
1982	169.7	3.45
1983	175.6	3.34
1984	190.9	3.07
1985	198.3	2.95
1986	203.7	2.88
1987	212.7	2.75
1988	223.8	2.62
1989	248.2	2.36
1990	283.5	2.07
1991	312.5	1.87
1992	344.2	1.70
1993	372.9	1.57
1994	436.0	1.34
1995	459.2	1.28
1996	482.0	1.22
1997	491.4	1.19
1998	488.9	1.20
1999	497.9	1.18
2000	508.1	1.15
2001	501.2	1.17
2002	504.5	1.16
2003	521.4	1.12
2004	563.2	1.04
2005	585.6	1.00
2006	666.1	0.88
2007	**585.6**	**1.00**

Figure 1a. Guam Annual Estimated Total Landings:
All Pelagics, Tuna PMUS, and Non-Tuna PMUS



Interpretation: The estimated total pelagic, tuna, and non-tuna PMUS have exhibited a cyclic trend, with a peak year followed by one or two down years. Total pelagic catch peaked in 1996, and has been decreasing since. Factors relating to this cycle may have to do with the biology of the fish or be weather related. Additionally, decreasing returns on fish catch, and increasing fuel prices may affect the amount of fish being caught. There is also anecdotal evidence from the average fishermen that pelagic fish are not caught consistently year round around Guam.

Compared with 2006, total pelagic and non-tuna PMUS increased 9.7% and 9.9% respectively, while tuna landings increased 10%. Non-tuna PMUS catch was slightly above the 26 year average, while the tuna PMUS and total pelagic catch were slightly below the 26 year average. Generally, tuna species are consistently caught year round, with the other major pelagic species being more seasonal.

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey.

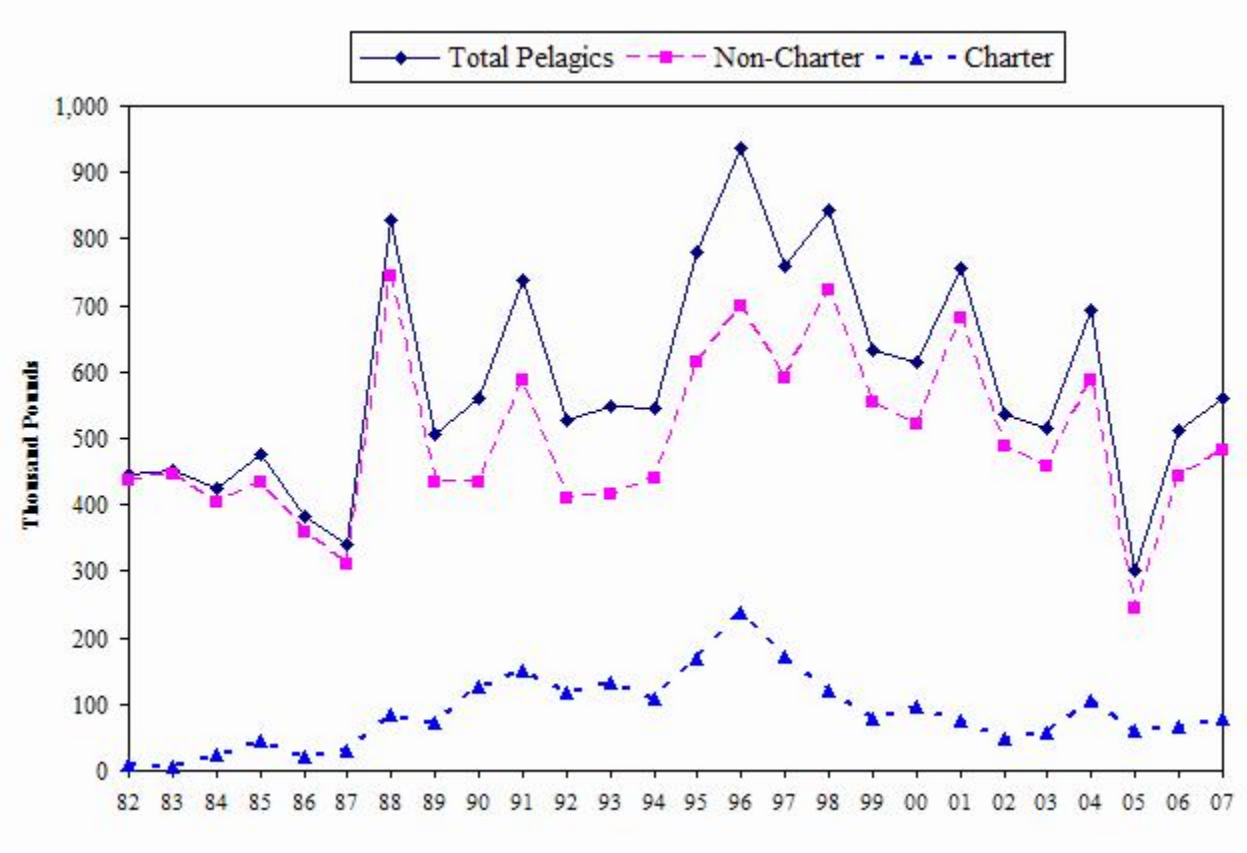
Calculation: A 365-day (366 days during leap years) quarterly expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the

expanded period. The annual catch for all pelagic species and the PMUS separately are summed across all methods to obtain the numbers plotted above.

Estimated Total Landings (Pounds)

Year	All Pelagics	Tuna PMUS	Non-Tuna PMUS
1982	447,000	245,081	192,007
1983	450,823	166,105	277,179
1984	424,856	288,958	130,249
1985	477,154	210,620	258,045
1986	381,350	138,072	231,862
1987	341,385	109,757	224,471
1988	827,287	308,303	504,149
1989	506,184	176,973	311,339
1990	559,365	230,318	321,769
1991	737,898	168,800	566,353
1992	528,211	265,025	254,796
1993	548,295	184,394	357,787
1994	545,917	262,181	273,167
1995	781,389	282,586	490,234
1996	935,809	364,651	541,551
1997	759,932	316,548	420,967
1998	844,081	347,754	471,180
1999	632,354	270,744	321,178
2000	614,710	355,374	242,774
2001	755,028	403,720	336,571
2002	534,878	223,805	302,339
2003	515,145	273,042	217,469
2004	693,217	298,709	356,586
2005	301,504	129,500	159,935
2006	510,608	192,247	303,297
2007	**559,891**	**212,487**	**333,513**
Average	585,164	247,144	323,106
Standard Deviation	163,368	77,127	115,387

Figure 1b. Guam Annual Estimated Total Pelagic Landings: Total Pelagics, Non-Charter, and Charter



Interpretation: Non-charter trolling trips have always accounted for the bulk of the pelagic catch, although charter boats, which make up less than 5% of the troll fleet, account for a high proportion of trolling effort and catch. Prior to 1988, non-charter boats accounted for over 90% of the troll catch. In 1988, this percentage decreased due to an increase in charter boat activity catering specifically to Asian visitors. Beginning in 1996 however, a downturn in Japan's economy caused a significant decrease in charter trips and subsequent landings. No such trend is observed for non-charters. In 2007, total pelagic and non-charter landings increased 9.7% and 8.6% respectively, while charter landings increased 16%. All three categories are slightly below the 26 year average for the data set. Non-charter boats landed 86% of all pelagics in 2007.

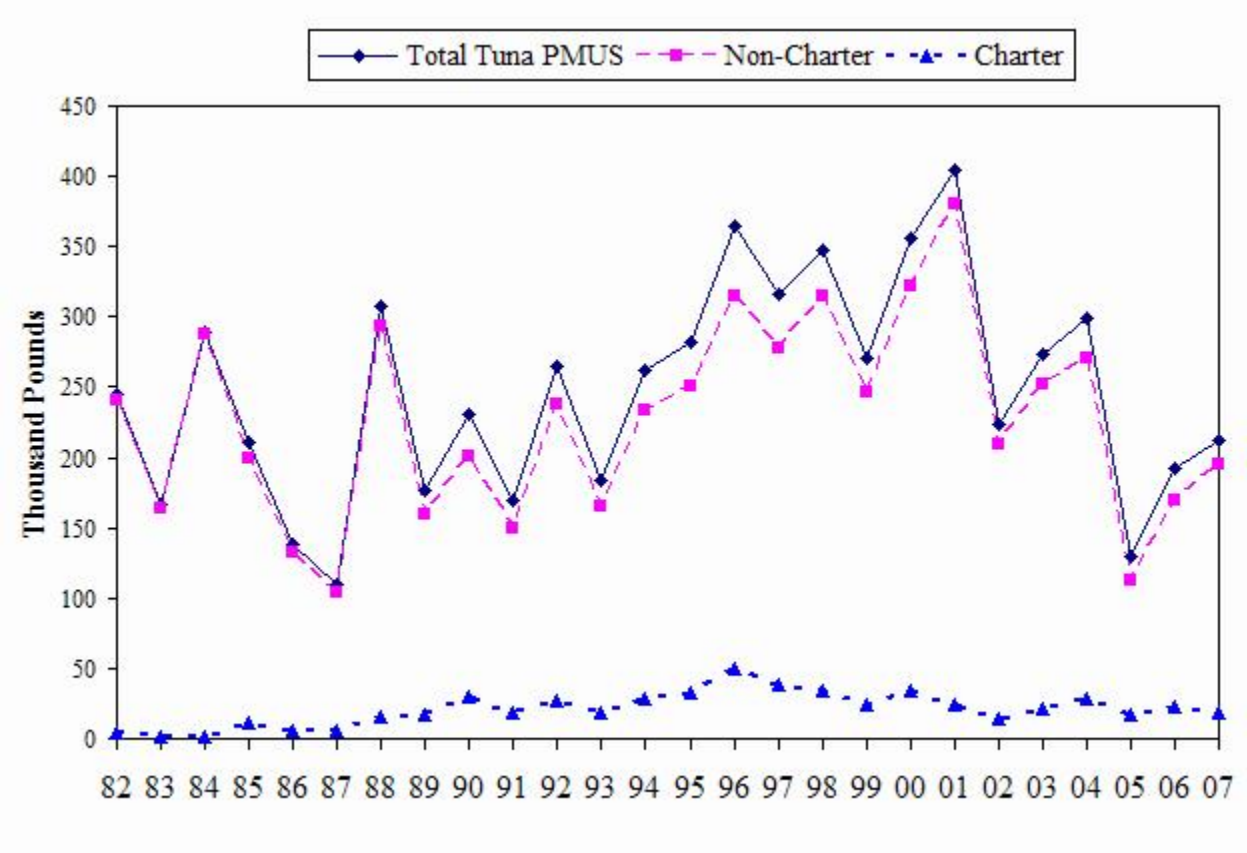
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey data.

Calculation: A 365-day (366 days during leap years) quarterly expansion is run for each calendar year of survey data to produce catch and effort estimates for trolling. 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 PMUS separately are summed across all methods to obtain the numbers plotted above.

Estimated Total Landings (Pounds)

Year	Total Pelagics	Non-Charter	Charter
1982	447,000	437,865	9,135
1983	450,823	445,116	5,707
1984	424,856	402,245	22,612
1985	477,154	432,283	44,871
1986	381,350	359,027	22,323
1987	341,385	310,378	31,007
1988	827,287	743,442	83,845
1989	506,184	435,206	70,978
1990	559,365	433,954	125,411
1991	737,898	587,400	150,498
1992	528,211	409,544	118,667
1993	548,295	416,340	131,955
1994	545,917	438,677	107,239
1995	781,389	614,137	167,251
1996	935,809	699,054	236,755
1997	759,932	589,085	170,847
1998	844,081	722,107	121,974
1999	632,354	553,486	78,868
2000	614,710	519,679	95,032
2001	755,028	680,465	74,563
2002	534,878	486,791	48,087
2003	515,145	459,071	56,074
2004	693,217	586,688	106,529
2005	301,504	242,536	58,968
2006	510,608	443,504	67,104
2007	**559,891**	**481,607**	**78,284**
Average	585,164	497,296	87,869
Standard Deviation	163,368	125,853	55,358

Figure 1c. Guam Annual Estimated Tuna PMUS Landings: Total, Non-Charter, and Charter



Interpretation: The general trend of the estimated total tuna landings shows an increasing trend between 1987 and 2001. Non-charter boats account for the bulk of the total tuna catch, up to 95% in the 1980's. This decreased when charter boat activity began increased from the late 1980's until the mid 1990's. In 2007, 91% of tuna were caught by non-charter boats. In 2007, total tuna and non-charter landings increased by 10% and 15% respectively. Charter tuna landings decreased by 23% from 2006 totals. The 2007 estimated tuna PMUS landings were 14% lower than the 26 year average.

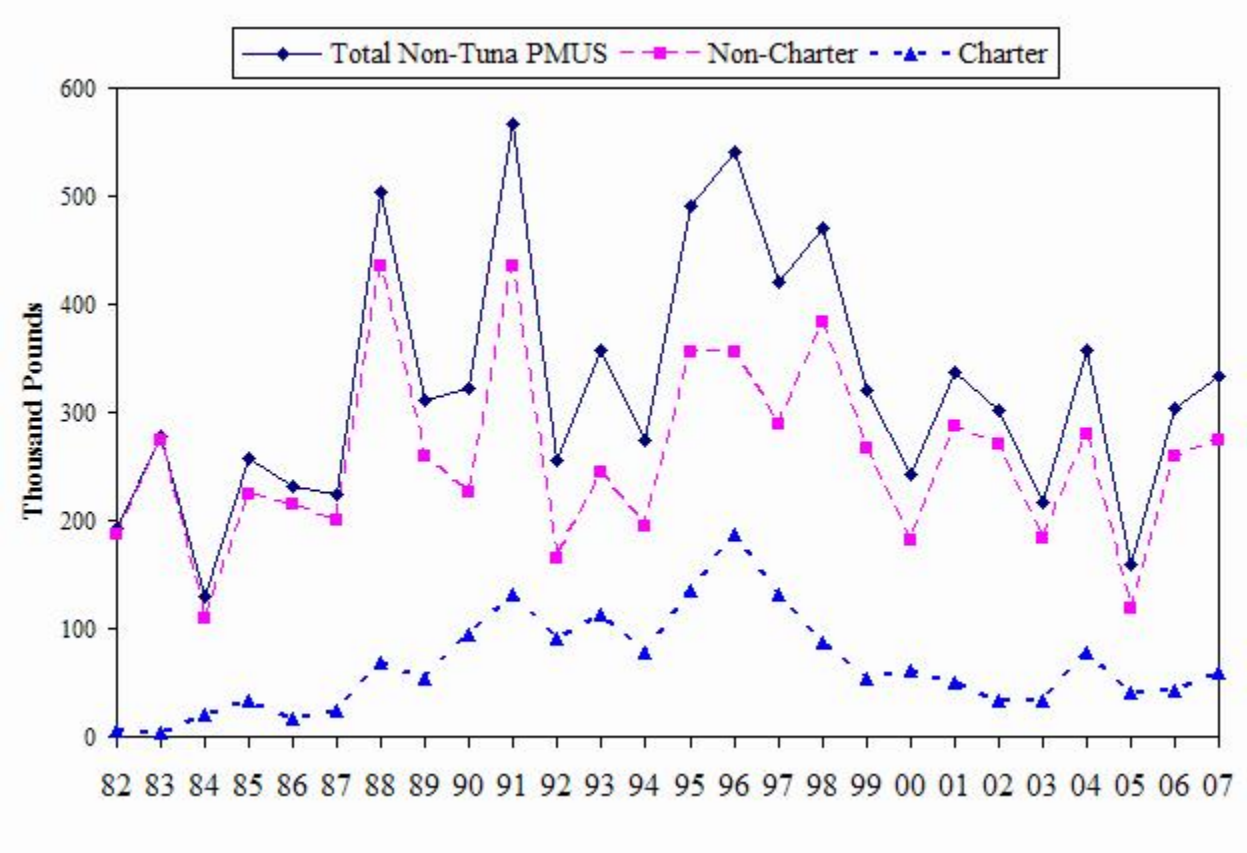
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: A 365-day (366 days during leap years) quarterly expansion is run for each calendar year of survey data to produce catch and effort estimates for trolling. 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 PMUS separately are summed across all methods to obtain the numbers plotted above.

Estimated Total Landings (Pounds)

Year	Total Tunas	Non-Charter	Charter
1982	245,081	241,091	3,990
1983	166,105	164,377	1,729
1984	288,958	287,375	1,582
1985	210,620	199,270	11,350
1986	138,072	132,354	5,718
1987	109,757	103,971	5,787
1988	308,303	293,340	14,963
1989	176,973	159,302	17,671
1990	230,318	200,780	29,538
1991	168,800	149,735	19,065
1992	265,025	237,890	27,135
1993	184,394	165,609	18,786
1994	262,181	233,223	28,959
1995	282,586	250,219	32,366
1996	364,651	315,268	49,383
1997	316,548	277,983	38,566
1998	347,754	314,221	33,533
1999	270,744	246,792	23,952
2000	355,374	321,546	33,828
2001	403,720	380,019	23,701
2002	223,805	208,925	14,880
2003	273,042	251,498	21,545
2004	298,709	269,861	28,848
2005	129,500	113,050	16,450
2006	192,247	168,788	23,459
2007	**212,487**	**194,528**	**17,958**
Average	247,144	226,193	20,952
Standard Deviation	77,127	70,329	11,903

Figure 1d. Guam Annual Estimated Non-Tuna PMUS Landings: Total, Non-Charter, and Charter



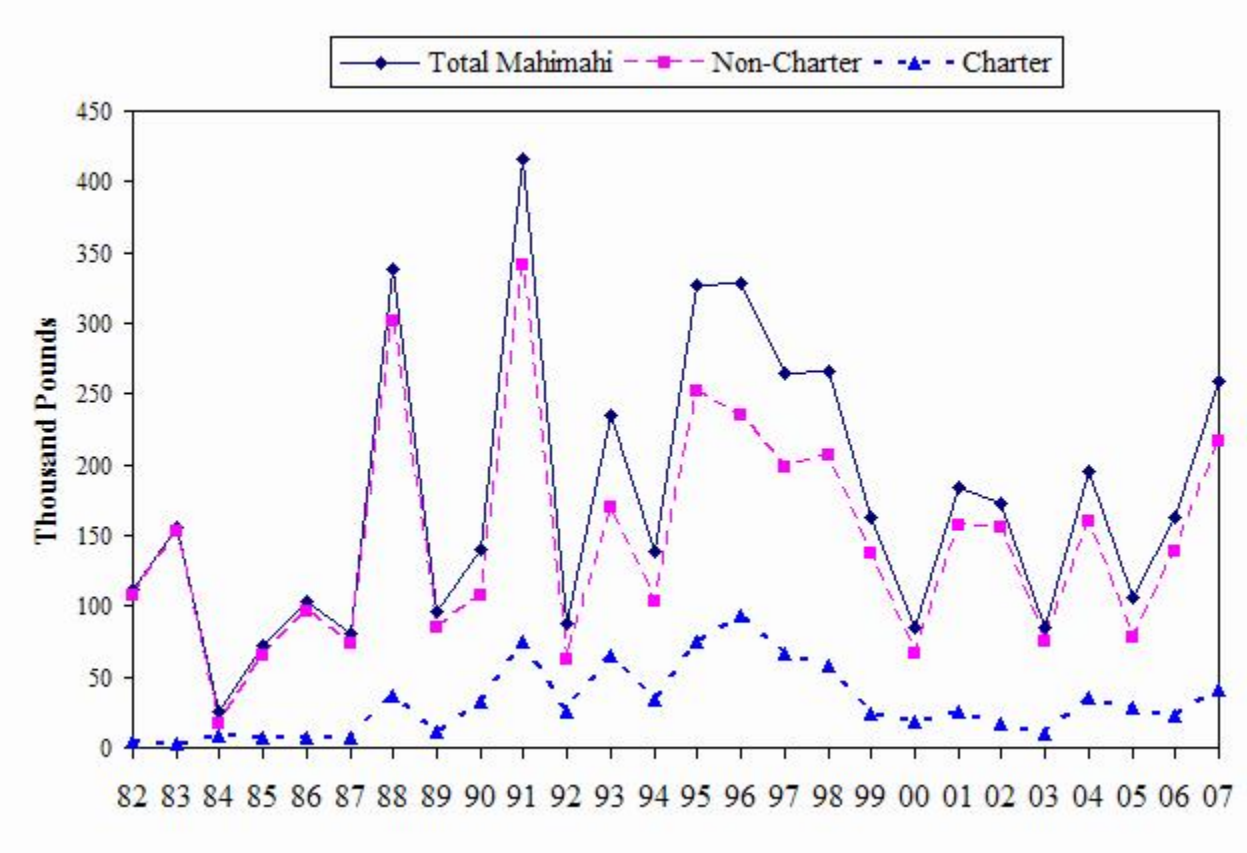
Interpretation: The estimated total PMUS landings showed a general increase between 1984 and 1996, corresponding with an increase in boats entering the fishery. Non-charter trolling trips accounts for the bulk of the other PMUS catch. Up until the mid-1980's, non-charter boats accounted for up to 90% of the non-PMUS species. This percentage began decreasing in the late 1980's when charter fishing activity began increasing, associated with an increase in tourism. Charter PMUS harvest began gradually decreasing after 1996. Non-charter PMUS landings also began decreasing after 1996, but exhibit year to year fluctuations. In 2007, total non-tuna PMUS and non-charter non-tuna PMUS increased 9.9% and 5% respectively, compared with 2006. Charter non-tuna PMUS increased 38%. Non-charter boats accounted for 82% of non-tuna PMUS catch in 2007.

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 PMUS separately are summed across all methods to obtain the numbers plotted above.

Estimated Total Landings (Pounds)

Year	Total Non-Tuna PMUS	Non-Charter	Charter
1982	192,007	187,219	4,788
1983	277,179	273,201	3,978
1984	130,249	109,220	21,029
1985	258,045	224,539	33,506
1986	231,862	215,344	16,518
1987	224,471	199,531	24,940
1988	504,149	435,477	68,672
1989	311,339	258,378	52,961
1990	321,769	226,418	95,350
1991	566,353	435,148	131,205
1992	254,796	164,396	90,400
1993	357,787	245,139	112,648
1994	273,167	195,134	78,032
1995	490,234	355,964	134,271
1996	541,551	354,763	186,788
1997	420,967	289,596	131,371
1998	471,180	383,251	87,929
1999	321,178	267,112	54,066
2000	242,774	181,972	60,802
2001	336,571	286,816	49,756
2002	302,339	269,555	32,784
2003	217,469	183,696	33,773
2004	356,586	279,289	77,297
2005	159,935	118,434	41,500
2006	303,297	259,979	43,318
2007	**333,513**	**273,589**	**59,924**
Average	323,106	256,660	66,446
Standard Deviation	115,387	84,526	45,107

Figure 2a. Guam Annual Estimated Total Mahimahi Landings: Total, Non-Charter, and Charter



Interpretations: Historically, mahimahi catches have fluctuated wildly, with a good year followed by one or two down years. Catch peaked in 1996, and has been lower since, although still demonstrating the cyclical nature. Non-charter trips account for the bulk of the mahimahi catch, with charter activity harvesting proportionally more beginning in the late 1980's as tourist arrivals to Guam increased. A drop in charter catch corresponds to decreasing tourist arrivals in the late 1990's. In 2007, mahimahi landings increased, with total and non-charter landings increasing 59% and 55%, respectively. Charter landings increased by 78%. Mahimahi season generally occurs during the first quarter of the year. Guam was in a mild El Nino condition the last quarter of 2004 and the first quarter of 2005 The 2004 total mahimahi harvest was the highest across all categories since 1998, which was the year of the last major El Nino event on Guam. This suggests a possible link between ENSO events and mahimahi harvest around Guam. El Nino events also corresponded to elevated mahimahi harvests of 1995-6, 1991, and 1987-8. (NOAA website). Guam experienced El Nino conditions in 2006. This corresponded to an increased mahimahi catch for 2007.

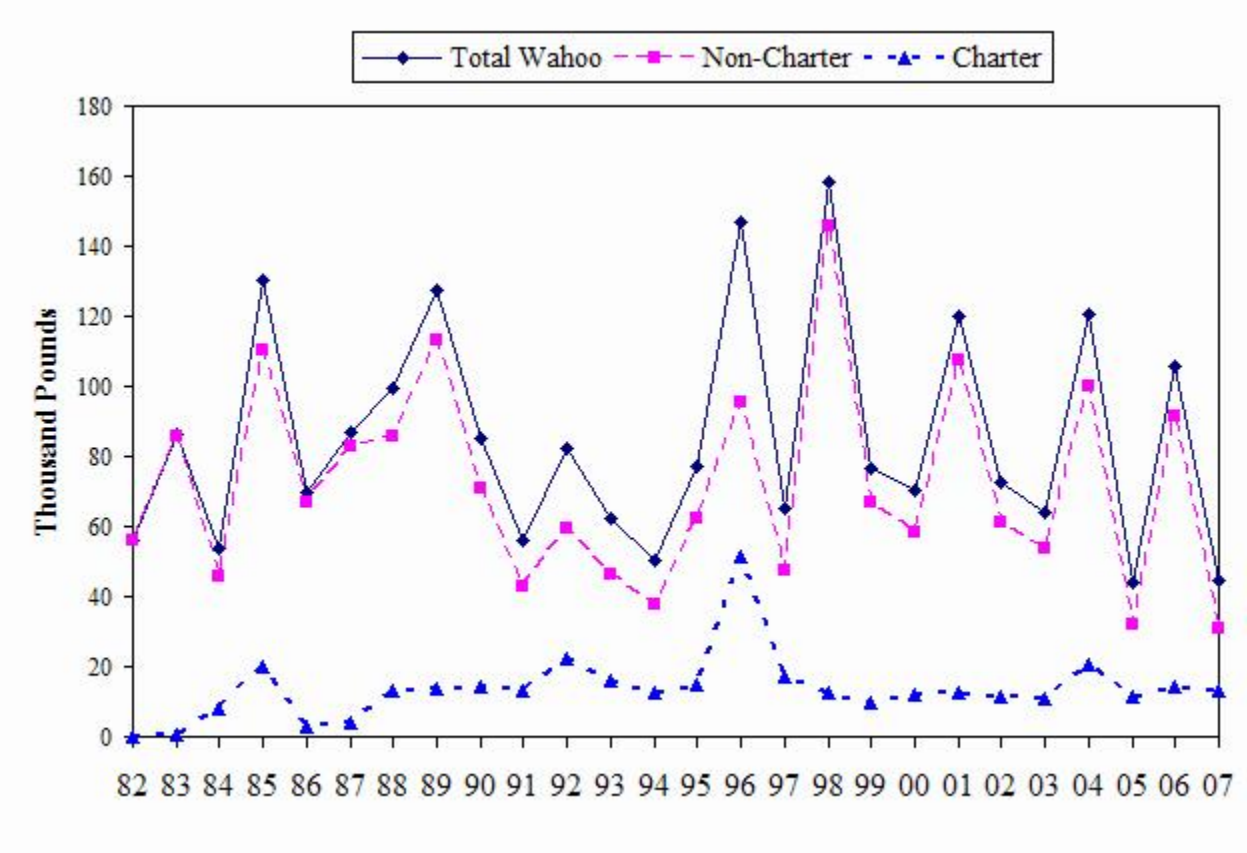
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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

Estimated Total Landings (Pounds)

Year	Total Mahimahi	Non-Charter	Charter
1982	112,202	107,501	4,701
1983	156,340	153,158	3,183
1984	26,080	17,372	8,707
1985	72,699	65,658	7,041
1986	102,921	96,065	6,856
1987	80,275	73,028	7,247
1988	338,413	301,732	36,680
1989	96,039	84,563	11,476
1990	140,293	107,740	32,553
1991	416,053	341,358	74,695
1992	87,620	61,765	25,856
1993	234,979	169,662	65,317
1994	138,014	103,648	34,367
1995	327,394	251,782	75,611
1996	327,604	234,507	93,097
1997	265,157	198,344	66,813
1998	265,388	207,239	58,149
1999	162,223	137,811	24,413
2000	85,585	66,499	19,086
2001	183,278	157,293	25,986
2002	173,130	156,172	16,958
2003	84,739	74,766	9,973
2004	195,340	159,948	35,392
2005	105,715	77,931	27,784
2006	162,512	139,365	23,147
2007	**258,260**	**216,953**	**41,307**
Average	176,856	144,687	32,169
Standard Deviation	99,469	79,126	25,379

Figure 2b. Guam Annual Estimated Total Wahoo Landings: Total, Non-charter, and Charter



Interpretations: The wide fluctuations in wahoo landings are probably due to the high variability in the year-to-year abundance and availability of the stocks. Until 1987, non-charter landings accounted for over 95% of the total catch. In 1988, this percentage decreased due to an increase in charter boat activity. In 1996, wahoo charter landings peaked, accounting for 35% of the total catch. In 2007, total, non-charter, and charter harvest of wahoo decreased 58%, 66%, and 5% respectively from 2007. Non-charter boats harvested 70% of the total wahoo harvest. The total wahoo catch was the second lowest for the 26 year data set. A lack of deployed FADs may have contributed to the low catch in 2007.

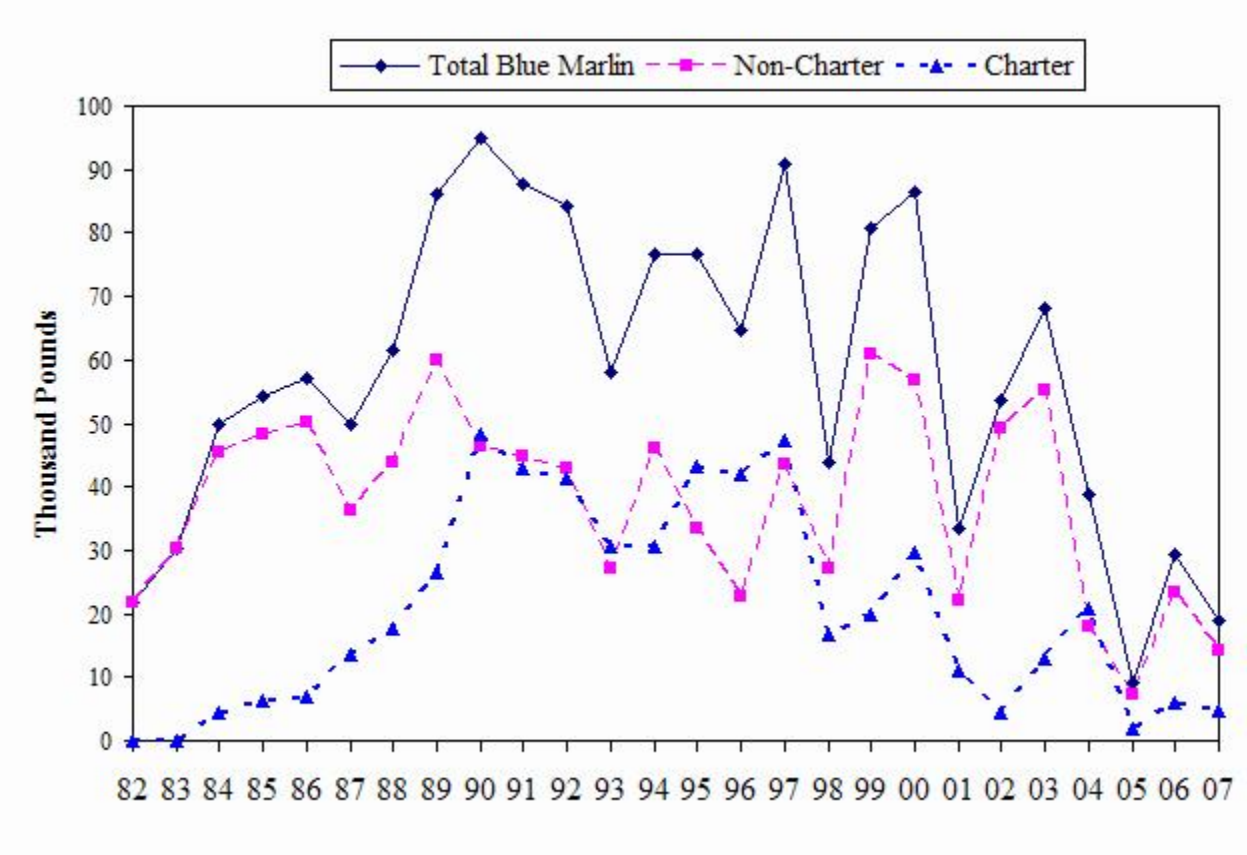
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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

Estimated Total Landings (Pounds)

Year	Total Wahoo	Non-Charter	Charter
1982	55,909	55,822	87
1983	86,530	85,735	795
1984	53,847	45,943	7,905
1985	130,304	110,046	20,258
1986	69,583	66,815	2,768
1987	86,967	82,903	4,065
1988	99,149	85,764	13,385
1989	127,183	113,250	13,933
1990	85,280	71,131	14,149
1991	55,952	42,681	13,270
1992	82,244	59,681	22,563
1993	62,550	46,532	16,018
1994	50,457	37,766	12,691
1995	77,369	62,255	15,114
1996	146,926	95,545	51,381
1997	65,034	47,693	17,341
1998	158,538	145,928	12,610
1999	76,477	66,673	9,804
2000	70,484	58,429	12,056
2001	119,765	107,150	12,616
2002	72,643	61,386	11,257
2003	64,266	53,505	10,761
2004	120,288	99,963	20,325
2005	43,906	32,201	11,704
2006	105,878	91,713	14,166
2007	**44,354**	**30,992**	**13,362**
Average	85,072	71,442	13,630
Standard Deviation	31,898	28,624	9,475

Figure 3a. Guam Annual Estimated Total Blue Marlin Landings: Total, Non-charter, and Charter



Interpretations: During the 1980's, non-charter boats accounted for the bulk of the blue marlin catch. In the early 1990's, charters share of the marlin catch began to increase, peaking at 64% in 1996. The increases were due to an increase in charter boat activity and the active targeting of blue marlin by charter boats during the summer months. The decrease in charter landings after 1997 corresponded to the decrease in tourist charter trips. In 2007, the overall, and non-charter blue marlin landings decreased 35%, and 39% respectively. Charter blue marlin catch decreased by 19%, and accounted for 25% of the total blue marlin harvest. Blue marlin landings were below the 26 year average in all categories.

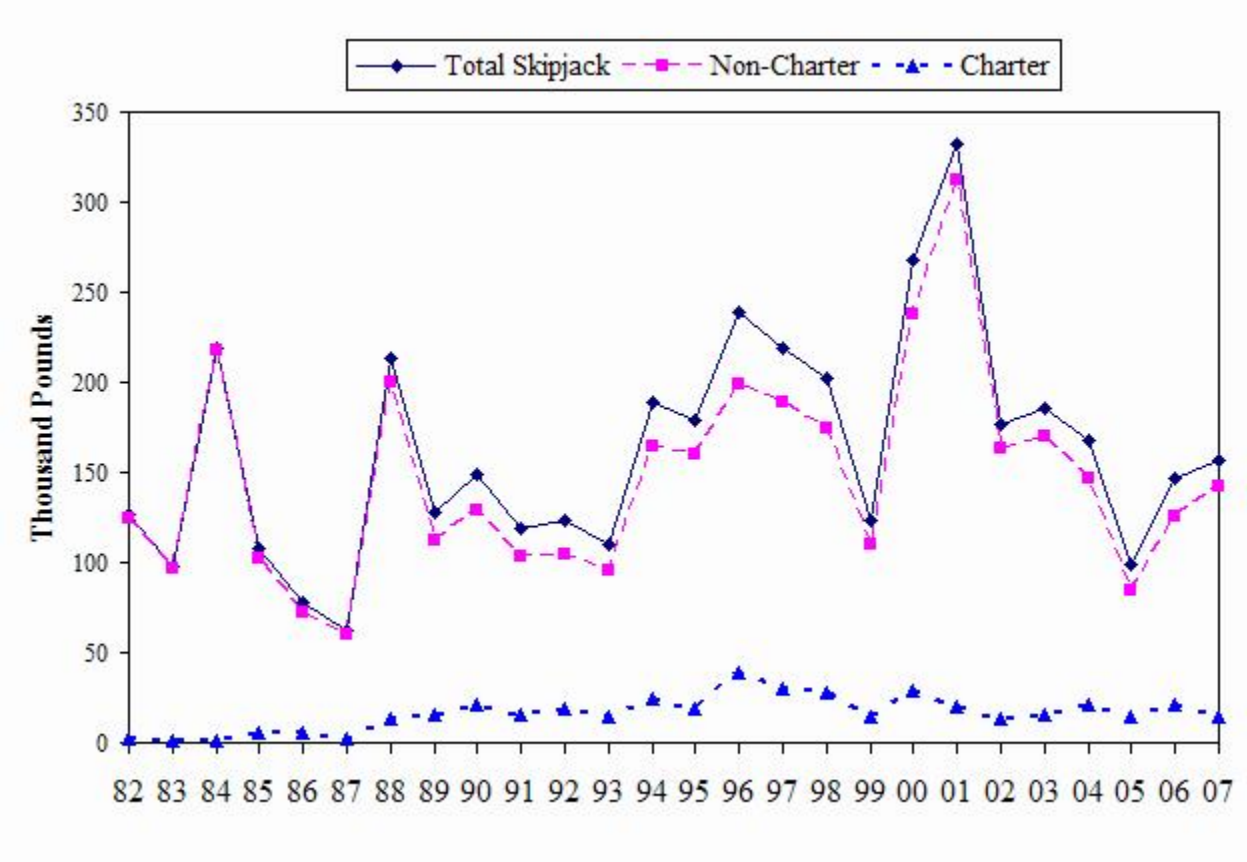
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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

Estimated Total Landings (Pounds)

Year	Total Blue Marlin	Non-Charter	Charter
1982	21,787	21,787	
1983	30,402	30,402	
1984	49,711	45,293	4,417
1985	54,319	48,113	6,207
1986	57,105	50,211	6,894
1987	49,979	36,351	13,629
1988	61,647	43,989	17,657
1989	86,238	59,886	26,352
1990	94,796	46,411	48,385
1991	87,838	44,941	42,897
1992	84,358	42,939	41,419
1993	57,992	27,280	30,713
1994	76,633	46,057	30,576
1995	76,703	33,450	43,252
1996	64,527	22,597	41,930
1997	90,777	43,559	47,217
1998	43,912	27,051	16,860
1999	80,760	61,032	19,728
2000	86,565	56,905	29,660
2001	33,302	22,148	11,154
2002	53,761	49,191	4,569
2003	68,204	55,165	13,039
2004	38,845	18,036	20,809
2005	9,270	7,258	2,012
2006	29,222	23,217	6,005
2007	**18,994**	**14,148**	**4,846**
Average	57,986	37,593	22,093
Standard Deviation	24,609	14,914	15,578

Figure 4a. Guam Annual Estimated Total Skipjack Landings: Total, Non-charter, and Charter



Interpretations: Skipjack tuna catch has fluctuated over the reporting period, peaking in 2001. A drop in skipjack tuna during 2002 may be due to direct hits by two super typhoons, though the catch for 2002 is still above the 24 year average. The reason for the high numbers of 2001 is not clear. It could have to do with the biology of the species.

Total skipjack tuna landings and non-charter landings increased in 2007 by 6.8% and 12.8% respectively, while charter landings decreased by 29%. All three categories are slightly below the 26-year averages.

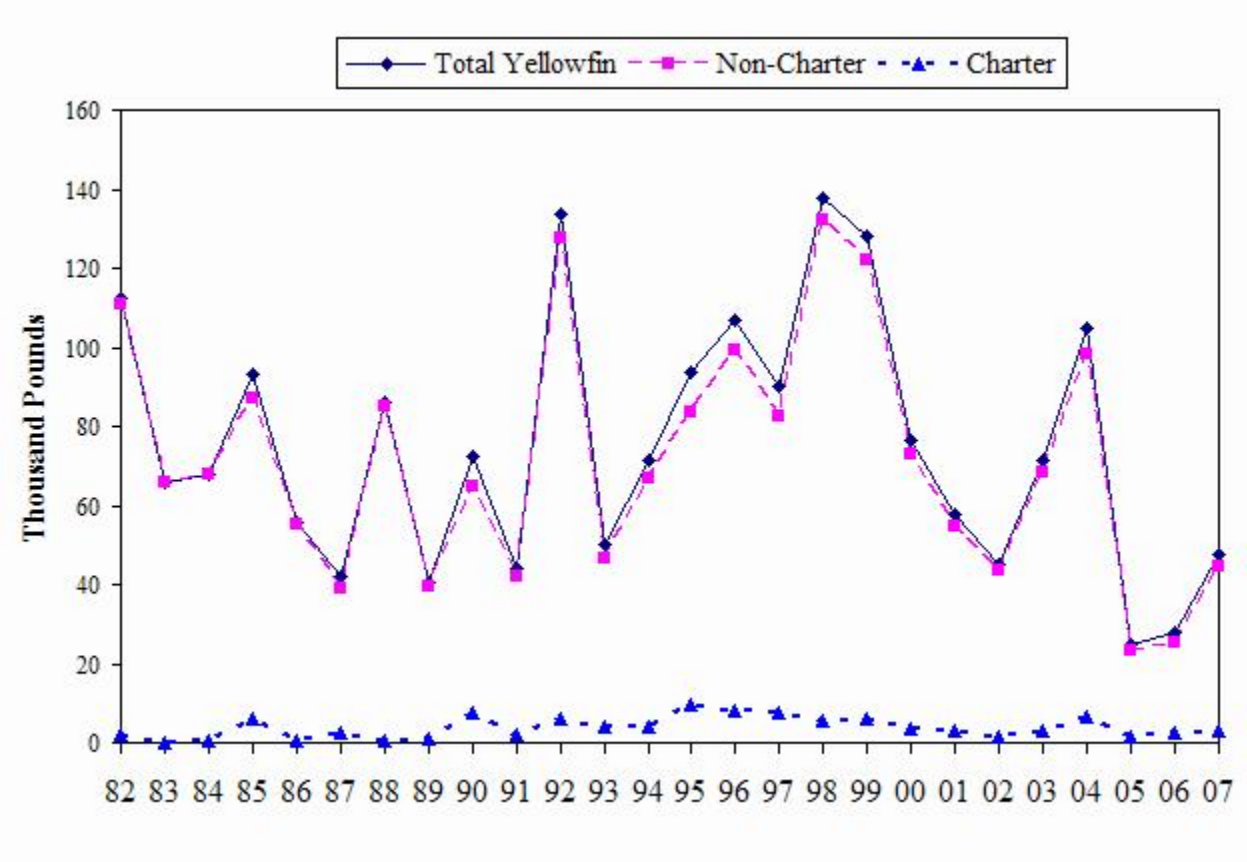
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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

Estimated Total Landings (Pounds)

Year	Total Skipjack	Non-Charter	Charter
1982	126,652	124,476	2,176
1983	97,802	96,142	1,660
1984	218,556	217,388	1,168
1985	107,815	102,616	5,199
1986	77,735	72,652	5,083
1987	62,296	59,600	2,696
1988	213,469	200,395	13,074
1989	128,134	112,037	16,097
1990	149,312	128,747	20,566
1991	118,799	102,967	15,832
1992	123,766	104,539	19,227
1993	109,582	95,081	14,502
1994	188,784	164,288	24,496
1995	178,635	160,275	18,360
1996	238,409	199,431	38,978
1997	219,177	189,211	29,966
1998	202,482	174,763	27,718
1999	123,720	109,696	14,024
2000	267,541	238,304	29,237
2001	331,768	312,001	19,767
2002	176,356	163,504	12,852
2003	185,575	170,352	15,223
2004	168,232	146,841	21,391
2005	99,391	84,762	14,629
2006	146,658	126,042	20,616
2007	**156,651**	**142,122**	**14,529**
Average	162,204	146,086	16,118
Standard Deviation	62,203	57,233	9,524

Figure 4b. Guam Annual Estimated Total Yellowfin Landings: Total, Non-charter, and Charter



Interpretations: The overall yellowfin landings show wide fluctuations during the 26-year time series, although the total and non-charter estimated landings showed a significant decrease from 1998 to 2002. Charter landings of yellowfin tuna peaked in 1985, 1990, and 1995, and then showed a general decrease until 2002. Yellowfin tuna catch was up significantly in 2007, with total catch, non-charter catch, and charter catch up 70%, 76%, and 21%, respectively. Non-charter boats harvested 93% of the total yearly catch of yellowfin. Despite these increases, all three categories are well below their 26-year averages.

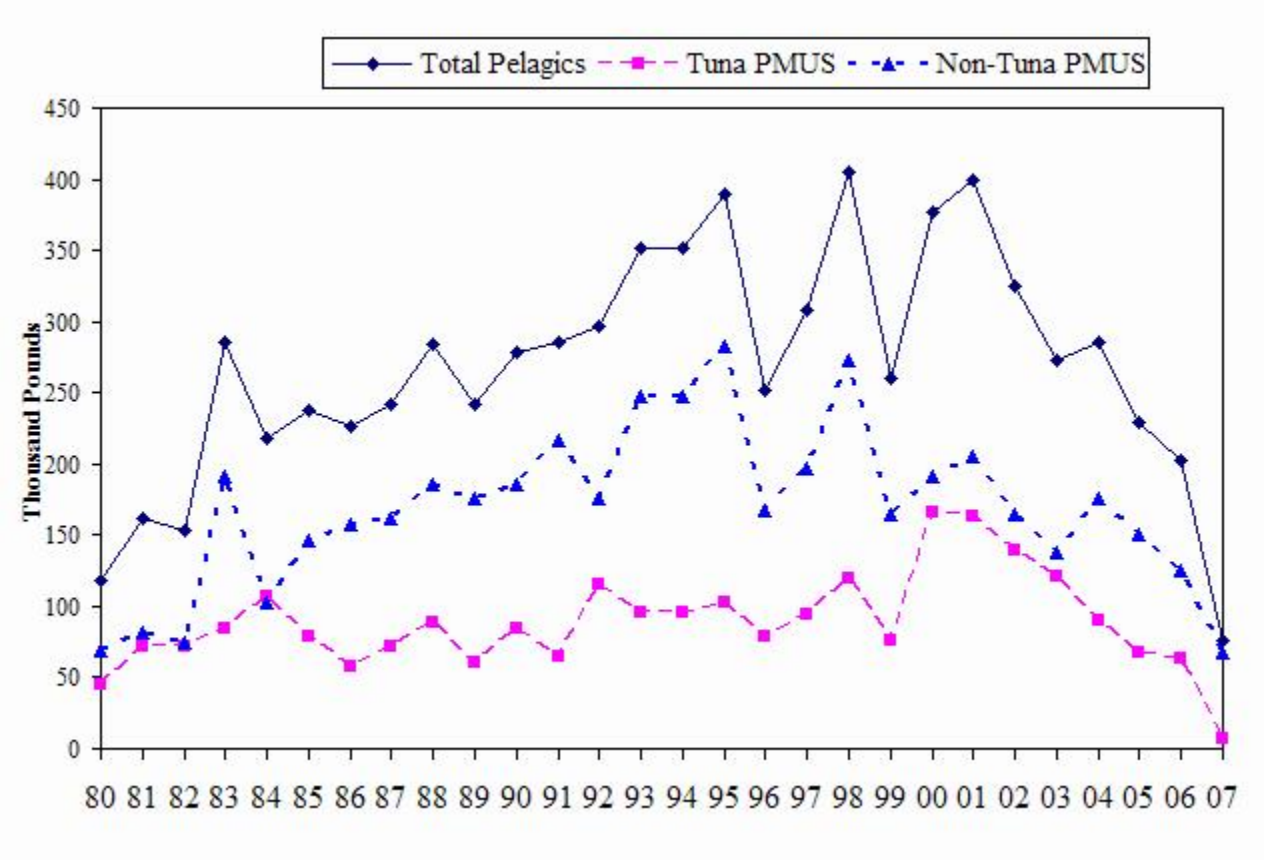
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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

Estimated Total Landings (Pounds)

Year	Total Yellowfin	Non-Charter	Charter
1982	112,654	110,841	1,813
1983	65,996	65,996	
1984	68,048	67,769	279
1985	93,018	87,129	5,889
1986	55,611	55,063	549
1987	41,810	39,052	2,758
1988	85,828	85,245	582
1989	40,382	39,354	1,028
1990	72,314	64,782	7,532
1991	44,073	41,865	2,208
1992	133,429	127,539	5,889
1993	50,350	46,444	3,906
1994	71,221	67,022	4,199
1995	93,424	83,791	9,633
1996	107,023	99,127	7,896
1997	90,167	82,408	7,759
1998	137,707	132,353	5,354
1999	128,048	122,204	5,844
2000	76,606	72,905	3,702
2001	57,929	54,668	3,261
2002	45,089	43,336	1,753
2003	71,626	68,573	3,053
2004	104,845	98,145	6,700
2005	24,884	23,130	1,754
2006	28,049	25,419	2,630
2007	**47,833**	**44,649**	**3,184**
Average	74,922	71,108	3,966
Standard Deviation	31,969	30,579	2,607

Figure 5. Guam Annual Estimated Commercial Landings: All Pelagics, Tuna PMUS, and Non-tuna PMUS



Interpretations: Commercial pelagic fishery landings have shown a general increase for the first 20 years in the 27-year time series. In 2002, the estimated commercial landings decreased overall by 17%, with a 15% decrease for tuna landings and a 20% decrease for landings of other PMUS, possibly due to direct hits by two super typhoons, resulting in boat damage, lack of tourist for the commercial charter boats, and unavailability of ice for fishermen. After a small increase in catch for 2004, the downward trend continued in 2007. Early in 2007, a vendor who provides a large part of DAWR's commercial data opted to not share the data with DAWR. Thus, numbers are much lower, primarily due to a lack of data for the entire year. Percent changes were not calculated due to lack of data.

Source: The WPACFIN-sponsored commercial landings system.

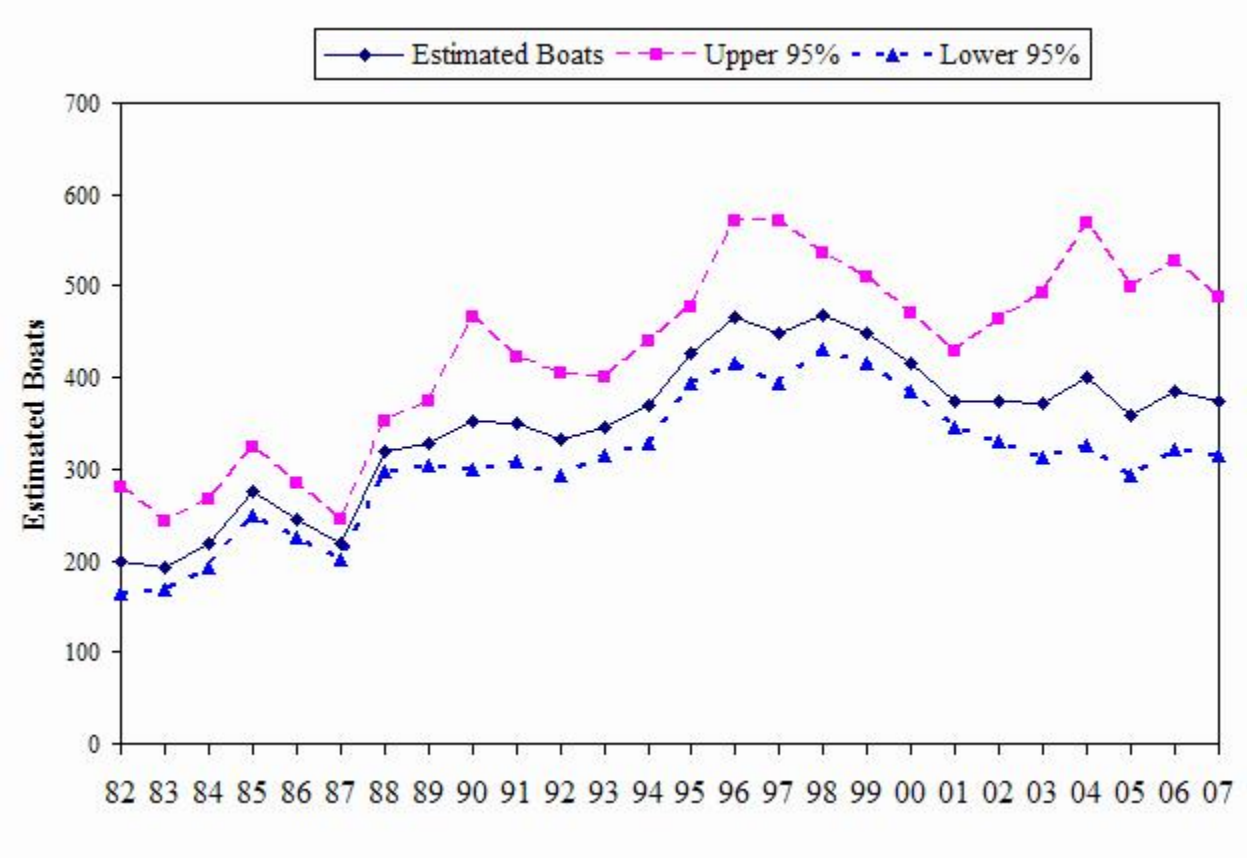
Calculation: Total commercial landings were estimated by summing the weight fields in the commercial landings database from the principle fish wholesalers on Guam, and then multiplying by an estimated percent coverage expansion factor. The annual expansion factor was subjectively created based on as 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.

Estimated Commercial Landings (Pounds)

Year	All Pelagics	Tuna PMUS	Non-Tuna PMUS
1980	118,251	45,043	69,062
1981	162,186	72,229	81,808
1982	153,577	72,347	74,832
1983	285,118	83,764	191,676
1984	218,028	107,568	102,398
1985	237,695	79,028	146,477
1986	226,138	57,689	157,377
1987	242,444	72,004	161,657
1988	284,408	88,093	185,451
1989	242,554	59,825	175,667
1990	279,121	84,176	185,934
1991	285,696	64,694	216,611
1992	296,809	114,765	175,751
1993	351,201	96,289	248,070
1994	351,187	95,321	246,860
1995	389,849	102,236	282,468
1996	252,075	78,636	166,702
1997	307,754	93,825	196,324
1998	405,666	120,186	272,882
1999	260,669	75,346	164,082
2000	376,192	165,898	190,761
2001	399,471	163,369	205,648
2002	325,299	139,009	164,853
2003	272,633	121,326	138,160
2004	285,545	89,479	175,777
2005	228,936	66,804	150,770
2006	202,570	63,328	125,659
2007	**75,259**	**6,632**	**66,867**
Average	268,440	88,532	168,592
Standard Deviation	81,671	33,797	56,844

Figure 6. Guam Estimated Number of Trolling Boats



Interpretations: Since 1982, the general trend on Guam has been an increase in the number of boats participating in the pelagic fishery, 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. In 2007, the number of boats was 370, a decrease of 4% from 2006.

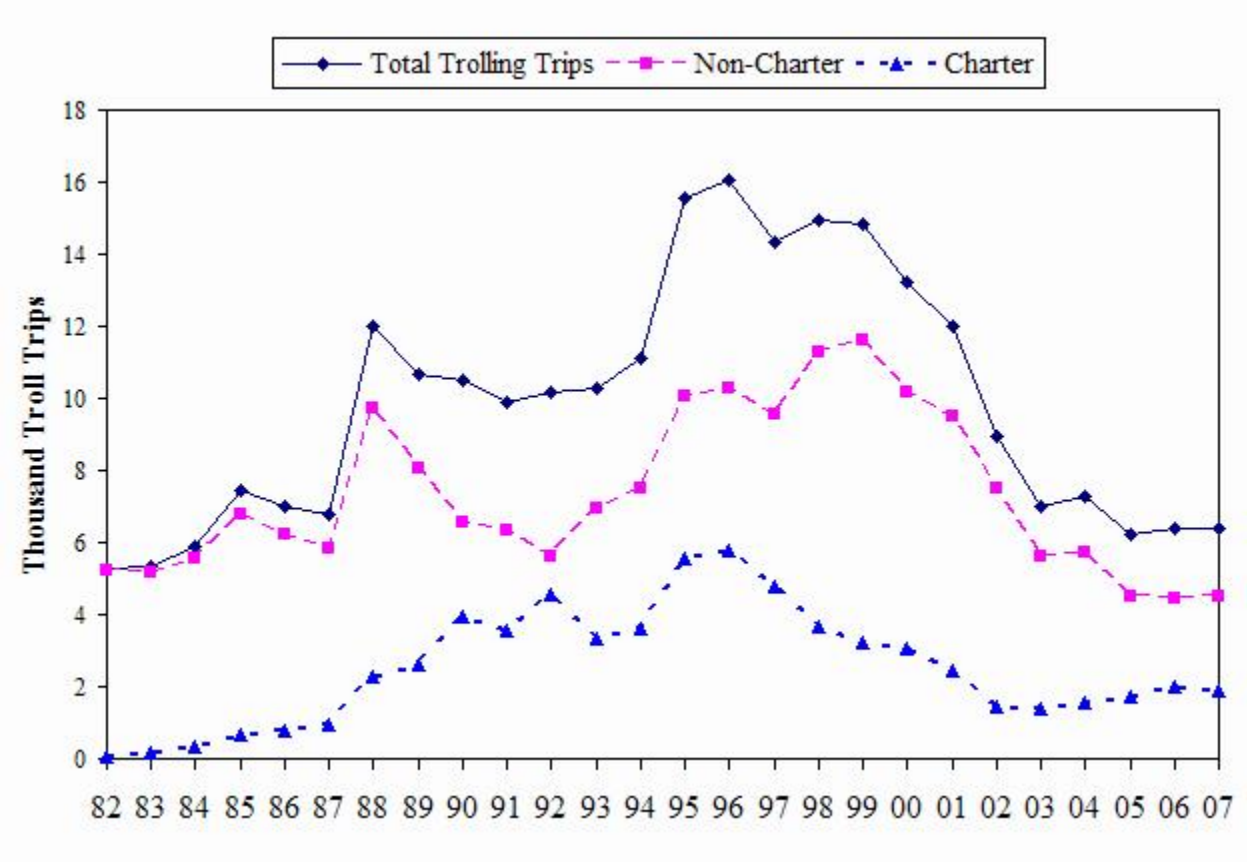
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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 2007 trolling boat log was converted and processed through a boat estimator model 1,000 times.

Estimated Number of Trolling Boats

Year	Estimated Boat	Upper 95%	Lower 95%
1982	199	280	165
1983	193	242	168
1984	219	267	193
1985	276	323	249
1986	246	284	226
1987	219	244	201
1988	320	353	297
1989	329	374	303
1990	352	467	299
1991	349	422	309
1992	332	405	294
1993	346	401	316
1994	369	439	329
1995	427	476	393
1996	466	572	415
1997	449	572	393
1998	469	537	430
1999	449	510	415
2000	416	470	385
2001	375	429	345
2002	375	464	330
2003	371	492	312
2004	401	568	326
2005	358	498	293
2006	386	527	321
2007	**373**	**488**	**315**

Figure 7a. Guam Annual Estimated Number of Troll Trips: Total, Non-charter, Charter



Interpretations: Non-charter and charter troll trips generally increased for the first 15 years of the 26-year time series. The number of troll trips began to decline in 1999, due to a number of factors including a continuing economic recession on the island, a decline in Asian visitors for charter boats, and an increase in cost to maintain, repair, and fuel boats for the average fishermen compared with fish caught for sale to make up for expenses. In 2007, the total number of troll trips decreased by .5%, and the number of charter trips decreased by 5%. The number of non-charter trips increased, by1.5%. The increase in non-charter trips can be attributed to an increase in pelagic fishes, especially mahi. All three categories are below the 26-year averages.

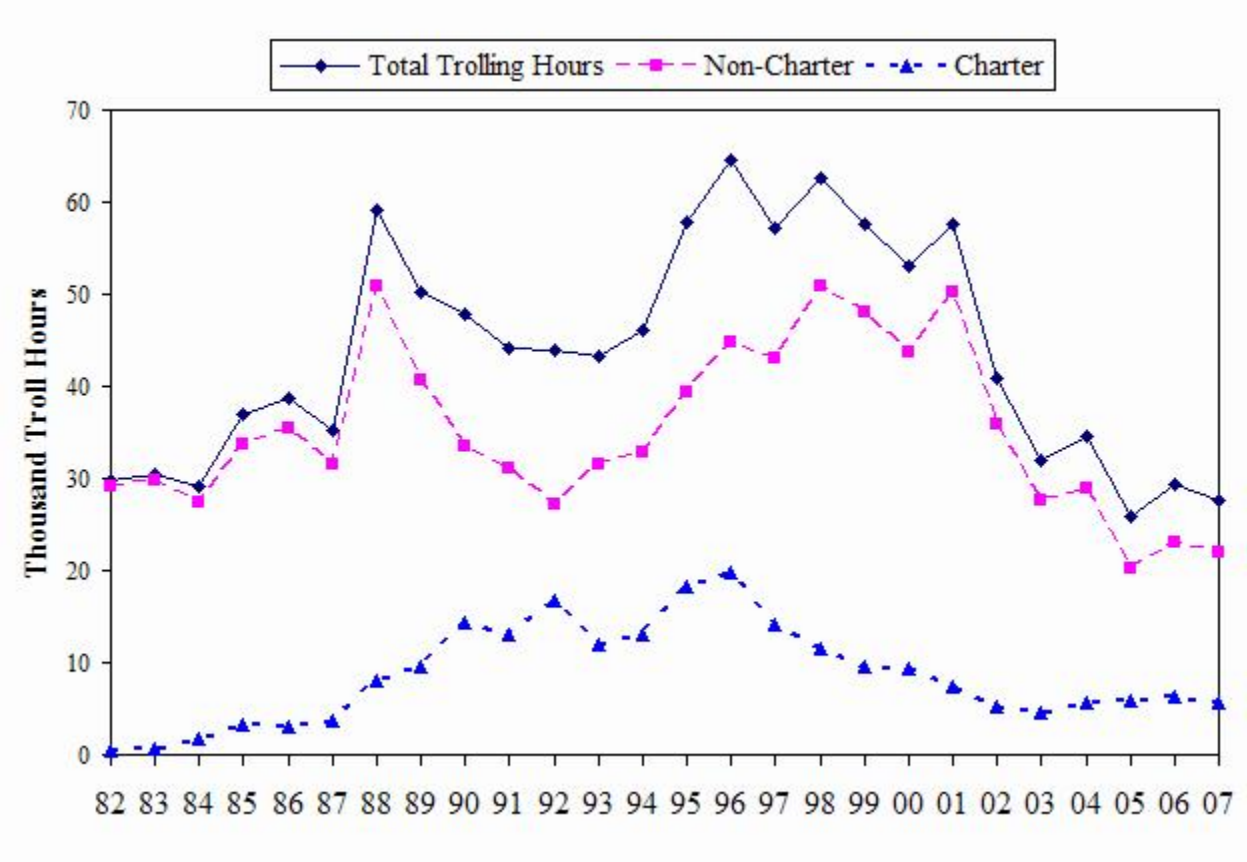
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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.

Estimated Number of Trolling Trips

Year	Estimated Trips	Non-Charter	Charter
1982	5,292	5,230	62
1983	5,339	5,187	151
1984	5,913	5,554	359
1985	7,454	6,783	671
1986	6,999	6,227	772
1987	6,776	5,818	958
1988	11,981	9,727	2,254
1989	10,669	8,057	2,612
1990	10,523	6,563	3,960
1991	9,870	6,325	3,545
1992	10,167	5,617	4,551
1993	10,295	6,971	3,324
1994	11,125	7,515	3,610
1995	15,562	10,030	5,532
1996	16,066	10,289	5,776
1997	14,313	9,555	4,758
1998	14,944	11,304	3,641
1999	14,848	11,610	3,239
2000	13,203	10,154	3,049
2001	11,977	9,522	2,456
2002	8,917	7,497	1,420
2003	6,991	5,622	1,368
2004	7,296	5,743	1,553
2005	6,238	4,495	1,743
2006	6,414	4,440	1,973
2007	**6,383**	**4,508**	**1,875**
Average	9,829	7,321	2,508
Standard Deviation	3,452	2,233	1,624

Figure 7b. Guam Annual Estimated Number of Troll Hours: Total, Non-charter, Charter



Interpretations: Trolling hours for non-charters and charters have generally increased over the past 20 years. Beginning in 1996, charter troll hours began to decrease. This corresponded to a downturn in Asian economies, which resulted in fewer charter trolling hours. After 2001, charter activity dropped off dramatically. Tourism was also down, due to the 9/11 attacks, the SARS scare, and two typhoons striking Guam in 2002. In 2007, total, non-charter, and charter totals decreased by 6%, 5%, and 9%, respectively. The decrease in hours trolling may be attributed to an increase in the price of fuel. All three totals are below the 26-year average.

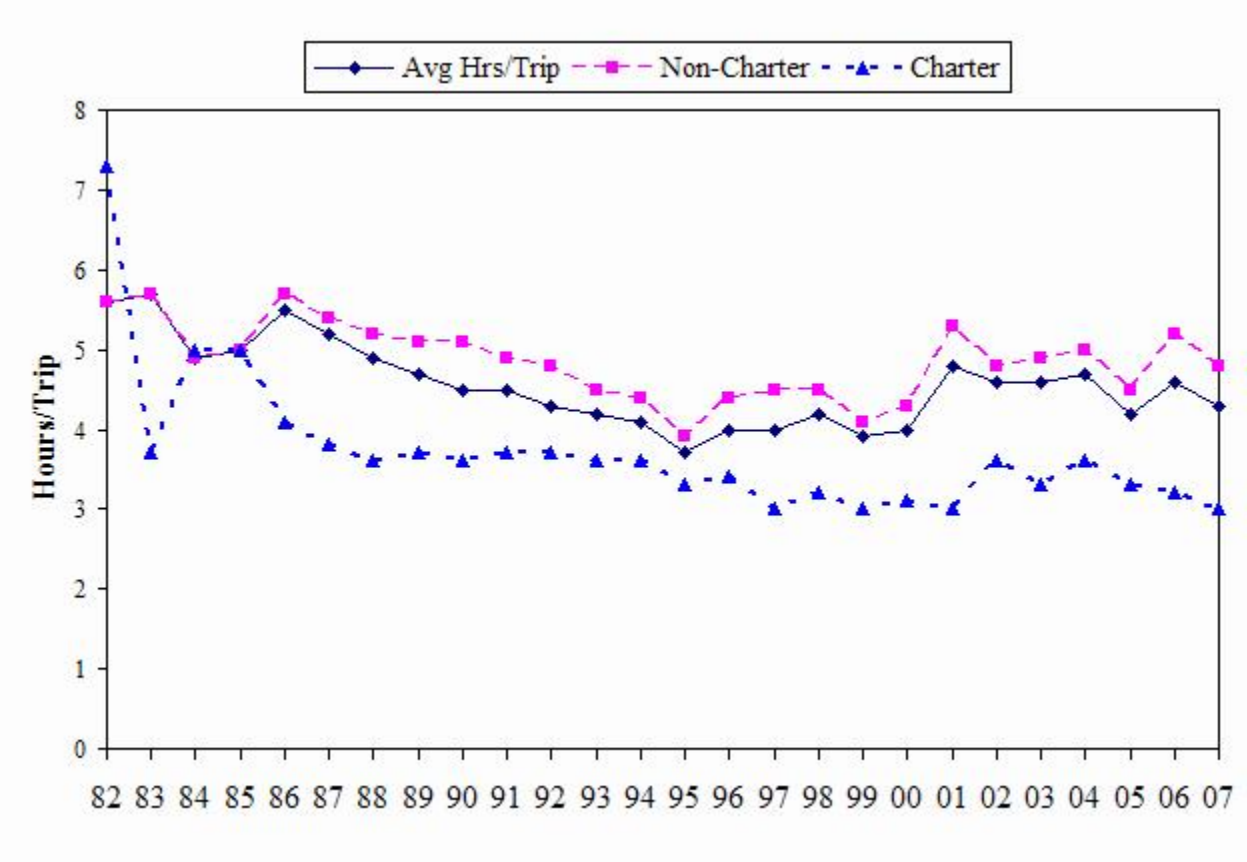
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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.

Estimated Number of Trolling Hours

Year	Estimated Hours	Non-Charter	Charter
1982	29,678	29,226	453
1983	30,363	29,803	560
1984	29,074	27,291	1,783
1985	36,967	33,630	3,337
1986	38,621	35,489	3,132
1987	35,112	31,441	3,671
1988	59,043	50,971	8,073
1989	50,262	40,728	9,535
1990	47,824	33,527	14,298
1991	44,151	31,016	13,135
1992	43,865	27,080	16,785
1993	43,354	31,465	11,889
1994	46,017	32,903	13,113
1995	57,767	39,409	18,359
1996	64,461	44,787	19,675
1997	57,122	42,965	14,157
1998	62,587	50,969	11,618
1999	57,533	47,973	9,560
2000	53,072	43,743	9,329
2001	57,572	50,231	7,341
2002	40,950	35,787	5,162
2003	31,974	27,511	4,463
2004	34,565	28,957	5,608
2005	25,903	20,116	5,786
2006	29,250	22,987	6,263
2007	**27,544**	**21,855**	**5,689**
Average	43,640	35,072	8,568
Standard Deviation	12,144	9,082	5,413

Figure 7c. Guam Annual Estimated Trip Length:
Overall Average Hours/Trip, Non-charter, Charter



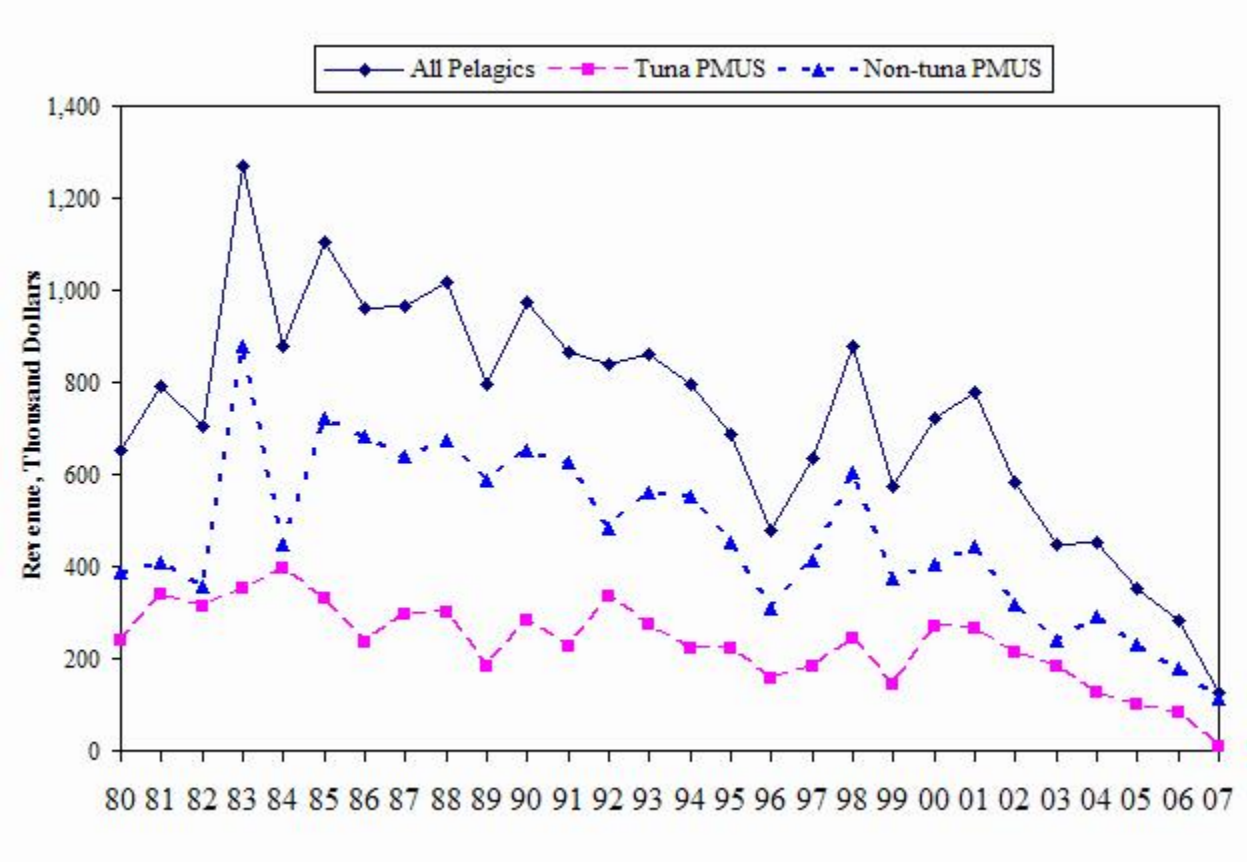
Interpretations: The overall average trolling trip decreased slightly from 2006. The redeployment of fish aggregating devices (FADs) still provide charter boats and non-charter fishermen with a prescribed route for trolling activity, although many boats have been observed to be making longer trips to the banks located north and south of Guam. Overall trolling trip length appears to have remained fairly constant throughout the 26-year time series. In 2007, non-charter vessels showed a slight decrease in average trip length, down 7%, while charter vessels also show a slight decrease in the number of hours per trip, down 6%. This decrease in trip length may be due to a smaller number of 6 hour charters, due to more budget minded tourist activity on Guam. Additionally, rising cost of fuel discourages longer fishing trips.
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.

Estimated Trip Length (Hours/trip)

Year	Average Length	Non-Charter	Charter
1982	5.6	5.6	7.3
1983	5.7	5.7	3.7
1984	4.9	4.9	5.0
1985	5.0	5.0	5.0
1986	5.5	5.7	4.1
1987	5.2	5.4	3.8
1988	4.9	5.2	3.6
1989	4.7	5.1	3.7
1990	4.5	5.1	3.6
1991	4.5	4.9	3.7
1992	4.3	4.8	3.7
1993	4.2	4.5	3.6
1994	4.1	4.4	3.6
1995	3.7	3.9	3.3
1996	4.0	4.4	3.4
1997	4.0	4.5	3.0
1998	4.2	4.5	3.2
1999	3.9	4.1	3.0
2000	4.0	4.3	3.1
2001	4.8	5.3	3.0
2002	4.6	4.8	3.6
2003	4.6	4.9	3.3
2004	4.7	5.0	3.6
2005	4.2	4.5	3.3
2006	4.6	5.2	3.2
2007	**4.3**	**4.8**	**3.0**
Average	4.6	4.9	3.7
Standard Deviation	0.5	0.5	0.9

Figure 8. Guam Annual Estimated Inflation-Adjusted Commercial Revenues: All Pelagics, Tuna PMUS, and Non-tuna PMUS



Interpretations: The estimated inflation-adjusted commercial revenues for 2006 decreased 82% for tuna PMUS, decreased 19% for total, and 23% for non-tuna PMUS. Overall, commercial revenues have shown a gradual decrease since the early 1980's. A large drop occurring after 2003 can partly be attributed to a change in government policy (see introduction). This trend continued in 2006, with all three adjusted revenue categories well below the 27-year averages. The loss of the primary source of commercial data to DAWR precluded analysis of commercial landing data. The numbers shown are for a partial year.

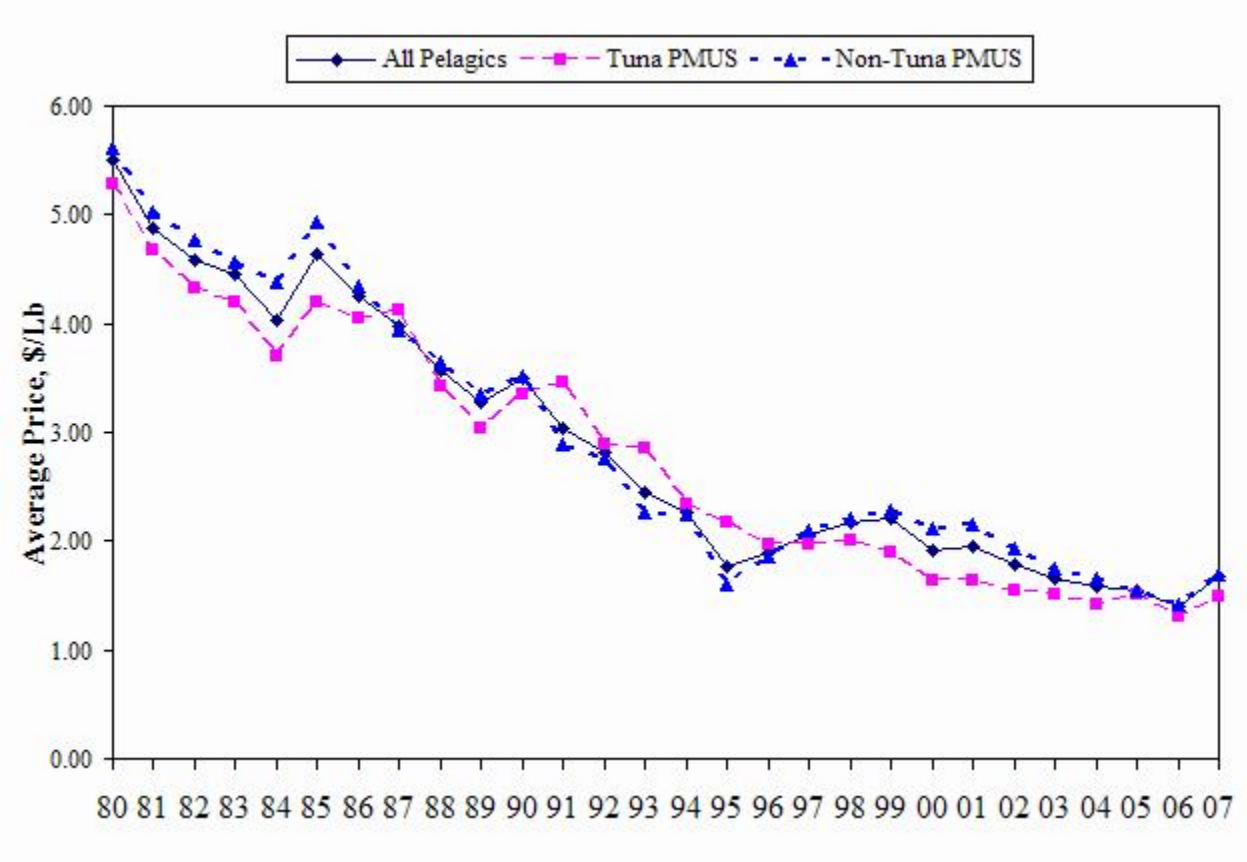
Source: The WPACFIN-sponsored commercial landings system.

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

Inflation-Adjusted Commercial Revenues ($)

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	149,124	651,671	54,353	237,521	88,775	387,948
1981	218,384	792,298	92,914	337,094	113,212	410,734
1982	203,847	703,477	90,719	313,071	103,459	357,037
1983	380,231	1,268,069	105,308	351,202	262,817	876,494
1984	286,490	878,951	129,389	396,966	146,339	448,970
1985	373,796	1,103,818	112,286	331,579	244,423	721,782
1986	334,955	962,996	81,299	233,736	237,826	683,750
1987	350,828	965,829	107,642	296,339	231,451	637,184
1988	388,630	1,017,044	115,243	301,592	258,203	675,718
1989	337,586	796,365	76,865	181,326	249,421	588,383
1990	471,241	973,585	136,321	281,639	316,491	653,870
1991	462,191	866,145	119,640	224,206	333,096	624,222
1992	492,707	838,095	195,547	332,625	284,546	484,013
1993	547,835	860,102	175,360	275,316	358,592	562,989
1994	593,838	797,525	165,296	221,992	411,832	553,090
1995	537,889	685,809	173,629	221,377	356,256	454,227
1996	392,442	476,818	127,375	154,761	254,063	308,687
1997	534,352	636,948	154,819	184,544	344,972	411,206
1998	733,101	878,255	201,639	241,563	502,801	602,356
1999	489,605	575,776	122,023	143,500	319,342	375,547
2000	626,803	722,703	234,735	270,650	349,312	402,757
2001	667,648	779,812	228,652	267,065	379,174	442,875
2002	500,777	581,402	184,705	214,443	274,929	319,193
2003	399,989	449,187	163,423	183,524	214,143	240,483
2004	433,911	451,268	122,098	126,982	278,721	289,870
2005	353,131	353,131	100,720	100,720	232,336	232,336
2006	323,591	284,436	93,600	82,274	202,232	177,762
2007	**126,375**	**126,375**	**9,830**	**9,830**	**113,814**	**113,814**
Average	418,261	731,353	131,265	232,766	266,521	465,618
Standard Deviation	149,078	256,502	51,783	89,614	98,131	181,853

Figure 9. Guam Annual Estimated Inflation-Adjusted Average Prices: All Pelagics, Tuna PMUS, and Non-tuna PMUS



Interpretations: The inflation-adjusted price of tuna and other non-tuna PMUS has shown a dramatic decline since data on the pelagic fishery was first collected in 1980. In 2007, the adjusted price for all pelagics increased 20%, 14% for tuna PMUS, and 20.5% for non-tuna PMUS species. All three prices are well below their 28 year averages. Locally caught pelagic fish continues to have to compete with cheaper pelagic fish caught by longliners. These are value-added products sold at several supermarkets and roadside vendors.

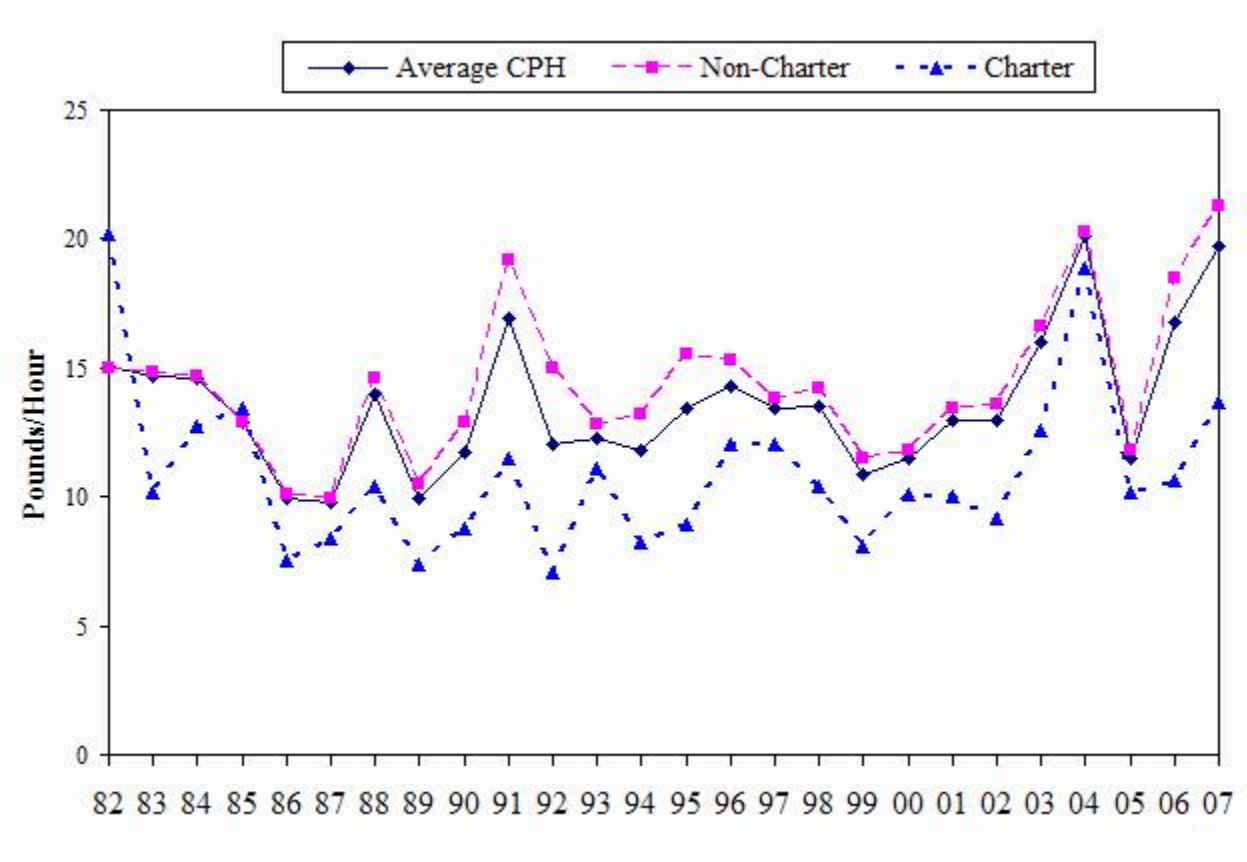
Source: The WPACFIN-sponsored commercial landings system.

Calculation: The average price of the Tunas and other PMUS 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.

Inflation-Adjusted Average Price ($/Pounds)

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	1.26	5.51	1.21	5.27	1.29	5.62
1981	1.35	4.89	1.29	4.67	1.38	5.02
1982	1.33	4.58	1.25	4.33	1.38	4.77
1983	1.33	4.45	1.26	4.19	1.37	4.57
1984	1.31	4.03	1.20	3.69	1.43	4.38
1985	1.57	4.64	1.42	4.20	1.67	4.93
1986	1.48	4.26	1.41	4.05	1.51	4.34
1987	1.45	3.98	1.49	4.12	1.43	3.94
1988	1.37	3.58	1.31	3.42	1.39	3.64
1989	1.39	3.28	1.28	3.03	1.42	3.35
1990	1.69	3.49	1.62	3.35	1.70	3.52
1991	1.62	3.03	1.85	3.47	1.54	2.88
1992	1.66	2.82	1.70	2.90	1.62	2.75
1993	1.56	2.45	1.82	2.86	1.45	2.27
1994	1.69	2.27	1.73	2.33	1.67	2.24
1995	1.38	1.76	1.70	2.17	1.26	1.61
1996	1.56	1.89	1.62	1.97	1.52	1.85
1997	1.74	2.07	1.65	1.97	1.76	2.09
1998	1.81	2.16	1.68	2.01	1.84	2.21
1999	1.88	2.21	1.62	1.90	1.95	2.29
2000	1.67	1.92	1.41	1.63	1.83	2.11
2001	1.67	1.95	1.40	1.63	1.84	2.15
2002	1.54	1.79	1.33	1.54	1.67	1.94
2003	1.47	1.65	1.35	1.51	1.55	1.74
2004	1.52	1.58	1.36	1.42	1.59	1.65
2005	1.54	1.54	1.51	1.51	1.54	1.54
2006	1.60	1.40	1.48	1.30	1.61	1.41
2007	**1.68**	**1.68**	**1.48**	**1.48**	**1.70**	**1.70**
Average	1.54	2.89	1.48	2.78	1.57	2.95
Standard Deviation	0.16	1.23	0.19	1.19	0.18	1.28

Figure 10a. Guam Trolling CPUE (Pounds/Hour): Average, Non-charter, and Charter



Interpretations: The fluctuations in CPUE are probably due to 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. This is especially true with charter boats targeting blue marlin during the summer months. In 2007, total overall, non-charter, and charter trolling catch rate increased 17%, 15%, and 29%, respectively. These increases are primarily a reflection of the exceptionally high CPUE for mahi mahi for the previous year. Charter catch rates have generally been lower than catch rates of non-charter boats, probably due to their shorter fishing time, and non-charter boats beginning earlier in the morning and ending as late as early evening.

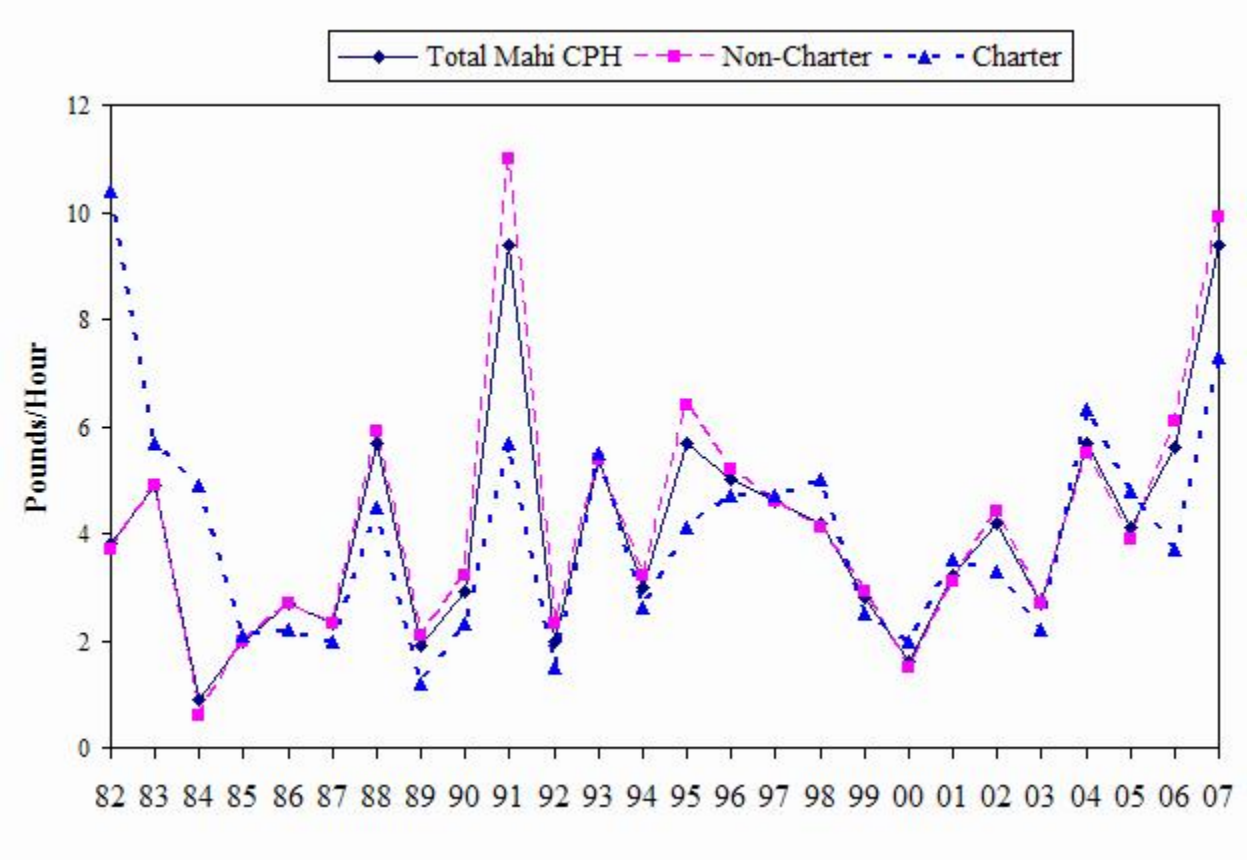
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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).

Trolling Catch Rates (Pounds/Hour):

Year	Catch Rate	Non-Charter	Charter
1982	15.1	15.0	20.2
1983	14.7	14.8	10.2
1984	14.6	14.7	12.7
1985	12.9	12.9	13.4
1986	9.9	10.1	7.5
1987	9.8	9.9	8.4
1988	14.0	14.6	10.4
1989	9.9	10.5	7.4
1990	11.7	12.9	8.8
1991	16.9	19.2	11.5
1992	12.0	15.0	7.1
1993	12.3	12.8	11.1
1994	11.8	13.2	8.2
1995	13.4	15.5	8.9
1996	14.3	15.3	12.0
1997	13.4	13.8	12.0
1998	13.5	14.2	10.4
1999	10.9	11.5	8.1
2000	11.5	11.8	10.1
2001	13.0	13.4	10.0
2002	13.0	13.6	9.2
2003	16.0	16.6	12.6
2004	20.1	20.3	18.9
2005	11.5	11.8	10.2
2006	16.8	18.5	10.6
2007	**19.7**	**21.3**	**13.7**
Average	13.6	14.4	10.9
Standard Deviation	2.7	2.9	3.1

Figure 10b. Mahimahi CPUE (Pounds/Hour): All, Non-charter, and Charter



Interpretations: The wide fluctuations in mahimahi CPUE values are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is not possible to allocate species-specific effort one particular species; effort used to target other species can result in artificially high or low catch rates for a given species. In 2007, the catch rate for total and non-charter mahimahi increased 68%, and 62%, while charter CPUE increased by 97%. Non-charter CPUE was the second highest for the 26 year data set, while the total CPUE matched the highest level of the data set. All three categories were well above their 26 year averages

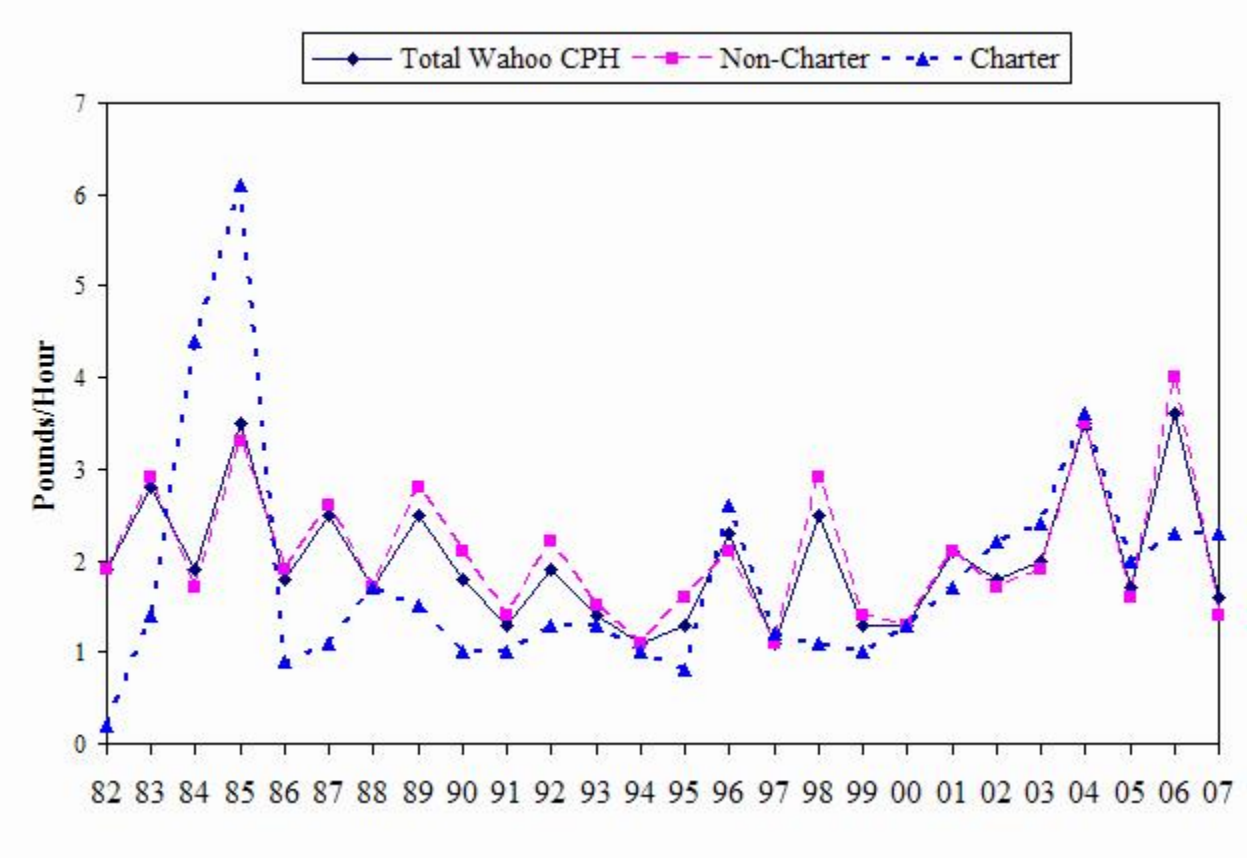
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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).

Trolling Catch Rates (Pounds/Hour)

Year	Total Mahimahi	Non-Charter	Charter
1982	3.8	3.7	10.4
1983	4.9	4.9	5.7
1984	0.9	0.6	4.9
1985	2.0	2.0	2.1
1986	2.7	2.7	2.2
1987	2.3	2.3	2.0
1988	5.7	5.9	4.5
1989	1.9	2.1	1.2
1990	2.9	3.2	2.3
1991	9.4	11.0	5.7
1992	2.0	2.3	1.5
1993	5.4	5.4	5.5
1994	3.0	3.2	2.6
1995	5.7	6.4	4.1
1996	5.0	5.2	4.7
1997	4.6	4.6	4.7
1998	4.2	4.1	5.0
1999	2.8	2.9	2.5
2000	1.6	1.5	2.0
2001	3.2	3.1	3.5
2002	4.2	4.4	3.3
2003	2.7	2.7	2.2
2004	5.7	5.5	6.3
2005	4.1	3.9	4.8
2006	5.6	6.1	3.7
2007	**9.4**	**9.9**	**7.3**
Average	4.1	4.2	4.0
Standard Deviation	2.1	2.4	2.1

Figure 10c. Wahoo CPUE (Pounds/Hour): All, Non-charter, and Charter



Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year-to-year abundance and availability of the stocks. In 2007, the total and non-charter CPUEs declined, while charter catch rates for wahoo increased. Total wahoo CPUE decreased by 56%, with non-charter CPUE decreasing by 65%. Charter CPUE remained unchanged.

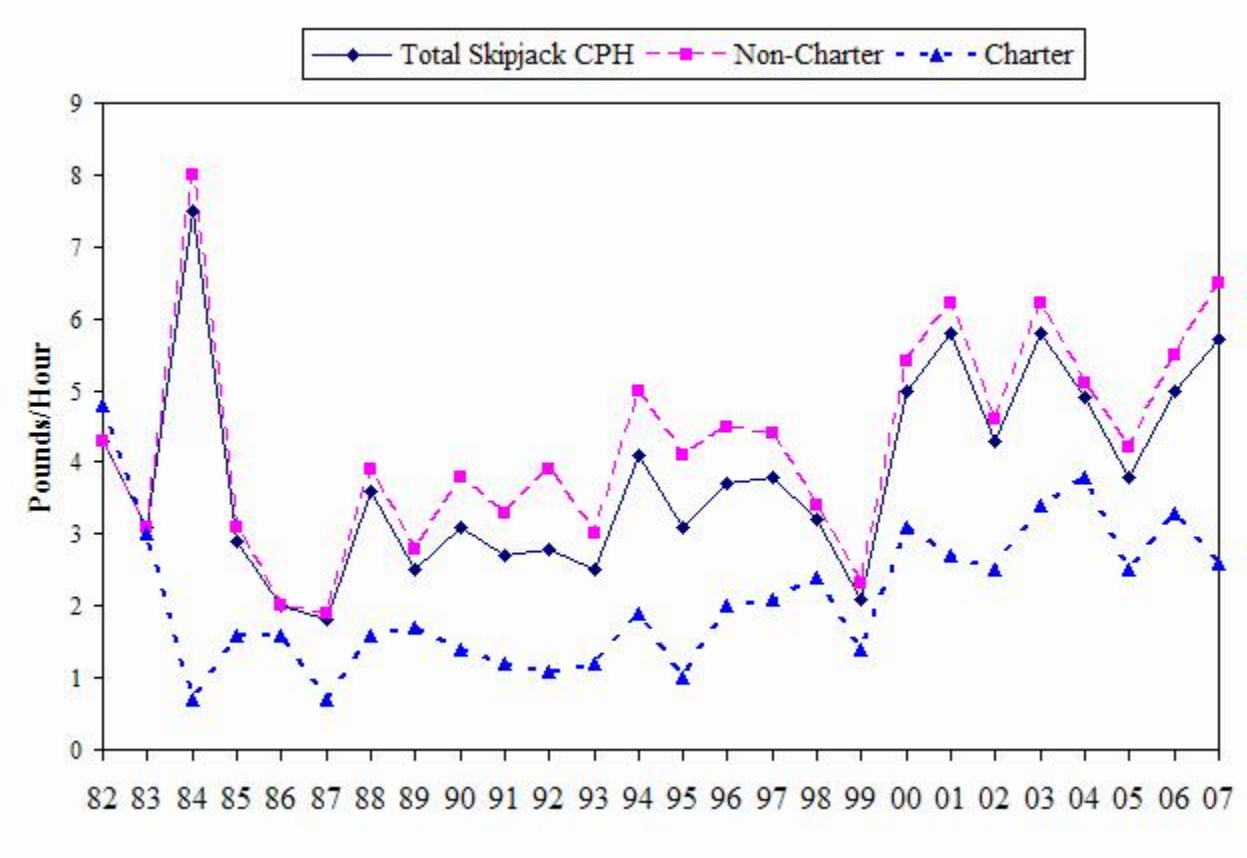
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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).

Trolling Catch Rates (Pounds/Hour)

Year	Total Wahoo	Non-Charter	Charter
1982	1.9	1.9	0.2
1983	2.8	2.9	1.4
1984	1.9	1.7	4.4
1985	3.5	3.3	6.1
1986	1.8	1.9	0.9
1987	2.5	2.6	1.1
1988	1.7	1.7	1.7
1989	2.5	2.8	1.5
1990	1.8	2.1	1.0
1991	1.3	1.4	1.0
1992	1.9	2.2	1.3
1993	1.4	1.5	1.3
1994	1.1	1.1	1.0
1995	1.3	1.6	0.8
1996	2.3	2.1	2.6
1997	1.1	1.1	1.2
1998	2.5	2.9	1.1
1999	1.3	1.4	1.0
2000	1.3	1.3	1.3
2001	2.1	2.1	1.7
2002	1.8	1.7	2.2
2003	2.0	1.9	2.4
2004	3.5	3.5	3.6
2005	1.7	1.6	2.0
2006	3.6	4.0	2.3
2007	**1.6**	**1.4**	**2.3**
Average	2.0	2.1	1.8
Standard Deviation	0.7	0.8	1.3

Figure 11a. Skipjack CPUE (Pounds/Hour): All, Non-Charter, and Charter



Interpretations: The wide fluctuations in CPUE for skipjack tuna are probably due to the high variability in the year-to-year abundance and availability of the stocks, although skipjack tuna is caught year round. However, it is not possible to allocate species-specific effort, since effort used to target other species can result in an artificially high or low catch rate for a given species. In 2007, the catch rates for total and non-charter increased by 14% and 18%, respectively. Charter rates decreased 21% in 2007. All three categories were above their 26-year averages.

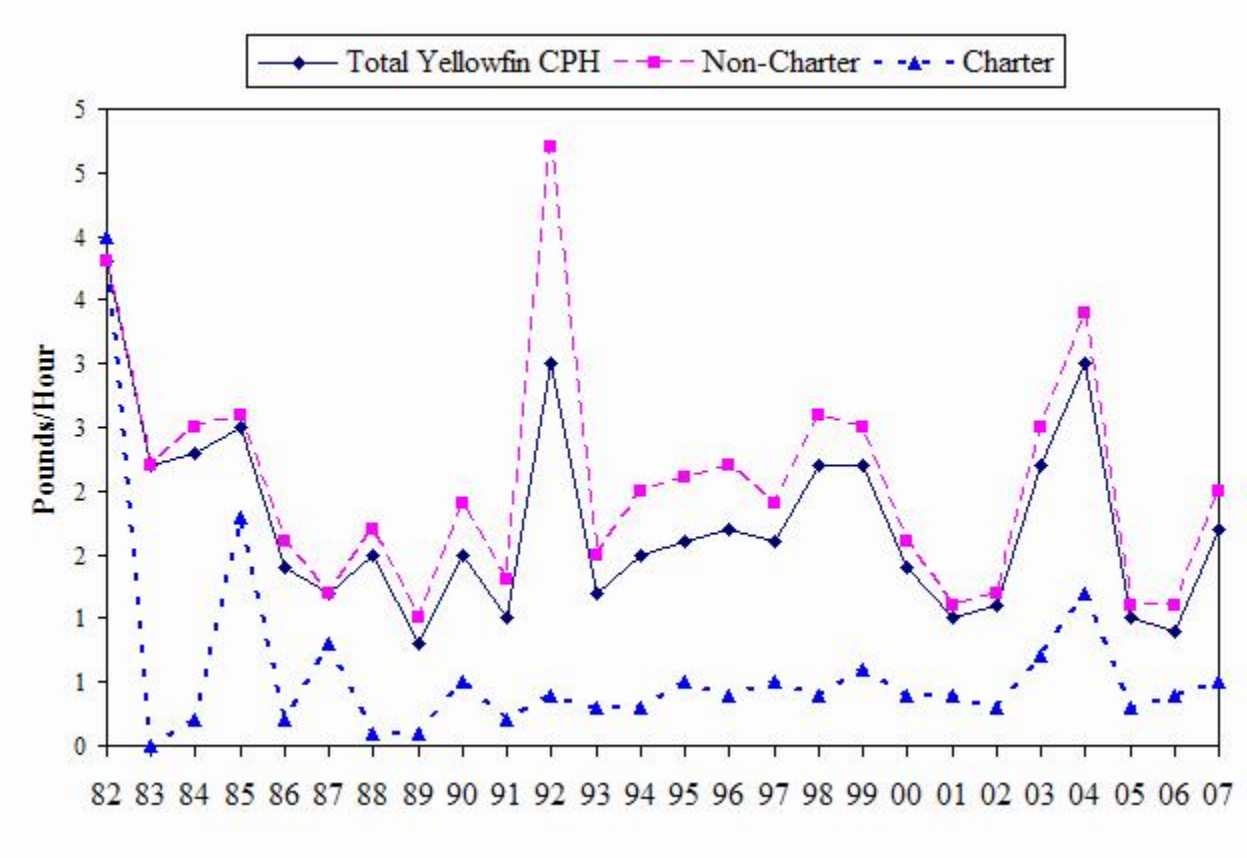
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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).

Trolling Catch Rates (Pounds/Hour)

Year	Total Skipjack	Non-Charter	Charter
1982	4.3	4.3	4.8
1983	3.1	3.1	3.0
1984	7.5	8.0	0.7
1985	2.9	3.1	1.6
1986	2.0	2.0	1.6
1987	1.8	1.9	0.7
1988	3.6	3.9	1.6
1989	2.5	2.8	1.7
1990	3.1	3.8	1.4
1991	2.7	3.3	1.2
1992	2.8	3.9	1.1
1993	2.5	3.0	1.2
1994	4.1	5.0	1.9
1995	3.1	4.1	1.0
1996	3.7	4.5	2.0
1997	3.8	4.4	2.1
1998	3.2	3.4	2.4
1999	2.1	2.3	1.4
2000	5.0	5.4	3.1
2001	5.8	6.2	2.7
2002	4.3	4.6	2.5
2003	5.8	6.2	3.4
2004	4.9	5.1	3.8
2005	3.8	4.2	2.5
2006	5.0	5.5	3.3
2007	**5.7**	**6.5**	**2.6**
Average	3.8	4.3	2.1
Standard Deviation	1.4	1.5	1.0

Figure 11b. Yellowfin CPUE (Pounds/Hour): All, Non-charter, and Charter



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. It is not possible to allocate species-specific effort, since effort used to target other species can also result in an artificially high or low catch rate for a given species. In 2007, the yellowfin catch rates for total, non-charter, and charter catch increased by 89%, 82%, and 25%, respectively. All three categories are virtually identical to their 26-year averages.

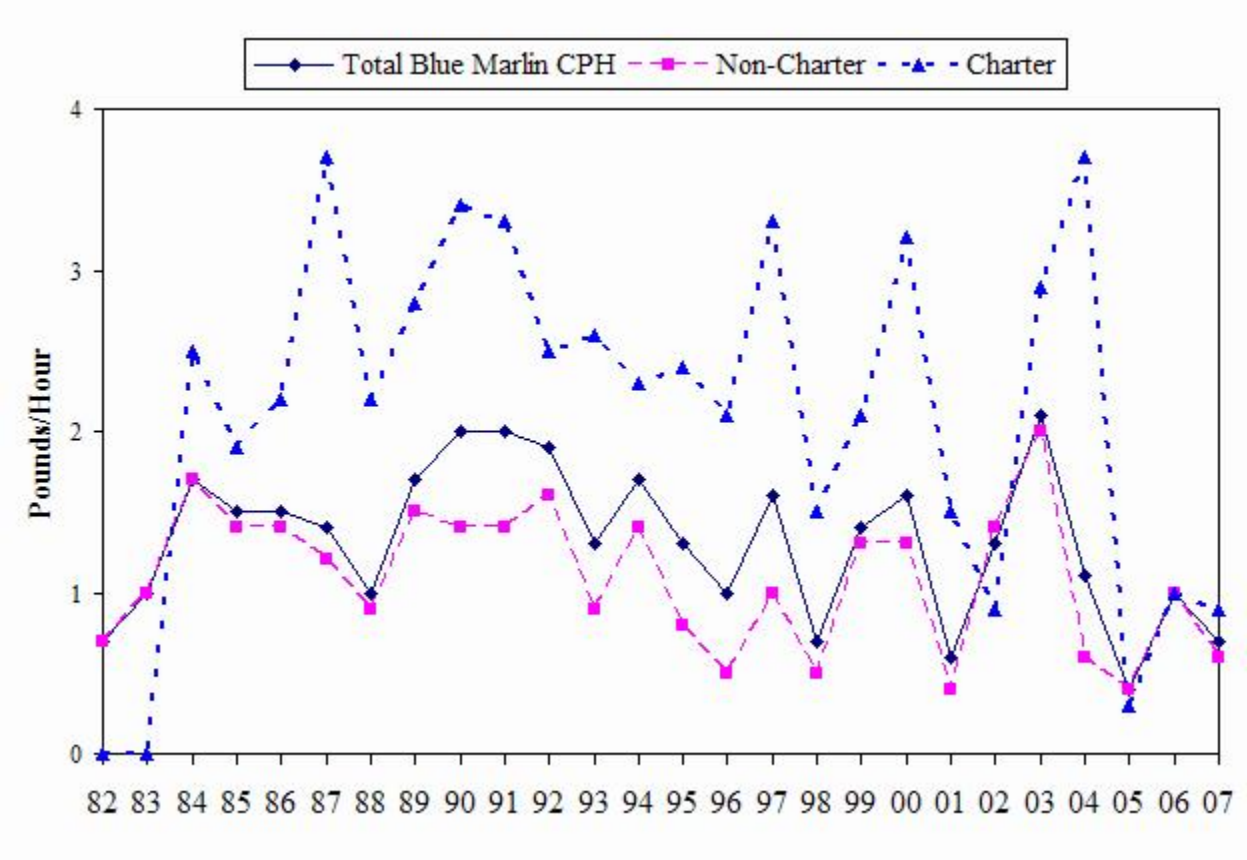
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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).

Trolling Catch Rates (Pounds/Hour)

Year	Total Yellowfin	Non-Charter	Charter
1982	3.8	3.8	4.0
1983	2.2	2.2	0.0
1984	2.3	2.5	0.2
1985	2.5	2.6	1.8
1986	1.4	1.6	0.2
1987	1.2	1.2	0.8
1988	1.5	1.7	0.1
1989	0.8	1.0	0.1
1990	1.5	1.9	0.5
1991	1.0	1.3	0.2
1992	3.0	4.7	0.4
1993	1.2	1.5	0.3
1994	1.5	2.0	0.3
1995	1.6	2.1	0.5
1996	1.7	2.2	0.4
1997	1.6	1.9	0.5
1998	2.2	2.6	0.4
1999	2.2	2.5	0.6
2000	1.4	1.6	0.4
2001	1.0	1.1	0.4
2002	1.1	1.2	0.3
2003	2.2	2.5	0.7
2004	3.0	3.4	1.2
2005	1.0	1.1	0.3
2006	0.9	1.1	0.4
2007	**1.7**	**2.0**	**0.5**
Average	1.8	2.1	0.6
Standard Deviation	0.7	0.9	0.8

Figure 11c. Blue Marlin CPUE (Pounds/Hour): All, Non-charter, and Charter



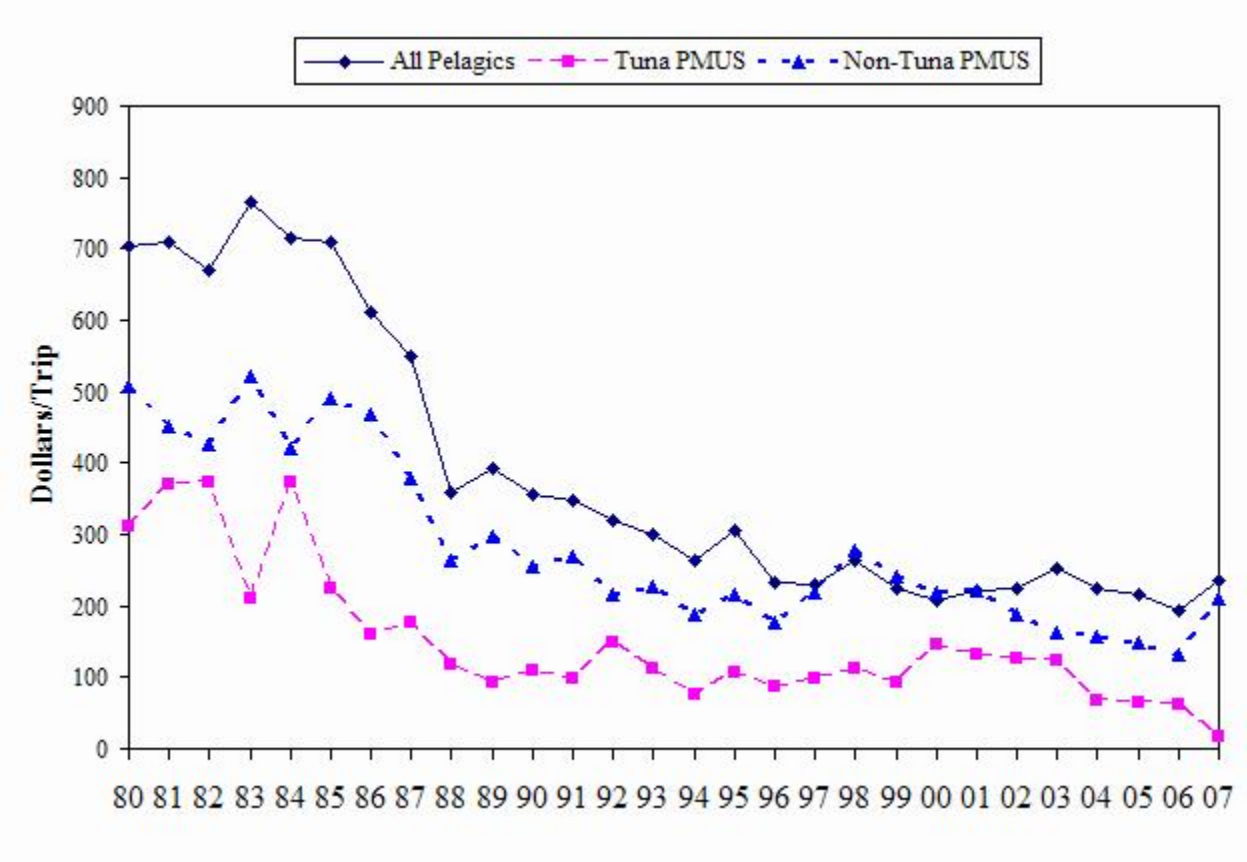
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year-to-year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. The 2007 blue marlin catch rates decreased for total and non-charter by 30% and 40%, respectively. Charter blue marlin catch rate decreased by 10%. All three levels are below the 26 year averages.
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).

Trolling Catch Rates (Pounds/Hour)

Year	Total Blue Marlin	Non-Charter	Charter
1982	0.7	0.7	
1983	1.0	1.0	
1984	1.7	1.7	2.5
1985	1.5	1.4	1.9
1986	1.5	1.4	2.2
1987	1.4	1.2	3.7
1988	1.0	0.9	2.2
1989	1.7	1.5	2.8
1990	2.0	1.4	3.4
1991	2.0	1.4	3.3
1992	1.9	1.6	2.5
1993	1.3	0.9	2.6
1994	1.7	1.4	2.3
1995	1.3	0.8	2.4
1996	1.0	0.5	2.1
1997	1.6	1.0	3.3
1998	0.7	0.5	1.5
1999	1.4	1.3	2.1
2000	1.6	1.3	3.2
2001	0.6	0.4	1.5
2002	1.3	1.4	0.9
2003	2.1	2.0	2.9
2004	1.1	0.6	3.7
2005	0.4	0.4	0.3
2006	1.0	1.0	1.0
2007	**0.7**	**0.6**	**0.9**
Average	1.3	1.1	2.3
Standard Deviation	0.5	0.4	0.9

Figure 12. Guam Annual Estimated Inflation-Adjusted Revenue per Trolling Trip: All Pelagics, Tuna PMUS, and Non-tuna PMUS



Interpretation: There has been a general decrease from 1980 in the adjusted revenues per trolling trip for all pelagics, tunas and other PMUS, although the revenue values have remained fairly constant for past 9 years. In 2007, the adjusted revenue per trip increased for all pelagics by 21%. tuna PMUS revenues decreased by 73%. Non-tuna PMUS increased by 61%. Despite continual declines in revenues, trolling effort still occurs since most charter and non-charter trolling boats do not rely on selling fish caught as their primary source of income and a reliable market exists for members of the local fishermen's cooperative which provides additional income. The commercial data is given with the warning that this only a partial year worth of data. The loss of the primary vendor providing commercial data reduces the reliability of this data

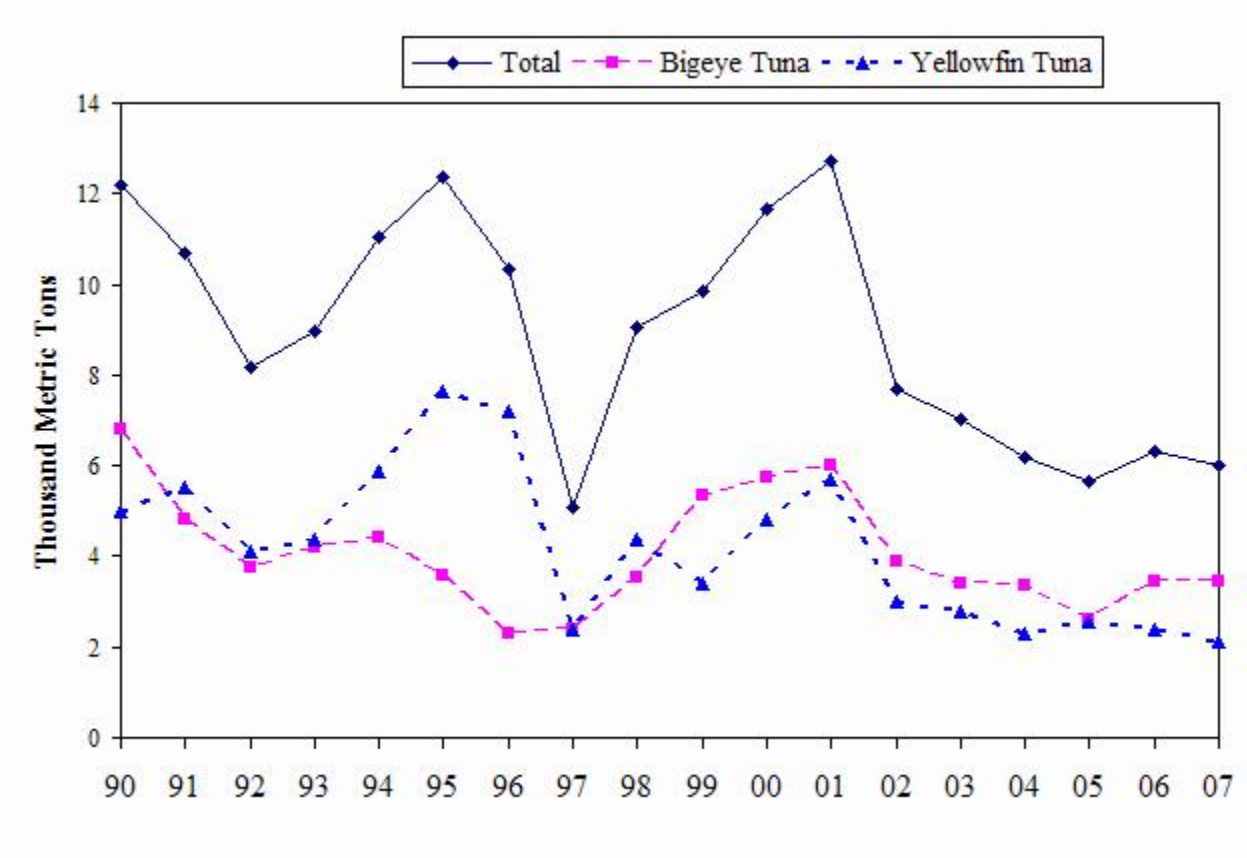
Source: The WPacFIN-sponsored commercial landings system.

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 PMUS sold, and then dividing each by the number of trips, respectively, for any trip, which landed PMUS. Adjusted revenue per trip was derived from the Guam Annual Consumer Price Index (CPI).

Inflation-Adjusted Revenues per Trolling Trip ($/Trip)

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	161.31	704.92	71.14	310.88	116.20	507.79
1981	195.29	708.51	102.24	370.93	124.58	451.98
1982	194.29	670.49	108.45	374.26	123.68	426.82
1983	229.26	764.58	62.81	209.47	156.75	522.76
1984	233.01	714.87	121.56	372.95	137.48	421.79
1985	240.34	709.72	76.21	225.05	165.90	489.90
1986	212.25	610.22	55.68	160.08	162.89	468.31
1987	199.18	548.34	64.07	176.38	137.77	379.28
1988	137.30	359.31	44.98	117.71	100.78	263.74
1989	166.79	393.46	38.89	91.74	126.20	297.71
1990	172.68	356.76	53.19	109.89	123.50	255.15
1991	185.96	348.49	51.79	97.05	144.20	270.23
1992	188.33	320.35	86.72	147.51	126.18	214.63
1993	191.92	301.31	70.60	110.84	144.36	226.65
1994	197.09	264.69	56.32	75.64	140.32	188.45
1995	239.79	305.73	82.55	105.25	169.38	215.96
1996	191.10	232.19	72.55	88.15	144.71	175.82
1997	192.95	230.00	82.74	98.63	184.35	219.75
1998	221.01	264.77	92.81	111.19	231.44	277.27
1999	190.05	223.50	78.35	92.14	205.04	241.13
2000	179.42	206.87	127.01	146.44	189.00	217.92
2001	188.68	220.38	113.92	133.06	188.92	220.66
2002	193.42	224.56	109.41	127.03	162.85	189.07
2003	223.73	251.25	110.95	124.60	145.38	163.26
2004	215.73	224.36	65.56	68.18	149.66	155.65
2005	216.34	216.34	64.62	64.62	149.05	149.05
2006	219.66	193.08	68.70	60.39	148.43	130.47
2007	**234.82**	**234.82**	**18.16**	**18.16**	**210.28**	**210.28**
Average	200.42	385.85	76.86	149.58	153.90	283.98
Standard Deviation	25.08	198.43	26.48	97.14	30.64	121.26

Figure 13. Annual Foreign Guam Longline Landings



Interpretation: Annual landings from a primarily foreign longline fishing fleet have ranged from a low of 5,093 metric tons in 1997 to a high of 12,627 metric tons in 2001. These vessels fish primarily outside Guam's EEZ, but transship their catch through Guam. The dramatic drop observed in 1997 was due to a large number of foreign fishing boats leaving the western Pacific that year for several reasons, including availability of fish stocks. Compared with 2006, the 2007 total longline landings decreased 5%, with bigeye landings decreasing .5%. Yellowfin landings decreased in 2007, down 10%.

Source: The Bureau of Statistics and Plans.

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

Foreign Longline Landings (Metric tons)

Year	Total	Bigeye	Yellowfin
1990	12,198	6,793	5,011
1991	10,707	4,824	5,505
1992	8,157	3,754	4,104
1993	8,981	4,178	4,379
1994	11,023	4,400	5,878
1995	12,366	3,560	7,635
1996	10,356	2,280	7,214
1997	5,093	2,395	2,392
1998	9,032	3,533	4,379
1999	9,865	5,328	3,404
2000	11,664	5,725	4,795
2001	12,716	5,996	5,711
2002	7,691	3,904	3,011
2003	7,010	3,418	2,788
2004	6,190	3,375	2,287
2005	5,660	2,618	2,574
2006	6,315	3,455	2,377
2007	**5,991**	**3,439**	**2,134**
Average	8,945	4,054	4,199
Standard Deviation	2,532	1,251	1,715

Table 4a: Trolling Bycatch: Non-charter and Charter

Species Name	Number Released			Caught All	Bycatch (%)
	Alive	Dead/Injured	Both		
Non-Charter					
Katsuwonus pelamis	1	10	11	1883	.58
Thunnus albacores	0	10	10	366	2.73
Non-Charter Bycatch Total	**1**	**20**	**21**	2249	**.9**
Compare with All Caught				**3276**	**0.67**
Charter					
Scomberoides lysan	1	0	1	3	33.33
Charter Bycatch Total	**1**	**0**	**1**	**1**	
Compare with All Caught				**722**	**0.14**
All Bycatch Total	**2**	**20**	**22**	**2252**	**.98**
Compare with All Caught				3998	**0.57**

*unexpanded total number of that species caught
**unexpanded total number of fish caught from non-charter trolling

4b. Trolling Bycatch: Summary

Year	**Released alive**	**Released dead/injured**	**Total Number Released**	**Total Number Landed**	**Percent Bycatch***	**Interviews with Bycatch**	**Total Number of Interviews**	**Percent of Interviews with Bycatch**
2001	7	3	10	5,289	0.2	10	461	2.2
2002	1	2	3	3,443	0.1	3	258	1.2
2003	5	0	5	3,026	0.2	2	178	1.1
2004	0	0	0	4,292		0	91	0
2005	3	0	3	2,631	.11	3		
2006	2	1	3	3,478	.09	3	413	.7

*"percent bycatch" represents the number of pieces that were discarded compared to the total number of fish caught trolling. The bycatch information is from unexpanded data, taken only from actual interviews that reported bycatch.

Interpretation: Bycatch information was recorded beginning in 2000 as a requirement of the pelagic FMP. Historically, most fish that is landed by fishermen is kept regardless of size and species. Bycatch for this fishery are sharks, shark-bitten pelagics, small pelagics, or other pelagic species. In 2004 bycatch was not encountered by Fisheries staff when interviewing trollers.

Source: The DAWR creel survey data for boat based methods.

Calculations: Bycatch is obtained directly from trolling interviews where bycatch was voluntarily reported. The number of bycatch reported is from unexpanded data.

C. Hawaii

Introduction

Hawaii's pelagic fisheries, which include the longline, main Hawaiian Island (MHI) troll and handline, offshore handline, and aku boat (pole and line) fisheries, are the state's largest and most valuable. These pelagic fisheries landed an estimated 30 million pounds worth about $72 million (ex-vessel revenue) in 2007. The longline fishery was the largest of all commercial pelagic fisheries in Hawaii and represented 83% of the total commercial pelagic landings and 87% of the ex-vessel revenue. The MHI troll accounted for 9% and 8% of the landings and revenue, respectively. The MHI handline, aku boat, offshore handline and other gear types made up the remainder.

The target species for the Hawaii fisheries are tunas and billfishes, but a variety of other pelagic species are also landed with some regularity. The largest component of the pelagic landings was tunas, which comprised 64% of the total in 2007. Bigeye tuna alone accounted for 72% of the tunas and 46% of all pelagic landings. Billfish landings made up 19% of the total landings in 2007. Swordfish was the largest of these, at 67% of the billfish and 13% of the total landings. Landings of other pelagic management unit species (PMUS) represented 18% of the total landings in 2007 with mahimahi being the largest component at 6% of the total and 31% of other pelagic landings.

Data Sources and Calculation Procedures

This report contains the most recently available information on Hawaii's commercial pelagic fisheries, as compiled from four data sources: The State of Hawaii's Division of Aquatic Resources (HDAR) Commercial Fish Catch data, HDAR Commercial Marine Dealer (Dealer) data, the National Marine Fisheries Service (NMFS) Pacific Islands Fisheries Science Center's (PIFSC) longline logbook data, and joint NMFS and HDAR Market Sample (Market Sample) data.[7] Landings and revenue were calculated for each Hawaii pelagic fishery. The data sources and estimation procedures are described below.

Hawaii-based Longline Fishery**:** The Market Sample data were used to estimate catch and revenue for the longline fishery from 1987 to 1991. Market Sample data was collected on five of six business days a week to approximate a coverage rate of about 80%. The Market Sample data were extrapolated to represent a full coverage rate.

The federal longline logbook system was implemented in December 1990 and served as the source of the data used to determine fish catches. Due to limited manpower, the market sampling data collection program was reduced to two business days in 1991 for a coverage rate of about 33%. The number of fish kept from the longline logbook data was multiplied by the average weight per fish from the market sample data to estimate total landings. The estimated

[7] 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.

landings were then multiplied by the average price per pound from the market sampling data to estimate total revenue.

A system to submit Dealer data electronically was implemented in 1999; the first complete year of fish dealer data was 2000. The Dealer data coverage of the longline landings and revenue was near complete and replaced the Market Sample data as the data source for average weight and average price.

The longline purchases in the Dealer data was identified and separated out by matching specific vessel names and HDAR Commercial Marine License (CML) numbers. The estimation procedure for longline landings and revenue was done by multiplying the total number of each species kept from the Federal longline logbook data by the corresponding average weight of fish from Dealer data. The result was "Pounds Landed" for each species. This procedure was repeated on a monthly basis and summed over the year to get annual totals. There were exceptions though. When the sum of "Pounds Bought" for individual species from the Dealer data was greater than the calculation for "Pounds Landed", "Pounds Bought" was used as the final estimate for landings.

Aku Boat: This fishery includes pelagic species caught by the aku boat or pole-and-line method (HDAR gear code 1) for skipjack tuna in all HDAR statistical areas. Aku boat fishing vessel names and CML numbers were matched up with the corresponding vessel names and CMLs in the Dealer data. The landings and revenue summaries were produced by summing "Pounds Bought" and "Amount Paid" in the Dealer data. Aku boat landings were also summed from the Aku Boat Fishing report to yield "Pounds Landed". When the total of "Pounds Landed" from the Aku Boat Fishing data was greater than the "Pounds Bought" from the Dealer data, "Pounds Landed" was used as the catch. Contrarily, if "Pounds Bought" was greater than "Pounds Landed", the total from "Pounds Bought" was used as the catch. "Pounds Landed" was typically greater than Pounds Bought.

MHI Troll Fishery: The MHI troll fishery includes pelagic species caught by Miscellaneous Trolling Methods (HDAR gear code 6), Lure Trolling (61), Bait Trolling (62), Stick Trolling (63), Casting, Light Tackle, Spinners or Whipping (10) and Hybrid Methods (97) in HDAR statistical areas 100 through 642. These are areas that begin from the shoreline out to 20 minute squares around the islands of Hawaii, Maui, Kahoolawe, Lanai, Mokolai, Oahu, Kauai and Niihau.

MHI Handline Fishery: The MHI handline fishery includes pelagic species caught by Deep Sea or Bottom Handline Methods (HDAR gear code 3), Inshore Handline or Cowrie Shell (Tako) Methods (4), Ika_Shibi (8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35) and Floatline Methods (91) in HDAR statistical areas 100 to 642 except areas 175, 176, and 181.

Offshore Handline Fishery: The offshore handline fishery includes pelagic species caught by Ika-Shibi (HDAR gear code 8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35), Miscellaneous Trolling Methods (6), Lure Trolling (61), and

Hybrid Methods (97) in Areas 15217 (NOAA Weather Buoy W4), 15717 (NOAA Weather Buoy W2), 15815, 15818 (Cross Seamount) , 16019 (NOAA Weather Buoy W3), 16223 (NOAA Weather Buoy W1), 175, 176, 181, 804, 807, 816, 817, 825, 839, 842, 892, 893, 894, 898, 900, 901, 15416, 15417, 15423, 15523, 15718, 15918, 15819, and 16221. This fishery also includes pelagic species caught by Deep Sea or Bottom Handline Methods (3) in Area 16223.

Other Gear: Even though this category is not mentioned specifically in this report, the catch is included in the overall total. It represents pelagic species caught by methods or in areas other than those methods mentioned above. Catch and revenue from this category is primarily composed of pelagic species caught by trolling in areas outside of the MHI (the distant water albacore troll fishery) or pelagic species caught close to shore by diving, spearfishing, squidding, or netting inside of the MHI.

Calculations: Calculating catch by the MHI troll, MHI handline, offshore handline, and other gear involved processing of two data sets: the HDAR Commercial Fish Catch data collected and submitted by the aforementioned fishers, and Dealer data collected and submitted by seafood dealers. "Pounds Landed" from HDAR Commercial Fish Catch data was summed by species for each of the above fisheries. Total "Pounds Landed" for each species was then calculated by summing the catch of that particular species for the MHI troll, MHI handline, offshore handline fisheries and other gear category. The percent catch of each species by fishery was also calculated and later used in conjunction with the Dealer data.

Catch in the Dealer data, referred to as "Pounds Bought", by each fishery was not clearly differentiated; however, "Pounds Sold" by the longline and aku boat fisheries were identified by CML numbers or vessel names and excluded. The remaining "Pounds Bought" was presumed to be from the MHI troll, MHI handline, offshore handline fisheries or other gear category. "Pounds Bought" from this subset of the data was summed on a species specific basis with fishery specific landings of each particular species allocated based on the percent catch by fishery calculated from the Dealer data. The fishery specific allocation was then compared to the "Pounds Landed" from the HDAR Commercial Fish Catch total. The greater value of "Pounds Bought" from the Dealer data or the "Pounds Landed" from the HDAR Commercial Fish catch data was used as the catch. This process was repeated on a monthly basis.

Detailed data were not available for recreational fishers because they are not required to file catch reports (if they sell no fish during the year). In addition, there is no comprehensive creel survey of Hawaii anglers. JIMAR research reports describe aspects of the relationship between commercial and recreational pelagic fishing, but accurate estimates of total recreational participation and catch remain absent.[8] The NMFS Marine Recreational Fisheries Statistical Survey (MRFSS) has reinitiated operations in Hawaii after a 20-year absence with the first full

[8] 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.

year of field surveys in 2002. The combined telephone-creel intercept survey is being conducted in collaboration with the HDAR. In the interim, a summary of what is known about recreational fisheries, including preliminary estimates of recreational catch are included in Appendix 6.

This module was prepared by Russell Ito of NMFS. Summaries from NMFS longline logbooks were provided by Frederick Dowdell of NMFS. HDAR Commercial Fish Catch and Dealer data used calculate the MHI troll, MHI handline, offshore handline, and other gear landings were compiled by Craig Graham from JIMAR. Information on HDAR CMLs was provided by Reginald Kokubun, HDAR.

Hawaii Commercial Marine License information

Any fisherman who takes marine species for commercial purposes is required by the State of Hawaii to have a Commercial Marine License (CML) and submit a monthly catch report to HDAR. An exception to this rule is that only one person per vessel is required to submit a catch report. This person is usually, but not necessarily, the captain. Crew members do not ordinarily submit catch reports. HDAR asks fishermen to identify their primary fishing gear or method on the CML at time of licensing. This does not preclude fishermen from using other gears or methods.

A total of 3,150 fishermen were licensed in 2007, including 2,164 (69%) who indicated that their primary fishing method and gear were intended to catch pelagic fish. Most licenses that indicated pelagic fishing as their primary method were issued to trollers (65%) and longline fishermen (28%). The remainder was issued to ika shibi and palu ahi (handline) (6%) and aku boat fishers (1%).

Primary Fishing Method	Number of licensees	
	2006	2007
Trolling	1,367	1,399
Longline	606	606
Ika Shibi & Palu Ahi	133	131
Aku Boat (Pole and Line)	29	28
Total Pelagic	2,135	2,164
Total All Methods	3,166	3,150

2007 Plan Team Recommendations:

1. The PPT recommends that PIFSC analyze the Hawaii-based longline logbook data to investigate whether the 2001 regulations defining deep setting in the Hawaii longline fishery caused fishermen to change their operational behavior. Analyses should include the way deep set longline fishing was conducted, i.e. longer float and branch-lines, more hooks between floats, and whether there has been a change in seasonality when peak fishing activity occurs.

Table 1. Hawaii commercial pelagic landings, revenue, and average price by species, 2006-2007

Species	2006 Pounds landed (x 1000)	2006 Ex-vessel revenue ($1000)	2006 Average price ($/lb)	2007 Pounds landed (x 1000)	2007 Ex-vessel revenue ($1000)	2007 Average price ($/lb)
Tuna PMUS						
Albacore	766	$1,346	$1.76	775	$1,131	$1.54
Bigeye tuna	10,590	$35,294	$3.54	13,726	$41,974	$3.26
Bluefin tuna	1	$0	-	1	$0	-
Skipjack tuna	1,044	$1,255	$1.45	1,002	$800	$1.10
Yellowfin tuna	3,223	$8,324	$2.75	3,473	$7,243	$2.23
Tuna PMUS subtotal	**15,650**	**$46,219**	**$3.16**	**19,001**	**$51,148**	**$2.91**
Billfish PMUS						
Swordfish	2,581	$5,372	$2.14	3,796	$7,725	$2.12
Blue marlin	1,223	$1,018	$1.08	837	$914	$1.22
Striped marlin	1,438	$1,653	$1.15	637	$1,109	$1.78
Other marlins	418	$416	$1.09	378	$378	$1.09
Billfish PMUS subtotal	**5,661**	**$8,459**	**$1.60**	**5,648**	**$10,126**	**$1.92**
Other PMUS						
Mahimahi	1,515	$3,819	$2.84	1,650	$3,483	$2.51
Ono (wahoo)	1,001	$2,442	$2.74	842	$2,086	$2.92
Opah (moonfish)	1,084	$1,963	$1.83	1,223	$2,143	$1.77
Oilfish	417	$873	$2.11	458	$1,020	$2.23
Pomfrets	583	$1,374	$2.39	618	$1,461	$2.46
Sharks (whole weight)	337	$157	$0.58	417	$192	$0.53
Other PMUS subtotal	**4,937**	**$10,628**	**$2.32**	**5,208**	**$10,385**	**$2.19**
Other pelagics	28	$36	$1.08	26	$49	$1.57
Total pelagics	**26,276**	**$65,342**	**$2.67**	**29,883**	**$71,708**	**$2.59**

Interpretation: The total commercial pelagic landings in 2007 were 29.9 million pounds, up 14% (=3.6 million pounds) from 2006. Tunas represented 64% of the total landings. Bigeye tuna landings were a record 13.7 million pounds in 2007, up 3.1 million pounds from the previous year. Bigeye tuna was the largest component of the landings (46%). Swordfish (13%) was the next largest, followed by yellowfin tuna (12%).

Total Hawaii commercial ex-vessel revenue ($71.7 million) increased by 10% in 2007. Tunas comprised 71% of this total. Bigeye tuna alone accounted for 59% of the total revenue at $42 million. Yellowfin tuna revenue decreased 13% to $7.2 million. Billfish revenue ($10.1 million)

increased by 20% due to higher swordfish revenue. Swordfish was the second highest contributor to total revenue at $7.7 million. Revenue of other PMUS species decreased modestly (down 2%) in 2007. The total pelagic fish price decreased slightly in 2007. Average prices for tuna and other PMUS decreased by 8% and 6%, respectively while average price for billfish increased by 20% in 2007.

Source and Calculations: NMFS longline logbook and HDAR Dealer data were used to produce longline catch, revenue, and average price estimates. The Main Hawaiian Islands (MHI) troll, MHI handline, offshore handline, and other gear catch, revenue, and average price estimates were produced from HDAR Commercial Fish Catch and Dealer data.

"Other Billfish" includes unclassified billfish, sailfish, spearfish and black marlin. "Sharks" includes unclassified sharks, hammerhead sharks, mako sharks, thresher sharks, tiger sharks, blue sharks and white-tipped sharks. "Other Pelagics" includes unclassified tunas, kawakawa, sting rays, barracudas, flying fish, oilfish, sunfish, frigate mackerel and pomfrets.

The revenue for the current year is an unadjusted value while the revenue for the previous year is adjusted by the CPI. The average price is the total revenue divided by the pounds sold for each species where pounds sold is equal to or less than the total catch for each species.

Table 2. Hawaii commercial pelagic landings, revenue, and average price by fishery, 2006-2007.

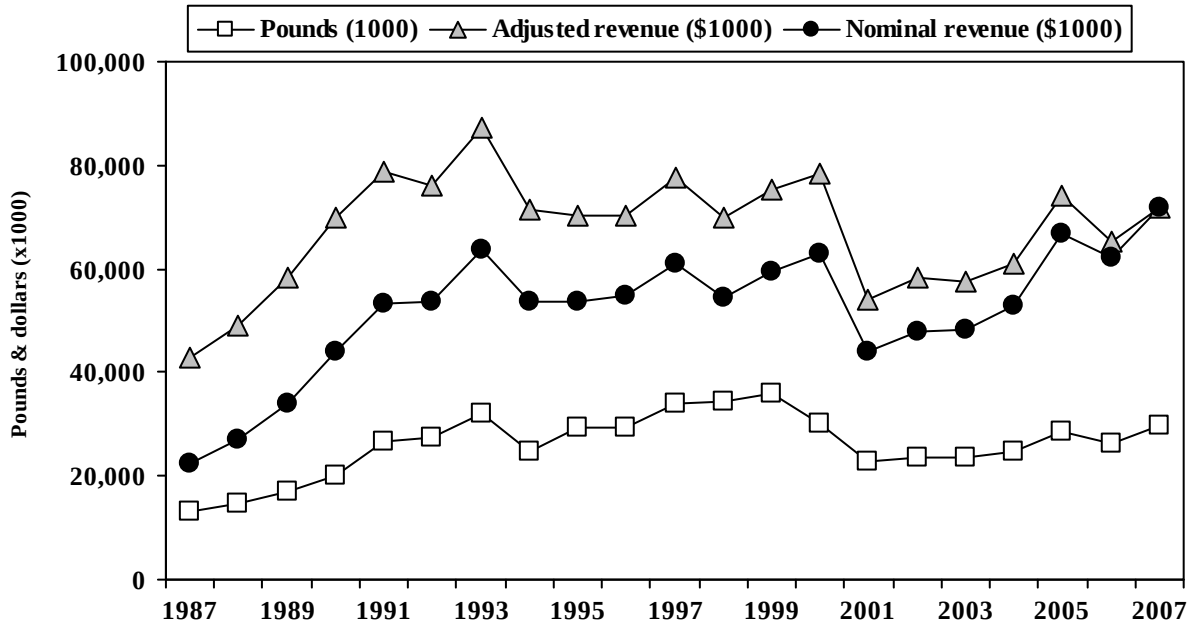
	2006			2007		
hery	**Pounds landed (x 1000)**	**Ex-vessel revenue ($1000)**	**Average price ($/lb)**	**Pounds landed (x 1000)**	**Ex-vessel revenue ($1000)**	**Average price ($/lb)**
Longline	21,522	$57,000	$2.75	24,709	$62,700	$2.68
MHI trolling	2,538	$5,016	$2.53	2,715	$5,407	$2.49
MHI handline	801	$1,417	$2.16	968	$1,630	$1.93
Offshore handline	487	$550	$1.78	547	$767	$2.00
Aku boat	661	$920	$1.40	654	$671	$1.05
Other gear	267	$439	$2.17	290	$533	$2.17
tal	**26,276**	**$65,342**	**$2.67**	**29,883**	**$71,708**	**$2.59**

Interpretation: The longline fishery is the largest commercial fishery in Hawaii. Longline landings and revenue were 24.7 million pounds and $62.7 million, respectively, in 2007. Landings increased by 3.2 million pounds while revenue increased by $5.7 million. The average price for the longline fishery was slightly lower in 2007. The MHI troll fishery is the second largest commercial fishery. It produced 2.7 million pounds worth $5.4 million in 2007. Landings and revenue increased slightly from 2006. The MHI handline fishery produced 970,000 pounds of pelagic landings worth $1.6 million while the offshore handline fishery total landings were 547,000 pounds worth $767,000 in 2007. Aku boat fishery landings was down slightly while revenue decreased by $249,000 in 2007.

Source and Calculations: NMFS longline logbook and HDAR Commercial Marine Dealer data were used to produce longline catch, revenue, and average price estimates. The MHI troll, MHI handline, offshore handline, and other gear catch, revenue, and average price estimates were produced from HDAR Commercial Fish Catch and Marine Dealer data.

The catch and revenue for each fishery for each year is the sum of the catch and revenue for each of the species in that fishery for that year. The revenue for the current year is an unadjusted value while the revenue for the previous year is adjusted by the CPI. The average price is the total revenue divided by the pounds sold for each fishery where pounds sold is equal to or less than the total catch for each fishery.

Figure 1. Hawaii total commercial landings and revenue, 1987-2007.

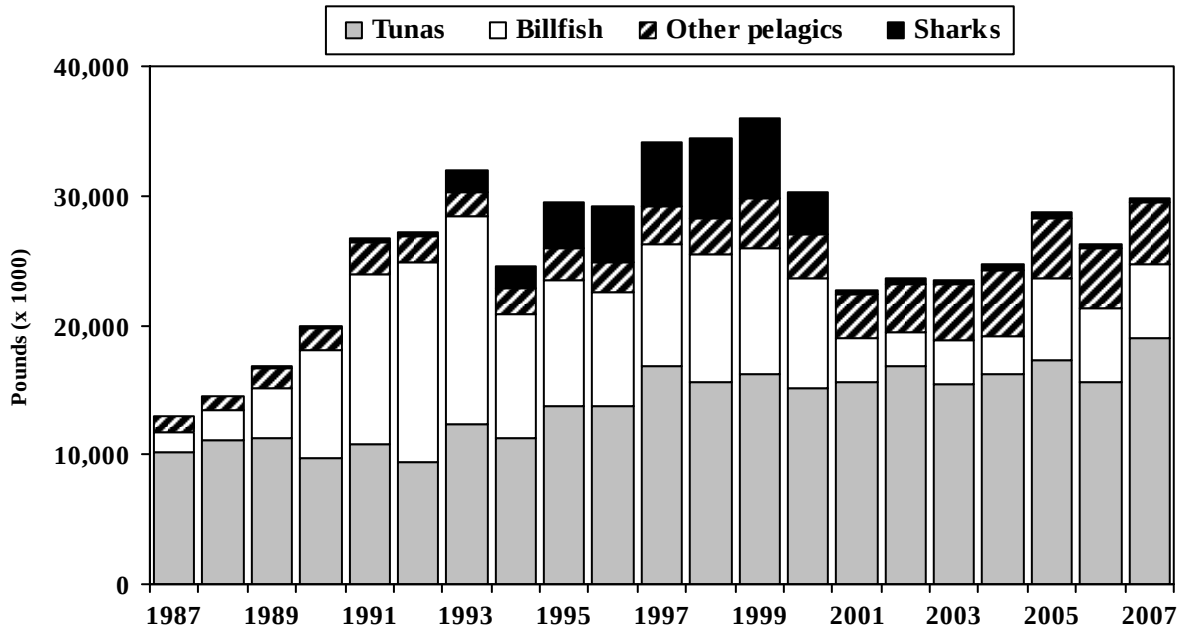


Interpretation: Commercial landings and revenue in 2007 were both above their respective long-term averages. The landings increased by 3.6 million pounds while revenue increased by $6.4 million in 2007. Gear and species specific changes over the 20-year period are explained in greater detail in the following figures and tables.

Source and Calculations: The pounds and nominal revenue values are obtained by adding the landings and revenue values for all species and all fisheries for each year. The adjusted revenue for each year is calculated by multiplying the nominal value by the Honolulu CPI for the current year and then dividing by the Honolulu CPI for that year.

Year	Pounds (1000)	Nominal revenue ($1000)	Adjusted revenue ($1000)	Honolulu CPI
1987	13,025	$22,493	$42,970	114.9
1988	14,569	$27,090	$48,860	121.7
1989	16,860	$34,166	$58,271	128.7
1990	19,933	$43,850	$69,696	138.1
1991	26,664	$53,170	$78,857	148.0
1992	27,252	$53,810	$76,153	155.1
1993	31,931	$63,680	$87,306	160.1
1994	24,569	$53,610	$71,534	164.5
1995	29,437	$53,720	$70,146	168.1
1996	29,157	$54,710	$70,351	170.7
1997	34,165	$60,840	$77,687	171.9
1998	34,473	$54,628	$69,917	171.5
1999	36,004	$59,320	$75,134	173.3
2000	30,298	$63,022	$78,465	176.3
2001	22,778	$43,896	$54,009	178.4
2002	23,592	$48,034	$58,477	180.3
2003	23,460	$48,299	$57,461	184.5
2004	24,738	$53,021	$61,060	190.6
2005	28,692	$66,810	$74,140	197.8
2006	26,276	$62,335	$65,342	209.4
2007	29,883	$71,708	$71,708	219.5
Average	**26,083.7**	**52,010.1**	**67,502.1**	
SD	**6,260.5**	**12,450.7**	**11,015.8**	

Figure 2. Hawaii commercial tuna, billfish, shark, and other pelagic PMUS landings, 1987-2007.



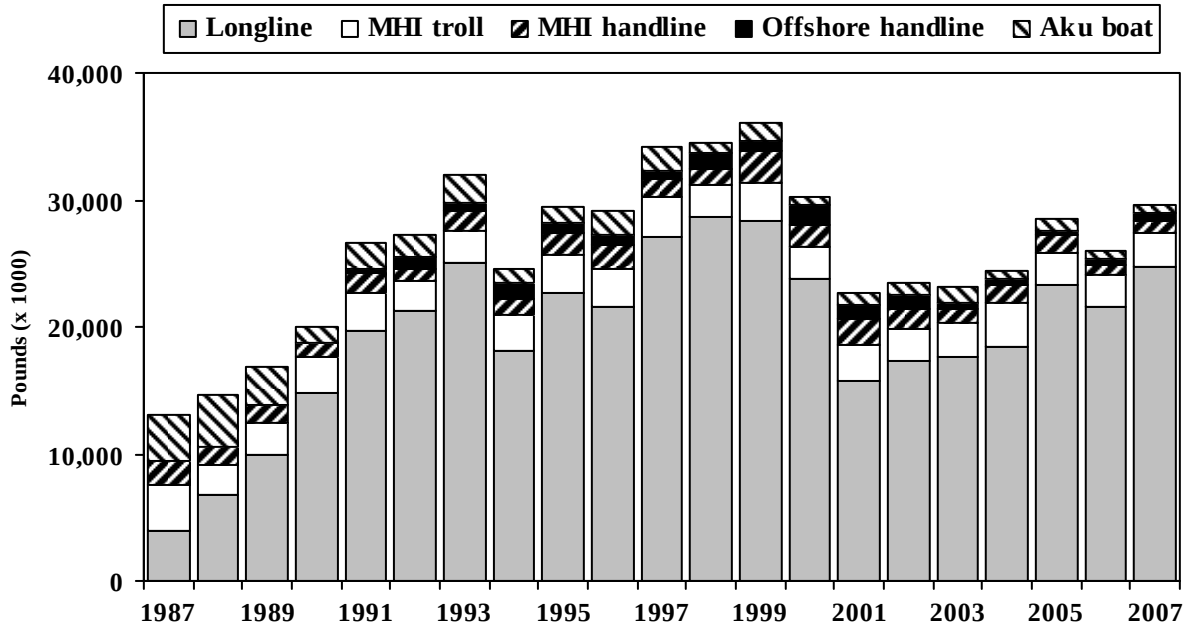
Interpretation: Hawaii's pelagic landings increased in 2007. The increase was primarily attributed to tuna landings, which went up 21% from 2006. There was a small decrease in billfish landings, but this was counterbalanced by a slight increase in landings of other pelagics and sharks. As shown previously, the billfish landings were primarily attributable to swordfish from the shallow-set longline fishery. The increase in swordfish landings offset much smaller landings of marlins in 2007.

Source and Calculations: The landings totals were obtained by adding the landings of individual species in their corresponding pelagic species groups. The groups were defined below:

Tunas:	Albacore, Bigeye tuna, Bluefin tuna, Kawakawa, Skipjack tuna, Unclassified tuna, Yellowfin tuna
Billfishes:	Blue marlin, Black marlin, Sailfish, Spearfish, Striped marlin, Swordfish Unclassified billfish
Other pelagics:	Barracuda, Beltfish, Flying fish, Frigate mackeral, Mahimahi, Moonfish Oilfish, Pomfret, Stingrays, Sunfish, Wahoo
Sharks:	Blue sharks, Hammerhead sharks, Mako sharks, Thresher sharks, Tiger sharks, Unclassified sharks, Oceanic white-tip sharks

	Hawaii pelagic landings (1000 pounds)				
Year	**Tunas**	**Billfish**	**Other pelagics**	**Sharks**	**Total**
1987	10,130	1,558	1,294	43	13,025
1988	11,197	2,301	978	94	14,570
1989	11,223	3,880	1,553	203	16,860
1990	9,726	8,278	1,707	222	19,933
1991	10,794	13,129	2,423	318	26,664
1992	9,461	15,355	2,026	410	27,252
1993	12,417	15,928	1,850	1,736	31,931
1994	11,309	9,526	1,977	1,757	24,570
1995	13,820	9,723	2,426	3,468	29,437
1996	13,685	8,796	2,349	4,327	29,157
1997	16,813	9,492	2,850	5,010	34,165
1998	15,556	9,923	2,782	6,212	34,473
1999	16,145	9,758	3,828	6,273	36,005
2000	15,157	8,535	3,346	3,253	30,298
2001	15,561	3,469	3,414	333	22,778
2002	16,771	2,728	3,727	366	23,592
2003	15,367	3,470	4,265	358	23,460
2004	16,142	3,019	5,159	418	24,738
2005	17,222	6,400	4,677	393	28,692
2006	15,650	5,661	4,628	337	26,276
2007	19,001	5,648	4,817	417	29,883
Average	**13,959.4**	**7,456.0**	**2,956.0**	**1,711.8**	**26,083.7**
SD	**2,832.9**	**4,186.4**	**1,259.6**	**2,124.8**	**6,260.5**

Figure 3. Total commercial pelagic landings by gear type 1987-2007.



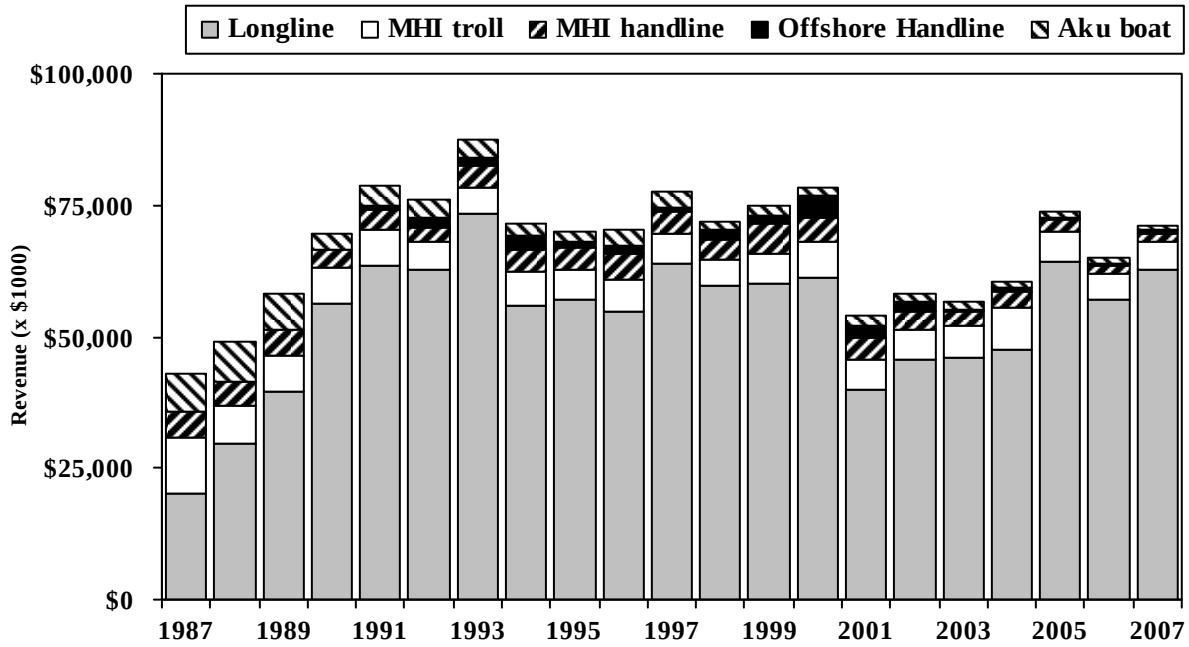
Interpretation: Hawaii commercial pelagic landings in 2007 were dominated by longline landings. Total landings increased largely due to higher landings by the longline fishery whose landings increased 14% in 2007. MHI troll and MHI handline fisheries are the next two largest fisheries in Hawaii. MHI troll landings have remained relatively constant since 1987 while MHI handline landings fluctuated. The offshore handline fishery grew in the early 1990s with landings leveling off from 2003. In contrast, aku boat landings have declined from the late 1980s due to attrition of an aging fleet.

Source and Calculations: The landings values are obtained by adding the landings values of all species of each fishery for each year. The total

	Hawaii pelagic total landings (1000 pounds)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	3,893	3,709	1,914	-	3,503	13,025
1988	6,713	2,445	1,471	-	3,940	14,569
1989	9,966	2,401	1,487	-	2,962	16,860
1990	14,790	2,901	1,060	66	1,116	19,933
1991	19,608	3,102	1,477	331	2,146	26,664
1992	21,190	2,394	945	987	1,735	27,252
1993	25,005	2,578	1,532	679	2,137	31,931
1994	18,138	2,810	1,287	1,175	1,159	24,569
1995	22,733	2,966	1,733	714	1,291	29,437
1996	21,564	2,994	1,963	793	1,844	29,157
1997	27,160	3,016	1,479	563	1,947	34,165
1998	28,655	2,471	1,369	1,134	845	34,473
1999	28,377	3,013	2,413	888	1,312	36,004
2000	23,786	2,558	1,711	1,476	708	30,298
2001	15,800	2,734	2,066	1,093	994	22,778
2002	17,390	2,384	1,695	1,058	936	23,592
2003	17,654	2,690	1,083	398	1,378	23,460
2004	18,474	3,376	1,403	485	656	24,738
2005	23,320	2,580	1,266	400	932	28,692
2006	21,522	2,538	801	487	661	26,276
2007	24,709	2,715	968	547	654	29,883
Average	**19,545.1**	**2,779.7**	**1,482.0**	**632.1**	**1,564.6**	**26,083.7**
SD	**6,625.5**	**345.6**	**402.9**	**427.3**	**939.6**	**6,260.5**

column is greater than the sum of the other five fisheries as it includes contributions from the "Other Gear" fishery.

Figure 4. Total commercial pelagic ex-vessel revenue by gear type 1987-2007.



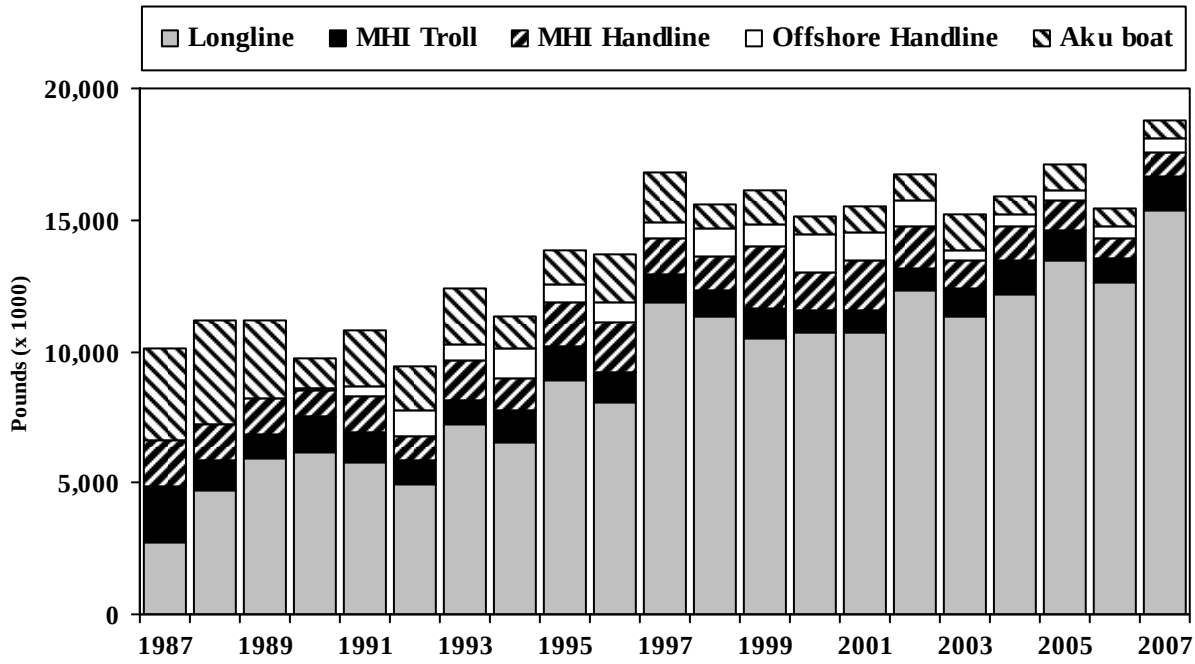
Interpretation: Ex-vessel revenue from Hawaii's pelagic fisheries increased 10% in 2007 due higher revenue by all fisheries particularly the longline fishery. The longline fishery was, by far, the largest revenue generating fishery with the MHI troll and MHI handline fisheries ranked as the next two largest fisheries. The offshore handline fishery grew in the early 1990s with revenue dropping below $1 million from 2003. Revenue from the aku boat fishery declined from the late 1980s due fleet attrition and lower landings.

Source and Calculations: The ex-vessel revenue values were obtained by adding the revenue for all species

	Hawaii pelagic total revenue ($1000)					
Year	Longline	MHI troll	MHI handline	Offshore Handline	Aku boat	Total
1987	$20,200	$10,576	$4,978	-	$7,170	$42,969
1988	$29,800	$6,989	$4,787	-	$7,330	$48,906
1989	$39,600	$6,650	$4,984	-	$7,070	$58,303
1990	$56,100	$7,143	$3,312	$154	$2,980	$69,697
1991	$63,600	$6,670	$3,755	$790	$4,010	$78,857
1992	$62,800	$5,324	$2,482	$2,090	$3,420	$76,153
1993	$73,200	$5,232	$4,009	$1,542	$3,310	$87,307
1994	$55,800	$6,534	$4,183	$2,598	$2,450	$71,565
1995	$56,900	$5,838	$4,099	$1,259	$2,020	$70,146
1996	$54,900	$5,979	$4,718	$1,674	$3,070	$70,351
1997	$64,000	$5,729	$3,887	$1,036	$3,060	$77,712
1998	$59,600	$5,134	$3,531	$2,171	$1,420	$71,906
1999	$60,000	$5,934	$5,448	$1,591	$2,120	$75,134
2000	$61,300	$6,819	$4,599	$4,131	$1,450	$78,465
2001	$40,000	$5,628	$4,315	$2,162	$1,720	$54,009
2002	$45,700	$5,471	$3,541	$2,003	$1,530	$58,478
2003	$45,900	$6,171	$2,494	$679	$1,580	$57,462
2004	$47,700	$7,832	$2,888	$979	$990	$61,061
2005	$64,400	$5,492	$2,334	$471	$1,190	$74,140
2006	$57,000	$5,016	$1,417	$550	$920	$65,342
2007	$62,700	$5,407	$1,630	$767	$671	$71,708
Average	**$53,390.5**	**$6,265.1**	**$3,685.3**	**$1,268.9**	**$2,832.4**	**$67,603.6**
SD	**$12,779.7**	**$1,242.1**	**$1,127.5**	**$1,032.4**	**$2,040.0**	**$11,042.7**

of each fishery for each year. Ex-vessel revenue was then adjusted for inflation using the Honolulu Consumer Price Index (CPI). The total column is greater than the sum of the other five fisheries as it includes contributions.

Figure 5. Hawaii commercial tuna landings by gear type, 1987-2007.



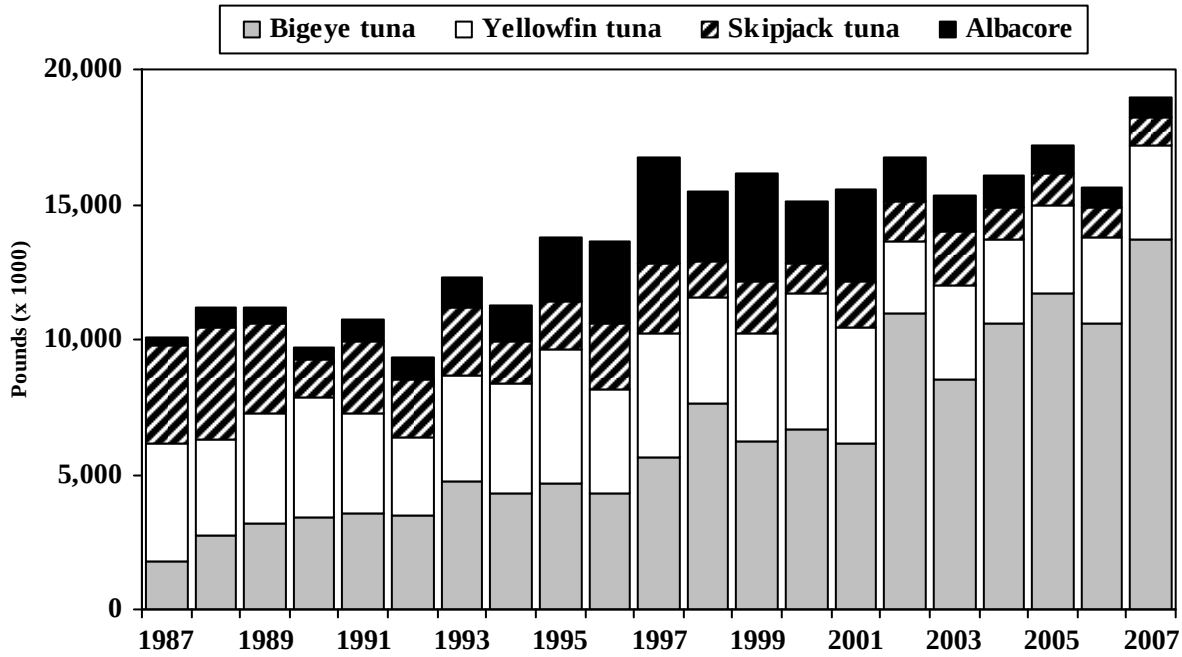
Interpretation: Longline gear was the largest single contributor to Hawaii commercial tuna landings since 1988 and reached a record level in 2007. Tuna landings by the MHI troll fishery were highest in 1987, dropped the following year, and remained around its long-term average thereafter. Landings by the MHI handline fishery peaked in 1999 and dropped to a record low in 2006. Offshore handline tuna landings was up slightly in 2007 but well below its long-term average. The aku boat fishery was on a declining trend with landings below 1 million pounds in 7 of the past 8 years.

Source and Calculations: Tuna landings by gear types were summarized for the longline, MHI troll, MHI handline, offshore handline, aku boat fisheries, and other gear. The tuna catch statistics for the longline fishery were derived from NMFS longline logbook, Joint NMFS and

	Hawaii tuna landings by gear type (1000 pounds)					
Year	Longline	MHI Troll	MHI Handline	Offshore Handline	Aku boat	Total
1987	2,705	2,136	1,782	-	3,501	10,130
1988	4,725	1,141	1,395	-	3,936	11,197
1989	5,921	904	1,393	-	2,961	11,223
1990	6,162	1,401	981	66	1,116	9,726
1991	5,797	1,145	1,380	326	2,146	10,794
1992	4,908	980	885	966	1,721	9,461
1993	7,205	964	1,458	656	2,134	12,417
1994	6,540	1,240	1,213	1,157	1,158	11,309
1995	8,898	1,295	1,642	694	1,291	13,820
1996	8,074	1,146	1,845	776	1,844	13,685
1997	11,826	1,107	1,384	554	1,942	16,813
1998	11,359	933	1,298	1,121	845	15,556
1999	10,529	1,135	2,302	867	1,312	16,145
2000	10,700	877	1,440	1,397	707	15,157
2001	10,730	799	1,942	1,044	993	15,561
2002	12,346	804	1,598	1,010	935	16,771
2003	11,337	1,080	1,015	378	1,375	15,367
2004	12,181	1,316	1,285	461	654	16,142
2005	13,459	1,109	1,184	390	931	17,222
2006	12,630	939	735	469	661	15,650
2007	15,363	1,313	919	527	653	19,001
Average	**9,209.3**	**1,131.6**	**1,384.5**	**714.4**	**1,562.7**	**13,959.4**
SD	**3,418.8**	**287.6**	**382.0**	**350.8**	**938.9**	**2,832.8**

HDAR Market Sample, and HDAR Commercial Marine Dealer data. The HDAR Commercial Fish Catch and Marine Dealer data were used to calculate landings for other gear types.

Figure 6. Species composition of the tuna landings, 1987-2007.

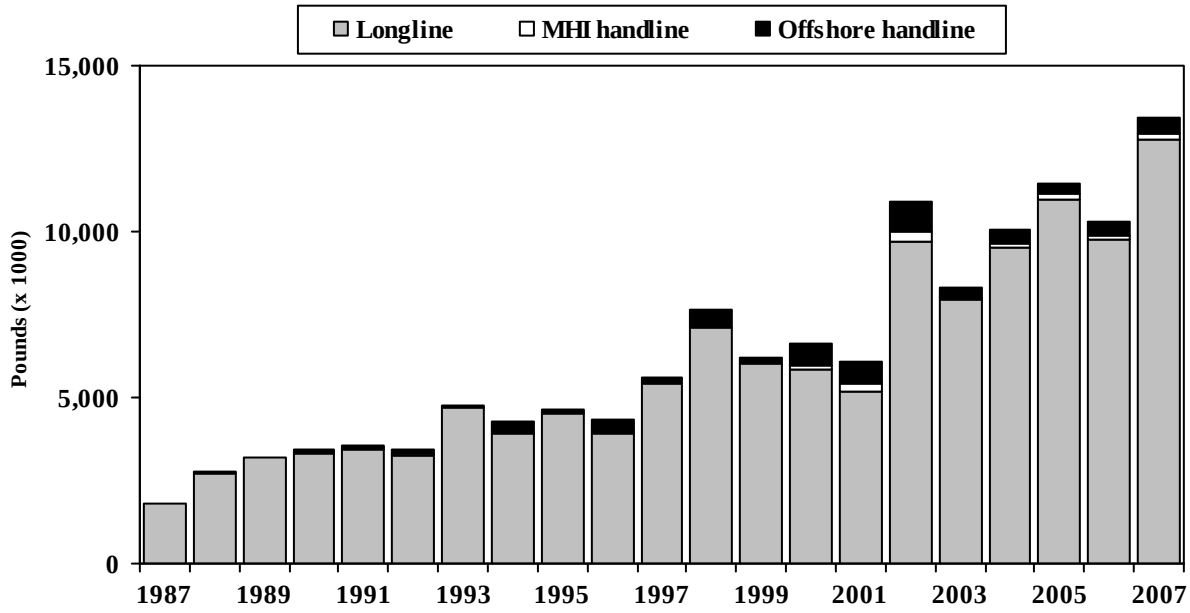


Interpretation: Bigeye tuna was the largest component of the tuna landings and reached a record level in 2007. Yellowfin tuna was the second largest component of the tuna landings. Yellowfin tuna landings were below its long-term average for the past 6 years. Skipjack tuna landings decreased over time and were at its lowest levels in 2006 and 2007. Albacore landings grew rapidly peaking in 1999 and declined thereafter dropping to less than 1 million pounds in the past two years.

Source and Calculations: The tuna landing statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The tuna landings were composed of albacore, bigeye tuna, bluefin tuna, kawakawa, skipjack tuna, and yellowfin tuna.

	Hawaii tuna landings (1000 pounds)				
Year	Bigeye tuna	Yellowfin tuna	Skipjack tuna	Albacore	Total
1987	1,813	4,316	3,633	344	10,130
1988	2,770	3,551	4,156	695	11,197
1989	3,208	4,064	3,298	626	11,223
1990	3,425	4,460	1,389	422	9,726
1991	3,573	3,661	2,691	846	10,794
1992	3,456	2,943	2,099	854	9,461
1993	4,768	3,872	2,546	1,122	12,417
1994	4,280	4,106	1,553	1,293	11,309
1995	4,667	4,940	1,814	2,328	13,820
1996	4,330	3,851	2,426	3,020	13,685
1997	5,595	4,628	2,608	3,920	16,813
1998	7,641	3,896	1,326	2,645	15,556
1999	6,212	4,012	1,909	3,979	16,145
2000	6,642	5,037	1,127	2,331	15,157
2001	6,124	4,306	1,694	3,421	15,561
2002	10,969	2,664	1,443	1,671	16,771
2003	8,511	3,471	1,989	1,348	15,367
2004	10,556	3,168	1,181	1,167	16,142
2005	11,732	3,219	1,188	1,050	17,222
2006	10,590	3,223	1,044	766	15,650
2007	13,726	3,473	1,002	775	19,001
Average	**6,408.9**	**3,850.6**	**2,005.6**	**1,648.7**	**13,959.4**
SD	**3,383.7**	**633.9**	**889.2**	**1,153.2**	**2,832.9**

Figure 7. Hawaii bigeye tuna landings, 1987-2007.

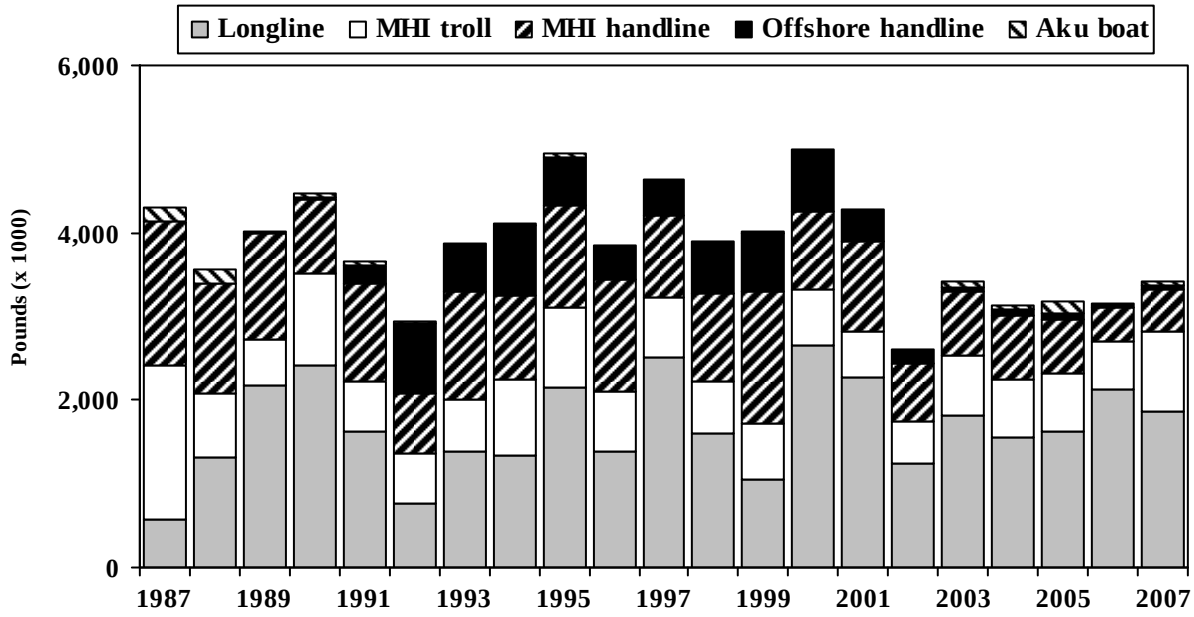


Interpretation: Annual bigeye tuna landings have increased more than seven-fold over the 20 year period with a record 13.7 million pounds in 2007; up 3.1 million pounds from 2006. The longline fishery typically produces over 90% of the bigeye tuna. Bigeye landings by this fishery reached a record 12.7 million pounds in 2007. The offshore handline fishery was the second largest producer of bigeye tuna in Hawaii accounting for 4% of the total in 2007. Combined MHI troll and MHI handline landings of bigeye tuna yielded 2% of the total.

Source and Calculations: Bigeye tuna catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of bigeye tuna included the longline, MHI troll, MHI handline, and offshore handline fisheries. The total column also contains small bigeye tuna catches by the aku boat fishery and other gear category.

	Hawaii bigeye tuna landings (1000 pounds)				
Year	Longline	MHI troll	MHI handline	Offshore handline	Total
1987	1,796	11	6	-	1,813
1988	2,732	10	28	-	2,770
1989	3,178	11	19	-	3,208
1990	3,338	15	41	31	3,425
1991	3,423	11	45	94	3,573
1992	3,277	9	19	151	3,456
1993	4,677	4	2	85	4,768
1994	3,940	6	10	324	4,280
1995	4,522	10	33	102	4,667
1996	3,940	4	11	375	4,330
1997	5,399	6	52	138	5,595
1998	7,113	5	15	508	7,641
1999	5,995	7	46	164	6,212
2000	5,836	15	141	650	6,642
2001	5,193	23	226	660	6,124
2002	9,674	86	353	850	10,969
2003	7,922	80	74	313	8,511
2004	9,534	328	125	385	10,556
2005	10,976	187	141	321	11,732
2006	9,764	124	129	414	10,590
2007	12,741	137	187	489	13,726
Average	**5,951.0**	**51.9**	**81.1**	**336.3**	**6,408.9**
SD	**3,050.9**	**82.4**	**89.9**	**230.6**	**3,383.7**

Figure 8. Hawaii yellowfin tuna landings, 1987-2007.

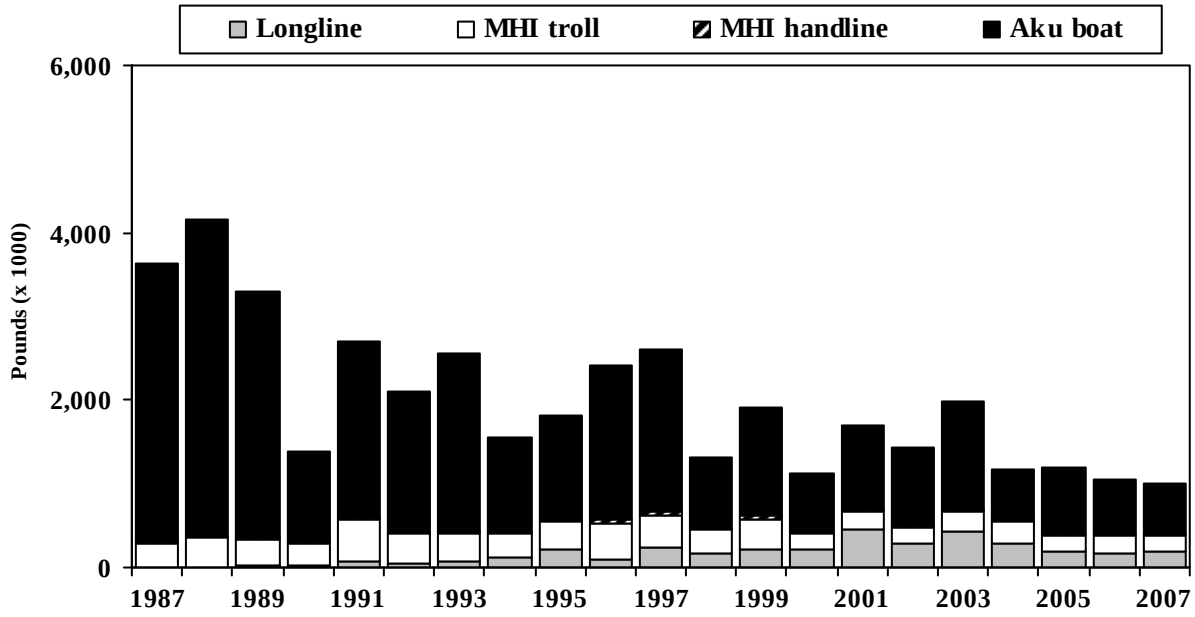


Interpretation: Annual landings of yellowfin tuna were low during the past six years. The longline fishery typically had the highest yellowfin tuna landings. The MHI troll fishery was usually the second largest producer of yellowfin tuna followed by the MHI handline and offshore handline fisheries, respectively. The aku boat fishery had small landings of yellowfin tuna. This species is usually caught by the aku boat fishery when fishing for skipjack tuna is poor.

	Hawaii yellowfin tuna landings (1000 pounds)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	575	1,828	1,734	-	173	4,316
1988	1,309	764	1,310	-	168	3,551
1989	2,174	559	1,266	-	21	4,064
1990	2,421	1,089	876	35	39	4,460
1991	1,617	615	1,154	232	44	3,661
1992	763	606	722	816	36	2,943
1993	1,392	616	1,283	571	10	3,872
1994	1,336	914	1,003	834	19	4,106
1995	2,159	949	1,207	591	34	4,940
1996	1,389	707	1,352	401	2	3,851
1997	2,515	712	986	415	0	4,628
1998	1,592	636	1,052	613	3	3,896
1999	1,042	687	1,559	703	21	4,012
2000	2,656	670	937	739	2	5,037
2001	2,277	542	1,078	379	4	4,306
2002	1,235	500	711	151	6	2,664
2003	1,815	726	746	52	73	3,471
2004	1,559	689	769	75	38	3,168
2005	1,620	703	645	67	149	3,219
2006	2,120	577	410	52	6	3,223
2007	1,864	967	502	38	50	3,473
Average	**1,687.1**	**764.6**	**1,014.4**	**375.8**	**42.7**	**3,850.6**
SD	**565.4**	**287.1**	**340.1**	**295.2**	**54.0**	**633.9**

Source and Calculations: Yellowfin tuna catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of yellowfin tuna included the longline, MHI troll, MHI handline, offshore handline and aku boat fisheries. The total column also contains small catches of yellowfin tuna from the other gear category.

Figure 9. Hawaii skipjack tuna landings, 1987-2007.

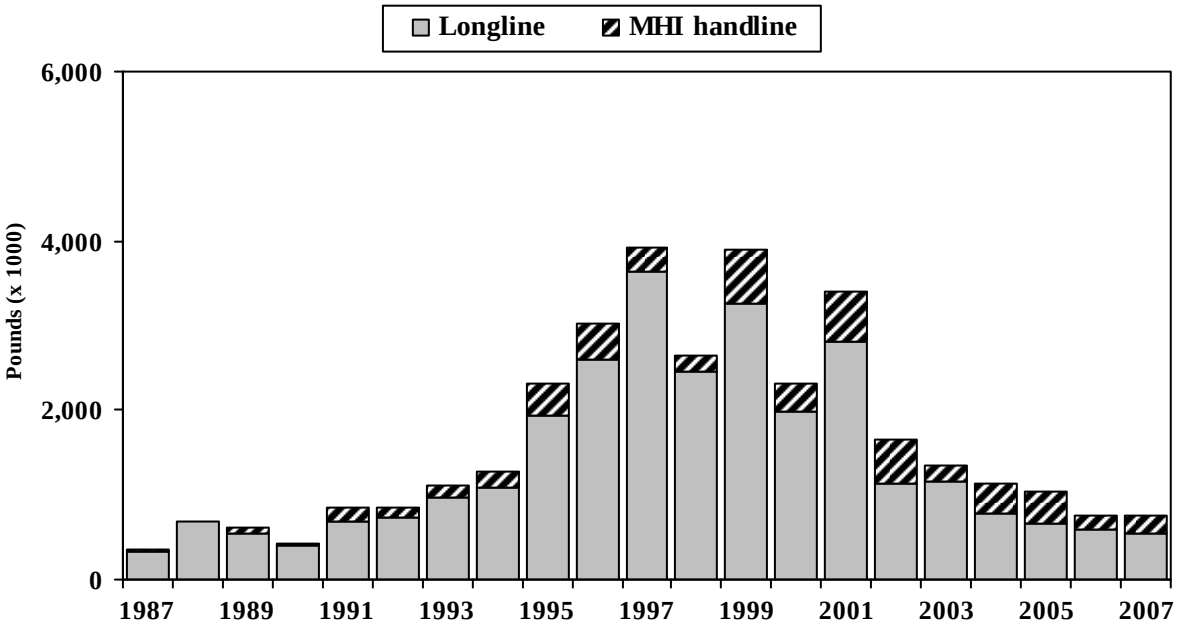


Interpretation: Skipjack tuna landings were on a declining trend with landings in 2007 50% below the long-term average. Since the aku boat fishery accounted for most of the skipjack tuna landings, the main source of overall decline was this fishery. Skipjack tuna landings by the aku boat fishery were below the long-term average for the past 10 years. The decline in skipjack tuna landings was not apparent or as apparent in other fisheries. Skipjack tuna landings by the longline fishery were on a increasing trend while landings by the MHI troll fishery did not decline as significantly as the aku boat fishery.

	Hawaii skipjack tuna landings (1000 pounds)				
Year	Longline	MHI troll	MHI handline	Aku boat	Total
1987	3	277	25	3,328	3,633
1988	8	351	29	3,768	4,156
1989	22	318	20	2,938	3,298
1990	12	278	26	1,073	1,398
1991	66	504	19	2,102	2,691
1992	49	347	21	1,682	2,099
1993	79	332	14	2,121	2,546
1994	116	283	21	1,133	1,553
1995	223	318	17	1,256	1,814
1996	91	424	69	1,842	2,426
1997	234	376	56	1,942	2,608
1998	168	278	38	842	1,326
1999	219	347	52	1,291	1,909
2000	221	181	14	704	1,127
2001	455	215	30	988	1,694
2002	282	203	20	927	1,443
2003	438	237	16	1,292	1,989
2004	293	246	23	615	1,181
2005	197	190	21	779	1,188
2006	162	220	10	648	1,044
2007	202	184	15	600	1,002
Average	**168.6**	**290.8**	**26.4**	**1,517.7**	**2,006.0**
SD	**130.1**	**83.9**	**15.3**	**911.1**	**888.9**

Source and Calculations: Skipjack tuna catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of skipjack tuna included the longline, MHI troll, MHI handline, and aku boat fisheries. The total column also contains small catches of skipjack tuna from the other gear category.

Figure 10. Hawaii albacore landings, 1987-2007.

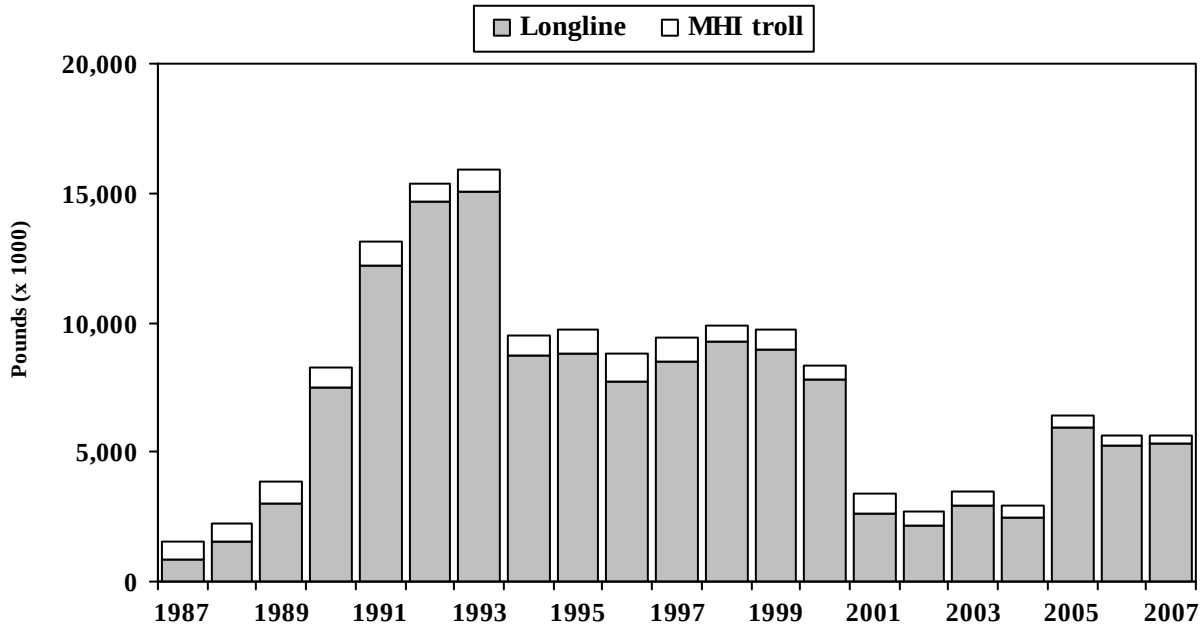


Interpretation: Albacore landings increased more than 11-fold from 1987 to 1999 and was on a declining trend thereafter. Albacore landings were 47% below the long-term average in 2007. The longline and MHI handline fisheries, account for almost all of the albacore landings and were responsible for the overall decline. Longline landings of albacore peaked in 1997 and declined thereafter. Albacore landings by the MHI handline fishery was relatively small but grew over the 21-year period peaking at 642,000 pounds in 1999. On rare occasions, the MHI troll fishery has encountered short "runs" of albacore but those landings were negligible in comparison.

Source and Calculations: Albacore catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer Data. The gear types summarized for catches of albacore included the longline, MHI troll, and MHI handline fisheries.

	Hawaii albacore landings (1000 pounds)			
Year	Longline	MHI troll	MHI handline	Total
1987	331	1	12	344
1988	676	1	18	695
1989	547	1	78	626
1990	390	1	31	422
1991	687	2	157	846
1992	735	3	116	854
1993	965	3	154	1,122
1994	1,095	22	176	1,293
1995	1,938	10	380	2,328
1996	2,606	5	409	3,020
1997	3,626	7	287	3,920
1998	2,450	4	191	2,645
1999	3,250	87	642	3,979
2000	1,979	5	347	2,331
2001	2,803	13	605	3,421
2002	1,145	9	511	1,668
2003	1,160	10	176	1,348
2004	790	7	351	1,167
2005	663	14	373	1,050
2006	581	2	183	770
2007	554	8	212	775
Average	**1,379.6**	**10.2**	**257.5**	**1,648.7**
SD	**1,014.7**	**18.4**	**182.9**	**1,153.1**

Figure 11. Hawaii commercial billfish landings by gear type, 1987-2007.

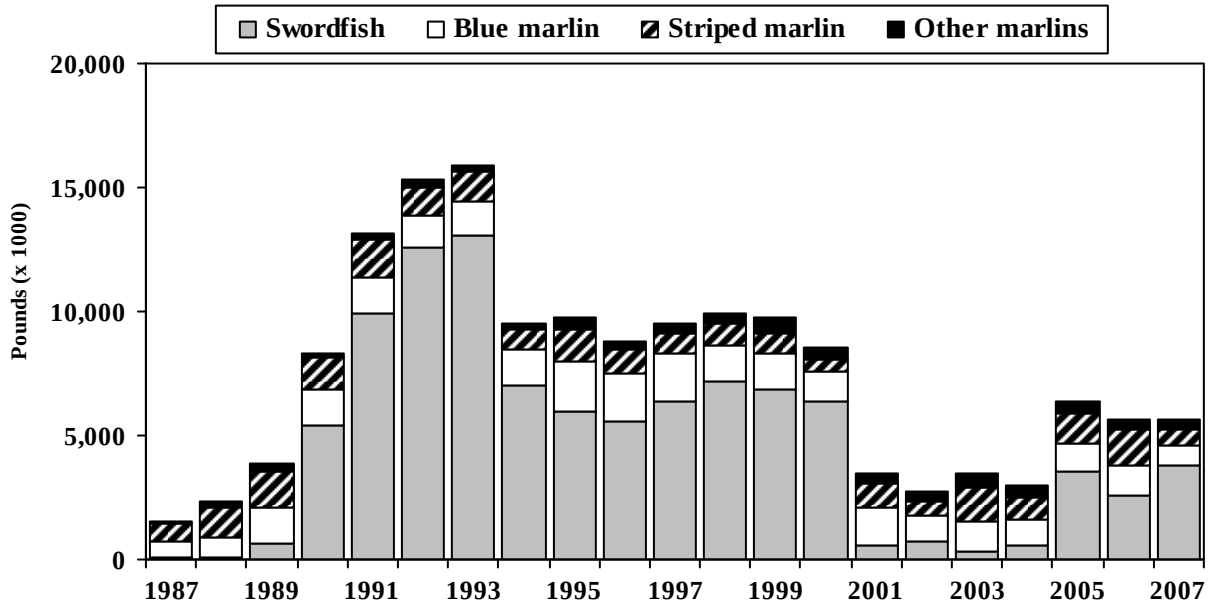


Interpretation: Two major factors affected billfish landings since 1987. The first was the growth of the longline fishery for swordfish in the early 1990s. The second was a series of management decisions that were intended to minimized longline interactions with sea turtles. These decisions strongly affected the amount of swordfish-targeted effort and the associated landings. In contrast, billfish landings by the MHI troll fishery and the MHI handline fishery were relatively small. Billfish landings by the MHI troll fishery were below the long-term average for the past 6 years.

	Hawaii billfish landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	862	666	30	1,558
1988	1,537	736	28	2,301
1989	3,043	805	32	3,880
1990	7,519	732	27	8,278
1991	12,208	890	31	13,129
1992	14,656	683	16	15,355
1993	15,034	870	24	15,928
1994	8,737	770	19	9,526
1995	8,837	856	30	9,723
1996	7,723	1,042	31	8,796
1997	8,517	935	40	9,492
1998	9,277	626	20	9,923
1999	8,958	769	31	9,758
2000	7,817	506	201	8,535
2001	2,630	780	51	3,469
2002	2,160	535	26	2,728
2003	2,954	491	18	3,472
2004	2,471	481	23	3,019
2005	5,909	471	17	6,400
2006	5,249	395	13	5,664
2007	5,322	307	14	5,648
Average	**6,734.3**	**683.2**	**34.3**	**7,456.3**
SD	**4,108.7**	**193.5**	**39.3**	**4,186.3**

Source and Calculations: The billfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. Billfish landings were calculated for the longline, MHI troll, and MHI handline. The total column also contains small catches of billfish from the offshore handline and other gear category. The billfish group was composed of swordfish, blue marlin, striped marlin, spearfish, sailfish, black marlin, and unclassified billfish.

Figure 12. Species composition of the billfish landings, 1987-2007.

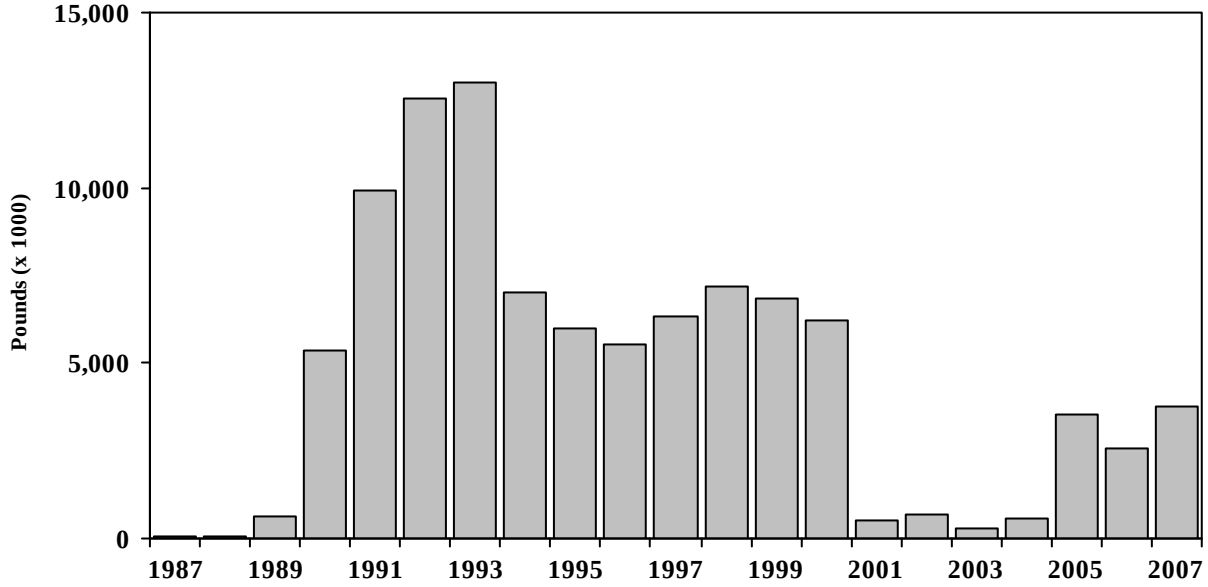


Interpretation: The billfish landings consisted mostly of marlins and small landings of swordfish from 1987 through 1989. However, in 1990 the billfish composition changed and total landings more than doubled as longline vessels began targeting swordfish. Swordfish landings continued to dominate billfish landings from 1990 through 2000 despite a 46% decrease in 1994. Swordfish landings dropped 91% in 2001 from regulatory actions and remained low through 2004. Swordfish reestablished itself as the dominant component of the billfish landings from 2005 through 2007 when targeting of swordfish was once again allowed under a new suite of regulations. Blue marlin composed 15% of the billfish landings with landings peaking in 1995-1997. Striped marlin landings peaked in 1991, declined to a low in 2000, recovered close to its long-term average in 2003-2006, but dropped significantly in 2007.

	Hawaii billfish landings (1000 lbs)				
Year	Swordfish	Blue marlin	Striped marlin	Other marlins	Total
1987	60	687	667	144	1,558
1988	65	812	1,230	194	2,301
1989	635	1,502	1,403	340	3,880
1990	5,383	1,484	1,246	164	8,278
1991	9,953	1,417	1,552	208	13,129
1992	12,569	1,339	1,098	349	15,355
1993	13,036	1,434	1,191	266	15,928
1994	7,010	1,454	796	267	9,526
1995	5,994	1,952	1,313	464	9,723
1996	5,529	1,931	1,044	292	8,796
1997	6,368	1,908	861	354	9,492
1998	7,208	1,403	891	421	9,923
1999	6,855	1,432	866	605	9,758
2000	6,404	1,146	548	438	8,535
2001	562	1,527	1,001	380	3,469
2002	703	1,050	615	360	2,728
2003	316	1,176	1,373	606	3,470
2004	599	993	937	490	3,019
2005	3,539	1,132	1,221	509	6,400
2006	2,581	1,223	1,438	418	5,661
2007	3,796	837	637	378	5,648
Average	**4,722.2**	**1,325.7**	**1,044.2**	**364.0**	**7,456.0**
SD	**3,994.4**	**349.8**	**296.3**	**130.9**	**4,186.4**

Source and Calculations: The billfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each species. The gear types summarized for each species was composed longline, MHI troll, MHI handline, offshore handline, aku boat, and other gear.

Figure 13. Hawaii swordfish landings, 1987-2007.

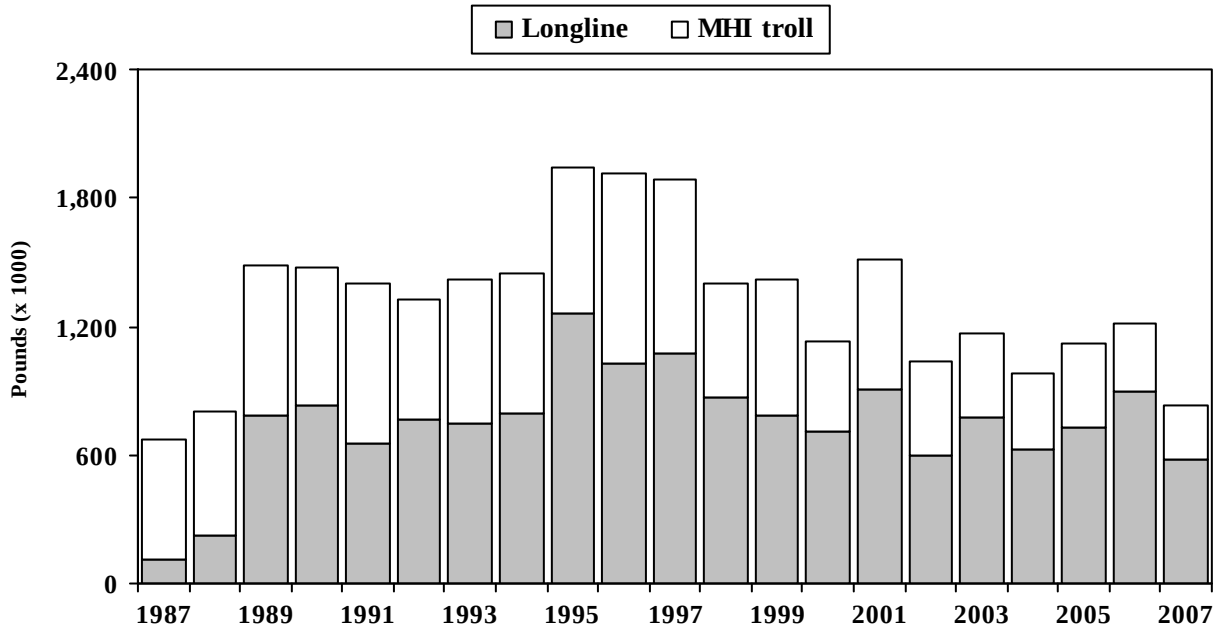


Interpretation: The trend in swordfish landings reflected both an increase in the number of vessels in the longline fishery and widespread targeting of swordfish by the fishery. Swordfish landings rose rapidly, peaking in 1993, and falling the following year. Landings remained relatively steady up to 2000 but dropped dramatically a result of increased regulations and prohibition on targeting swordfish by the longline fishery. Although the longline fishery for swordfish was reopened under a new set of regulations in April 2004, landings remained low. Swordfish landings increased during 2005 through 2007 as longline fishers became more proficient using techniques mandated under the new requirements. Swordfish landings by the MHI handline fishery were negligible.

Source and Calculations: Swordfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of swordfish included the longline, MHI troll, and MHI handline fisheries. The total column also contains small swordfish catches by the other gear category.

	Swordfish landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	52	1	7	60
1988	52	2	11	65
1989	619	2	14	635
1990	5,372	1	10	5,383
1991	9,939	1	13	9,953
1992	12,566	0	3	12,569
1993	13,027	0	9	13,036
1994	7,002	1	7	7,010
1995	5,981	1	12	5,994
1996	5,517	1	11	5,529
1997	6,352	1	15	6,368
1998	7,193	1	14	7,208
1999	6,835	1	19	6,855
2000	6,205	5	193	6,404
2001	519	4	39	562
2002	681	3	19	703
2003	301	1	12	316
2004	549	0	16	599
2005	3,527	1	11	3,539
2006	2,573	1	8	2,581
2007	3,781	2	12	3,796
Average	**4,697.3**	**1.5**	**21.7**	**4,722.2**
SD	**3,995.7**	**1.2**	**39.9**	**3,994.4**

Figure 14. Hawaii blue marlin landings, 1987-2007.



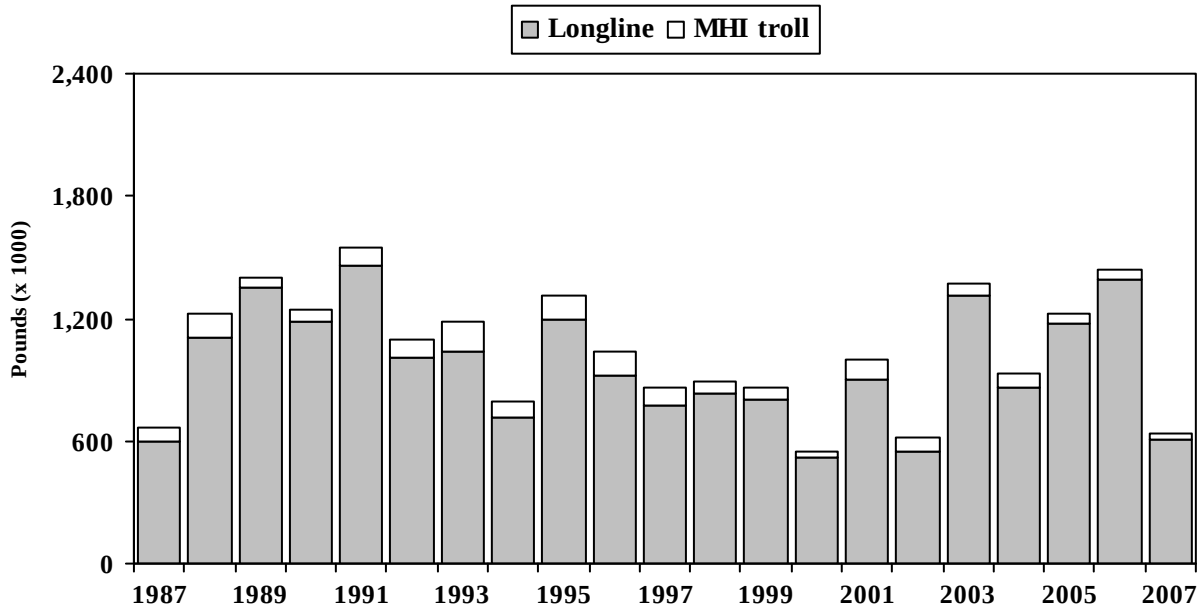
Interpretation: The two fisheries that landed the most blue marlin were the longline and MHI troll fisheries. Blue marlin landings by the longline fishery was below the long-term average for three of the past four years while blue marlin landings by the MHI troll fishery were below the long-term average for the past six years.

Source and Calculations: Blue marlin catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of blue marlin included the longline, MHI troll, and MHI handline fisheries. The total column also contains small catches of blue marlin by the offshore handline fishery and other gear category.

Blue marlin catches by the longline fishery are nominal estimates that do not account for misidentification problems. The misidentification problems is currently being studied in a Pelagic Fisheries Research Program (PFRP) project (see PFRP newsletter 7(10), 1-4). The general pattern is blue marlin are overreported in longline logbooks. The reason is striped marlin is often misidentified as blue marlin. Thus, the nominal longline blue marlin estimates for are probably inflated.

	Blue marlin landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	112	557	18	687
1988	225	575	12	812
1989	784	704	14	1,502
1990	834	638	12	1,484
1991	654	749	14	1,417
1992	765	565	9	1,339
1993	748	675	11	1,434
1994	798	648	8	1,454
1995	1,257	684	11	1,952
1996	1,030	885	16	1,931
1997	1,074	814	20	1,908
1998	870	527	6	1,403
1999	787	635	10	1,432
2000	711	422	5	1,146
2001	909	608	5	1,527
2002	593	446	6	1,050
2003	777	390	5	1,176
2004	623	360	5	993
2005	731	392	5	1,132
2006	897	318	4	1,223
2007	577	254	2	837
Average	**750.3**	**564.2**	**9.4**	**1,325.7**
SD	**252.9**	**167.3**	**4.9**	**349.8**

Figure 15. Hawaii striped marlin landings, 1987-2007.



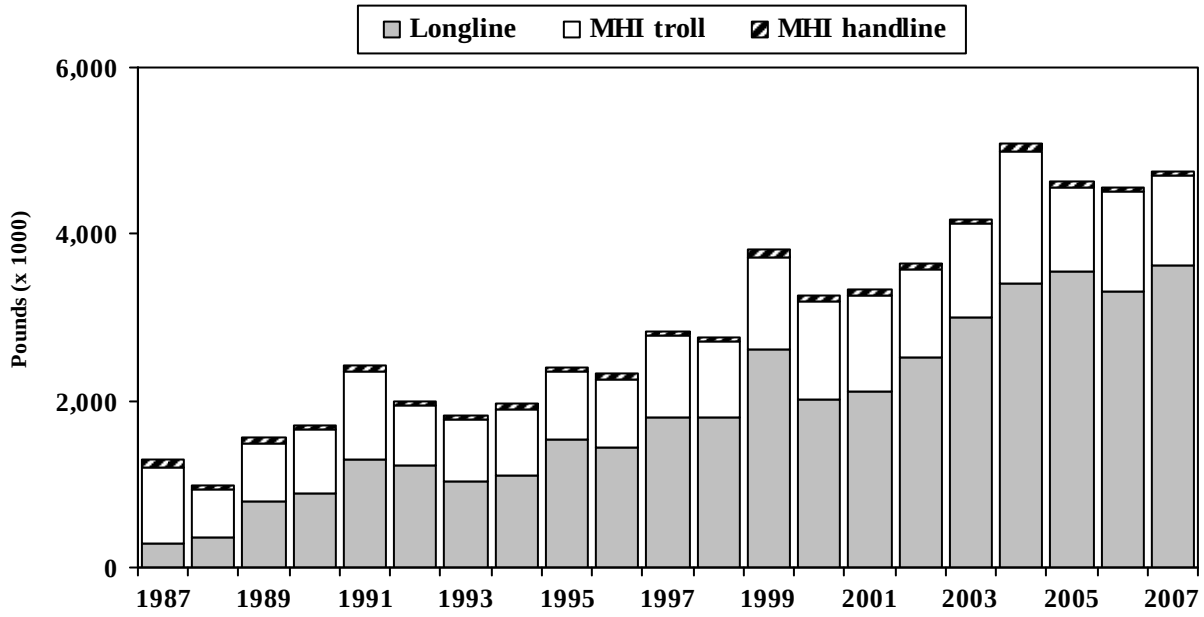
Interpretation: Striped marlin landings varied over the 21-year period and dropped significantly in 2007. Striped marlin was landed primarily by the longline fishery. The MHI troll fishery was the second largest producer of striped marlin in Hawaii. The MHI troll landings were close to the long-term average, but only contributed 4% to the total. There was substantial annual variation in landings of striped marlin by the MHI troll fishery.

Source and Calculations: Striped marlin catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of striped marlin included the longline, MHI troll, and MHI handline fisheries. The total column also contains small striped marlin catches by the offshore handline fishery and other gear category.

	Striped marlin landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	599	66	2	667
1988	1,110	118	2	1,230
1989	1,350	52	1	1,403
1990	1,186	59	1	1,246
1991	1,462	89	1	1,552
1992	1,013	83	2	1,098
1993	1,039	150	2	1,191
1994	719	76	1	796
1995	1,198	114	1	1,313
1996	923	119	2	1,044
1997	775	83	3	861
1998	834	57	0	891
1999	803	62	1	866
2000	517	30	1	548
2001	902	93	5	1,001
2002	550	65	1	615
2003	1,308	63	1	1,373
2004	858	74	2	937
2005	1,177	43	0	1,221
2006	1,390	47	0	1,438
2007	609	28	0	637
Average	**967.7**	**74.8**	**1.3**	**1,044.2**
SD	**288.2**	**31.1**	**1.1**	**296.3**

Striped marlin catches by the longline fishery are nominal estimates which do not account for misidentification problems. The misidentification problems is currently being studied in a Pelagic Fisheries Research Program (PFRP) project (see PFRP newsletter 7(10), 1-4). The results of this study have shown that striped marlin underreported in longline logbooks because they are often misidentified as blue marlin. Thus, the nominal striped marlin landing estimates for the longline fishery are negatively biased. Thus, the longline landings presented in this report are a conservative estimate.

Figure 16. Hawaii commercial landings of other pelagic PMUS by gear type, 1987-2007.

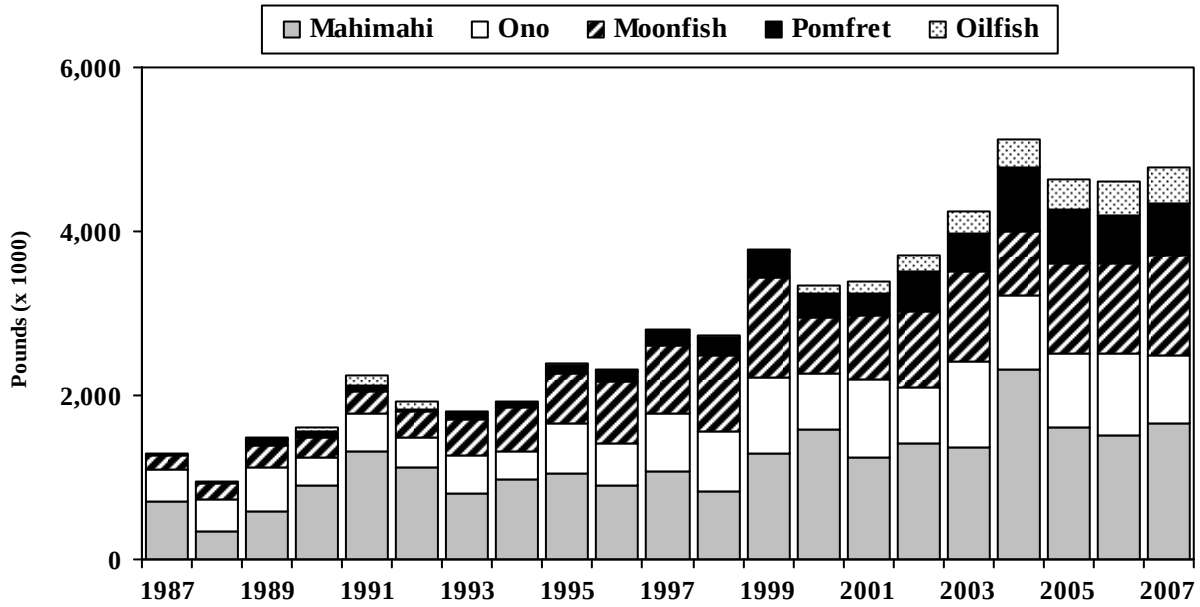


Interpretation: The landings of other pelagic PMUS were considerably greater than the long-term average. The increase was attributed primarily to the longline fishery given that the MHI troll, the fishery with the second highest landing, was above its long-term averages in 2007. The other pelagic PMUS landings by the MHI handline abd offshore handline fisheries were low in 2007.

Source and Calculations: Other pelagic PMUS catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each gear type. The other pelagic PMUS species include mahimahi, moonfish, oilfish, pomfret, and ono (wahoo).

	Landings of other PMUS by gear type (1000 lbs)					
Year	**Longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Aku boat**	**Total**
1987	283	907	102	-	2	1,294
1988	357	569	48	-	4	978
1989	799	691	62	-	1	1,553
1990	887	768	52	0	0	1,707
1991	1,285	1,067	66	5	0	2,423
1992	1,216	731	45	21	14	2,026
1993	1,030	744	50	23	3	1,850
1994	1,104	800	55	18	0	1,977
1995	1,530	815	61	20	0	2,426
1996	1,440	806	86	17	0	2,349
1997	1,807	974	55	9	5	2,850
1998	1,807	912	50	13	0	2,782
1999	2,618	1,109	81	20	0	3,828
2000	2,019	1,174	70	69	1	3,346
2001	2,114	1,155	73	41	1	3,414
2002	2,525	1,045	71	44	1	3,727
2003	3,010	1,118	50	18	3	4,265
2004	3,408	1,580	95	22	2	5,159
2005	3,563	999	65	9	1	4,677
2006	3,310	1,204	53	14	0	4,628
2007	3,614	1,095	35	16	1	4,817
Average	**1,891.7**	**964.9**	**63.1**	**21.1**	**1.9**	**2,956.0**
SD	**1,048.8**	**229.1**	**17.2**	**16.1**	**3.1**	**1,259.5**

Figure 17. Species composition of other PMUS landings, 1987-2007.

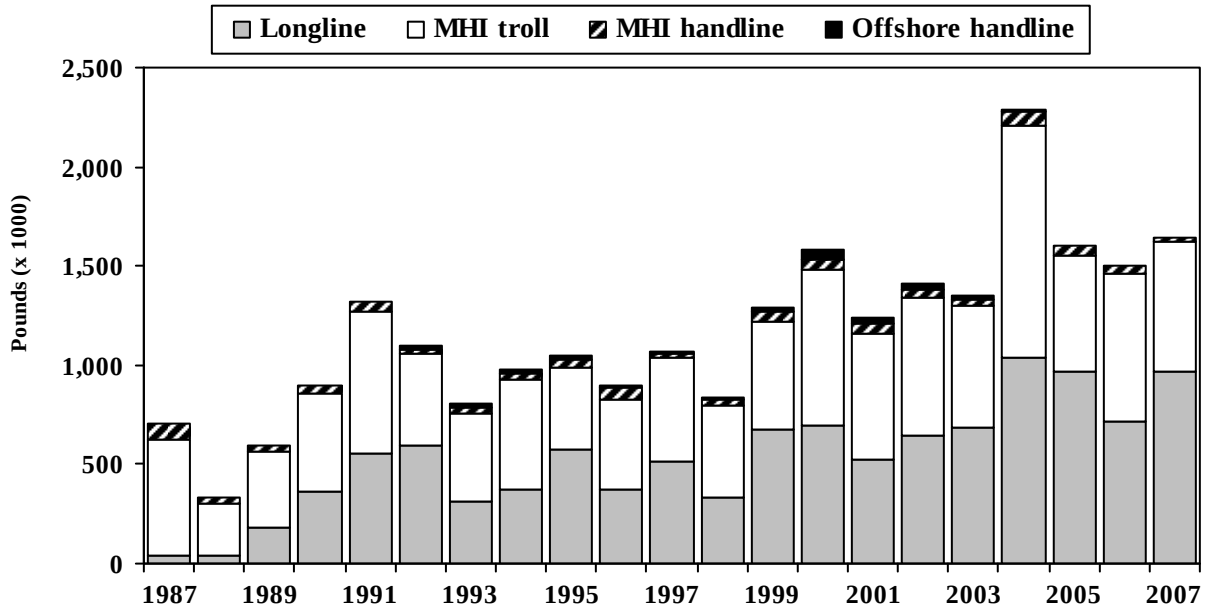


Interpretation: Mahimahi was the largest component of other pelagic landings. Mahimahi landings were above the long-term average for the past nine years. Ono landings increased at a gradual rate and consistently above its long-term average since 1997. Moonfish landings were above the long-term average for twelve years but pomfret, and oilfish landings increased at the highest rates during the 20-year period.

Source and Calculations: The other pelagic PMUS catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each species. The gear types summarized for each species include catches from the longline, MHI troll, MHI handline, offshore handline, aku boat fisheries, and other gear category.

	Landings of other pelagic PMUS by species (1000 lbs)					
Year	**Mahimahi**	**Ono**	**Moonfish**	**Pomfret**	**Oilfish**	**Total**
1987	704	400	152	23	2	1,294
1988	332	406	182	18	3	978
1989	597	522	274	63	24	1,553
1990	894	353	253	66	52	1,707
1991	1,322	456	270	75	130	2,423
1992	1,112	365	320	37	85	2,026
1993	814	450	454	92	0	1,850
1994	974	351	524	85	4	1,977
1995	1,044	606	629	93	10	2,426
1996	899	514	760	121	11	2,349
1997	1,077	715	823	178	15	2,850
1998	839	725	922	225	26	2,782
1999	1,293	929	1,210	313	29	3,828
2000	1,587	683	691	277	93	3,346
2001	1,252	945	768	276	143	3,414
2002	1,418	687	910	492	201	3,727
2003	1,362	1,053	1,091	459	278	4,265
2004	2,311	919	781	768	344	5,159
2005	1,615	890	1,094	658	386	4,677
2006	1,515	1,001	1,084	583	417	4,628
2007	1,650	842	1,223	618	458	4,817
Average	**1,171.9**	**657.8**	**686.4**	**262.9**	**129.1**	**2,956.0**
SD	**439.7**	**237.0**	**352.5**	**238.2**	**154.5**	**1,259.6**

Figure 18. Hawaii mahimahi landings, 1987-2007.

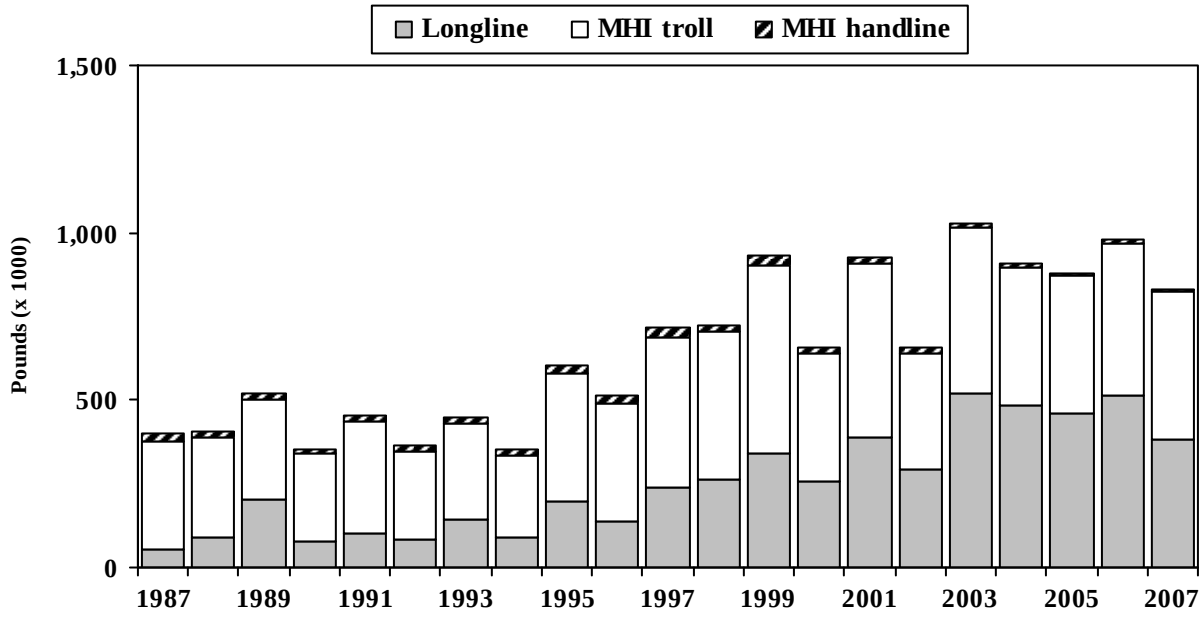


Interpretation: Mahimahi landings were higher than the long-term average for the past ten years. The highest landing for this species was in 2004 with records for both the longline and troll fisheries. Ninety-eight percent of mahimahi landings were attributable to the MHI troll and longline fisheries. Both the MHI troll and longline landings were above their respective long-term averages. The MHI handline, offshore handline, and aku boat landings of mahimahi in 2007 were very low and below their averages.

Source and Calculations: Mahimahi catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of mahimahi included the longline, MHI troll, MHI handline, offshore handline, and aku boat fisheries. The total column also contains small mahimahi catches by the other gear category.

	Mahimahi landings (1000 lbs)					
Year	**Longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Aku boat**	**Total**
1987	45	579	78	-	2	704
1988	39	264	25	-	4	332
1989	183	379	34	-	1	597
1990	366	491	37	0	0	894
1991	555	718	44	5	0	1,322
1992	593	461	24	21	14	1,112
1993	316	444	27	23	3	814
1994	377	546	33	18	0	974
1995	570	419	35	20	0	1,044
1996	375	451	56	17	0	899
1997	518	517	27	9	5	1,077
1998	336	464	26	13	0	839
1999	679	545	49	20	0	1,293
2000	694	786	48	54	1	1,587
2001	523	637	47	35	1	1,252
2002	645	693	48	26	1	1,418
2003	686	618	30	14	3	1,362
2004	1,041	1,166	72	14	2	2,311
2005	972	584	44	7	1	1,615
2006	715	746	36	8	0	1,515
2007	966	653	21	4	1	1,650
Average	**533.0**	**579.1**	**40.0**	**14.7**	**1.9**	**1,171.9**
SD	**276.4**	**186.8**	**15.2**	**13.2**	**3.1**	**439.7**

Figure 19. Hawaii ono landings, 1987-2007.

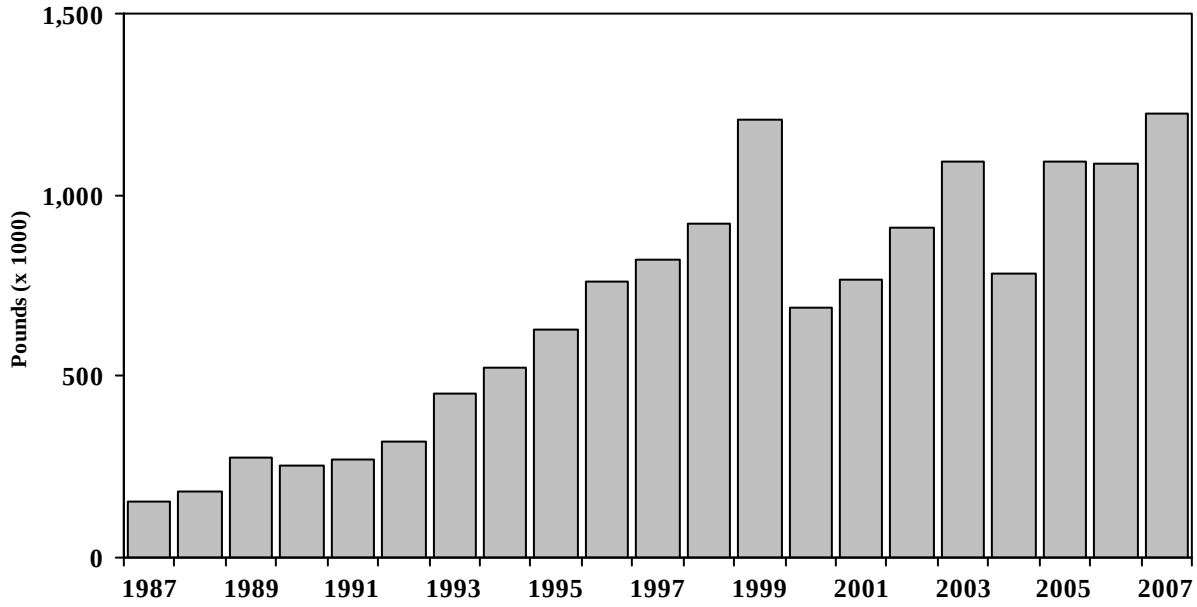


Interpretation: Ono landings were above the long-term average from 1997 with the highest total in 2003. The longline and MHI troll fisheries accounted for 99% of the ono landings in 2007. The MHI troll fishery contributed the greatest fraction of these landings every year until 2003, at which time the longline fishery began to produce the greatest landings.

Source and Calculations: Ono catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of ono included the longline, MHI troll, and MHI handline fisheries. The total column also contains small ono catches by the other gear category.

	Ono landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	53	324	23	400
1988	90	298	18	406
1989	202	298	22	522
1990	80	262	11	353
1991	101	337	18	456
1992	85	262	18	365
1993	142	286	22	450
1994	87	245	19	351
1995	195	388	23	606
1996	140	347	27	514
1997	239	451	25	715
1998	262	442	21	725
1999	343	558	28	929
2000	256	386	18	683
2001	390	516	18	945
2002	292	350	15	687
2003	519	498	13	1,053
2004	486	412	8	919
2005	459	411	10	890
2006	512	457	9	1,001
2007	382	440	7	842
Average	**253.1**	**379.5**	**17.8**	**657.8**
SD	**155.9**	**89.4**	**6.3**	**237.0**

Figure 20. Hawaii moonfish landings, 1987-2007.

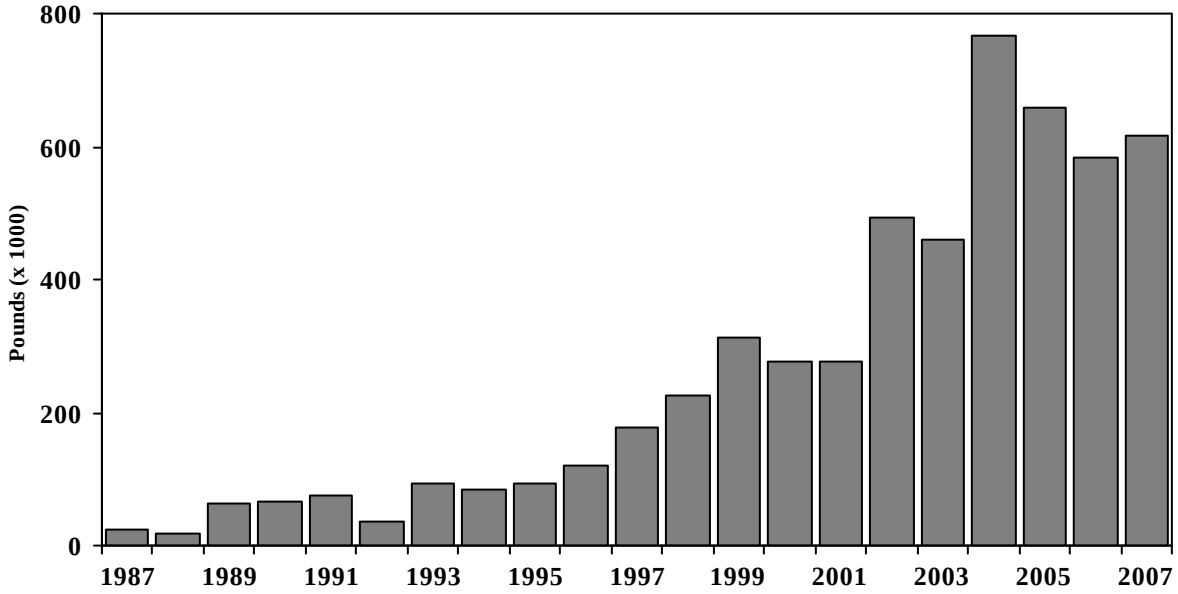


Interpretation: Moonfish are unique among the PMUS because they are caught exclusively by the longline fishery. Moonfish landings was a record 1.2 million pounds. Moonfish appear to have 3 cycles where there were four years of increasing landings followed by a drop in the fifth year for the past 12 years.

Source and Calculations: Moonfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, and HDAR Commercial Marine Dealer data.

	Moonfish landings (1000 lbs)	
Year	**Longline**	**Total**
1987	152	152
1988	182	182
1989	274	274
1990	253	253
1991	270	270
1992	320	320
1993	454	454
1994	524	524
1995	629	629
1996	760	760
1997	823	823
1998	922	922
1999	1,210	1,210
2000	691	691
2001	768	768
2002	910	910
2003	1,091	1,091
2004	781	781
2005	1,093	1,094
2006	1,084	1,084
2007	1,223	1,223
Average	**686.4**	**686.4**
SD	**352.4**	**352.5**

Figure 21. Hawaii pomfret landings, 1987-2007.

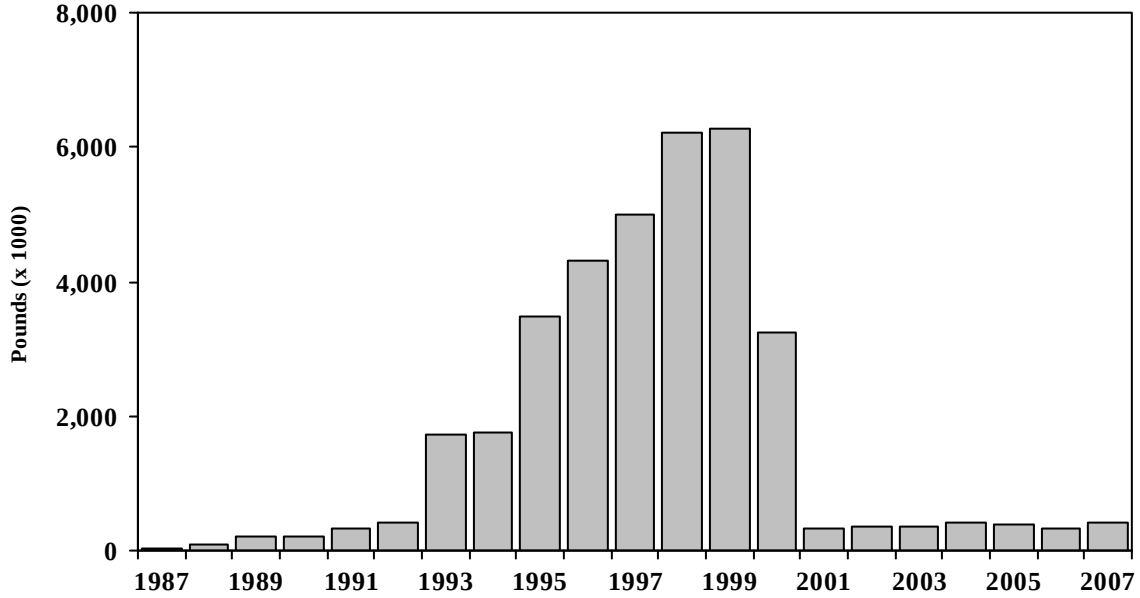


Interpretation: Landings of pomfrets came primarily from the longline fishery. The total in 2007 was the third highest over the 21 year period with record landings in 2004. Pomfret landings rose gradually from 1987 to 1996 with substantially higher landings observed from 2002, peaking in 2004 and remaining stable thereafter.

Source and Calculations: Pomfret catch statistics were derived from NMFS longline logbook and HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of pomfrets included the longline, MHI troll, and MHI handline fisheries. The total column also contains small landings of pomfret by the other gear category.

	Pomfret landings (1000 lbs)			
Year	Longline	MHI handline	Offshore handline	Total
1987	23	0	-	23
1988	18	0	-	18
1989	49	0	-	63
1990	66	0	0	66
1991	75	0	0	75
1992	37	0	0	37
1993	92	0	0	92
1994	85	0	0	85
1995	93	0	0	93
1996	121	0	0	121
1997	178	0	0	178
1998	225	0	0	225
1999	313	0	0	313
2000	272	3	0	277
2001	268	6	0	276
2002	463	6	14	492
2003	416	6	0	459
2004	734	14	5	768
2005	632	9	1	658
2006	558	8	3	583
2007	572	7	11	618
Average	**251.9**	**2.8**	**1.6**	**262.9**
SD	**224.9**	**4.1**	**3.9**	**238.2**

Figure 22. Hawaii shark landings, 1987-2007.

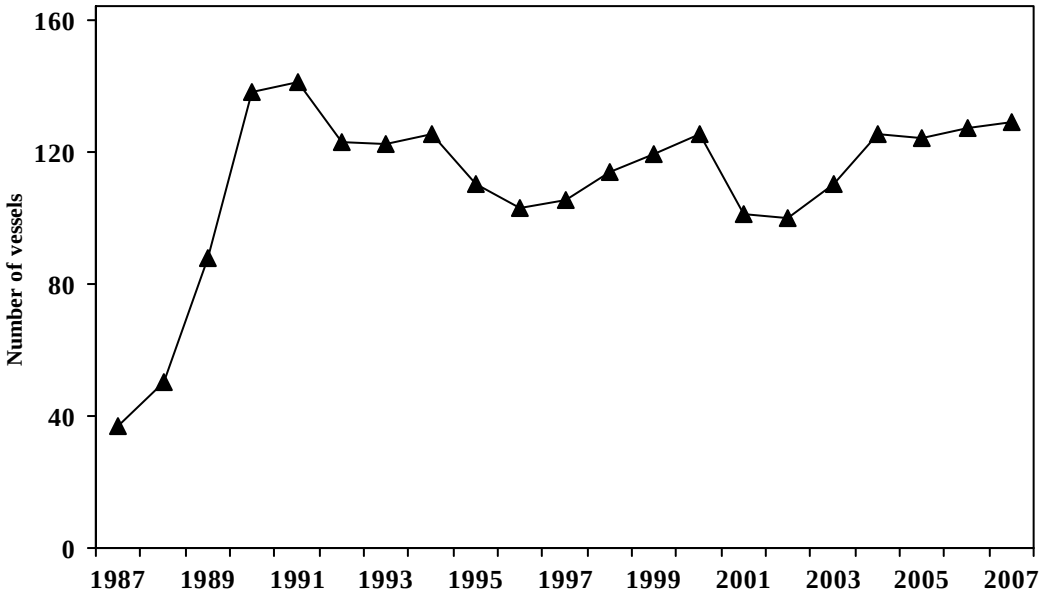


Interpretation: Sharks were landed almost exclusively by the longline fishery. Shark landings increased dramatically from 1987 to a peak of 6.3 million pounds in 1999. Sharks were landed headed and gutted in the late 1980's but a market for shark fins began in the early 1990's. Finning sharks then became widespread throughout the longline fishery. Shark landings dropped by 47% in 2000 in response to a state law that prohibited finning. This was followed by the federal Shark Finning Prohibition Act which was passed shortly thereafter. These regulatory measures caused a 90% decline in shark landings observed in 2001 with landings remaining low through 2007.

Source and Calculations: Shark catches (in number of fish) were derived from NMFS longline logbook and extrapolated to weight by using the mean weight calculated from the Market sample or HDAR Commercial Marine Dealer data. When the practice of finning sharks was allowed (typically blue and other shark species) their carcasses were discarded at sea. These fish still represented a kept and landed fish. Since the mean weight could not be calculated using either the NMFS market sample or HDAR commercial marine dealer data, these finned shark catches were also extrapolated by multiplying the number of sharks finned by an average weight from the observer data as a crude method to estimate shark biomass.

	Shark landings (1000 lbs)	
Year	**Longline**	**Total**
1987	43	43
1988	94	94
1989	203	203
1990	222	222
1991	318	318
1992	410	410
1993	1,736	1,736
1994	1,757	1,757
1995	3,468	3,468
1996	4,327	4,327
1997	5,010	5,010
1998	6,212	6,212
1999	6,272	6,273
2000	3,250	3,253
2001	326	333
2002	359	366
2003	353	358
2004	414	418
2005	389	393
2006	333	337
2007	410	417
Average	**1,709.8**	**1,711.8**
SD	**2,125.8**	**2,124.8**

Figure 23. Number of Hawaii-based longline vessels, 1987-2007.



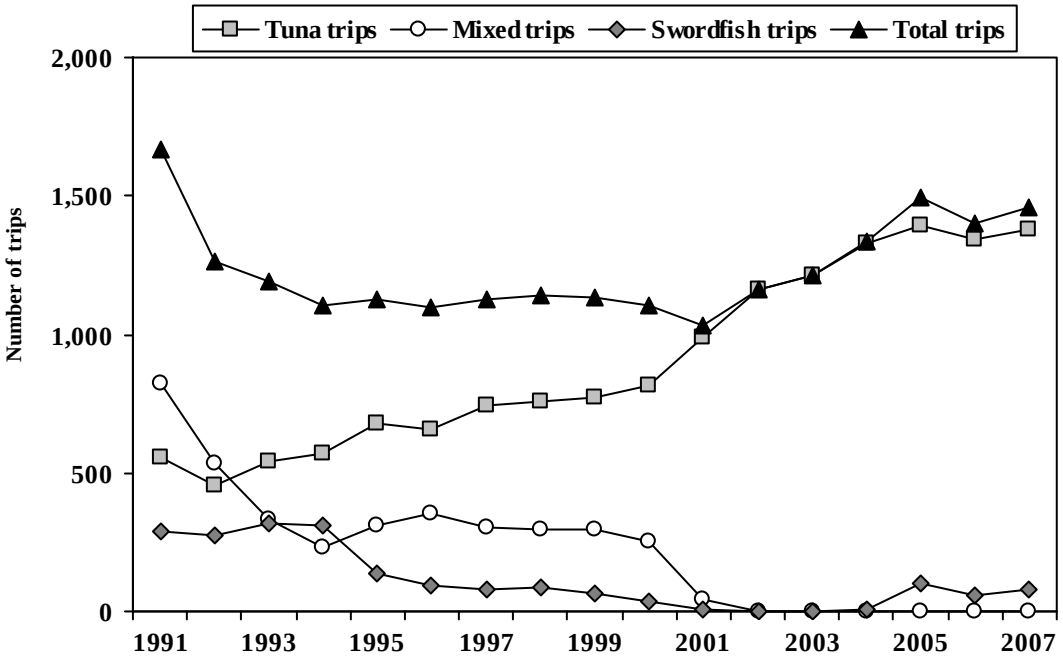
Interpretation: There were 129 active Hawaii-based longline vessels in 2007, up 2 vessels from 2006. One hundred two longline vessels targeted tunas exclusively throughout the entire year while 27 vessels targeted both swordfish and tunas at some time during 2007.

The shallow-set sector of the Hawaii-based longline fishery for swordfish was reopened April 2004 under a new set of regulations intended to reduce the number of sea turtle interactions. The California-based longline fishery targeting swordfish was closed at the same time. The increase in vessels during 2003 and 2004 is due to California-based vessels migrating back to Hawaii.

Source and Calculations: The number of Hawaii-based longline vessels was compiled by counting the number of unique permit numbers from the NMFS marketing monitoring data from 1987-1990 and the NMFS longline logbook data from 1991-2007 based on date of landing.

Year	Vessels
1987	37
1988	50
1989	88
1990	138
1991	141
1992	123
1993	122
1994	125
1995	110
1996	103
1997	105
1998	114
1999	119
2000	125
2001	101
2002	100
2003	110
2004	125
2005	124
2006	127
2007	129
Average	**110.3**
SD	**25.8**

Figure 24. Number of trips by the Hawaii-based longline fishery, 1991-2007.

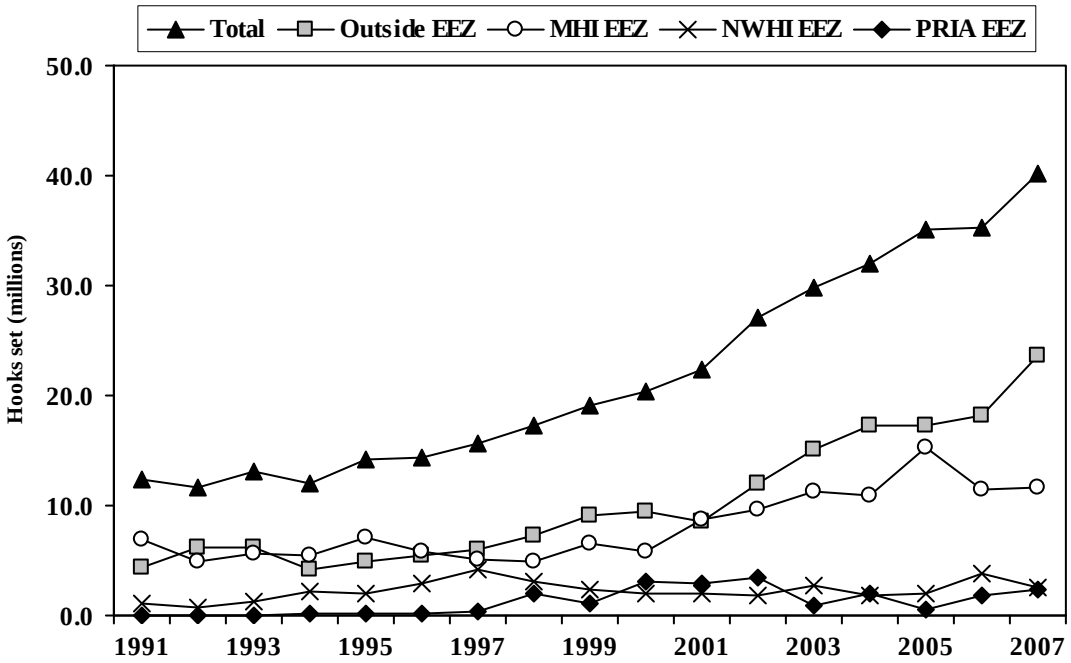


Interpretation: The Hawaii-based longline fleet made 1,462 trips in 2007. Total number of trips was above the long-term average in 2007. A large majority (94%) of the trips targeted tunas, with the remainder targeting swordfish.

Source and Calculations: The number of trips was compiled from NMFS federal longline logbook data collected from 1991 to 2007. The trip summary was based on landing date. The trip type was determined by an interview with the vessel captain or assigned by FMEP staff on the basis of gear characteristics, fishing techniques and locations, catch composition and past targeting strategy.

	Hawaii longline trip activity			
Year	Total trips	Tuna trips	Mixed trips	Swordfish trips
1991	1,671	556	823	292
1992	1,266	458	531	277
1993	1,192	542	331	319
1994	1,106	568	228	310
1995	1,125	682	307	136
1996	1,100	657	351	92
1997	1,125	745	302	78
1998	1,140	760	296	84
1999	1,137	776	296	65
2000	1,103	814	252	37
2001	1,034	987	43	4
2002	1,163	1,163	2	0
2003	1,215	1,215	0	0
2004	1,338	1,332	0	6
2005	1,496	1,397	0	99
2006	1,401	1,341	0	60
2007	1,462	1,381	0	81
Average	**1,239.6**	**904.4**	**221.3**	**114.1**
SD	**175.3**	**331.7**	**228.8**	**113.0**

Figure 25. Number of hooks set by the Hawaii-based longline fishery, 1991-2007.

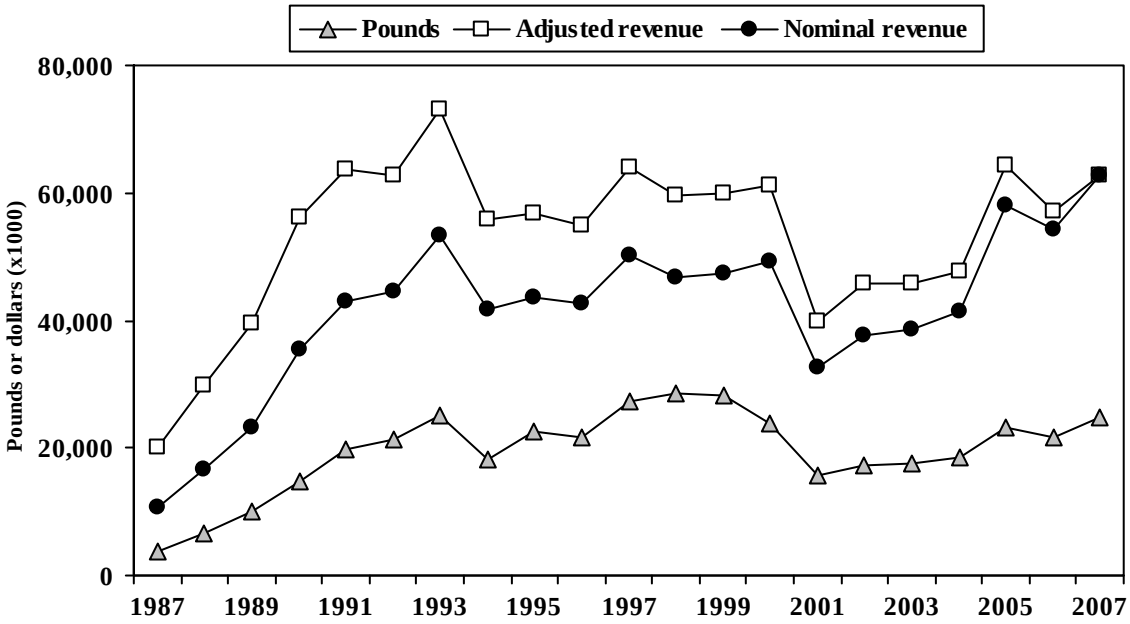


Interpretation: The total number of hooks set by the Hawaii-based longline fishery increased steadily since 1994 to a record 40.2 million hooks in 2007. Much of the increase is due to the shift in effort from swordfish and mixed target to tuna. Tuna sets typically set more hooks per day than swordfish and mixed target set types. Most of the hooks set were in the areas outside the EEZ (59%) and MHI EEZ (29%) in 2007. Effort in the NWHI EEZ (6%) decreased while effort in the EEZ of Pacific Remote Island Areas (PRIAs) (6%) increased in 2007.

Source and Calculations: Number of hooks set was compiled from NMFS federal longline logbook data collected from 1991 to 2007. The summary of hooks set was based on date of haul.

	Number of hooks set by area (milions)				
Year	Outside EEZ	MHI EEZ	NWHI EEZ	PRIA EEZ	Total
1991	4.4	6.9	1.1	0.1	12.3
1992	6.1	4.9	0.7	0.0	11.7
1993	6.2	5.6	1.3	0.0	13.0
1994	4.1	5.5	2.2	0.2	12.0
1995	4.9	7.1	2.0	0.2	14.2
1996	5.4	5.9	2.9	0.2	14.4
1997	6.0	5.1	4.1	0.4	15.6
1998	7.4	5.0	3.1	1.9	17.4
1999	9.1	6.6	2.4	1.1	19.1
2000	9.5	5.7	2.1	3.0	20.3
2001	8.6	8.8	2.0	2.9	22.4
2002	12.0	9.7	1.8	3.5	27.0
2003	15.0	11.2	2.7	0.9	29.9
2004	17.3	11.0	1.8	2.0	32.0
2005	17.3	15.2	2.0	0.5	35.0
2006	18.2	11.5	3.8	1.8	35.3
2007	23.6	11.7	2.5	2.4	40.2
Average	**10.29**	**8.07**	**2.26**	**1.24**	**21.86**
SD	**5.89**	**3.10**	**0.89**	**1.19**	**9.47**

Figure 26. Hawaii longline landings and revenue, 1987-2007.



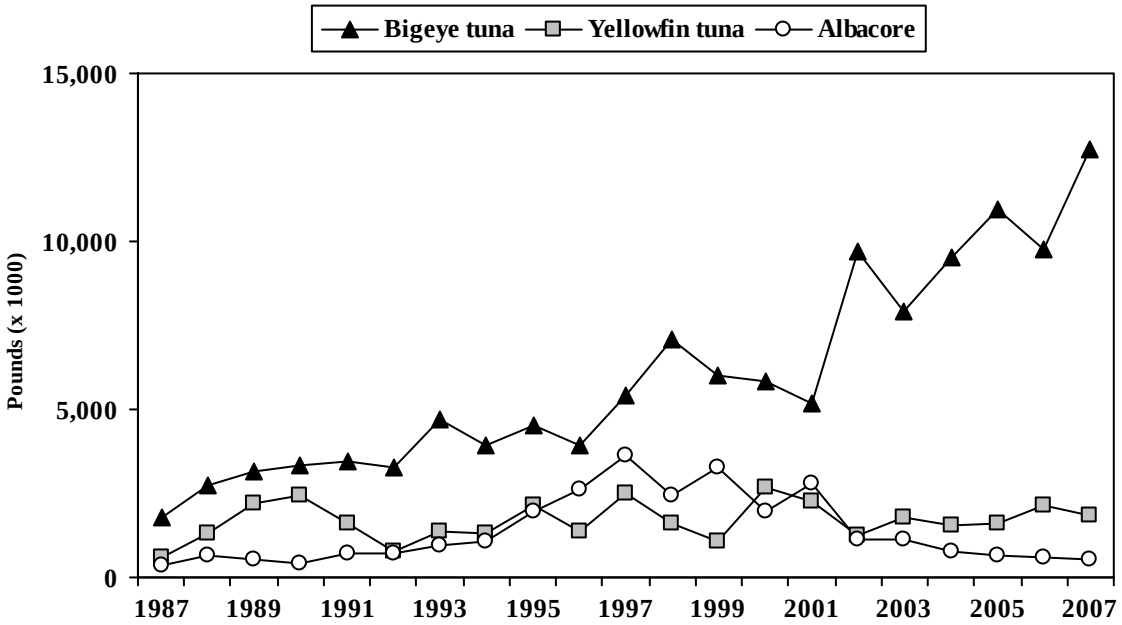
Interpretation: Hawaii longline landings trended upwards from 2001. Total landings in 2007 was 26% higher than long-term average. Inflation adjusted revenue also trended higher during the same period. Revenue in 2007 was 17% higher than long-term average.

Source and Calculations: Longline catch and nominal ex-vessel revenue estimates were compiled from NMFS logbook and market sample or HDAR Commercial Marine Dealer data.

Total catch and revenue estimates were calculated by extrapolating NMFS market sample data from 1987-1991, combining the number of fish from the federal logbook with the average weight per fish and average price per pound from the market sample data during 1992-1999, and the HDAR Dealer data from 2000 to 2007. The adjusted revenue was calculated by multiplying nominal revenue by the Honolulu CPI for the current year and then dividing by the Honolulu CPI for that corresponding year.

Year	Pounds	Adjusted revenue	Nominal revenue	Honolulu CPI
1987	3,893	$20,200	$10,600	114.9
1988	6,713	$29,800	$16,500	121.7
1989	9,966	$39,600	$23,200	128.7
1990	14,790	$56,100	$35,300	138.1
1991	19,608	$63,600	$42,900	148.0
1992	21,190	$62,800	$44,400	155.1
1993	25,005	$73,200	$53,400	160.1
1994	18,138	$55,800	$41,800	164.5
1995	22,733	$56,900	$43,600	168.1
1996	21,564	$54,900	$42,700	170.7
1997	27,160	$64,000	$50,100	171.9
1998	28,655	$59,600	$46,600	171.5
1999	28,377	$60,000	$47,400	173.3
2000	23,786	$61,300	$49,200	176.3
2001	15,800	$40,000	$32,500	178.4
2002	17,390	$45,700	$37,500	180.3
2003	17,654	$45,900	$38,600	184.5
2004	18,474	$47,700	$41,400	190.6
2005	23,320	$64,400	$58,000	197.8
2006	21,522	$57,000	$54,400	209.4
2007	24,709	$62,700	$62,700	219.5
Average	**19,545.1**	**53,390.5**	**41,561.9**	
SD	**6,625.5**	**12,779.7**	**12,842.4**	

Figure 27. Hawaii longline tuna landings, 1987-2007.



Interpretation: The three major tuna species landed by the Hawaii-based longline fishery are bigeye tuna, yellowfin tuna, and albacore. Landings of bigeye tuna increased to 12.7 million pounds in 2007, up from 9.8 million pounds in 2006. It was also the largest component of the longline landings and made up 83% of the tuna landings. Yellowfin tuna was above to its long-term average in 2007 at 1.9 million pounds. Albacore landings were 60% below its long-term average in 2007 and showed a substantial decline from its peak in 1997. The longline fishery also landed small amounts of skipjack tuna and bluefin tuna.

Hawaii longline tuna landings (1000 lbs)

Year	Bigeye tuna	Yellowfin tuna	Albacore	Skipjack tuna	Bluefin tuna	Total
1987	1,796	575	331	3	0	2,705
1988	2,732	1,309	676	8	0	4,725
1989	3,178	2,174	547	22	0	5,921
1990	3,338	2,421	390	12	1	6,162
1991	3,423	1,617	687	66	4	5,797
1992	3,277	763	735	49	84	4,908
1993	4,677	1,392	965	79	92	7,205
1994	3,940	1,336	1,095	116	53	6,540
1995	4,522	2,159	1,938	223	56	8,898
1996	3,940	1,389	2,606	91	48	8,074
1997	5,399	2,515	3,626	234	52	11,826
1998	7,113	1,592	2,450	168	36	11,359
1999	5,995	1,042	3,250	219	23	10,529
2000	5,836	2,656	1,979	221	7	10,700
2001	5,193	2,277	2,803	455	2	10,730
2002	9,674	1,235	1,145	282	2	12,346
2003	7,922	1,815	1,160	438	1	11,337
2004	9,534	1,559	790	293	1	12,181
2005	10,976	1,620	663	197	1	13,459
2006	9,764	2,120	581	162	1	12,630
2007	12,741	1,864	554	202	0	15,363
Average	**5,951.0**	**1,687.1**	**1,379.6**	**168.6**	**22.1**	**9,209.3**
SD	**3,050.9**	**565.4**	**1,014.7**	**130.1**	**30.1**	**3,418.8**

Source and Calculations: The longline tuna catch estimates were derived from NMFS longline logbook, market sample, and Marine Dealer data. Longline tuna catches were estimated by either extrapolating the NMFS market sample data (1987-1991) or multiplying the number of fish from the logbook data by the average weight from the sample or HDAR Dealer data (1992-2007).

Figure 28a. Hawaii longline swordfish and billfish landings, 1987-2007.

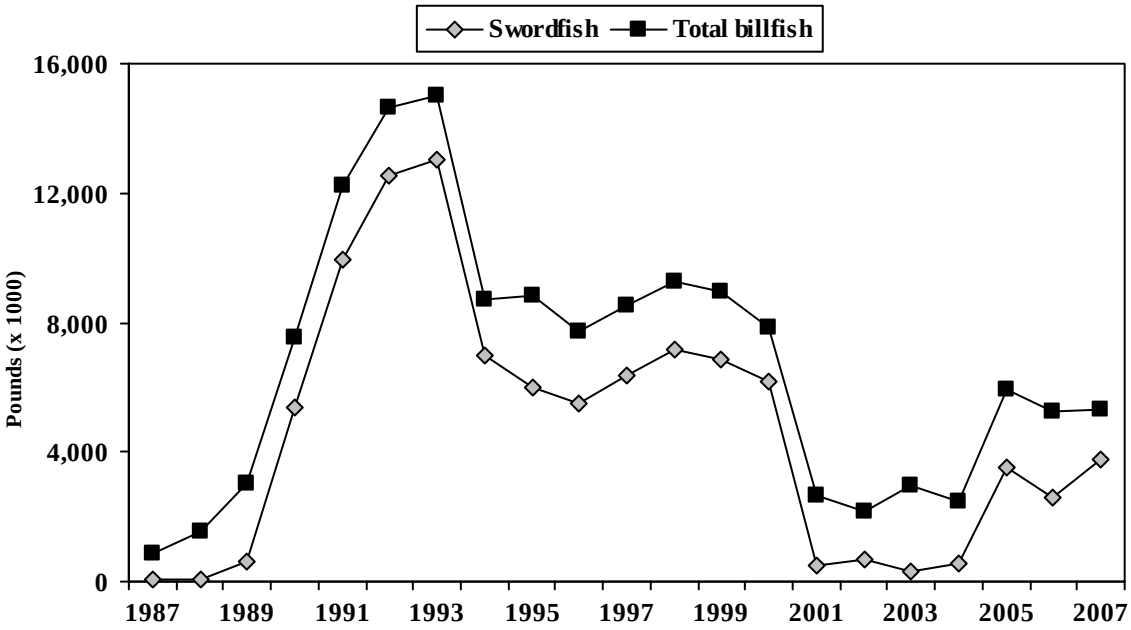
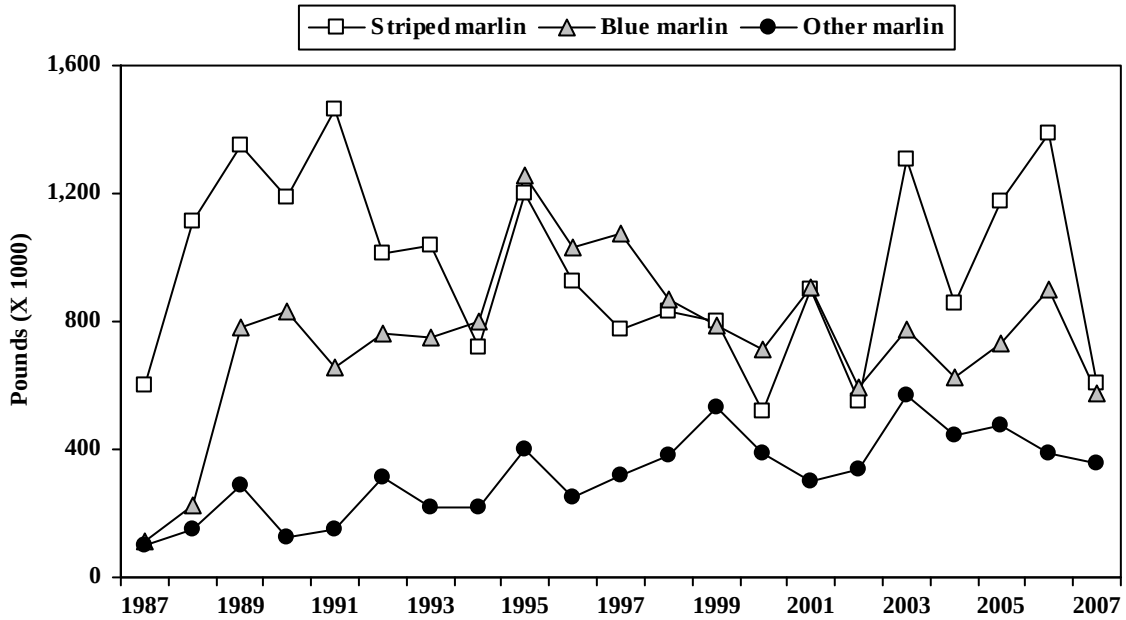


Figure 28b. Hawaii longline marlin landings, 1987-2007.



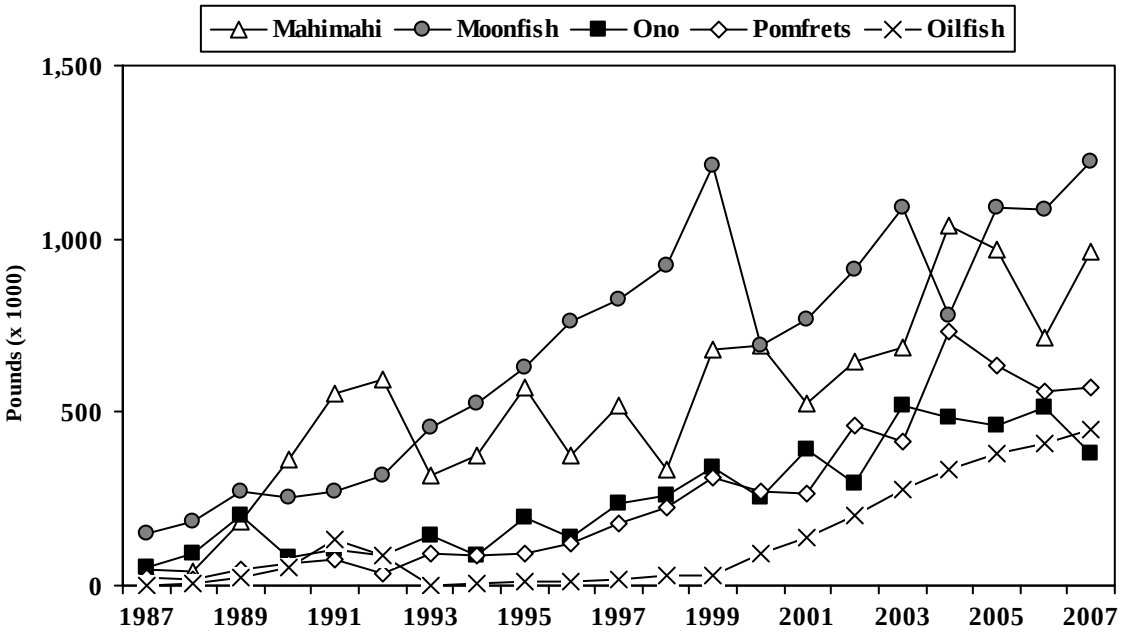
Year	Hawaii longline billfish landings (1000 lbs)				
	Swordfish	Striped marlin	Blue marlin	Other marlin	Total billfish
1987	52	599	112	99	862
1988	52	1,110	225	150	1,537
1989	619	1,350	784	290	3,043
1990	5,372	1,186	834	127	7,519
1991	9,939	1,462	654	153	12,208
1992	12,566	1,013	765	312	14,656
1993	13,027	1,039	748	220	15,034
1994	7,002	719	798	218	8,737
1995	5,981	1,198	1,257	401	8,837
1996	5,517	923	1,030	253	7,723
1997	6,352	775	1,074	316	8,517
1998	7,193	834	870	380	9,277
1999	6,835	803	787	533	8,958
2000	6,205	517	711	385	7,817
2001	519	902	909	299	2,630
2002	681	550	593	337	2,160
2003	301	1,308	777	567	2,954
2004	549	858	623	441	2,471
2005	3,527	1,177	731	473	5,909
2006	2,573	1,390	897	389	5,249
2007	3,781	609	577	355	5,322
Average	**4,697.3**	**967.7**	**750.3**	**319.0**	**6,734.3**
SD	**3,995.7**	**288.2**	**252.9**	**129.3**	**4,108.7**

Interpretation: Billfish landings was 5.3 m,illion pounds, 21% below the long-term average in 2007. The decrease observed in 2007 was attributable to lower swordfish landings. The swordfish-targeted longline fishery target was able to operate throughout the entire year because the fishery managed to keep the number of loggerhead and leather back sea turtle interactions below the allowable levels. Swordfish landings by the Hawaii longline fishery in 2007 was significantly higher than those landed during 2001-2004 and at a record level since the reopening of the shallow-set lognline fishery for swordfish.

Marlins are caught incidentally by the longline fishery and are retained because they sell for a moderate market price. Striped marlin and blue marlin are the largest component of the marlin landings. Both striped marlin and blue marlin landings were substantially below their long-term averages in 2007; down by 37% and 23%, respectively. Other marlin, primarily spearfish, was on an decreasing trend after peaking in 2003.

Source and Calculations: The longline billfish catch estimates were derived from NMFS longline logbook, market sample, and HDAR Dealer data. Longline billfish catches were estimated by either extrapolating the NMFS Market Sample data to an estimated full coverage (1987-1991) or multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data (1992-2007).

Figure 29. Hawaii longline landings of other pelagic PMUS, 1987-2007.



Interpretation: Longline landings of other pelagic PMUS show an increasing trend with landings at 3.6 million pounds in 2007, 91% above the long-term average. Moonfish was dominant component in this category at 1.2 million pounds in 2007, 78% above the long-term average. Mahimahi composed a large fraction of the landings with landings 81% higher than its long-term average in 2007. Ono and pomfret landings increased substantially during the 21-year period with record landings in 2003 and 2004, respectively.

	Hawaii longline landings of other pelagic PMUS (1000 lbs)					
Year	**Mahimahi**	**Moonfish**	**Ono**	**Pomfrets**	**Oilfish**	**Total**
1987	45	152	53	23	2	283
1988	39	182	90	18	3	357
1989	183	274	202	49	24	799
1990	366	253	80	66	52	887
1991	555	270	101	75	130	1,285
1992	593	320	85	37	85	1,216
1993	316	454	142	92	0	1,030
1994	377	524	87	85	4	1,104
1995	570	629	195	93	10	1,530
1996	375	760	140	121	11	1,440
1997	518	823	239	178	15	1,807
1998	336	922	262	225	26	1,807
1999	679	1,210	343	313	29	2,618
2000	694	691	256	272	93	2,019
2001	523	768	390	268	141	2,114
2002	645	910	292	463	200	2,525
2003	686	1,091	519	416	277	3,010
2004	1,041	781	486	734	335	3,408
2005	972	1,093	459	632	380	3,563
2006	715	1,084	512	558	412	3,310
2007	966	1,223	382	572	448	3,614
Average	**533.0**	**686.4**	**253.1**	**251.9**	**127.5**	**1,891.7**
SD	**276.4**	**352.4**	**155.9**	**224.9**	**151.7**	**996.9**

Source and Calculations: Estimates of longline catch of other pelagic species were derived from NMFS longline logbook, Market Sample, and HDAR Dealer data. Catch of other pelagic species were estimated by either extrapolating the NMFS Market Sample data to an estimated full coverage (1987-1991) or multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data (1992-2007).

Figure 30a. Hawaii longline blue and total shark landings, 1987-2007.

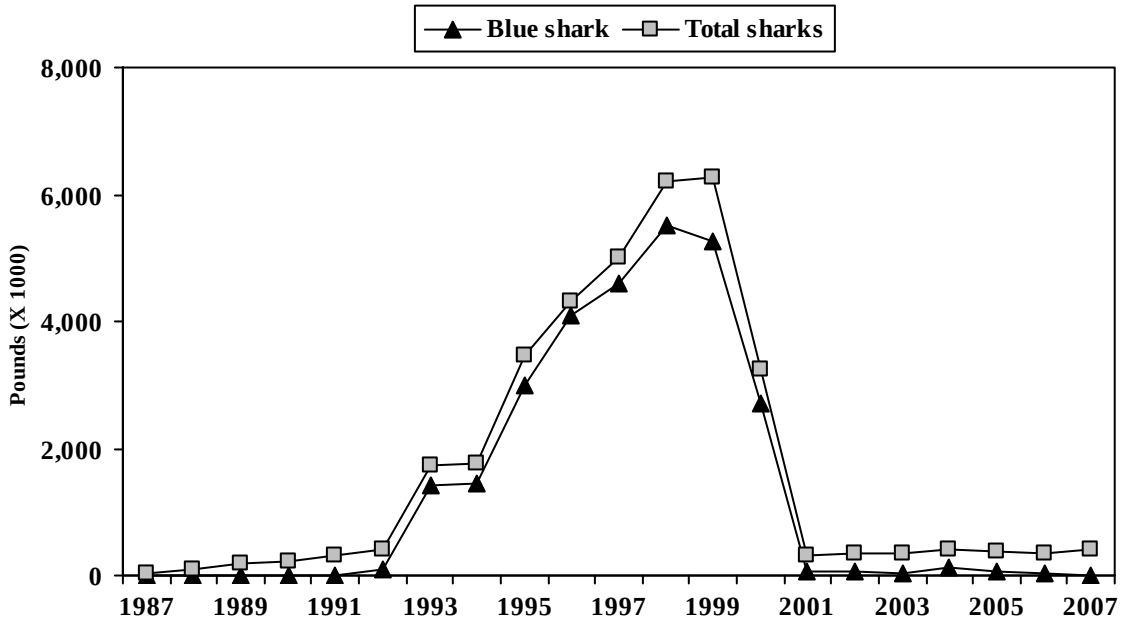
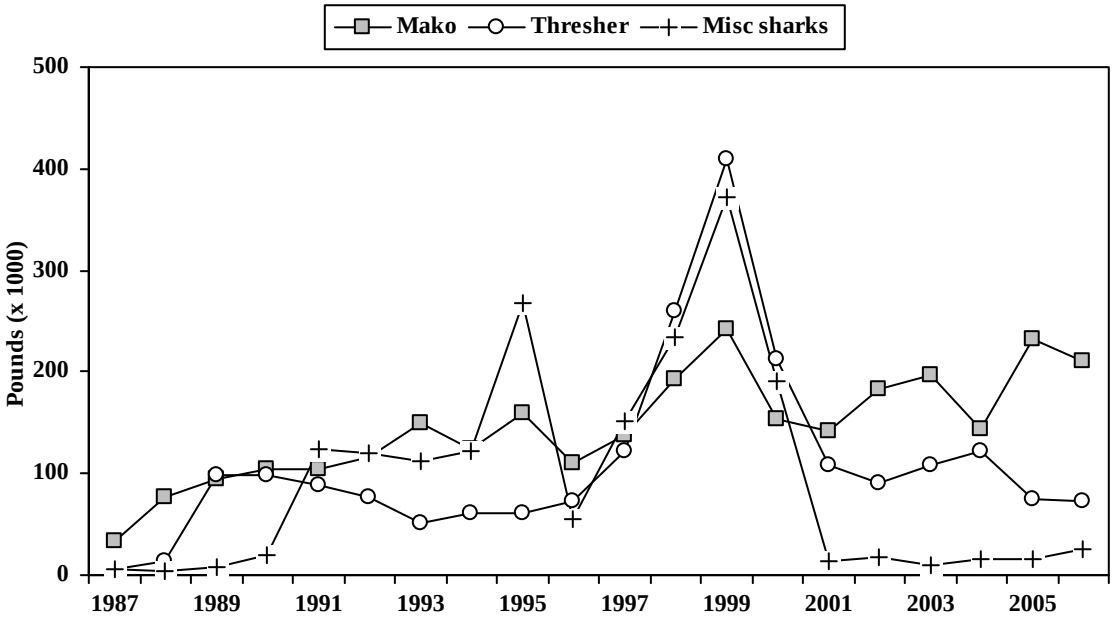


Figure 30b. Hawaii longline mako, thresher and other shark landings, 1987-2007.



	Hawaii longline shark landings (1000 lbs)				
Year	Blue shark	Mako	Thresher	Misc sharks	Total sharks
1987	0	33	5	5	43
1988	0	77	13	4	94
1989	2	95	98	8	203
1990	0	105	98	19	222
1991	0	104	89	125	318
1992	97	117	76	120	410
1993	1,423	150	51	112	1,736
1994	1,450	124	61	122	1,757
1995	2,978	160	62	268	3,468
1996	4,088	110	73	56	4,327
1997	4,598	137	123	152	5,010
1998	5,527	192	259	234	6,212
1999	5,249	242	409	372	6,272
2000	2,693	153	213	191	3,250
2001	63	142	109	13	326
2002	67	184	90	17	359
2003	39	196	109	9	353
2004	130	144	123	16	414
2005	66	233	75	15	389
2006	26	210	73	25	333
2007	15	281	97	17	410
Average	**1,357.7**	**151.9**	**109.8**	**90.5**	**1,774.8**
SD	**1,968.9**	**59.6**	**88.8**	**103.8**	**2,159.5**

Interpretation: Shark landings in 2007 were 77% below the long-term average. Shark landings have been low since 2001 due to State and Federal laws which prohibited the practice of finning and landing sharks without the associated carcass. Blue shark and other sharks were retained for fins only so landings dropped significantly when laws prohibiting the practice took effect. Mako and thresher sharks were retained for their flesh and had landings substantially lower and less variable compared to blue shark.

Source and Calculations: Catch statistics for sharks were derived from NMFS longline logbook, Market Sample, and HDAR Dealer data. Shark catch landed whole was estimated by multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data. When finning sharks was allowed, finned shark catches were also extrapolated to whole weight by multiplying the number of sharks finned by an average weight from the observer data.

Table 3. Hawaii-based longline catch (number of fish) by area, 1991-2007.

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Main Hawaiian Islands											
1991	**22,517**	**7,150**	5,763	13,598	**2,881**	**18,117**	**8,197**	17,672	**1,885**	**2,569**	13,295
1992	**22,982**	**3,846**	3,979	7,102	**2,761**	**9,838**	**3,368**	13,313	**1,194**	**2,387**	11,748
1993	**25,031**	**8,895**	6,496	4,388	**2,720**	**10,426**	**3,440**	9,366	**2,641**	**3,261**	12,955
1994	**27,022**	**6,815**	10,833	2,842	**3,344**	**6,494**	**3,213**	**17,660**	**1,332**	**3,626**	14,455
1995	**31,899**	**13,018**	18,271	5,262	**4,168**	**12,472**	**6,900**	**30,410**	2,656	**4,041**	22,560
1996	**29,803**	**7,715**	19,259	4,634	**3,556**	**7,163**	**3,404**	**11,676**	1,527	**3,094**	19,418
1997	21,397	10,982	19,025	4,873	**4,085**	**4,193**	**3,662**	11,660	2,525	**2,847**	16,476
1998	26,723	4,678	12,482	4,721	1,698	**4,856**	**4,254**	7,664	2,305	**3,585**	14,685
1999	29,203	4,835	23,805	2,357	1,709	**5,607**	6,691	11,654	2,579	5,161	17,449
2000	21,546	5,240	5,952	2,510	1,557	2,438	3,486	17,586	1,201	2,759	16,561
2001	**36,928**	5,671	10,448	1,027	2,151	**7,651**	**4,029**	**21,608**	3,223	**3,404**	16,086
2002	51,177	2,463	2,706	752	873	**3,449**	3,761	21,374	1,345	3,373	14,810
2003	39,901	10,058	2,593	1,421	1,738	**12,243**	**8,284**	25,233	4,748	3,467	25,856
2004	49,001	8,773	3,022	1,166	1,135	**6,665**	5,366	26,609	3,199	2,688	24,923
2005	52,844	**13,761**	4,606	2,463	1,594	**6,951**	**7,796**	**40,168**	5,472	4,228	27,274
2006	32,799	6,731	1,598	916	1,547	7,479	3,881	16,854	4,130	3,313	17,824
2007	43,887	6,127	1,236	1,926	635	2,405	3,250	21,599	2,862	2,946	16,725
Northwestern Hawaiian Islands											
1991	4,473	1,375	481	9,472	342	3,845	1,082	2,003	134	70	10,604
1992	2,624	396	311	5,228	244	1,776	330	2,321	77	187	9,042
1993	7,760	2,019	1,413	9,565	509	2,861	754	2,279	198	398	17,507
1994	10,726	2,015	5,592	9,752	554	2,679	719	3,037	227	707	28,346
1995	9,011	3,630	5,097	8,400	1,379	5,076	1,557	5,836	902	939	19,915
1996	15,409	2,451	12,738	3,987	1,114	4,184	1,651	1,995	659	2,388	16,539
1997	**30,168**	5,139	17,118	5,148	1,519	4,109	2,250	6,321	1,789	2,887	17,921
1998	16,629	2,713	6,802	10,611	1,217	5,757	2,927	3,527	761	1,862	20,152
1999	9,672	1,581	6,261	6,182	1,053	3,515	2,400	4,316	763	1,431	15,150
2000	7,660	1,395	2,969	6,679	418	2,309	1,082	6,458	224	750	11,446
2001	8,521	1,169	3,648	373	761	2,528	882	3,923	783	1,030	5,478
2002	9,492	806	1,897	109	295	1,352	1,339	3,485	313	882	4,950
2003	8,929	2,522	2,286	259	1,035	4,703	2,597	3,559	1,596	1,372	11,871
2004	8,918	932	708	203	265	1,292	938	3,866	469	662	6,854
2005	6,709	2,030	1,041	6,030	512	2,187	1,044	5,697	620	865	11,524
2006	20,383	4,162	1,005	256	480	3,291	1,660	4,005	1,322	1,291	12,865
2007	11,390	1,973	966	2,385	161	1,212	737	3,011	476	927	7,416
Pacific Remote Island Areas											
1991	374	439	30	25	17	60	45	84	21	0	237
1992	70	42	0	16	7	1	7	6	8	0	223
1993	0	0	0	0	0	0	0	0	0	0	0
1994	1,127	1,649	151	53	37	173	55	37	77	24	705
1995	460	583	296	21	94	121	94	252	206	5	895
1996	766	1,184	1,612	17	86	192	93	49	155	57	756
1997	2,070	1,932	4,054	33	194	255	293	591	328	206	1,503
1998	17,666	6,313	3,784	174	308	307	450	831	1,127	258	5,892
1999	4,514	**5,737**	1,575	102	315	438	619	542	1,499	179	3,463
2000	7,483	**21,788**	8,766	234	762	733	916	1,202	1,916	448	8,307
2001	5,563	**20,777**	9,493	224	1,072	1,047	683	1,705	2,150	277	5,195
2002	18,110	**12,826**	6,342	532	778	1,015	765	957	2,429	377	7,660
2003	2,106	2,392	2,202	83	443	572	490	842	1,058	117	2,606
2004	9,813	4,587	2,661	253	426	618	533	1,049	1,344	288	4,860
2005	1,428	1,714	1,089	64	143	161	163	316	569	46	962
2006	6,698	7,353	2,359	134	614	520	528	1,126	1,486	311	3,499
2007	14,509	3,257	1,432	248	426	383	567	870	1,677	137	4,452

Table 3 (Cont.) Hawaii-based longline catch (number of fish) by area, 1991-2007.

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Outside EEZ											
1991	13,559	4,305	**7,777**	**43,194**	1,008	6,730	3,511	**19,766**	695	440	**47,047**
1992	18,228	3,595	**15,523**	**61,968**	1,506	4,434	1,963	**41,044**	1,169	719	**73,884**
1993	22,008	5,147	**22,551**	**65,601**	1,895	4,920	1,486	**14,367**	1,600	856	**124,139**
1994	9,227	3,037	**14,553**	**30,698**	742	1,946	1,130	12,283	877	733	**71,150**
1995	18,577	6,419	**22,125**	**23,745**	3,165	4,885	3,220	23,315	**2,801**	1,382	**57,922**
1996	17,588	6,227	**23,719**	**29,495**	1,878	4,250	2,658	9,507	**2,116**	1,776	**64,081**
1997	26,149	**10,990**	**30,887**	**29,627**	2,457	4,080	2,819	**30,730**	**3,668**	2,314	**49,935**
1998	**37,762**	**8,004**	**25,621**	**28,269**	**2,125**	3,408	3,872	**10,157**	**4,068**	3,462	**59,180**
1999	**36,883**	4,817	**35,659**	**29,323**	**1,857**	4,857	**7,401**	**27,743**	**5,435**	**5,628**	**51,475**
2000	**37,804**	9,956	**22,088**	**27,600**	**1,772**	**2,459**	**3,527**	**32,529**	**4,410**	**3,079**	**43,049**
2001	27,712	9,460	**27,841**	**2,545**	**2,440**	5,209	3,414	17,715	**7,225**	3,068	**20,152**
2002	**62,068**	4,278	**9,643**	**2,275**	**2,025**	3,076	**4,215**	**22,407**	**4,791**	**4,658**	**23,196**
2003	**56,190**	**12,950**	**13,782**	**1,777**	**2,437**	8,417	7,076	**25,702**	**10,963**	**6,943**	**29,085**
2004	**74,230**	**11,541**	**10,941**	**3,569**	**3,020**	6,585	**7,741**	**35,061**	**10,593**	**4,905**	**38,280**
2005	**68,365**	11,468	**6,901**	**15,796**	**2,072**	6,493	6,207	31,779	**9,505**	**8,193**	**35,944**
2006	**58,785**	**12,324**	**6,460**	**15,279**	**3,063**	**9,728**	**6,372**	**30,615**	**10,197**	**7,909**	**34,316**
2007	**89,650**	**14,923**	**7,210**	**19,714**	**2,069**	**4,207**	**5,999**	**57,401**	**7,541**	**10,361**	**47,170**
Total catch											
1991	40,923	13,269	14,051	66,289	4,248	28,752	12,835	39,525	2,735	3,079	71,183
1992	43,904	7,879	19,813	74,314	4,518	16,049	5,668	56,684	2,448	3,293	94,897
1993	54,799	16,061	30,460	79,554	5,124	18,207	5,680	26,012	4,439	4,515	154,601
1994	48,102	13,516	31,129	43,345	4,677	11,292	5,117	33,017	2,513	5,090	114,656
1995	59,947	23,650	45,789	37,428	8,806	22,554	11,771	59,813	6,565	6,367	101,292
1996	63,566	17,577	57,328	38,133	6,634	15,789	7,806	23,227	4,457	7,315	100,794
1997	79,784	29,043	71,084	39,681	8,255	12,637	9,024	49,302	8,310	8,254	85,835
1998	98,780	21,708	48,689	43,775	5,348	14,328	11,503	22,179	8,261	9,167	99,909
1999	80,272	16,970	67,300	37,964	4,934	14,417	17,111	44,255	10,276	12,399	87,537
2000	74,493	38,379	39,775	37,023	4,509	7,939	9,011	57,775	7,751	7,036	79,363
2001	78,724	37,077	51,430	4,169	6,424	16,435	9,008	44,951	13,381	7,779	46,911
2002	140,847	20,373	20,588	3,668	3,971	8,892	10,080	48,223	8,878	9,290	50,616
2003	107,126	27,922	20,863	3,540	5,653	25,935	18,447	55,336	18,365	11,899	69,418
2004	141,962	25,833	17,332	5,191	4,846	15,160	14,578	66,585	15,605	8,543	74,917
2005	129,346	28,973	13,637	24,353	4,321	15,792	15,210	77,960	16,166	13,332	75,704
2006	118,665	30,570	11,422	16,585	5,704	21,018	12,441	52,600	17,135	12,824	68,504
2007	159,436	26,280	10,844	24,273	3,291	8,207	10,553	82,881	12,556	14,371	75,763

Interpretation: The bolded numbers in Table 5 show the area with the highest catch for a particular species. Longline catches of tunas, billfishes, and other pelagic PMUS were highest outside of the U.S. EEZ in 2006 and 2007. Catches of albacore, swordfish, and sharks were always highest outside of the U.S. EEZ. Bigeye tuna, blue marlin, moonfish, and ono catches were highest in the MHI EEZ in the early years but shifted to areas outside of the U.S. EEZ in more recent times. Yellowfin tuna catches were highest in the MHI EEZ during 1991-1996, switched to the NWHI EEZ in 1999-2002 and moved outside of the U.S. EEZ in 2003-2004. The predominant area of capture for yellowfin tuna was the MHI EEZ in 2005. Striped marlin catch was typically highest in the MHI EEZ. The highest catches for mahimahi were outside of the EEZ and the MHI EEZ.

Source and Calculations: Catches (number of fish) by area were compiled from NMFS federal longline logbook data collected from 1991 to the current year. The catch tables (based on date of haul) were

summaries of fish kept and released. The bold numbers are the areas where the catch for that species and year was larger than for the other three areas

Table 4. Average weight of the Hawaii-based longline landings by species, 1987-2007.

	Tunas				
Year	Bigeye tuna	Yellowfin tuna	Albacore	Skipjack tuna	Bluefin Tuna
1987	77	82	63	18	-
1988	83	103	60	19	-
1989	77	104	62	19	-
1990	81	122	61	21	638
1991	85	118	52	20	185
1992	77	99	45	17	192
1993	88	93	44	17	203
1994	81	97	41	18	190
1995	79	95	51	18	271
1996	64	80	53	17	223
1997	71	89	55	20	239
1998	74	76	55	20	177
1999	75	62	52	20	202
2000	79	67	54	17	166
2001	68	62	55	18	190
2002	71	62	56	16	151
2003	77	67	56	19	273
2004	69	62	46	16	207
2005	88	58	50	15	238
2006	84	68	51	13	-
2007	82	74	54	15	-
Average	**77.6**	**82.9**	**53.1**	**17.8**	**234.1**
SD	**6.5**	**19.5**	**5.8**	**2.0**	**113.1**

	Billfish					
Year	Swordfish	Striped marlin	Blue marlin	Spearfish	Sailfish	Black marlin
1987	129	66	161	34	52	208
1988	119	57	157	31	51	151
1989	130	62	165	31	55	191
1990	152	62	199	35	55	204
1991	153	58	173	32	51	184
1992	178	66	175	34	45	155
1993	171	64	157	34	49	136
1994	163	64	171	33	55	167
1995	171	58	156	33	47	72
1996	157	58	154	31	40	-
1997	163	66	134	31	46	190
1998	176	60	165	32	43	167
1999	188	55	164	29	45	131
2000	180	62	157	35	57	150
2001	146	48	142	31	48	151
2002	146	55	150	33	59	222
2003	141	49	145	31	56	150
2004	137	53	132	30	39	185
2005	164	72	175	31	40	196
2006	167	64	158	30	50	186
2007	174	74	176	33	48	192
Average	**157.4**	**60.6**	**160.3**	**32.1**	**49.1**	**169.4**
SD	**18.8**	**6.7**	**15.5**	**1.7**	**5.8**	**34.0**

Table 4. (Cont.) Average weight of the Hawaii-based longline landings by species, 1987-2007.

	Other PMUS					Sharks	
Year	Mahimahi	Ono (Wahoo)	Moonfish	Pomfrets	Oilfish	Mako shark	Thresher shark
1987	21	33	111	15	20	124	97
1988	20	32	108	18	22	137	122
1989	23	35	104	18	23	161	158
1990	19	36	98	18	22	162	167
1991	15	32	97	17	23	135	180
1992	11	35	98	16	22	144	176
1993	13	33	101	16	21	147	199
1994	12	34	103	17	13	153	164
1995	10	31	101	16	23	178	172
1996	17	31	105	15	-	177	156
1997	13	30	103	17	-	161	160
1998	16	32	101	15	-	177	171
1999	16	34	98	14	-	177	202
2000	14	33	100	14	18	168	166
2001	12	29	99	13	16	175	166
2002	14	33	98	13	17	182	166
2003	13	29	93	12	16	184	196
2004	16	31	92	11	16	173	169
2005	13	29	83	13	17	177	202
2006	14	30	85	13	17	176	193
2007	12	31	86	15	16	189	190
Average	**15.0**	**32.0**	**98.3**	**15.0**	**18.9**	**164.6**	**170.1**
SD	**3.4**	**2.1**	**7.2**	**2.1**	**3.2**	**18.1**	**25.3**

Interpretation: Longline fishing effort can cover a large area within a trip. The data on individual fish from the market data cannot be directly linked to the exact area of capture, therefore, the average weight by location was referenced in general terms.

The three main tuna species, bigeye tuna, yellowfin tuna, and albacore, exhibited changes throughout 1987-2007. The average weight of bigeye tuna showed small change over the 21 year period, ranging from 64 pounds to 88 pounds. Bigeye tuna average weight was more than 80 pounds for the past three years and was 82 pounds in 2007. Yellowfin tuna average weight showed the most variation ranging from 58 pounds to 122 pounds. The average weight of yellowfin tuna was more than 100 pounds in earlier years and decreased to less than 70 pounds from 1999. This probably reflects a trend of increasing effort in the EEZ of Kingman Reef and Palmyra Atoll where relatively small yellowfin tuna are caught. The average weight of albacore was 60 pounds or more from 1987 until 1990 then declined to less than 50 pounds during 1992-94. This decline was related to increasing incidental landings of small albacore far north of the Hawaiian Islands by longliners targeting swordfish. The average weight of albacore then increased as a greater proportion of longline effort shifted back to target tunas.

Swordfish landed by tuna-targeted trips were smaller than from swordfish-targeted trips. Average weight for swordfish was lowest in the late 1980s when the longline fishery targeted tunas only. The average weight increased in the early 1990s with as the number of swordfish-target trips grew. Average weight peaked at 188 pounds in 1999 and was about the same in the following year. Swordfish-directed effort (shallow-set longlining) was restricted or prohibited during 2001-2004. As a result, almost all the longline effort was directed towards tuna target (deep-set longline) and swordfish average weight then dropped below 150 pounds during that time. Swordfish average weight increased to more than 160

pounds from 2005 when the longline fishery was allowed to target swordfish once again and was 174 pounds in 2007.

Average weight of blue marlin varied substantially and ranged from 132 pounds in 2004 to 199 pounds in 1990. Average weight of striped marlin show very little variation over the 20-year period ranging from 48 pounds in 2001 to a record 74 pounds in 2007.

Source and Calculations: Average weight of the longline landings was summarized from the NMFS, Honolulu Laboratory and HDAR market sampling data from 1987 to 1999. The average weight was calculated from the State Commercial Marine Dealer data identified as landed by longline fishing during 2000 to 2006. Swordfish and sharks were landed headed and gutted. In December of 2004, the Honolulu Auction required fishers to gill and gut tunas and mahimahi that weighed more than 20 pounds and marlins greater than 40 pounds. When fish were processed prior to sale, e.g., headed and gutted, gilled and gutted, a conversion factor was applied to convert it to an estimated whole weight. Discarded fish and sharks that were retained for fins only were not represented in these size summaries.

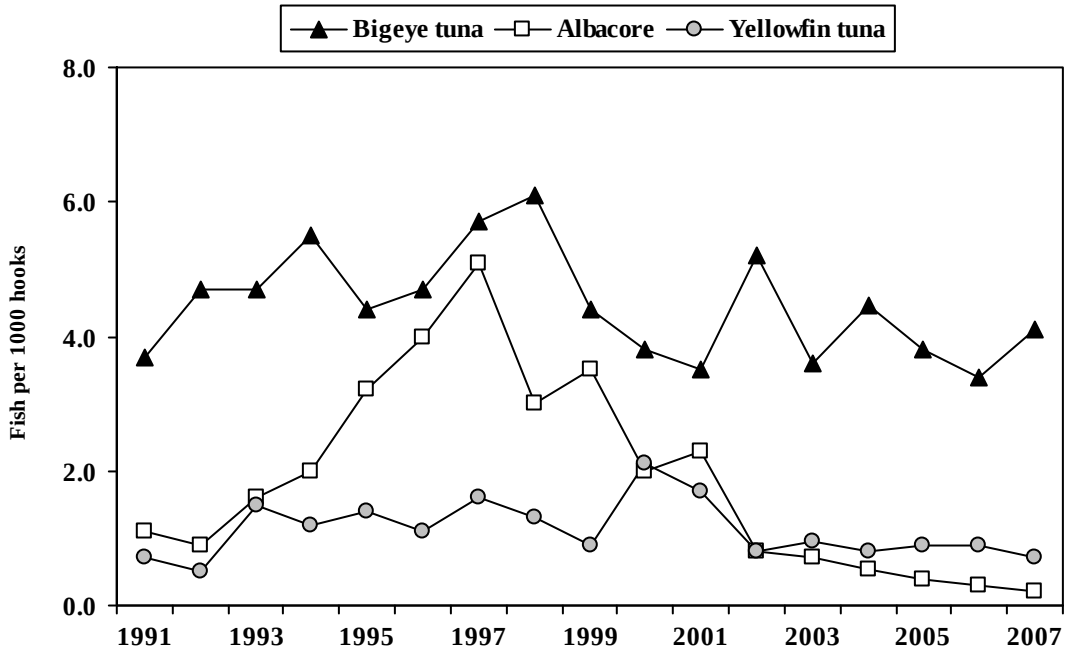
Table 5. Bycatch, retained catch, and total catch for the Hawaii-based longline fishery, 2007.

	Number released	Percent released	Kept	Caught
Tuna				
Albacore	574	5.3	10,270	10,844
Bigeye tuna	4,444	2.8	154,992	159,436
Bluefin tuna	0	0.0	2	2
Skipjack tuna	1,162	8.1	13,104	14,266
Yellowfin tuna	958	3.6	25,322	26,280
Other tuna	2	5.6	34	36
Billfish				
Blue marlin	30	0.9	3,261	3,291
Spearfish	123	1.2	9,913	10,036
Striped marlin	115	1.4	8,092	8,207
Other marlin	8	1.5	509	517
Swordfish	2,515	10.4	21,758	24,273
Other pelagic fish				
Mahimahi	1,659	2.0	81,222	82,881
Moonfish	78	0.5	14,293	14,371
Oilfish	704	2.6	26,511	27,215
Pomfret	332	0.8	39,311	39,643
Wahoo	72	0.6	12,484	12,556
Miscellaneous fish	67	7.4	844	911
Total (non-shark)	**12,843**	**3.0**	**421,922**	**434,765**
Sharks				
Blue shark	65,351	99.7	173	65,524
Mako shark	1,715	53.6	1,485	3,200
Thresher shark	4,497	89.6	520	5,017
Other sharks	1,892	93.6	130	2,022
Total sharks	**73,455**	**97.0**	**2,308**	**75,763**

Interpretation: Bycatch of the Hawaii-based longline fishery was measured in number of fish released. The total bycatch for all species combined was 17% in 2007. Tunas, which are the primary target species of the longline fleet, had a low bycatch rate (3%). The number of bigeye tuna released was highest for all tuna species although the bycatch rate was relatively low (3%). Swordfish had a bycatch rate of 10% in 2007. Although marlins and other miscellaneous pelagic catch are not targeted, these species are highly marketable and also have low rates of discards (1% and 2%, respectively). Ninety-seven percent of the sharks caught by the longline fishery were released. Blue shark and other sharks are not marketable and therefore a high percentage of those species were discarded. In contrast, a relatively higher proportion of mako and thresher sharks were kept since there was a market for their flesh.

Source and Calculations: Longline bycatch totals and percentages were compiled from NMFS longline logbook data. Longline catch was summarized on date of haul.

Figure 31. Hawaii longline CPUE for major tunas on tuna trips, 1991-2007.



Interpretation: Tuna-target trips always had the highest catch-per-unit-effort (CPUE) for bigeye tuna, which is the primary target species. Bigeye tuna CPUE was consistently higher than those for albacore or yellowfin tuna. Bigeye tuna CPUE peaked at 6.1 in 1998, declined to a low of 3.4 in 2006, and was 4.1 in 2007. Bigeye tuna CPUE was usually highest in the MHI EEZ.

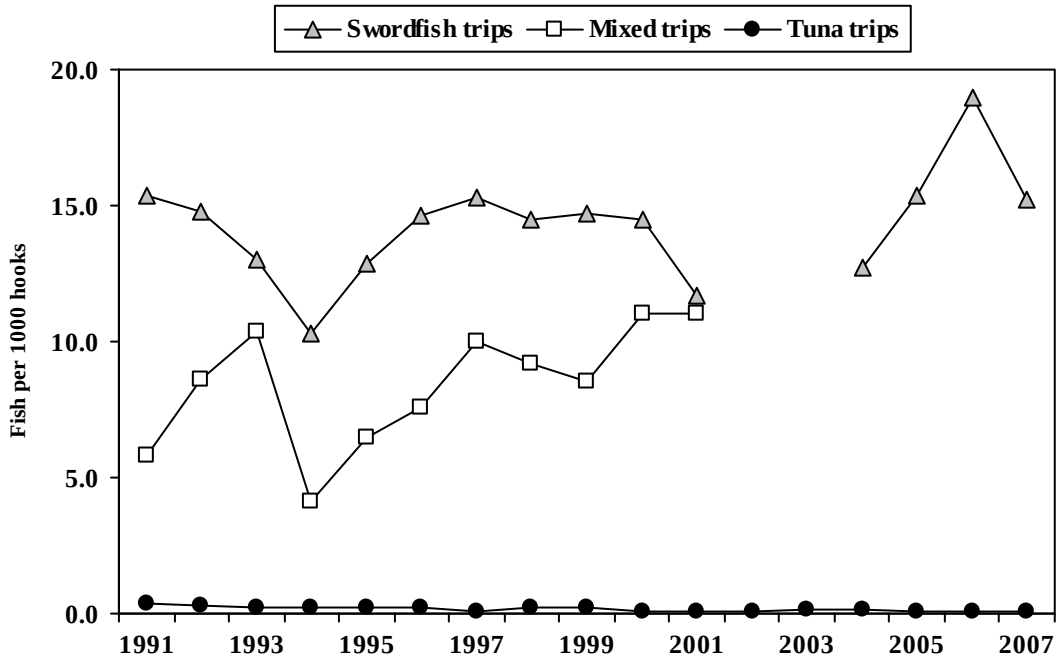
Albacore generally sells for a substantially lower price than bigeye tuna, so it is seldom targeted or is caught incidentally. Albacore CPUE rose rapidly in the early 1990s, peaked in 1997, then declined to a record low of 0.2 fish per 1000 hooks in 2007. Albacore CPUE is usually higher outside of the U.S. EEZ.

CPUE for yellowfin tuna was at its lowest level at 0.5 in 1992, peaked at 2.1 in 2000, declined just below 1 fish two years later and has remained thereafter. High yellowfin tuna CPUEs were observed in the EEZ of Kingman Reef and Palmyra Atoll.

	Tuna trip CPUE (fish per 1000 hooks)		
Year	Bigeye tuna	Albacore	Yellowfin tuna
1991	3.7	1.1	0.7
1992	4.7	0.9	0.5
1993	4.7	1.6	1.5
1994	5.5	2.0	1.2
1995	4.4	3.2	1.4
1996	4.7	4.0	1.1
1997	5.7	5.1	1.6
1998	6.1	3.0	1.3
1999	4.4	3.5	0.9
2000	3.8	2.0	2.1
2001	3.5	2.3	1.7
2002	5.2	0.8	0.8
2003	3.6	0.7	0.9
2004	4.5	0.5	0.8
2005	3.8	0.4	0.9
2006	3.4	0.3	0.9
2007	4.1	0.2	0.7
Average	**4.46**	**1.86**	**1.12**
SD	**0.81**	**1.46**	**0.43**

Source and Calculation: Tuna CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was measured as number of fish caught (kept + released) per 1000 hooks. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

Figure 32. Hawaii longline swordfish CPUE by trip type, 1991-2007.



Interpretation: Swordfish-targeted trips had the highest swordfish CPUE of all trip types. Swordfish CPUE on swordfish target trips declined to a low in 1994 but returned to typical swordfish catch rates the subsequent year up through 2000. Swordfish target effort was drastically reduced in 2001 and prohibited in 2002 and 2003 due to sea turtle conservation measures then reopened under a new set of regulations in April 2004. A few swordfish trips were made before the end of the year and had a respectable swordfish CPUE. In 2005, the first complete year since its reopening, the swordfish fishery managed to equal a record CPUE of 15.4 fish per 1000 hooks previously attained in 1991. The swordfish fishery was closed in March 2006 due to reaching the limit of 17 loggerhead turtle interaction but attained a record CPUE of 19. Swordfish CPUE for the shallow-set fishery was 15.2 in 2007

Tuna-target trips had significantly lower swordfish CPUEs compared to the swordfish targeted trips. Swordfish CPUE was 40 to 200 times lower on tuna-target trips when compared to swordfish-target trips.

	Swordfish CPUE (fish per 1000 hooks)		
Year	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	14.6	7.6	0.2
1997	15.3	10.0	0.1
1998	14.5	9.2	0.2
1999	14.7	8.5	0.2
2000	14.5	11.0	0.1
2001	11.7	11.0	0.1
2002	-	-	0.1
2003	-	-	0.1
2004	12.7	-	0.1
2005	15.4	-	0.1
2006	19.0	-	0.1
2007	15.2	-	0.1
Average	**14.27**	**8.43**	**0.17**
SD	**2.00**	**2.24**	**0.08**

Source and Calculation: Longline swordfish CPUE was compiled from NMFS longline logbook data and summarized based on date of haul. CPUE was based on number of swordfish caught (kept + released) divided by the number of hooks set. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

Figure 33a. Longline blue marlin CPUE by trip type, 1992-2007.

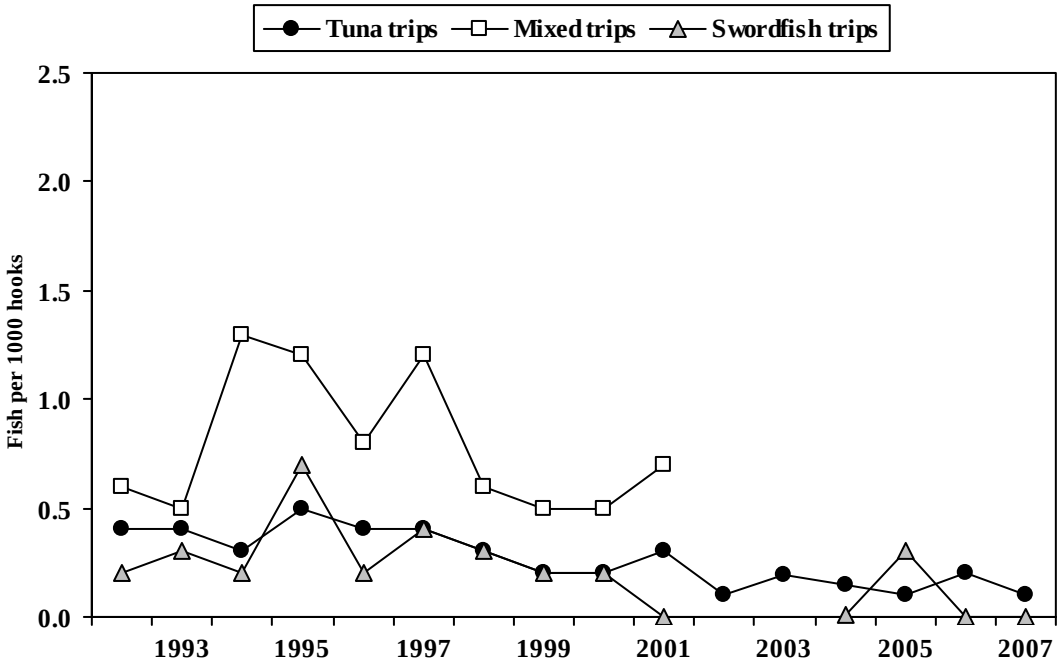
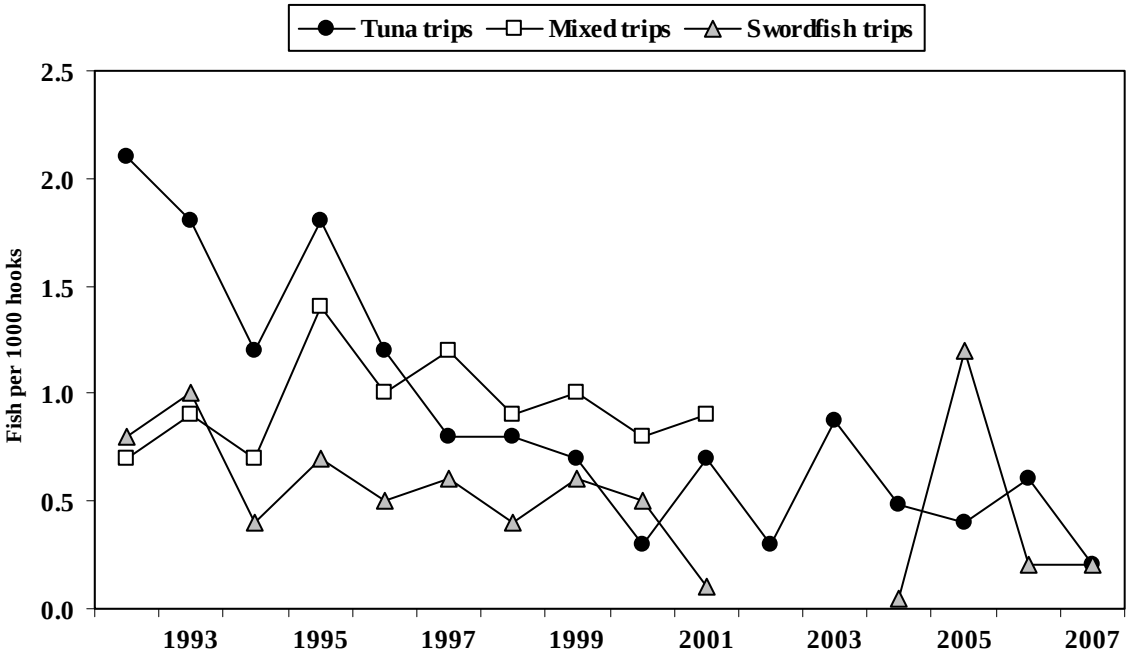


Figure 33b. Longline striped marlin CPUE by trip type, 1992-2007



Interpretation: Blue and striped marlin are caught incidentally by the longline fishery. Therefore, their catch rates are significantly lower than those for target species such as swordfish and bigeye tuna. There were differences in marlin CPUE among trip types. Blue marlin CPUE was higher on mixed-target trips.The highest blue marlin CPUE on mixed trips occurred between 1994 and 1997; catch rates remained stable at slightly lower levels from 1998 thorough 2001. Striped marlin CPUE was higher on tuna-target trips in the early to mid-1990s and converged with catch rates of swordfish and mixed trips and remained low thereafter. CPUE for both blue marlin and striped marlin were lower in the more recent years of the time series.

Source and Calculation: Longline CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was based on number of blue or striped marlin caught (kept + released) divided by the number of hooks set for each trip type. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

	Blue marlin			Striped marlin		
Year	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	**Poor species identification precluded quantification in 1991**					
1992	0.4	0.6	0.2	2.1	0.7	0.8
1993	0.4	0.5	0.3	1.8	0.9	1.0
1994	0.3	1.3	0.2	1.2	0.7	0.4
1995	0.5	1.2	0.7	1.8	1.4	0.7
1996	0.4	0.8	0.2	1.2	1.0	0.5
1997	0.4	1.2	0.4	0.8	1.2	0.6
1998	0.3	0.6	0.3	0.8	0.9	0.4
1999	0.2	0.5	0.2	0.7	1.0	0.6
2000	0.2	0.5	0.2	0.3	0.8	0.5
2001	0.3	0.7	0.0	0.7	0.9	0.1
2002	0.1	-	-	0.3	-	-
2003	0.2	-	-	0.9	-	-
2004	0.2	-	0.0	0.5	-	0.1
2005	0.1	-	0.3	0.4	-	1.2
2006	0.2	-	0.0	0.6	-	0.2
2007	0.1	-	0.0	0.2	-	0.2
Average	**0.27**	**0.79**	**0.22**	**0.89**	**0.95**	**0.52**
SD	**0.13**	**0.32**	**0.19**	**0.58**	**0.22**	**0.33**

Figure 34a. Hawaii longline mahimahi CPUE by trip type, 1991-2007.

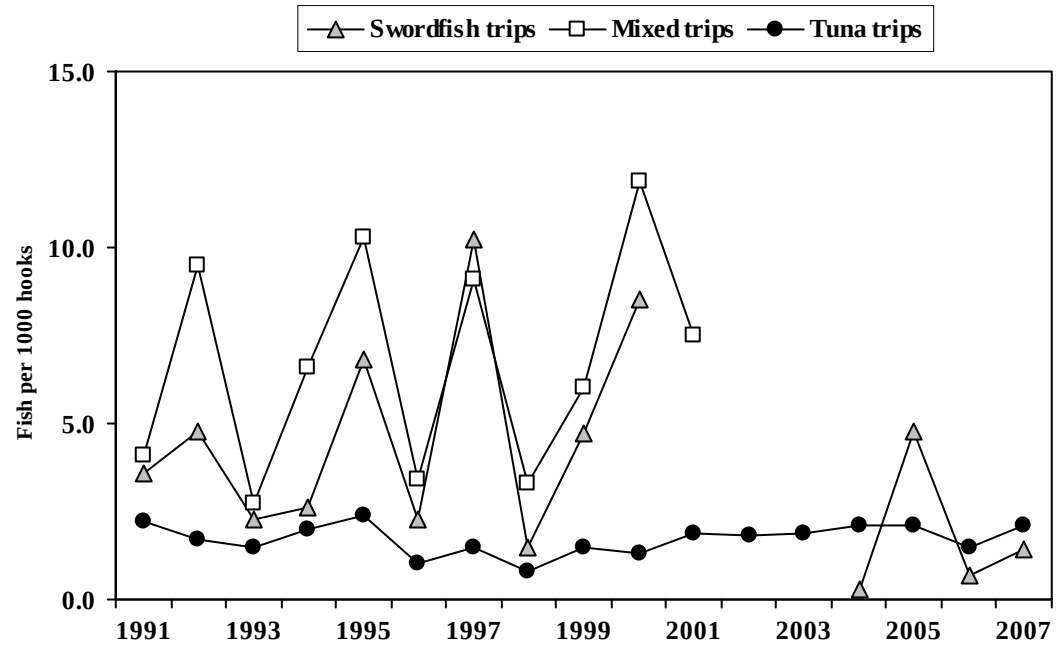
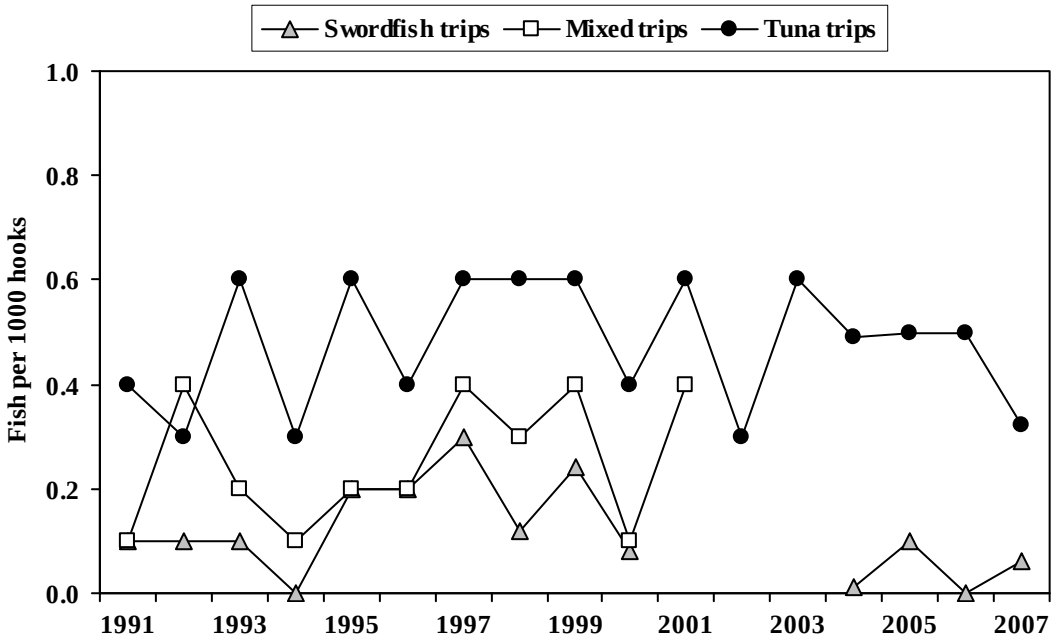


Figure 34b. Hawaii longline ono (wahoo) CPUE by trip type, 1991-2007.



Interpretation: Mahimahi and ono were caught incidentally by the longline fishery. There were substantial differences in mahimahi CPUE among trip types and considerable annual variation in CPUE within each trip type (Fig. 34a). Mahimahi CPUE was higher with much more annual variability on swordfish and mixed-target trips. The highest mahimahi CPUE was by mixed trips at 11.9 in 2000. Ono CPUE was consistently higher on tuna trips (Fig. 34b). Ono CPUE in 2007 was lower than its long-term CPUE.

Source and Calculation: Longline CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was based on number of mahimahi or ono caught (kept + released) divided by the number of hooks set for each trip type. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

	Mahimahi			Ono		
Year	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	2.2	4.1	3.6	0.4	0.1	0.1
1992	1.7	9.5	4.8	0.3	0.4	0.1
1993	1.5	2.7	2.3	0.6	0.2	0.1
1994	2.0	6.6	2.6	0.3	0.1	0.0
1995	2.4	10.3	6.8	0.6	0.2	0.2
1996	1.0	3.4	2.3	0.4	0.2	0.2
1997	1.5	9.1	10.2	0.6	0.4	0.3
1998	0.8	3.3	1.5	0.6	0.3	0.1
1999	1.5	6.0	4.7	0.6	0.4	0.2
2000	1.3	11.9	8.5	0.4	0.1	0.1
2001	1.9	7.5		0.6	0.4	
2002	1.8	-	-	0.3	-	-
2003	1.9	-	-	0.6	-	-
2004	2.1	-	0.3	0.5	-	0.0
2005	2.1	-	4.8	0.5	-	0.1
2006	1.5	-	0.7	0.5	-	0.0
2007	2.1	-	1.4	0.3	-	0.1
Average	**1.72**	**6.76**	**3.89**	**0.48**	**0.25**	**0.12**
SD	**0.43**	**3.16**	**2.96**	**0.12**	**0.13**	**0.09**

Figure 35a. Hawaii longline moonfish CPUE by trip type, 1991-2007.

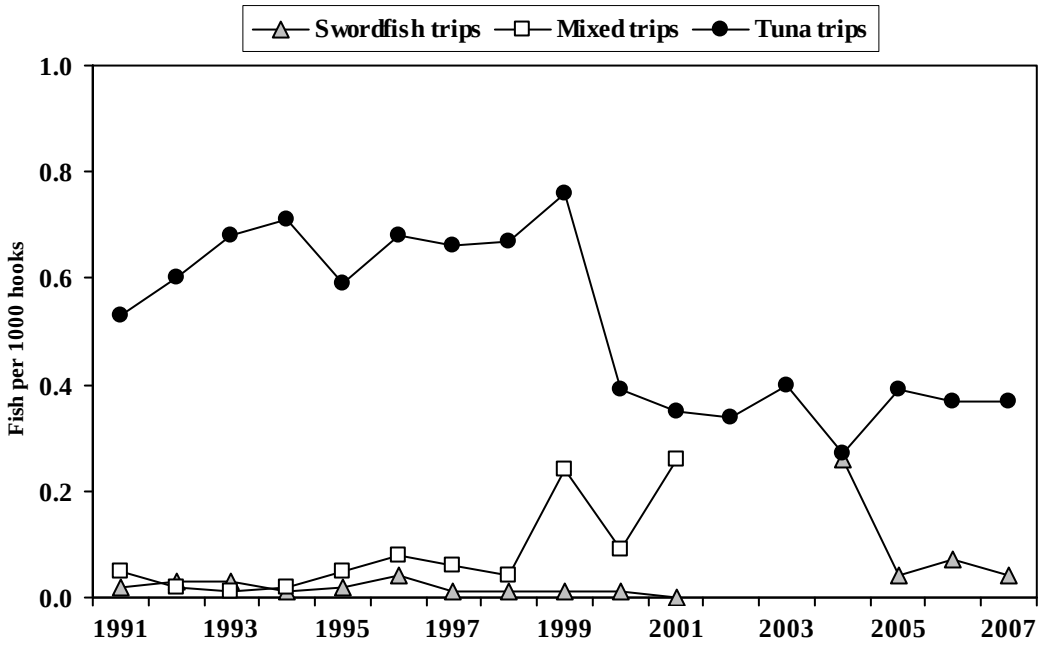
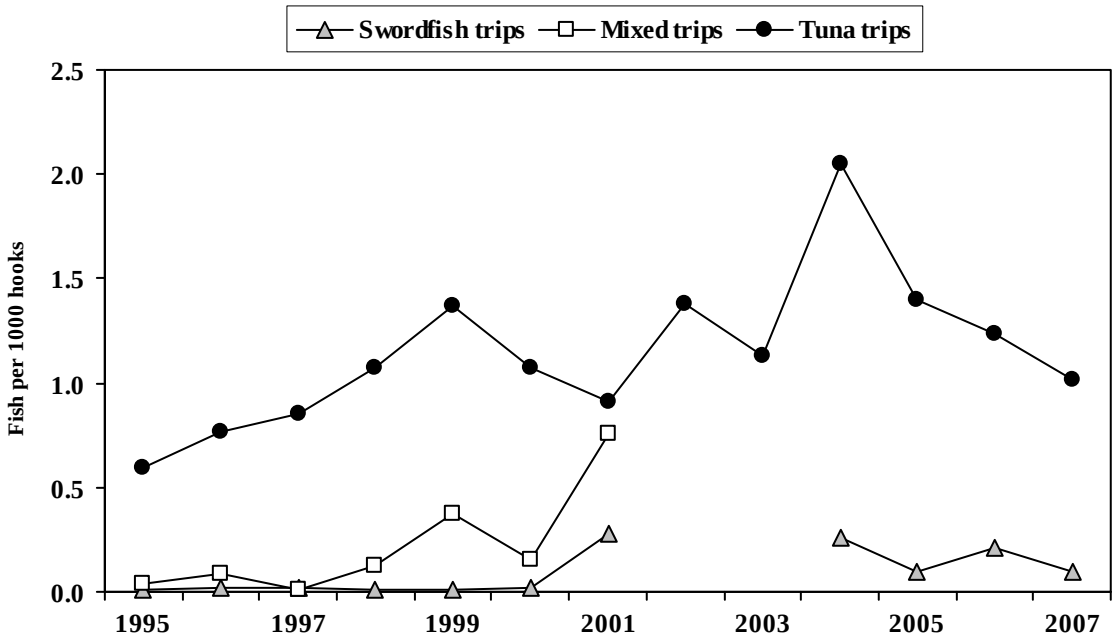


Figure 35b. Hawaii longline pomfret CPUE by trip type, 1995-2007.

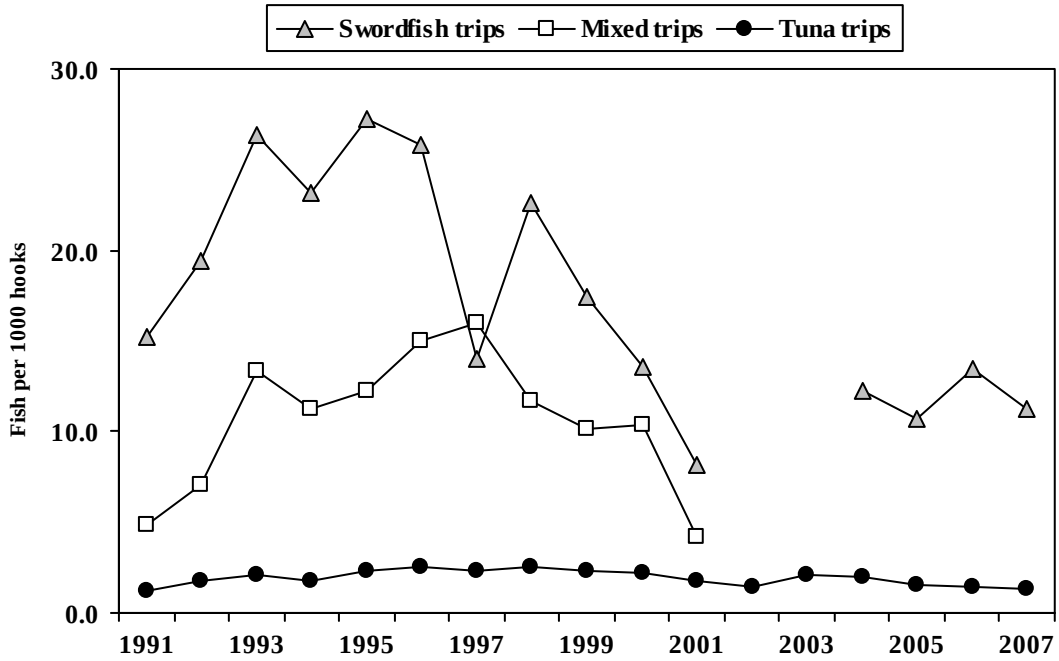

Swordfish trips
Mixed trips
Tuna trips
Fish per 1000 hooks
2.5
2.0
1.5
1.0
0.5
0.0
1995
1997
1999
2001
2003
2005
2007

Year	Moonfish			Pomfret		
	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	0.5	0.1	0.0	-	-	-
1992	0.6	0.0	0.0	-	-	-
1993	0.7	0.0	0.0	-	-	-
1994	0.7	0.0	0.0	-	-	-
1995	0.6	0.1	0.0	0.6	0.0	0.0
1996	0.7	0.1	0.0	0.8	0.1	0.0
1997	0.7	0.1	0.0	0.9	0.0	0.0
1998	0.7	0.0	0.0	1.1	0.1	0.0
1999	0.8	0.2	0.0	1.4	0.4	0.0
2000	0.4	0.1	0.0	1.1	0.2	0.0
2001	0.4	0.3	0.0	0.9	0.8	0.3
2002	0.3	-	-	1.4	-	-
2003	0.4	-	-	1.1	-	-
2004	0.3	-	0.3	2.1	-	0.3
2005	0.4	-	0.0	1.4	-	0.1
2006	0.4	-	0.1	1.2	-	0.2
2007	0.4	-	0.0	1.0	-	0.1
Average	**0.52**	**0.08**	**0.04**	**1.14**	**0.22**	**0.09**
SD	**0.16**	**0.09**	**0.06**	**0.37**	**0.27**	**0.11**

Interpretation: Moonfish and pomfrets were caught incidentally by the longline fishery. There were substantial differences in moonfish and pomfret CPUE among the different trip types. CPUE for both moonfish and pomfret was higher on tuna-target trips. Moonfish CPUE during 2000-2007 appear to be about half compared to the period 1993-1999. Pomfret CPUE showed a general increase from 1995 through 2004 then declined in the following years.

Source and Calculation: Longline CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was based on number of moonfish or pomfrets caught (kept + released) divided by the number of hooks set for each trip type. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

Figure 36. Hawaii longline blue shark CPUE by trip type, 1991-2007.

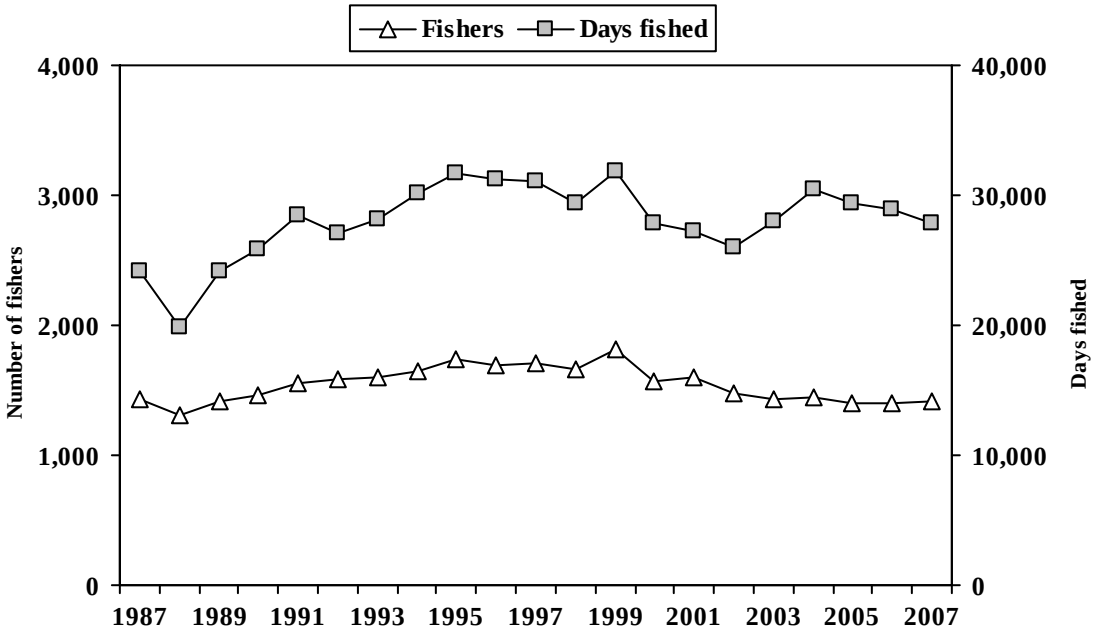


Interpretation: Blue sharks are caught incidentally by the longline fishery. The blue shark CPUE on swordfish-targeted trips is always considerably greater (by about 8-fold) than on tuna-targeted trips. Blue shark CPUE on swordfish targeted trip during 2004-2007 was lower than in the 1990s One factor that may have contributed to this is the implementation of sea turtle bycatch reduction measures, e.g., use of circle hooks, night setting, mackerel-like bait.

Source and Calculation: The longline blue shark CPUE was compiled from federal daily longline logbooks and summarized based on date of haul. CPUE was based on number of blue sharks caught (kept + released) divided by the number of hooks set. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessels' fishing history and gear configuration.

	Blue shark CPUE (fish per 1000 hooks)		
Year	Swordfish trips	Mixed trips	Tuna trips
1991	15.3	4.8	1.2
1992	19.4	7.1	1.7
1993	26.3	13.4	2.1
1994	23.1	11.3	1.8
1995	27.2	12.3	2.4
1996	25.9	15.0	2.5
1997	14.0	16.0	2.3
1998	22.6	11.7	2.6
1999	17.4	10.1	2.3
2000	13.6	10.3	2.2
2001	8.2	4.2	1.7
2002	-	-	1.5
2003	-	-	2.1
2004	12.3	-	2.0
2005	10.7	-	1.6
2006	13.5	-	1.4
2007	11.3	-	1.3
Average	**17.38**	**10.56**	**1.92**
SD	**6.27**	**3.83**	**0.44**

Figure 37. Number of fishers and days fished for the Main Hawaiian Islands troll fishery, 1987-2007.



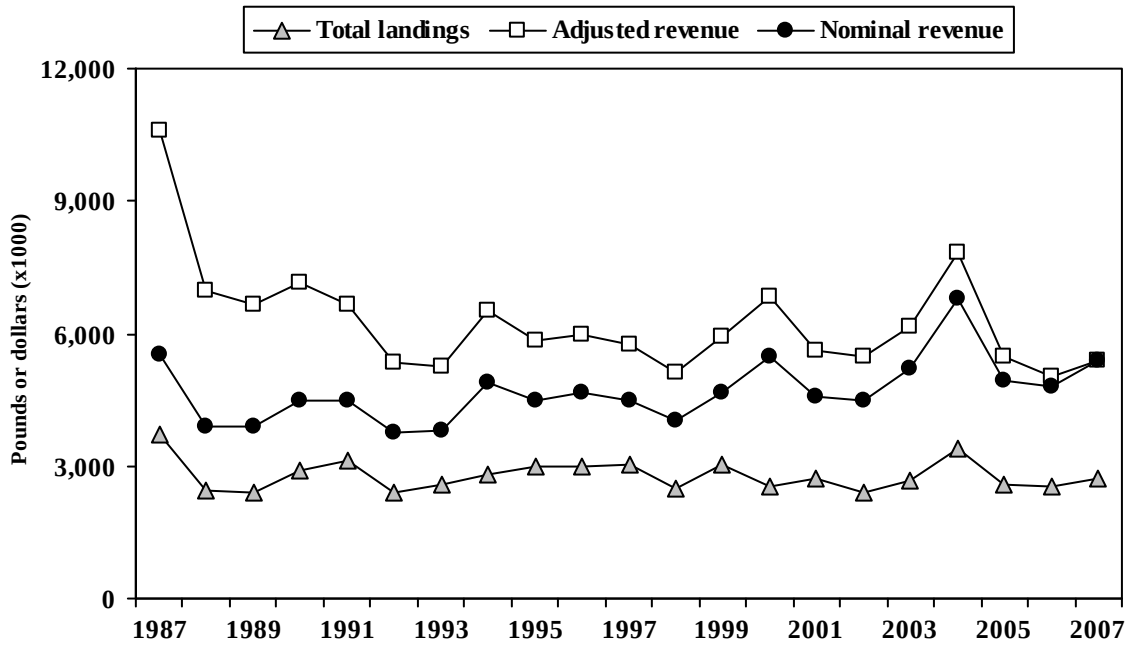
Interpretation: The Main Hawaiian Islands (MHI) troll trips fishers rose from 1988, peaked in 1999, decreased the following year, and remained relatively unchanged thereafter. There were 1,411 MHI troll fishers in 2007. The pattern for number of days fished by the MHI troll fishery was similar to that of the number of troll fishers.

Source and Calculations: The State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) based on the State Fiscal Year (FY); July 1st of one year through June 30th of the following year. A different CML number was issued every FY to each fisher up until 1993. Up to 1993, the number of fishers was counted as number of unique names of fishermen submitting Commercial Fishing Reports rather than unique CMLs to avoid double counting fishers within a calendar year. Beginning in FY 1994, the State began reissuing the same CML number to individual commercial fishers that reapplied for a CML. From this time the number of MHI troll fishers was counted based on number of unique CMLs submitting Fishing Reports.

The number of days fished by the MHI troll fishery was calculated using the Fishing Report data. A MHI troll day fished is defined as a unique CML number fishing on a unique day for the gear types and fishing areas defined for the MHI troll fishery at the beginning of this module. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

Year	Fishers	Days fished
1987	1,432	24,092
1988	1,306	19,912
1989	1,418	24,132
1990	1,458	25,830
1991	1,547	28,452
1992	1,578	27,003
1993	1,599	28,170
1994	1,648	30,093
1995	1,737	31,625
1996	1,698	31,240
1997	1,707	31,015
1998	1,669	29,406
1999	1,812	31,801
2000	1,564	27,796
2001	1,596	27,265
2002	1,480	26,076
2003	1,426	28,034
2004	1,446	30,396
2005	1,402	29,438
2006	1,395	28,852
2007	1,411	27,847
Average	**1,539.5**	**28,022.6**
SD	**136.5**	**2,897.9**

Figure 38. Main Hawaiian Islands troll landings and revenue, 1987-2007.



Interpretation: The total landings by the MHI troll fishery in 2007 were 2.7 million pounds worth an estimated $5.4 million. Total landings were close to its long-term average but revenue was 14% below its long-term average. Landings ranged from 2.4 million pounds to 3.7 million pounds from 1987-2007. Adjusted revenue varied substantially from $4.9 million in 1998 to $10.6 million in 1987.

Source and Calculations: Total landings and nominal revenue for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the MHI troll fishery. The adjusted revenue is calculated by dividing the nominal revenue by the Honolulu CPI for the respective year then multiplying the result by the current year (2007) Honolulu CPI.

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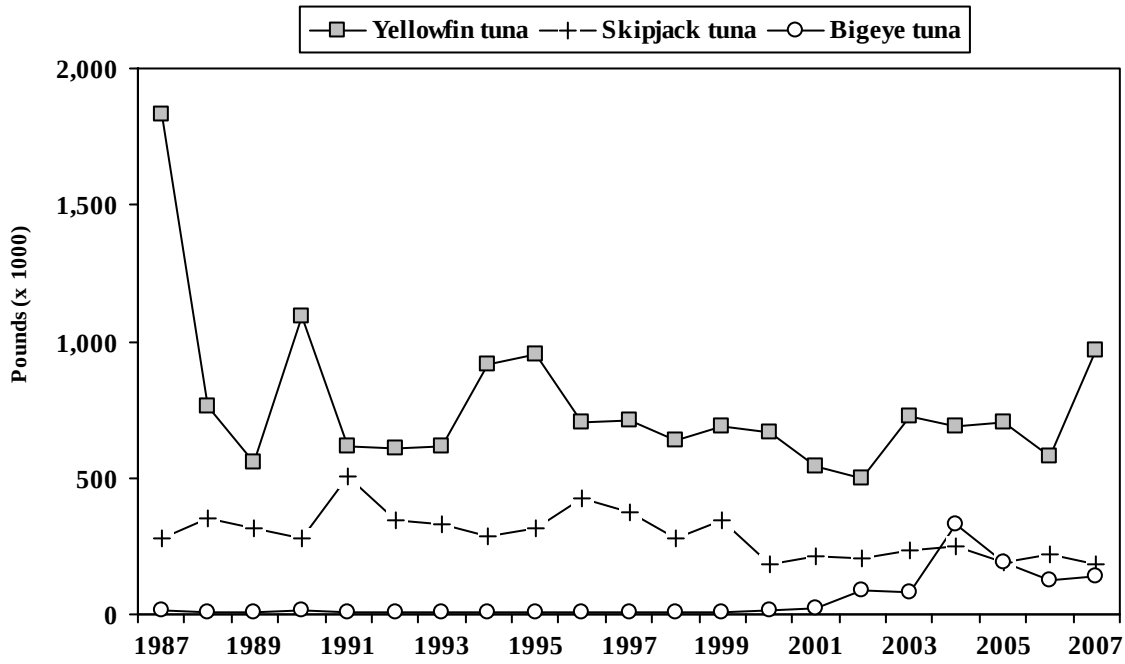
Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	3,709	$10,576	$5,536	114.9
1988	2,445	$6,989	$3,875	121.7
1989	2,401	$6,650	$3,899	128.7
1990	2,901	$7,143	$4,494	138.1
1991	3,102	$6,670	$4,497	148.0
1992	2,394	$5,324	$3,762	155.1
1993	2,578	$5,232	$3,816	160.1
1994	2,810	$6,534	$4,897	164.5
1995	2,966	$5,838	$4,471	168.1
1996	2,994	$5,979	$4,650	170.7
1997	3,016	$5,729	$4,487	171.9
1998	2,471	$5,134	$4,011	171.5
1999	3,013	$5,934	$4,685	173.3
2000	2,558	$6,819	$5,477	176.3
2001	2,734	$5,628	$4,574	178.4
2002	2,384	$5,471	$4,494	180.3
2003	2,690	$6,171	$5,187	184.5
2004	3,376	$7,832	$6,801	190.6
2005	2,580	$5,492	$4,949	197.8
2006	2,538	$5,016	$4,785	209.4
2007	2,715	$5,407	$5,407	219.5
Average	**2,783.0**	**$6,265.1**	**$4,702.6**	
SD	**354.2**	**$1,242.1**	**$716.3**	

Figure 39. Main Hawaiian Islands troll tuna landings, 1987-2007.

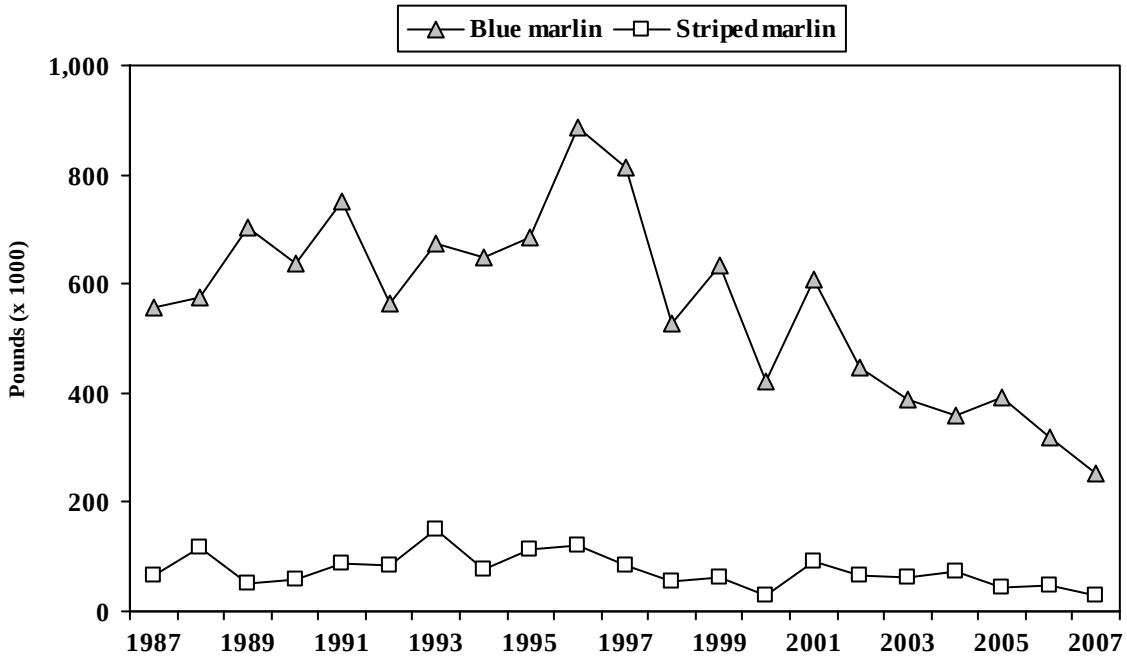


Interpretation: The MHI troll tuna landings was composed predominantly of yellowfin tuna. Yellowfin tuna landings increased dramatically from the mid 1980s, dropped in the late 1980s and remained relatively stable thereafter. Skipjack tuna was the second largest component of the MHI troll landings. Skipjack tuna landings were relatively stable though they have been on a gradual decline. Small quantities of bigeye tuna, albacore, and other tunas were also landed by this fishery.

Source and Calculations: The tuna landings statistics for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The MHI troll fishery tuna landings was calculated by totaling tuna caught by species and includes kawakawa and unclassified tunas in the other tunas category.

	MHI troll tuna landings (1000 pounds)					
Year	Yellowfin tuna	Skipjack tuna	Bigeye tuna	Albacore	Other tunas	Total tunas
1987	1,828	277	11	1	19	2,136
1988	764	351	10	1	16	1,141
1989	559	318	11	1	14	904
1990	1,089	278	15	1	18	1,401
1991	615	504	11	2	13	1,145
1992	606	347	9	3	15	980
1993	616	332	4	3	9	964
1994	914	283	6	22	15	1,240
1995	949	318	10	10	9	1,295
1996	707	424	4	5	6	1,146
1997	712	376	6	7	6	1,107
1998	636	278	5	4	10	933
1999	687	347	7	87	7	1,135
2000	670	181	15	5	6	877
2001	542	215	23	13	5	799
2002	500	203	86	9	6	804
2003	726	237	80	10	27	1,080
2004	689	246	328	7	45	1,316
2005	703	190	187	14	15	1,109
2006	577	220	124	2	16	939
2007	967	184	137	8	17	1,313
Average	**764.6**	**290.8**	**51.9**	**10.2**	**14.0**	**1,122.6**
SD	**287.1**	**83.9**	**82.4**	**18.4**	**9.1**	**292.0**

Figure 40. Main Hawaiian Islands troll billfish landings, 1987-2007.

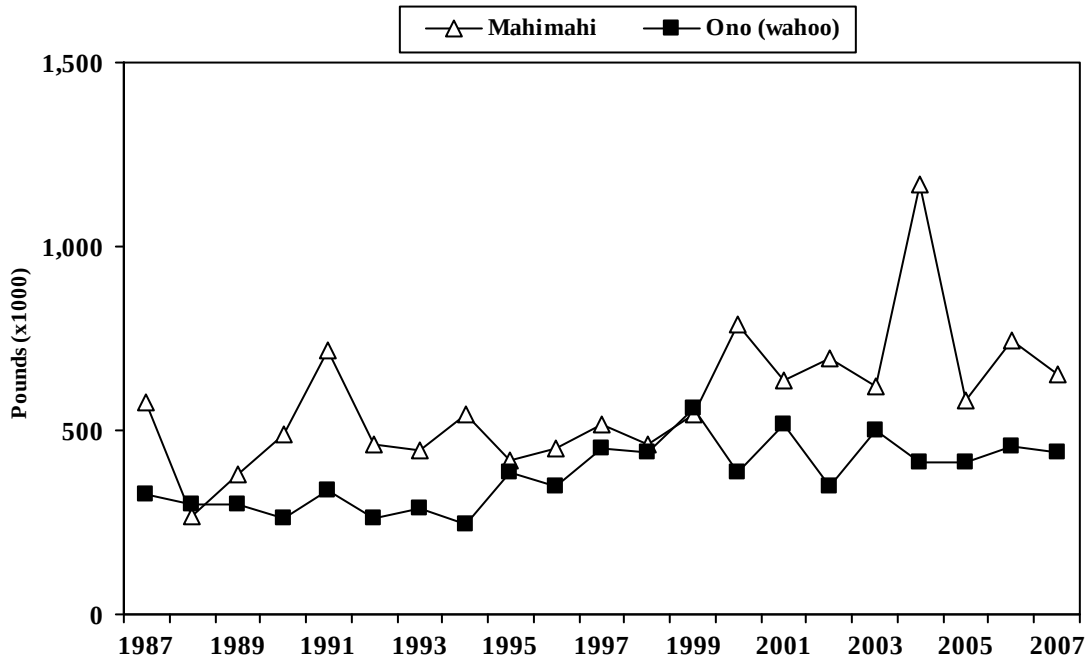


Interpretation: Billfish landings by the MHI troll fishery in 2007 were 307,000 pounds, 55% below the long-term average. Landings of billfish by the MHI troll fishery consisted primarily of blue marlin. Blue marlin landings have been on a decreasing trend from a peak of 885,000 pounds in 1996 to 254,000 pounds in 2007. The striped marlin landings in this fishery were relatively low. The MHI troll fishery also had small landings of other billfish, e.g., including spearfish, sailfish, swordfish, and black marlin.

Source and Calculations: The billfish landings statistics for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. Billfish landings by the MHI troll fishery was calculated by totaling billfish landings by species and include black marlin, sailfish, spearfish and unclassified billfish in the other billfish category.

	MHI troll billfish landings (1000 pounds)				
Year	Blue marlin	Striped marlin	Other billfish	Swordfish	Total billfishes
1987	557	66	42	1	666
1988	575	118	41	2	736
1989	704	52	47	2	805
1990	638	59	33	1	732
1991	749	89	52	1	890
1992	565	83	35	0	683
1993	675	150	44	0	870
1994	648	76	46	1	770
1995	684	114	57	1	856
1996	885	119	37	1	1,042
1997	814	83	36	1	935
1998	527	57	41	1	626
1999	635	62	71	1	769
2000	422	30	49	5	506
2001	608	93	75	4	780
2002	446	65	22	3	535
2003	390	63	37	1	491
2004	360	74	46	0	481
2005	392	43	34	1	471
2006	318	47	29	1	395
2007	254	28	22	2	307
Average	**564.2**	**74.8**	**42.6**	**1.5**	**683.2**
SD	**167.3**	**31.1**	**13.4**	**1.2**	**193.5**

Figure 41. Main Hawaiian Islands troll landings of other pelagic MUS, 1987-2007.

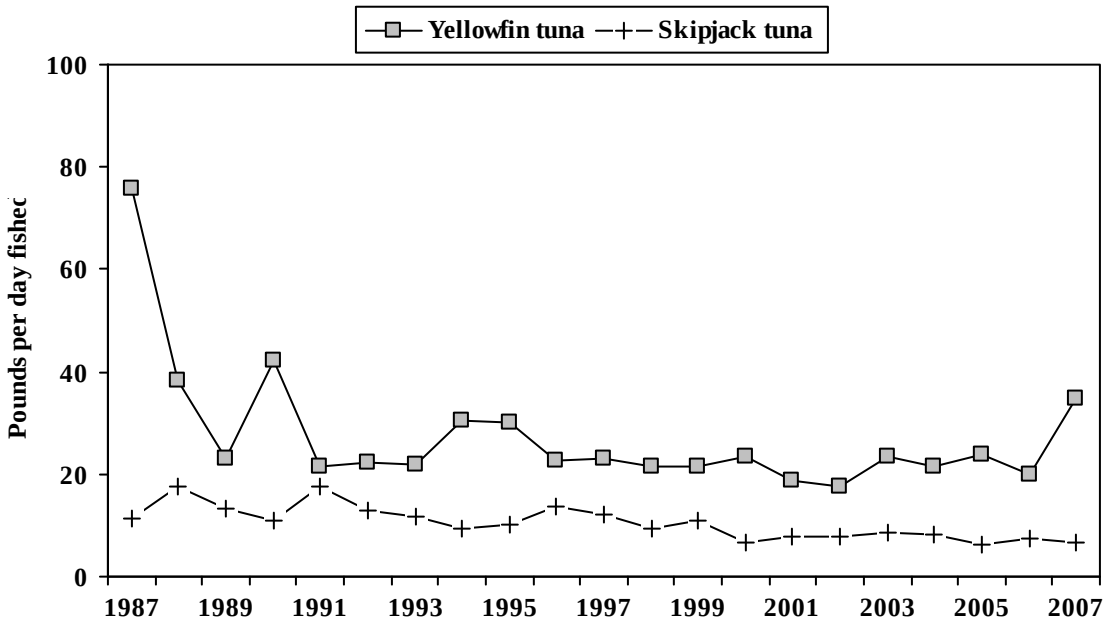


Interpretation: Landings of "other pelagic" species by the MHI troll fishery in 2006 was 1.2 million pounds, 21% above the long-term average. Mahimahi and ono comprised majority of these landings. Both mahimahi and ono landings in 2007 were above their long term average by 25% and 17%, respectively.

Source and Calculations: The other pelagic catch statistics for the MHI troll fishery were derived from HDAR Commercial Fishing and Dealer data. Other pelagic landings by the MHI troll fishery were calculated by totaling other pelagic landings by species. The total other pelagic column is the sum of the two dominant pelagic species plus miscellaneous pelagic species, which include barracuda, flying fish, and frigate mackerel.

	MHI troll other pelagic landings (1000 pounds)			
Year	Mahimahi	Ono (wahoo)	Misc pelagics	Total other pelagics
1987	579	324	3	907
1988	264	298	6	569
1989	379	298	14	691
1990	491	262	16	768
1991	718	337	12	1,067
1992	461	262	8	731
1993	444	286	13	744
1994	546	245	9	800
1995	419	388	8	815
1996	451	347	7	806
1997	517	451	5	974
1998	464	442	6	912
1999	545	558	6	1,109
2000	786	386	7	1,174
2001	637	515	6	1,155
2002	696	350	4	1,048
2003	620	498	3	1,119
2004	1,163	409	3	1,574
2005	569	406	4	978
2006	719	440	2	1,160
Average	**573.4**	**375.2**	**7.1**	**955.0**
SD	**189.3**	**89.6**	**3.9**	**229.9**

Figure 42. Main Hawaiian Islands troll tuna CPUE (pounds per day fished), 1987-2007.

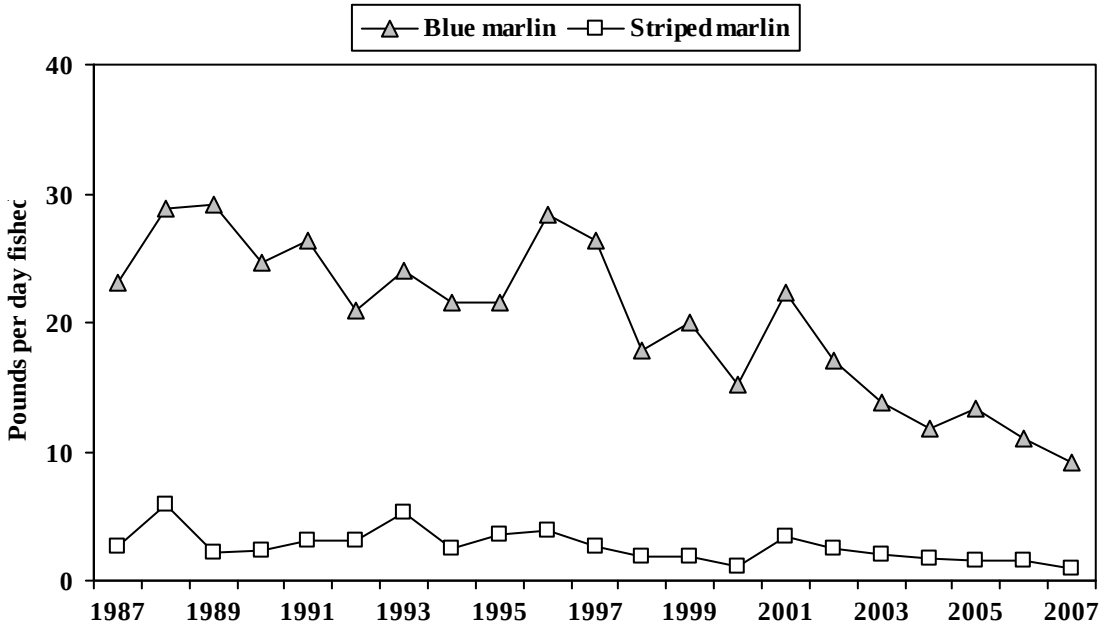


Interpretation: MHI troll yellowfin tuna CPUE was consistently higher than skipjack tuna CPUE. Yellowfin tuna CPUE was 35 pounds per trip in 2007; above the long-term average CPUE for the first time in the past eleven years. Yellowfin tuna peaked at 76 pounds in 1987 and dropped to of 23 pounds per trip in 1989 and remained close to that level thereafter. Skipjack tuna CPUE was 7 pounds in 2007 and has been below its long-term average for the past eight years.

Source and Calculations: The MHI troll CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI troll yellowfin and skipjack tuna landings from the Fishing Report data was divided by the MHI troll the number of days fished in Figure 37. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

MHI troll tuna CPUE (pounds per day fished)		
Year	**Yellowfin tuna**	**Skipjack tuna**
1987	75.9	11.5
1988	38.3	17.6
1989	23.2	13.2
1990	42.2	10.8
1991	21.6	17.7
1992	22.4	12.9
1993	21.9	11.8
1994	30.4	9.4
1995	30.0	10.0
1996	22.6	13.6
1997	23.0	12.1
1998	21.6	9.5
1999	21.6	10.9
2000	23.3	6.5
2001	18.8	7.9
2002	17.4	7.8
2003	23.3	8.5
2004	21.3	8.1
2005	23.9	6.4
2006	20.0	7.6
2007	34.7	6.6
Average	**27.50**	**10.50**
SD	**12.82**	**3.26**

Figure 43. Main Hawaiian Island troll marlin CPUE (pounds per day fished), 1987-2007.



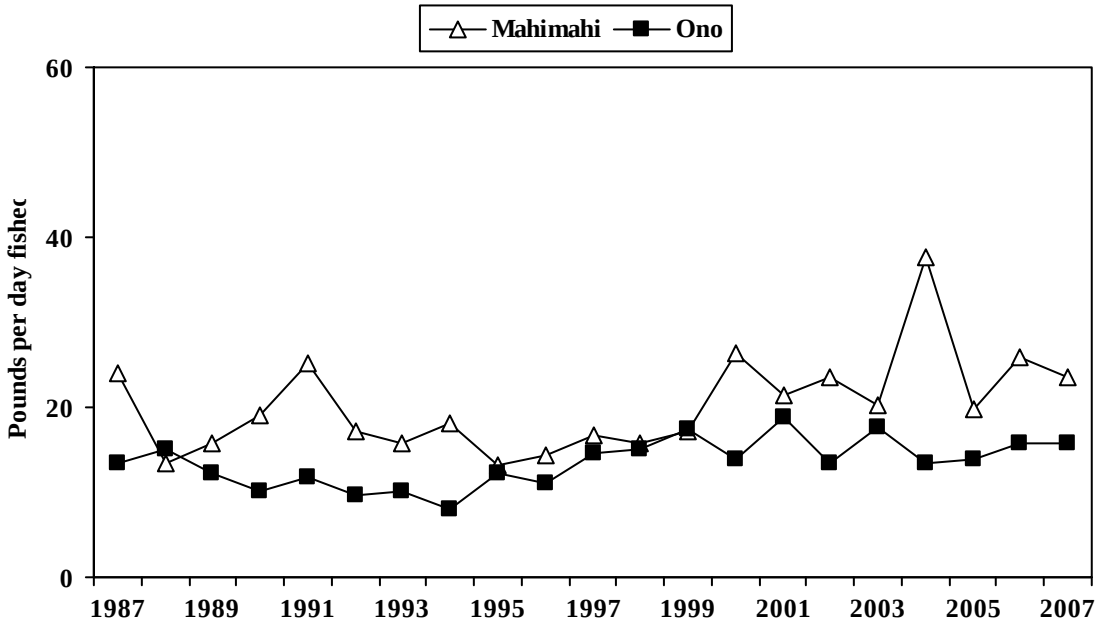
Interpretation: CPUE for blue marlin was substantially higher compared to the CPUE for striped marlin. CPUE for both blue marlin and striped marlin in 2007 was below their long-term average by 55% and 62%, respectively. Blue marlin and striped marlin CPUE were both below their long-term average for the past six years. The CPUE for both blue marlin and striped marlin appeared to be on a downward trend from the mid 1990s.

Source and Calculations: The MHI troll CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI troll blue marlin and striped marlin landings from the Fishing Report data was divided by the MHI troll the number of days fished in Figure 37. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

MHI troll marlin CPUE (pounds per day fished)

Year	Blue marlin	Striped marlin
1987	23.1	2.7
1988	28.9	5.9
1989	29.2	2.2
1990	24.7	2.3
1991	26.3	3.1
1992	20.9	3.1
1993	24.0	5.3
1994	21.5	2.5
1995	21.6	3.6
1996	28.3	3.8
1997	26.3	2.7
1998	17.9	1.9
1999	20.0	1.9
2000	15.2	1.1
2001	22.3	3.4
2002	17.1	2.5
2003	13.8	2.0
2004	11.8	1.7
2005	13.3	1.5
2006	11.0	1.6
2007	9.1	1.0
Average	**20.30**	**2.66**
SD	**6.14**	**1.25**

Figure 44. Main Hawaiian Island troll mahimahi and ono CPUE (pounds per day fished), 1987-2007.

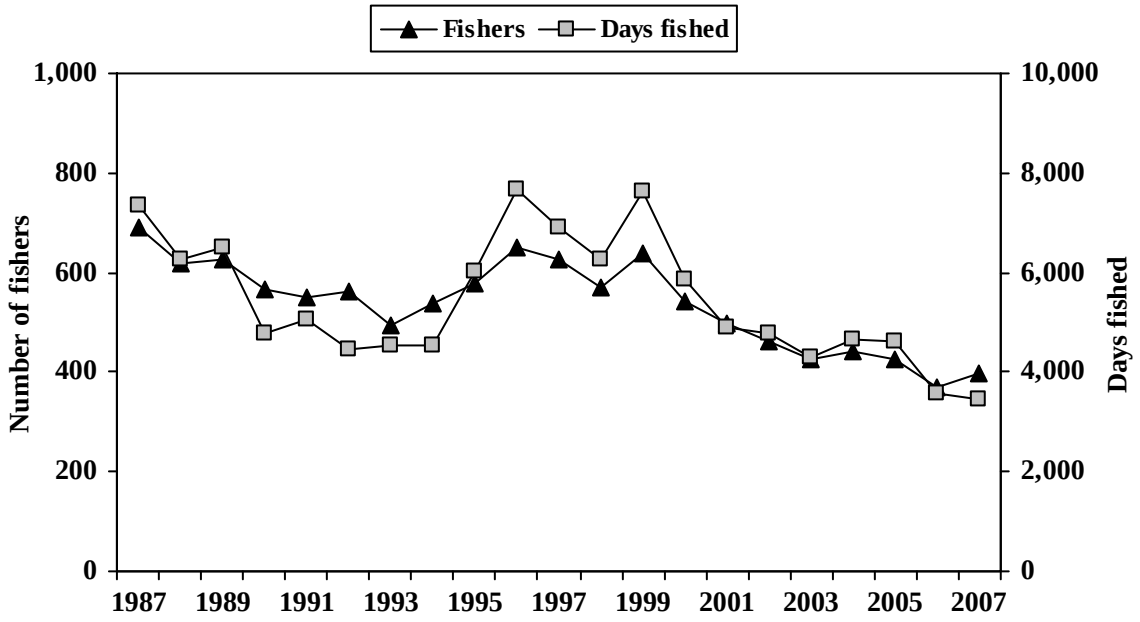


Interpretation: Mahimahi CPUE for the MHI troll fishery was slightly higher and more variable than that for ono. The CPUE for both mahimahi and ono in 2007 exceeded their long-term average by 16% and 17%, respectively. CPUE for both species have been on an upward trend since the mid-1990s.

Source and Calculations: The MHI troll CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI troll mahimahi and ono landings from the Fishing Report data was divided by the MHI troll the number of days fished in Figure 37. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

MHI troll mahimahi and ono CPUE (pounds per day fished)		
Year	**Mahimahi**	**Ono**
1987	24.0	13.5
1988	13.3	15.0
1989	15.7	12.3
1990	19.0	10.1
1991	25.2	11.8
1992	17.1	9.7
1993	15.8	10.2
1994	18.1	8.1
1995	13.2	12.3
1996	14.4	11.1
1997	16.7	14.6
1998	15.8	15.0
1999	17.1	17.5
2000	26.3	13.9
2001	21.4	18.9
2002	23.6	13.4
2003	20.3	17.7
2004	37.7	13.5
2005	19.8	14.0
2006	25.8	15.8
2007	23.5	15.8
Average	**20.18**	**13.53**
SD	**5.77**	**2.80**

Figure 45. Number of fishers and days fished for the Main Hawaiian Islands handline fishery, 1987-2007.



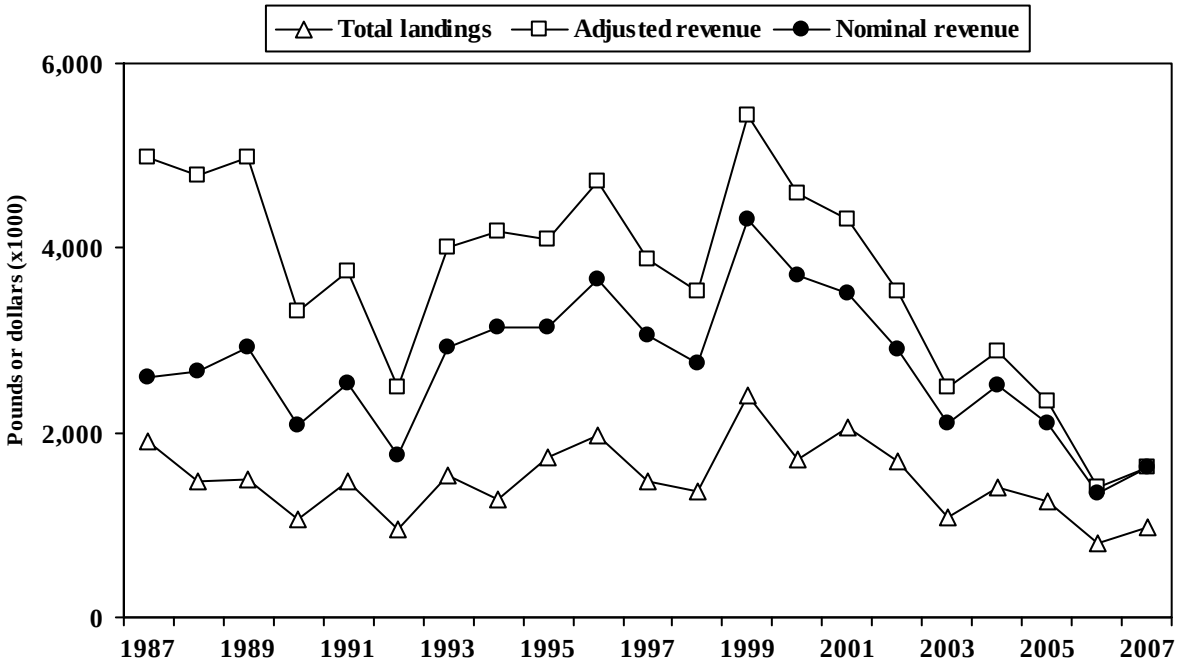
Interpretation: : There were 397 MHI handline fishers that fished 3,454 days in 2007. Both measures of effort were below their respective long-term averages. MHI handline effort was on a downward trend from 1999.

Source and Calculations: The State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) based on the State Fiscal Year (FY); July 1st of one year through June 30th of the following year. A different CML number was issued every FY to each fisher up until 1993. Up to 1993, the number of fishers was counted as number of unique names of fishermen submitting Commercial Fishing Reports rather than unique CMLs to avoid double counting fishers within a calendar year. Beginning in FY 1994, the State began reissuing the same CML number to individual commercial fishers that reapplied for a CML. From this time the number of MHI handline fishers was counted based on number of unique CMLs submitting Fish Reports.

The number of days fished by the MHI handline fishery was calculated using the HDAR Fishing Report data. A MHI handline day fished is defined as a unique CML number fishing on a unique day for the gear types and fishing areas defined for the MHI handline fishery at the beginning of this module. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

Year	Fishers	Days fished
1987	690	7,356
1988	620	6,280
1989	625	6,511
1990	567	4,791
1991	550	5,072
1992	564	4,462
1993	493	4,537
1994	538	4,548
1995	579	6,022
1996	650	7,655
1997	628	6,911
1998	572	6,259
1999	637	7,625
2000	544	5,862
2001	498	4,912
2002	463	4,770
2003	425	4,315
2004	442	4,658
2005	426	4,600
2006	371	3,565
2007	397	3,454
Average	**537.1**	**5,436.4**
SD	**90.5**	**1,273.8**

Figure 46. Main Hawaiian Islands handline landings and revenue, 1987-2007.

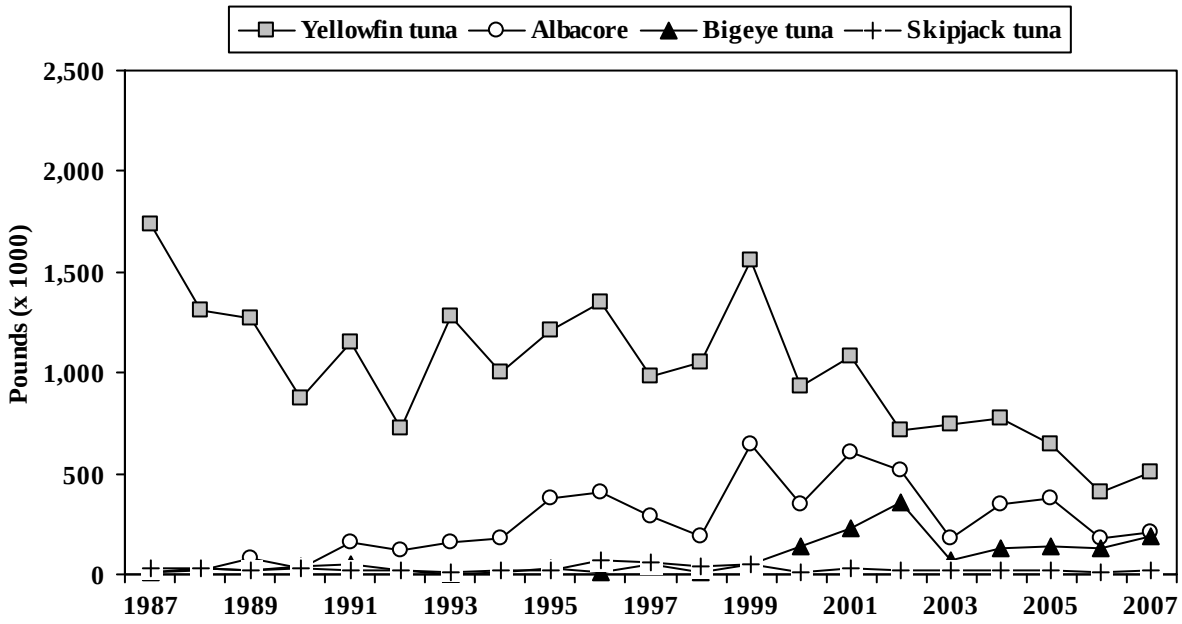


Interpretation: Total landings by the MHI handline fishery in 2007 were 9680,000 pounds, worth an estimated $1.6 million. Total landings and revenue by this fishery was below the long-term values by 36% and 56%, respectively. The recent pattern for MHI handline fishery landings and revenue was similar to the trip activity, which consisted of a decreasing trend from 1999.

Source and Calculations: Total landings and nominal revenue for the MHI handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the MHI handline fishery. The adjusted revenue is calculated by dividing the nominal revenue by the respective year Honolulu CPI and then multiplying the result by the current year (2007) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	1,914	$4,978	$2,606	114.9
1988	1,471	$4,787	$2,654	121.7
1989	1,487	$4,984	$2,922	128.7
1990	1,060	$3,312	$2,084	138.1
1991	1,477	$3,755	$2,532	148.0
1992	945	$2,482	$1,754	155.1
1993	1,532	$4,009	$2,924	160.1
1994	1,287	$4,183	$3,135	164.5
1995	1,733	$4,099	$3,139	168.1
1996	1,963	$4,718	$3,669	170.7
1997	1,479	$3,887	$3,044	171.9
1998	1,369	$3,531	$2,759	171.5
1999	2,413	$5,448	$4,301	173.3
2000	1,711	$4,599	$3,694	176.3
2001	2,066	$4,315	$3,507	178.4
2002	1,695	$3,541	$2,909	180.3
2003	1,083	$2,494	$2,096	184.5
2004	1,403	$2,888	$2,508	190.6
2005	1,266	$2,334	$2,103	197.8
2006	801	$1,417	$1,352	209.4
2007	968	$1,630	$1,630	219.5
Average	**1,507.7**	**$3,685.3**	**$2,729.6**	
SD	**395.3**	**$1,127.5**	**$735.0**	

Figure 47. Main Hawaiian Islands handline tuna landings, 1987-2007.

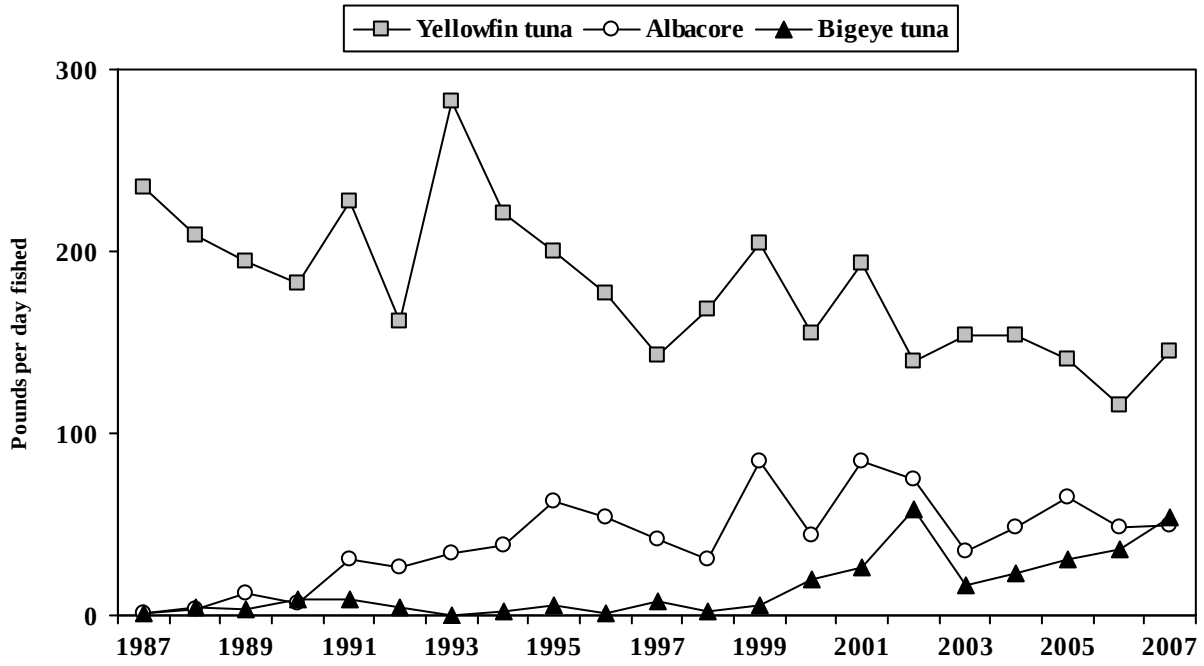


Interpretation: MHI handline tuna landings in 2007 were 919,000 pounds, 34% below the long-term average. The largest component of tuna landings by the MHI handline fishery was yellowfin tuna, followed by albacore and bigeye tuna. Yellowfin tuna landings by MHI handline fishery were 51% below the long-term average. Albacore landings was 18% below is long-term averages while bigeye tuna was up 231% its long-term average.

Source and Calculations: The tuna landing statistics for the MHI handline fishery were derived from HDAR Commercial Fishing and Dealer Report data. The MHI handline fishery tuna landings was calculated by totaling tuna landings by species and includes kawakawa and unclassified tunas in the other tunas category.

	MHI handline tuna landings (1000 lbs)					
Year	Yellowfin tuna	Albacore	Bigeye tuna	Skipjack tuna	Other tunas	Total
1987	1,734	12	6	25	5	1,782
1988	1,310	18	28	29	9	1,395
1989	1,266	78	19	20	11	1,393
1990	876	31	41	26	7	981
1991	1,154	157	45	19	6	1,380
1992	722	116	19	21	7	885
1993	1,283	154	2	14	5	1,458
1994	1,003	176	10	21	3	1,213
1995	1,207	380	33	17	6	1,642
1996	1,352	409	11	69	4	1,845
1997	986	287	52	56	3	1,384
1998	1,052	191	15	38	3	1,298
1999	1,559	642	46	52	2	2,302
2000	937	347	141	14	2	1,440
2001	1,078	605	226	30	4	1,942
2002	711	511	353	20	3	1,598
2003	746	176	74	16	4	1,015
2004	769	351	125	23	17	1,285
2005	645	373	141	21	5	1,184
2006	410	183	129	10	2	735
2007	502	212	187	15	3	919
Average	**1,014.4**	**257.5**	**81.1**	**26.4**	**5.2**	**1,384.5**
SD	**340.1**	**182.9**	**89.9**	**15.3**	**3.5**	**382.0**

Figure 48. Main Hawaiian Islands handline tuna CPUE (pounds per day fished), 1987-2007.

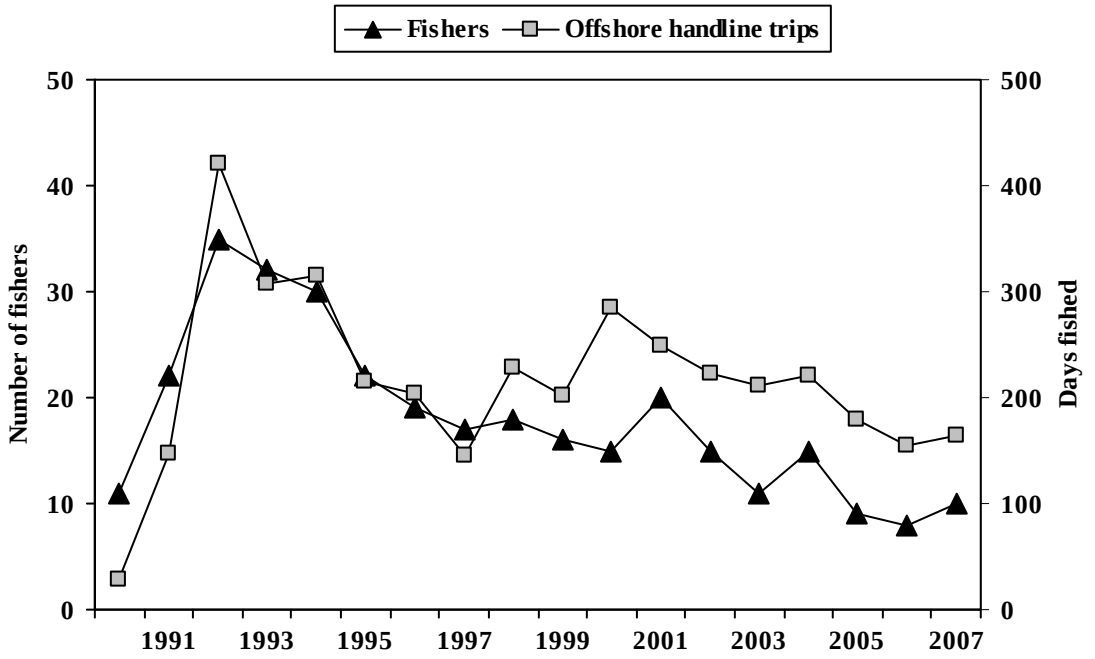


Interpretation: MHI handline CPUE (pounds per day fished) were slightly higher than the long-term average. Yellowfin tuna CPUE, the dominant component of the handline landings, was 146 pounds per trip in 2007; 20% below its long-term average. Nonetheless, the yellowfin tuna CPUE was relatively stable from 2002. Albacore and bigeye tuna CPUE were above their respective long term averages.

Source and Calculations: The MHI handline CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI handline yellowfin and skipjack tuna landings from the Fishing Report data was divided by the MHI handline the number of days fished in Figure 45. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold. The total CPUE was greater than the sum of the three dominant tuna species because it includes skipjack tuna, kawakawa, and other tunas.

	MHI handline CPUE (pounds per day fished)			
Year	Yellowfin tuna	Albacore	Bigeye tuna	Total
1987	235.7	1.6	0.8	242.3
1988	208.7	2.9	4.5	222.1
1989	194.4	11.9	2.9	214.0
1990	182.8	6.5	8.6	204.8
1991	227.4	30.9	8.9	272.1
1992	161.8	26.0	4.3	198.3
1993	282.8	33.9	0.4	321.4
1994	220.5	38.7	2.2	266.7
1995	200.4	63.1	5.4	272.7
1996	176.6	53.4	1.4	241.0
1997	142.7	41.5	7.5	200.3
1998	168.0	30.5	2.4	207.4
1999	204.5	84.2	6.0	301.9
2000	155.0	44.3	20.3	222.4
2001	193.9	84.9	26.3	312.0
2002	139.2	74.9	58.0	276.9
2003	153.8	34.8	16.3	209.7
2004	153.8	48.3	23.6	234.3
2005	140.2	65.1	30.6	241.5
2006	114.9	48.2	36.2	203.0
2007	145.5	49.4	54.2	254.1
Average	**181.08**	**41.67**	**15.28**	**243.24**
SD	**40.21**	**24.41**	**17.19**	**38.97**

Figure 49. Number of offshore handline fishers and days fished, 1990-2007.



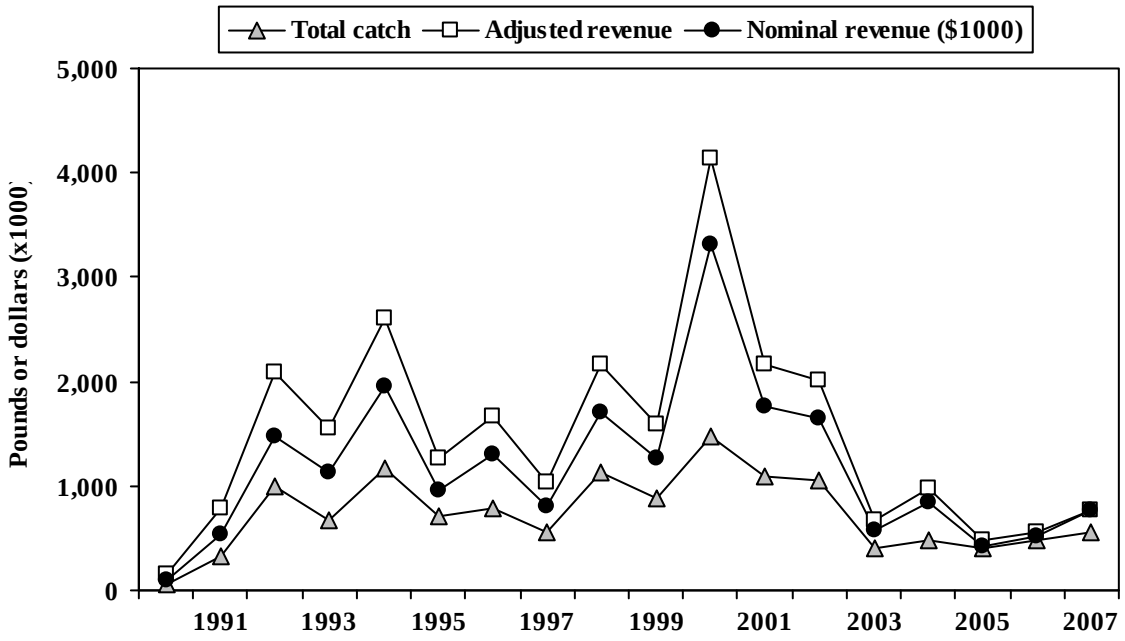
Interpretation: The offshore tuna handline fishery had 10 fishers that fished 164 days in 2007, slightly more than the previous year but below their respective long-term averages. Both number of fishers and days fished peaked in 1994 and declined slowly from 2000.

Year	Fishers	Days fished
1990	11	29
1991	22	148
1992	35	420
1993	32	307
1994	30	316
1995	22	216
1996	19	204
1997	17	145
1998	18	228
1999	16	202
2000	15	284
2001	20	250
2002	15	223
2003	11	212
2004	15	220
2005	9	180
2006	8	155
2007	10	164
Average	**18.1**	**216.8**
SD	**7.8**	**83.5**

Source and Calculations: The State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) based on the State Fiscal Year (FY); July 1st of one year through June 30th of the following year. A different CML number was issued every FY to each fisher up until 1993. Up to 1993, the number of fishers was counted as number of unique names of fishermen submitting Commercial Fish Reports rather than unique CMLs to avoid double counting fishers within a calendar year. Beginning in FY 1994, the State began reissuing the same CML number to individual commercial fishers that reapplied for a CML. From this time the number of offshore handline fishers was counted based on number of unique CMLs submitting Fishing Reports.

The number of days fished by the MHI handline fishery was calculated using the HDAR Fishing Report data. A MHI handline day fished is defined as a unique CML number fishing on a unique day for the gear types and fishing areas defined for the MHI handline fishery at the beginning of this module. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

Figure 50. Offshore Handline landings and revenue, 1990-2007.

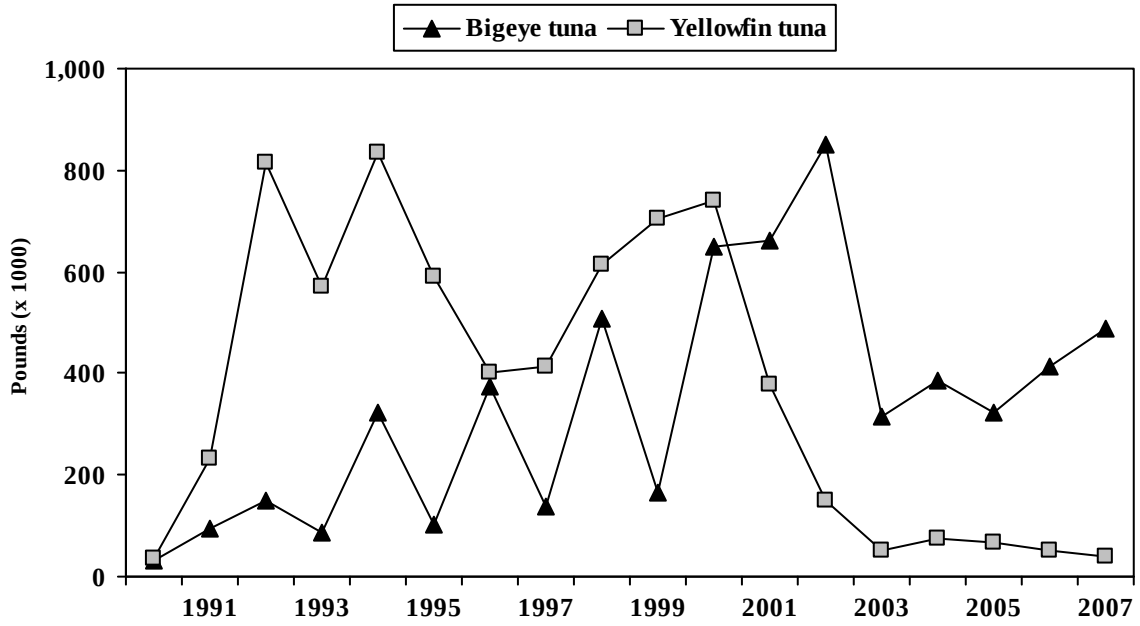


Interpretation: Total landings and revenue by the offshore handline fishery were 547,000 pounds worth an estimated $767,000 in 2007. Total landings and revenue by this fishery slightly from the previous year but were below the long-term values by 26% and 48%, respectively in 2007. The recent trend for landings and revenue by the offshore handline fishery was one that showed a steep decline from 2000 to 2003 and remained low through 2007.

Source and Calculations: Total landings and nominal revenue for the offshore handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the offshore handline fishery. The adjusted revenue is calculated by dividing the nominal revenue by the respective year Honolulu CPI and then multiplying the result by the current year (2007) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1990	66	$154	$97	138.1
1991	331	$790	$533	148.0
1992	987	$2,090	$1,477	155.1
1993	679	$1,542	$1,125	160.1
1994	1,175	$2,598	$1,947	164.5
1995	714	$1,259	$964	168.1
1996	793	$1,674	$1,302	170.7
1997	563	$1,036	$811	171.9
1998	1,134	$2,171	$1,696	171.5
1999	888	$1,591	$1,256	173.3
2000	1,476	$4,131	$3,318	176.3
2001	1,093	$2,162	$1,757	178.4
2002	1,058	$2,003	$1,645	180.3
2003	398	$679	$571	184.5
2004	485	$979	$850	190.6
2005	400	$471	$424	197.8
2006	487	$550	$525	209.4
2007	547	$767	$767	219.5
Average	**737.4**	**$1,480.4**	**$1,170.3**	
SD	**364.1**	**$960.5**	**$747.9**	

Figure 51. Offshore handline landings, 1990-2007.



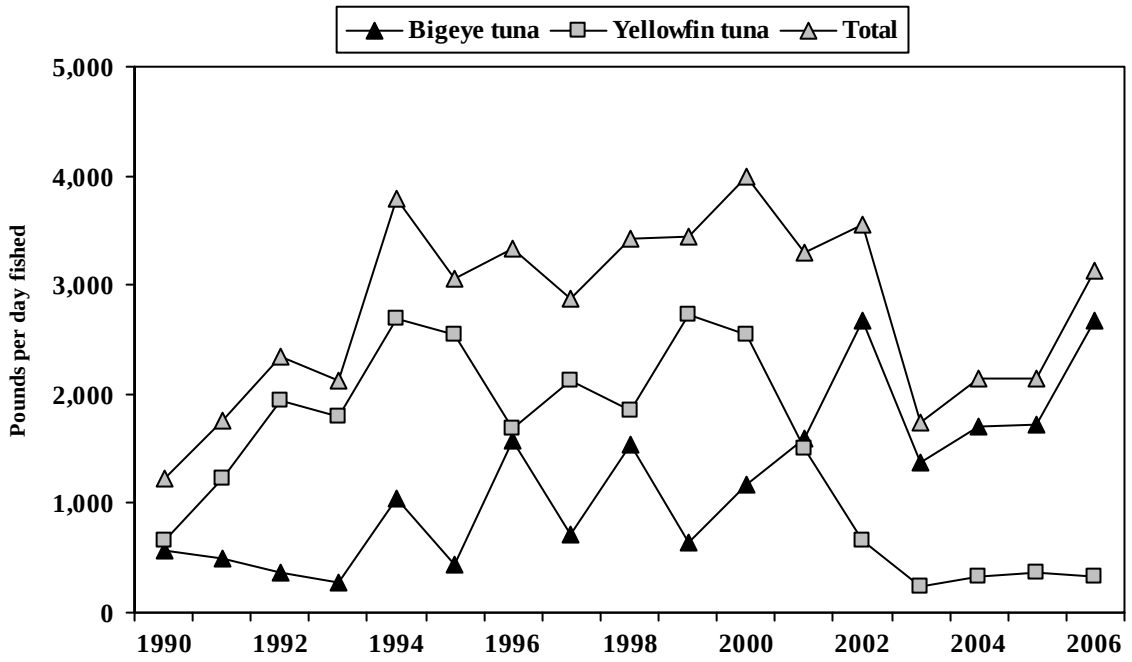
Interpretation: Bigeye tuna was the largest component of the offshore handline landings (85%) followed by yellowfin tuna (7%), and small landings of mahimahi. Yellowfin tuna was the largest component of the landings until 2001 when it was replaced by bigeye tuna. This may reflect better species identification by fishermen (small bigeye tuna and yellowfin tuna can be very difficult to distinguish. In general, bigeye tuna landings had wide inter-annual fluctuation in the 1990s, a steep decline in 2003 and a gradual increasing trend up to 2007.

Most of the tunas landed by the offshore handline fishery are smaller in size than the MHI handline fishery. The yellowfin tuna landings reported in the HDAR commercial fish landings data may actually be bigeye tuna. Therefore, the total tuna landings by the offshore handline fishery may be more accurate than the landings for individual species. HDAR is making an effort to help educate fishermen and fish dealers correctly ID small tunas.

	Offshore handline landings (1000 pounds)			
Year	Bigeye tuna	Yellowfin tuna	Mahimahi	Total
1990	31	35	0	74
1991	94	232	5	331
1992	151	816	21	987
1993	85	571	23	679
1994	324	834	18	1,175
1995	102	591	20	714
1996	375	401	17	793
1997	138	415	9	563
1998	508	613	13	1,134
1999	164	703	20	888
2000	650	739	54	1,443
2001	660	379	35	1,074
2002	850	151	26	1,049
2003	313	52	14	382
2004	385	75	14	501
2005	321	67	7	396
2006	414	52	8	476
2007	489	38	4	574
Average	**336.3**	**375.8**	**17.1**	**735.1**
SD	**230.6**	**295.2**	**12.7**	**358.0**

Source and Calculations: The landings statistics for the offshore tuna handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The offshore tuna handline fishery landings was calculated by totaling landings by species.

Figure 52. Offshore Handline CPUE (pounds per day fished), 1990-2007.



Interpretation: Offshore handline CPUE was 3,330 pounds in 2007, above its long-term average. Bigeye tuna CPUE in 2007 was more than two times as high as its long-term average. In contrast, yellowfin tuna and mahimahi CPUE down was far below their long-term averages; by 83% and 64%, respectively. In general, the trend for bigeye tuna CPUE was that of an increase while yellowfin tuna CPUE was a decrease.

The total landings per trip by the offshore handline fishery may be more accurate than the catch for individual species due to misidentification of tunas in this fishery.

Source and Calculations: The offshore handline CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. Offshore handline landings from the Fishing Report data was divided by the offshore handline the number of days fished in Figure 49. The total landings was greater than the sum of the three dominant species because it included skipjack tuna, kawakawa, and other pelagic species.

	Offshore handline CPUE (pounds per day fished)			
Year	Bigeye tuna	Yellowfin tuna	Mahimahi	Total
1990	565	654	1	1,220
1991	500	1,234	24	1,758
1992	358	1,937	49	2,344
1993	266	1,790	73	2,130
1994	1,044	2,689	57	3,790
1995	439	2,538	87	3,065
1996	1,576	1,685	70	3,331
1997	706	2,119	48	2,874
1998	1,535	1,852	39	3,426
1999	636	2,725	79	3,443
2000	1,171	2,539	169	3,989
2001	1,598	1,502	130	3,300
2002	2,669	658	98	3,554
2003	1,367	231	61	1,744
2004	1,712	322	61	2,137
2005	1,726	363	39	2,149
2006	2,674	337	53	3,137
2007	2,984	234	22	3,330
Average	**1,307.0**	**1,411.6**	**64.4**	**2,817.8**
SD	**837.6**	**923.2**	**39.6**	**803.7**

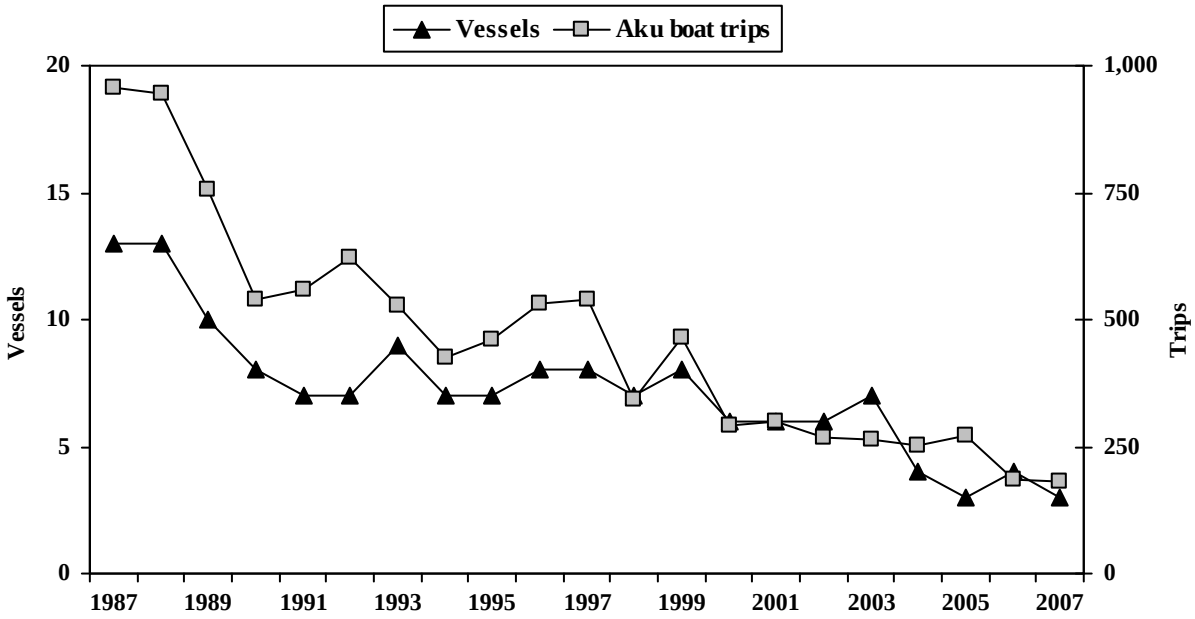
Table 6. Average weight by species for the troll and handline landings, 1987-2007.

	Tunas				Billfish			Other PMUS	
Year	Albacore	Bigeye tuna	Skipjack tuna	Yellowfin tuna	Blue marlin	Striped marlin	Swordfish	Mahimahi	Ono (wahoo)
1987	33	13	7	26	209	65	125	20	23
1988	57	33	7	27	178	64	115	18	24
1989	49	24	11	40	180	73	104	20	25
1990	52	25	6	35	246	71	93	19	24
1991	51	28	8	32	194	62	111	15	22
1992	52	24	6	26	213	69	73	13	25
1993	52	20	7	41	179	66	138	14	23
1994	50	22	8	35	228	66	94	14	26
1995	20	15	7	28	200	60	106	15	24
1996	41	21	11	40	192	65	87	16	22
1997	40	19	11	34	175	68	96	16	21
1998	21	21	6	28	224	64	82	18	25
1999	48	24	7	31	210	55	88	18	27
2000	48	28	11	48	238	61	177	15	25
2001	42	21	11	41	181	50	150	15	24
2002	38	30	10	42	224	42	152	16	26
2003	46	20	6	30	185	49	118	16	22
2004	43	36	6	27	207	60	142	18	23
2005	48	29	5	23	183	74	107	15	23
2006	47	27	8	29	210	69	128	16	23
2007	49	31	4	35	267	89	133	16	24
Average	**44.1**	**24.3**	**7.8**	**33.2**	**205.9**	**63.9**	**115.2**	**16.3**	**23.9**
SD	**9.6**	**5.8**	**2.2**	**6.7**	**25.2**	**9.9**	**26.7**	**2.0**	**1.5**

Interpretation: Except for mean weight for billfish, the average weight for fish landed by troll and handline gear in 2007 was about the same compared the previous year. Mean weight for blue marlin, striped marlin and swordfish was 61 pounds (+30%), 25 pounds (+37%), and 18 pounds (+15%) higher than their respective long-term average weights in 2007. Blue marlin had the biggest mean weight of all species landed by the troll and handline fishery at 206 pounds.

Source and Calculations: The average weights were calculated from HDAR commercial fish catch reports. Total weight landed was divided by the total number landed. Landings by the troll and handline fishery is usually landed whole, however, average weight calculations were based on reported weight and may include landings that were processed, i.e., headed and gutted, gilled and gutted.

Figure 53. Hawaii aku boat (pole and line) vessel and trip activity, 1987-2007.

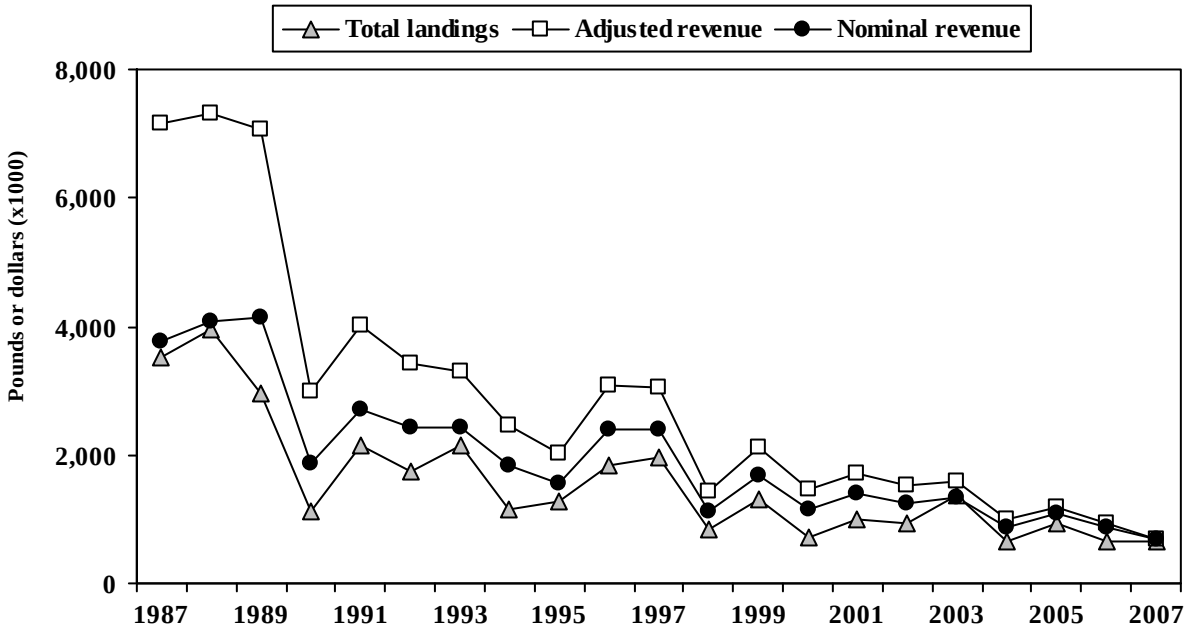


Interpretation: The vessel and trip activity of the aku boat fishery has been in decline over the 20-year period with only three aku boat vessels fishing in 2007. The steep decline occurred in the 1980s and was attributed primarily to the closure of the tuna cannery. Attrition of vessels, many which were built in the 1940s, and poor skipjack tuna landings also contributed to the long-term decline in this fishery. The trip activity for the aku boat fishery in 2007 was a record low 183 trips.

Source and Calculations: The number of aku boat vessels and trips were counted from HDAR Commercial Aku Boat Report data. The number of aku boat vessels was determined by counting the number of unique vessel names. A unique combination of HDAR Commercial Marine License numbers, landing month and day was used to calculate a aku boat trip. The total number of aku boat trips included zero landing trips.

Year	Vessels	Aku boat trips
1987	13	958
1988	13	945
1989	10	757
1990	8	541
1991	7	561
1992	7	621
1993	9	528
1994	7	425
1995	7	460
1996	8	530
1997	8	540
1998	7	341
1999	8	466
2000	6	290
2001	6	301
2002	6	268
2003	7	263
2004	4	251
2005	3	270
2006	4	187
2007	3	183
Average	**7.2**	**461.2**
SD	**2.7**	**224.3**

Figure 54. Hawaii aku boat (pole and line) landings and revenue, 1987-2007.

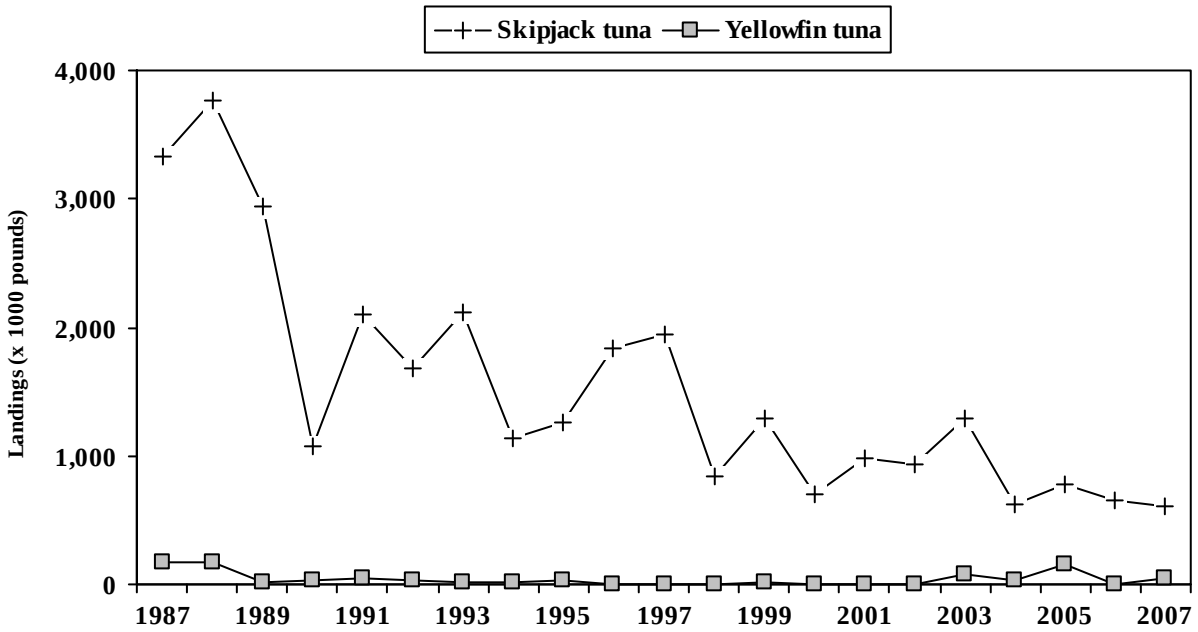


Interpretation: Aku boat landings were 654,000 pounds, worth an estimated $671,000 in 2007, down 58% and 76% from their respective long-term averages. The trends for total landings and revenue were similar to the number of aku boat vessels and trip activity. Aku boat landings and revenue peaked in 1988, then decreased sharply in 1990, and have continued to decline slowly since.

Source and Calculations: Total landings and nominal revenue for the aku boat fishery were derived from HDAR Commercial Aku Boat Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the aku boat fishery. The adjusted revenue is calculated by dividing the nominal revenue by the Honolulu CPI then multiplying the result by the current Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	3,503	$7,170	$3,751	114.9
1988	3,940	$7,330	$4,063	121.7
1989	2,962	$7,070	$4,146	128.7
1990	1,116	$2,980	$1,873	138.1
1991	2,146	$4,010	$2,706	148.0
1992	1,735	$3,420	$2,415	155.1
1993	2,137	$3,310	$2,415	160.1
1994	1,159	$2,450	$1,835	164.5
1995	1,291	$2,020	$1,550	168.1
1996	1,844	$3,070	$2,389	170.7
1997	1,947	$3,060	$2,393	171.9
1998	845	$1,420	$1,106	171.5
1999	1,312	$2,120	$1,674	173.3
2000	708	$1,450	$1,167	176.3
2001	994	$1,720	$1,399	178.4
2002	936	$1,530	$1,256	180.3
2003	1,378	$1,580	$1,327	184.5
2004	656	$990	$861	190.6
2005	932	$1,190	$1,074	197.8
2006	661	$920	$880	209.4
2007	654	$671	$671	219.5
Average	**1,564.6**	**$2,832.4**	**$1,950.0**	
SD	**939.6**	**$2,040.0**	**$1,034.7**	

Figure 55. Hawaii aku boat (pole and line) fishery landings, 1987-2007.

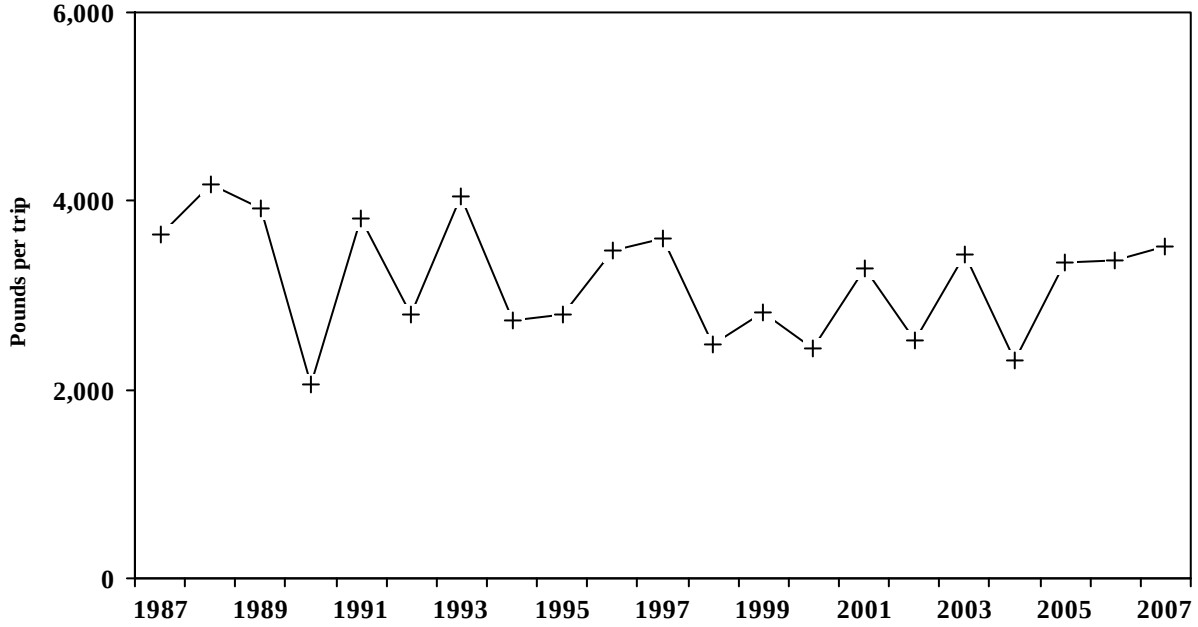


Interpretation: Total aku boat landings in 2006 were 654,000 pounds, 42% below the long-term average. The aku boat fishery landings consisted primarily of skipjack tuna. There were small landings of yellowfin tuna also. Skipjack tuna landings varied annually with an overall downward trend. Part of the reason for the decline in landings from this fishery was the closure of the tuna cannery in 1985. After the closure of the cannery, the aku boat fishery was left with only the fresh fish market.

Source and Calculations: The landing statistics for the aku boat fishery were derived from HDAR Commercial Aku Boat Report data. The aku boat landings was calculated by totaling catch by species.

	Aku boat landings (x 1000 pounds)				
Year	Skipjack tuna	Yellowfin tuna	Other tunas	Mahimahi	Total
1987	3,328	173	0	2	3,503
1988	3,768	168	0	4	3,940
1989	2,938	21	2	1	2,962
1990	1,073	39	4	0	1,116
1991	2,102	44	1	0	2,146
1992	1,682	36	4	14	1,735
1993	2,121	10	3	3	2,137
1994	1,133	19	6	0	1,159
1995	1,256	34	0	0	1,291
1996	1,842	2	0	0	1,844
1997	1,942	0	0	5	1,947
1998	842	3	0	0	845
1999	1,291	21	0	0	1,312
2000	704	2	1	1	708
2001	988	4	1	1	994
2002	927	6	2	1	936
2003	1,292	73	10	3	1,378
2004	615	38	1	2	656
2005	779	149	3	1	932
2006	648	6	7	0	661
2007	600	50	3	1	654
Average	**1,517.7**	**42.7**	**2.3**	**1.9**	**1,564.6**
SD	**911.1**	**54.0**	**2.7**	**3.1**	**939.6**

Figure 56. Hawaii aku boat (pole and line) fishery total landings per trip, 1987-2007.



Interpretation: The CPUE for skipjack tuna in the aku boat fishery was 3,278 pounds per trip in 2007, 7% higher than the long-term average. The aku boat skipjack tuna landings per trip varied substantially between 1987 and 2004 then was level for the past three years. .

Source and Calculations: Aku boat CPUE was measured as pounds per trip. The aku boat fishery CPUE statistics were derived from the HDAR Commercial Aku Boat Report data and measured as landings (in pounds) per trip. Landings per trip was calculated by dividing the pounds by the total number of aku boat trips. The calculation for aku boat CPUE included zero landing trips.

	Aku Boat CPUE (Pounds/Trip)	
Year	Skipjack Tuna	Total
1987	3,474	3,657
1988	3,987	4,169
1989	3,881	3,913
1990	1,983	2,063
1991	3,746	3,826
1992	2,709	2,794
1993	4,017	4,047
1994	2,667	2,727
1995	2,731	2,806
1996	3,475	3,479
1997	3,596	3,606
1998	2,469	2,478
1999	2,770	2,815
2000	2,429	2,436
2001	3,274	3,291
2002	2,508	2,521
2003	3,346	3,445
2004	2,178	2,303
2005	2,795	3,351
2006	3,305	3,372
2007	3,278	3,514
Average	**3,077**	**3,172**
Std. Dev.	**590**	**600**

D. Commonwealth of the Northern Marianas 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 30 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 around 90% of all commercial landings on Saipan. There is also a subsistence fishery on Saipan were profit making is made by selling a small portion of their catch to cover fishing expense. Usually fishermen selling their catch going “door to door” which results in around 30% of the unreported commercial landings do this.

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.

Summary

Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet, other than charter boats, consists primarily of vessels less than 24 ft in length which usually has a limited 20-mile travel radius from Saipan.

In the past charter vessels generally retain their catches, selling half or more to local markets. However in recent times, charter vessels rarely sell any of their landings. No logbook system is in effect.

The primary target and most marketable species for the pelagic fleet are skipjack tuna. In 2007 Skipjack Tuna landings comprised around 76% of the entire pelagic landings. 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 and several Korean restaurants, primarily as sashimi.

Yellowfin tuna and mahimahi are also easily 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.

In late 2007, Crystal Sea's, became the first established longline fishing company in the CNMI to begin its operation out of the island of Rota. It currently has two licensed fishing vessels but only one is currently being utilized. Federal log book data is being collected and submit to NMFS.

2006 Area Recommendation

1. To implement an area closure/exclusion zone for Longline fishing around or near islands and banks to avoid gear conflicts with the local artisinal fishing community.

2007 Area Recommendation

1. Request for NMFS to provide funding for a longline sampling program.

Table 1.—CNMI Consumer Price Indices (CPIs)

Year	CPI	CPI Adjuste Factor
1983	140.90	2.17
1984	153.20	2.00
1985	159.30	1.92
1986	163.50	1.87
1987	170.70	1.79
1988	179.60	1.70
1989	190.20	1.61
1990	199.33	1.53
1991	214.93	1.42
1992	232.90	1.31
1993	243.18	1.26
1994	250.00	1.22
1995	254.48	1.20
1996	261.98	1.17
1997	264.95	1.15
1998	264.18	1.16
1999	267.80	1.14
2000	273.23	1.12
2001	271.01	1.13
2002	271.55	1.13
2003	268.92	1.14
2004	271.28	1.13
2005	271.90	1.12
2006	285.96	1.07

2007	**305.76**	**1.00**

Calculation: The Commonwealth of the Northern Mariana Islands' Consumer Price Index is computed by the CNMI Department of Commerce using the Laspeyres' formula.

Table 2. NMI 2006 Commercial Pelagic Landings, Revenues and Price

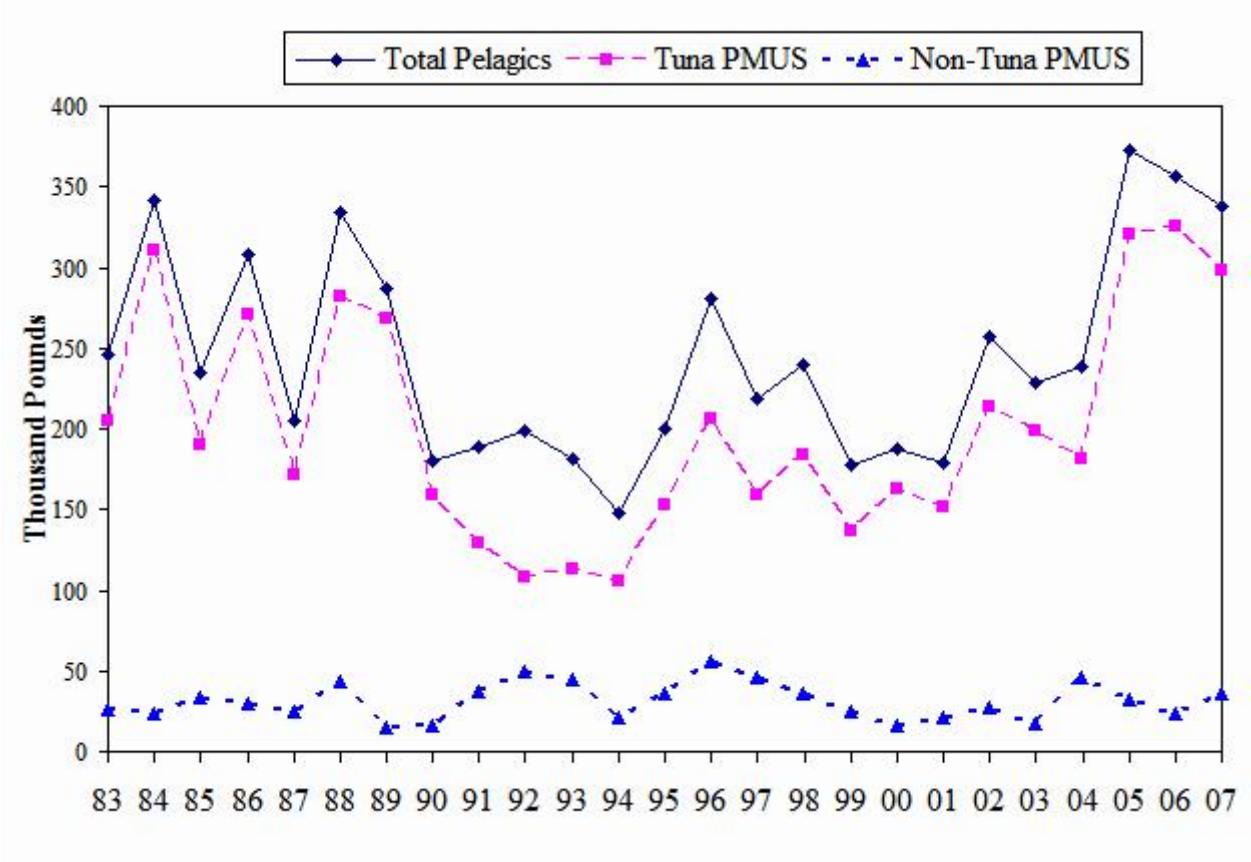
Species	Landing (Lbs)	Value ($)	Avg Price ($/Lb)
Skipjack Tuna	258,353	329,977	1.28
Yellowfin Tuna	37,802	69,441	1.84
Saba (kawakawa)	1,893	3,121	1.65
Tuna PMUS	**298,048**	**402,540**	**1.35**
Mahimahi	28,581	48,736	1.71
Wahoo	2,671	5,158	1.93
Blue Marlin	83	174	2.11
Sailfish	83	167	2.00
Sickle Pomfret (w/woman)	3,996	10,735	2.69
Non-tuna PMUS	**35,413**	**64,969**	**1.83**
Dogtooth Tuna	2,942	4,805	1.63
Rainbow Runner	1,559	2,984	1.91
Barracuda	33	59	1.78
Non-PMUS Pelagics	**4,534**	**7,847**	**1.73**
Total Pelagics	**337,995**	**475,356**	**1.41**

Interpretation: In 2007 Skipjack tuna continued to dominate the pelagic landings, comprising around 88% of the (commercially receipted) industry's pelagic catch. Though it is the majority of pelagic landings, skipjack landings decreased 6% in 2007. Yellowfin tuna and mahimahi ranked second and third in total landings in 2007. Mahi landings increased 65% in 2007. Yellowfin landings decreased 13%. Skipjack tunas are easily caught in near shore waters throughout the year. Mahimahi is seasonal with peak catch usually from February through April. Yellowfin season usually runs from April to September. The overall pelagic catch decreased by 5% in 2007.

The highest average price of identified pelagic species was $2.69/lb for Sickle Pomfret which increased 4% from 2006. The lowest priced species is blue marlin. The average price per pound for Skipjack tuna, the species with the greatest landings, decreased 15% from $1.75/lb in 2005 to $1.50/lb in 2006 and continued to decline another 15% or down to $1.28/lb.

Blue Marlin landing is rarely a target by commercial fishermen except during fishing tournaments and by Charter boats. Should commercial fishermen catch blue marlin, rarely to they sell to vendors participating in this Commercial Purchase Data Base invoices system and therefore will not be recorded in this report.

Figure 1. NMI Annual Commercial Landings:
All Pelagics, Tuna PMUS, and Non-Tuna PMUS



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

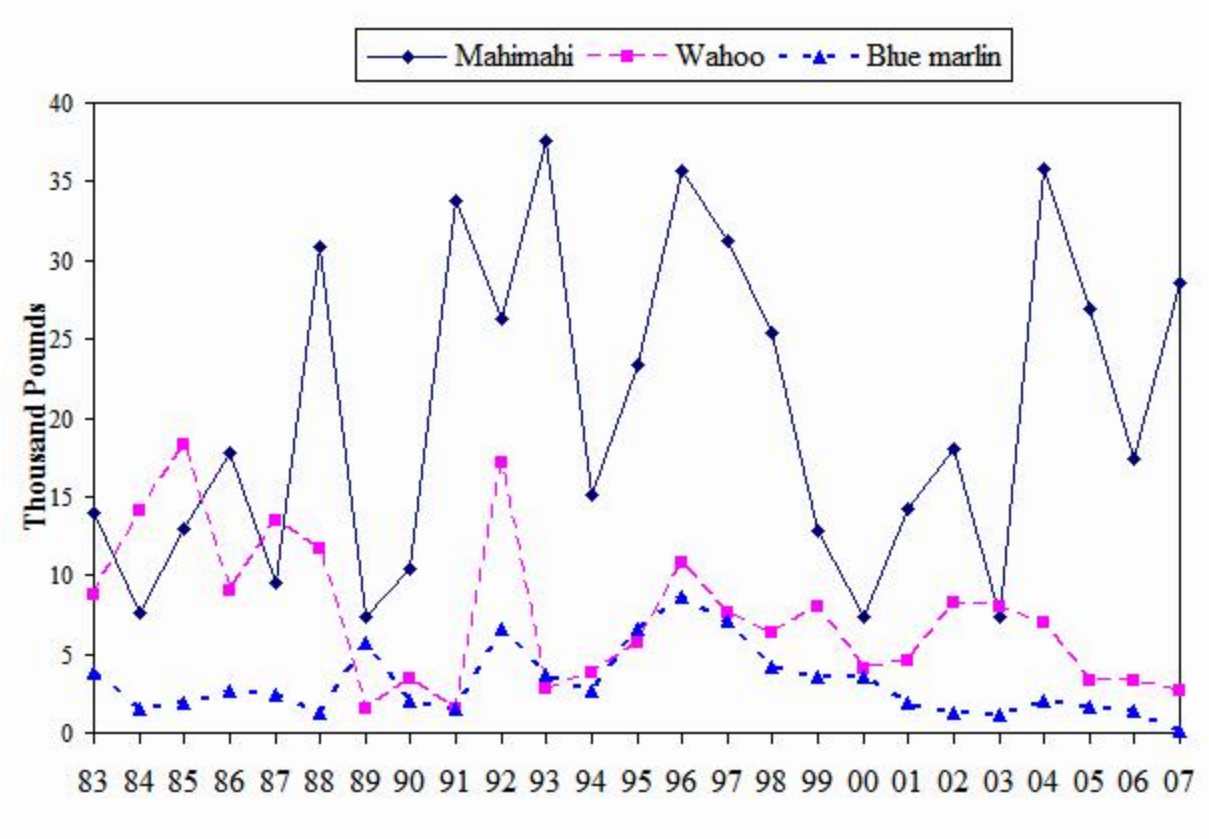
Interpretation: Total weight for pelagics landed in 2007 decreased slightly by 5% from 2006 but still above the 25 year mean. This decreased is a result of Tuna PMUS decreasing by 8%. Total weight of pelagics landed in 2006 decreased 7% from 2005 level which is still above the 24 year mean. Drop in total pelagic landings is mostly due to the decrease in landing by 28% in the Non-tuna PMUS and a 62% decrease in the Non-PMUS Pelagic species.

Source and Calculation: All pelagics, tuna and Non-Tuna PMUS landings were summed from the Commercial Purchase Data Base.

Total Commercial Landings (Lb)

Year	All Pelagics	Tuna PMUS	Non-Tuna PMUS
1983	245,985	204,692	26,544
1984	341,136	310,424	23,244
1985	234,178	189,809	33,143
1986	307,459	271,279	29,626
1987	205,068	171,957	25,450
1988	334,523	281,872	43,805
1989	286,784	267,811	14,595
1990	180,450	158,430	15,936
1991	188,561	128,848	36,975
1992	199,228	108,314	50,159
1993	181,328	113,207	44,518
1994	147,329	105,942	21,657
1995	200,180	152,756	35,759
1996	281,277	206,247	55,712
1997	218,873	159,626	46,049
1998	240,263	184,450	35,979
1999	177,031	136,907	24,768
2000	187,295	162,747	15,551
2001	179,181	152,144	21,198
2002	256,982	213,565	27,876
2003	228,416	198,843	17,346
2004	239,007	181,331	45,737
2005	372,375	321,089	32,136
2006	356,706	325,728	23,410
2007	**337,995**	**298,048**	**35,413**
Average	245,104	200,243	31,303
Standard Deviation	65,120	68,764	11,543

Figure 2. NMI Annual Commercial Landings: Mahimahi, Wahoo, and Blue Marlin.



Interpretation: 2007 mahimahi landings increased significantly by 65%, first sharp rise since 2004. In previous years mahimahi landings continue to decline since increasing 376% in 2004, which is the highest recording in 22 years. In 2005 landings decreased 25% which is still above the 23 year mean. This declined continued in 2006 by 36% which is below the 24 year mean. It is noteworthy that the NMI and Guam mahimahi catches have been fluctuating similarly since 1987, which may indicate a strong biological influence in local landing patterns.

From 1983 to 1988, wahoo landings were somewhat consistent and did not fall below 7,000 lbs., but in 1989 landings notably declined by 86% and remained at depressed levels until the dramatic increase in landings during 1992. Following the near-record 1992 landings, the 1993 wahoo landings again decreased by 84%, falling below the mean. Wahoo landings in 2001 increased by 362 pounds or 11% over the 2000 landings. Wahoo landings continued to increase in 2002 by 80% then drop slightly in 2003 and continued to decline by 14% in 2004. 2005 landings decreased 52% and declined 12% in 2006, which is the lowest recording in the past 13 years. Wahoo landings continued to decline in 2007 by another 18% and well below the 25 year mean.

In 2004 recordings of Blue Marlin landing increased 77% from the 2003 figures. 2005 landings decreased 20%. In 2006 Blue Marlin decline 12% from the 2005 figures. Data

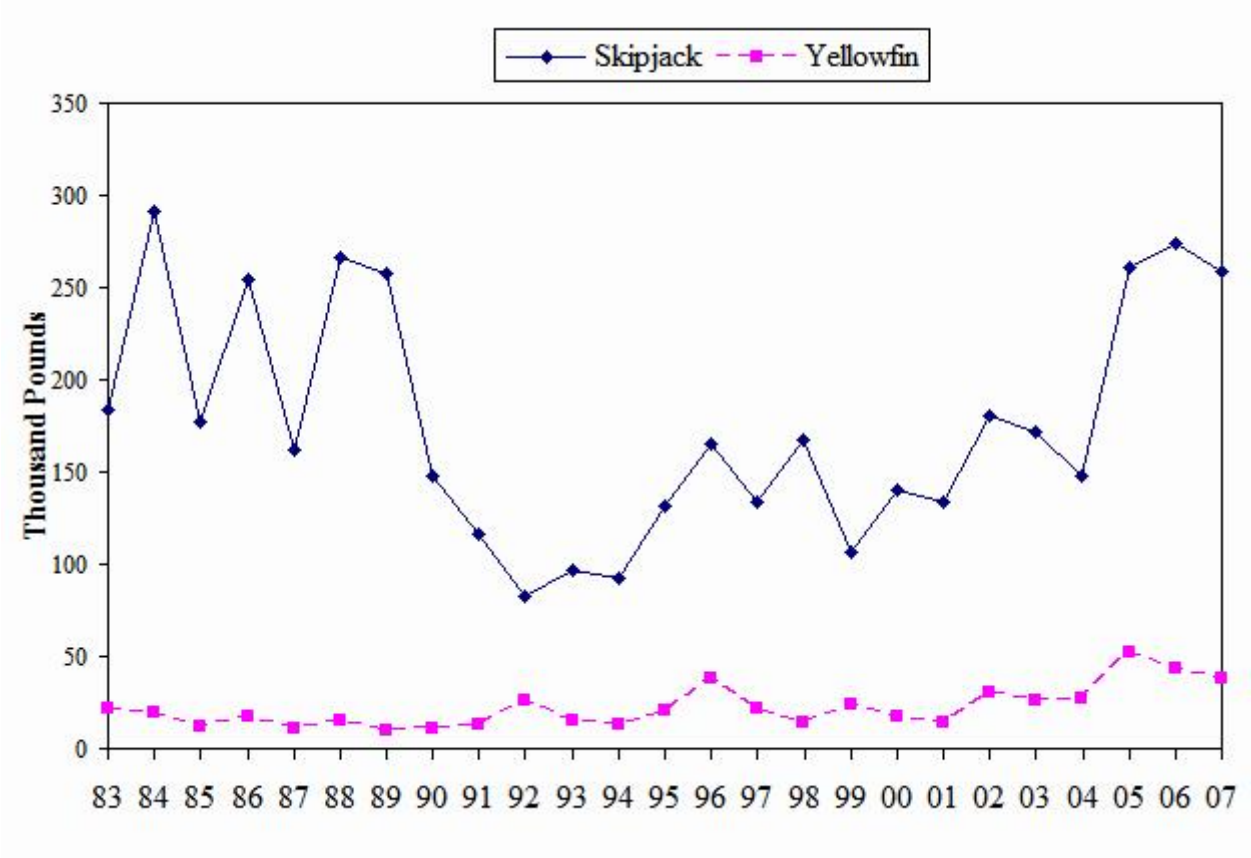
of blue marlin landings was rarely recorded in the Commercial Purchase Data Base for 2007. Blue marlin is rarely a target by the commercial fishermen except for charter boats and during fishing tournaments. If blue marlins are landed, they are often kept by the fishermen and therefore rarely ever recorded in the Commercial Purchase Data Base.

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

Total Commercial Landings (Lb)

Year	Mahimahi	Wahoo	Blue Marlin
1983	13,939	8,760	3,787
1984	7,614	14,087	1,544
1985	12,955	18,251	1,860
1986	17,796	9,062	2,654
1987	9,502	13,404	2,460
1988	30,799	11,697	1,309
1989	7,320	1,571	5,704
1990	10,439	3,462	2,034
1991	33,756	1,521	1,568
1992	26,257	17,172	6,603
1993	37,545	2,779	3,687
1994	15,063	3,863	2,635
1995	23,321	5,722	6,619
1996	35,655	10,783	8,593
1997	31,277	7,580	7,068
1998	25,375	6,299	4,201
1999	12,882	8,063	3,541
2000	7,324	4,097	3,608
2001	14,229	4,550	1,924
2002	18,042	8,212	1,261
2003	7,357	7,950	1,130
2004	35,808	6,936	2,001
2005	26,891	3,349	1,595
2006	17,360	3,267	1,402
2007	**28,581**	**2,671**	**83**
Average	20,283	7,404	3,155
Standard Deviation	10,167	4,686	2,192

Figure 3. NMI Annual Commercial Landings: Skipjack and Yellowfin Tuna.



Interpretation: Historically, skipjack landings exhibited an alternating two-year cycle from 1983 to 1988 and comprised more than 73% by weight of the total pelagic landings each year from 1983 to 1989 (data taken from Table 1 and Fig. 3). Skipjack tuna landings declined after that, reaching record lows from 1990 through 1994. In 1993 and 1994 skipjack landings showed signs of stabilizing at about half of their respective eleven and twelve year means, while the nearly 32,000 pounds increase in 1995 landings attained 61% of the 1983-1990 averages of 174,020 pounds. Skipjack landings for the year 2002 increased by 25% or over 43,000 pounds. In 2003 Skipjack landings declined 14% in 2004. In 2005 skipjack landings showed a significant increase of 75%, well above the 23 year mean. For 2006 skipjack landings increased slightly by 2%, and still well above the 24 year mean. 2007 landings decreased slightly by 6% but still well above the 25 year mean.

Although more highly prized than skipjack, yellowfin tuna are not as common, and therefore not landed as often. The average fish size tends to be smaller when compared with yellowfin tuna from other geographic areas. The total landings for yellowfin tuna increased in 2002 by 51% from the 2001 figures. This increase is partly due to landings from the Northern Islands bottom fishing fleet and a long lining experiment by one fishing company whom applied and received a federal long lining permit. However due to the high cost associated with longlining, permit holder did not continue longlining in 2003. This caused a decrease in landings by 13% for 2003. 2004 landings increased 3%. 2005 landings increased more than 24,000 pounds or 89% from 2004 figures. 2006

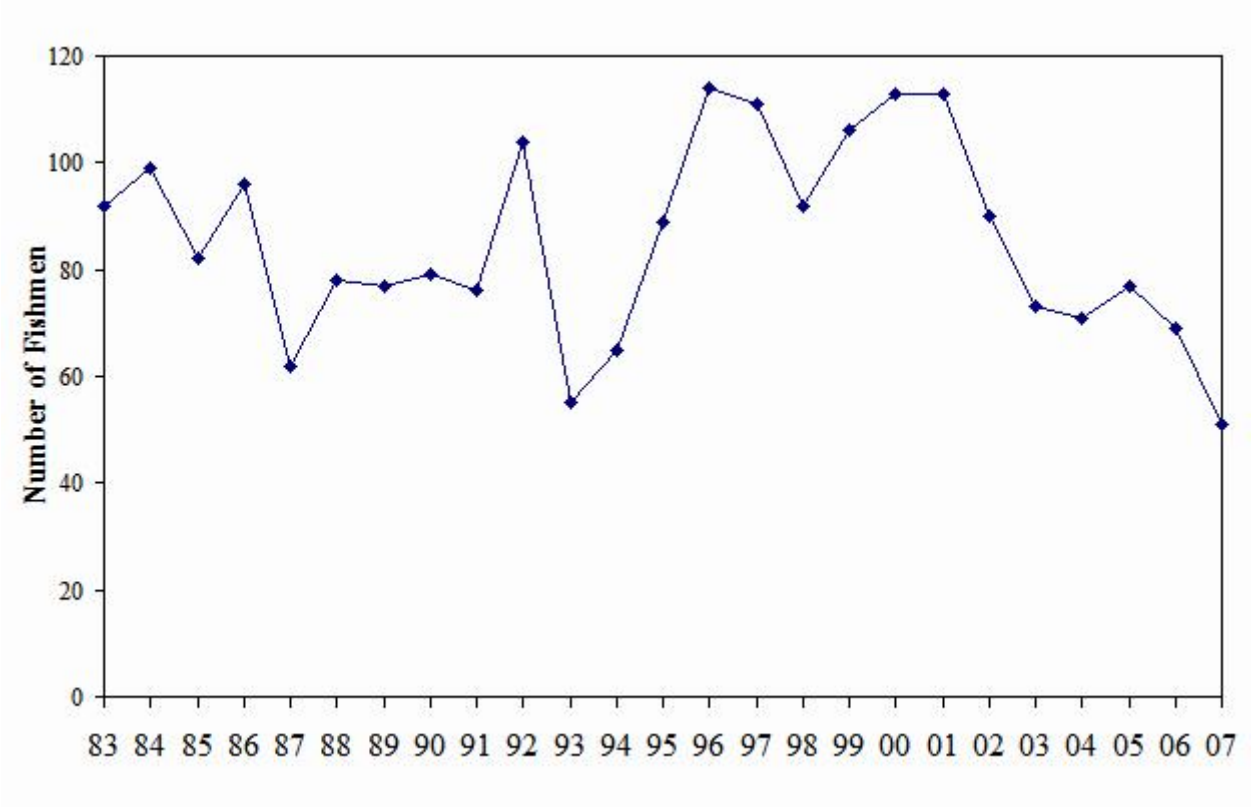
yellowfin landings decreased by 19% but still above the 24 year mean and 2007 landings decreased slightly by 13% over the previous year.

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

Total Commercial Landings (Lb)

Year	Skipjack	Yellowfin
1983	183,411	21,281
1984	290,843	19,580
1985	177,344	12,466
1986	254,362	16,917
1987	161,504	10,454
1988	266,497	15,375
1989	257,703	10,109
1990	147,962	10,468
1991	115,802	13,042
1992	82,280	25,687
1993	97,268	14,898
1994	92,212	13,445
1995	131,377	20,918
1996	165,037	38,043
1997	133,446	21,352
1998	167,114	14,570
1999	106,297	24,419
2000	140,389	17,673
2001	133,769	14,543
2002	179,966	30,017
2003	171,574	26,042
2004	148,328	27,548
2005	260,614	52,014
2006	273,715	43,220
2007	**258,353**	**37,802**
Average	175,887	22,075
Standard Deviation	63,599	10,990

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.

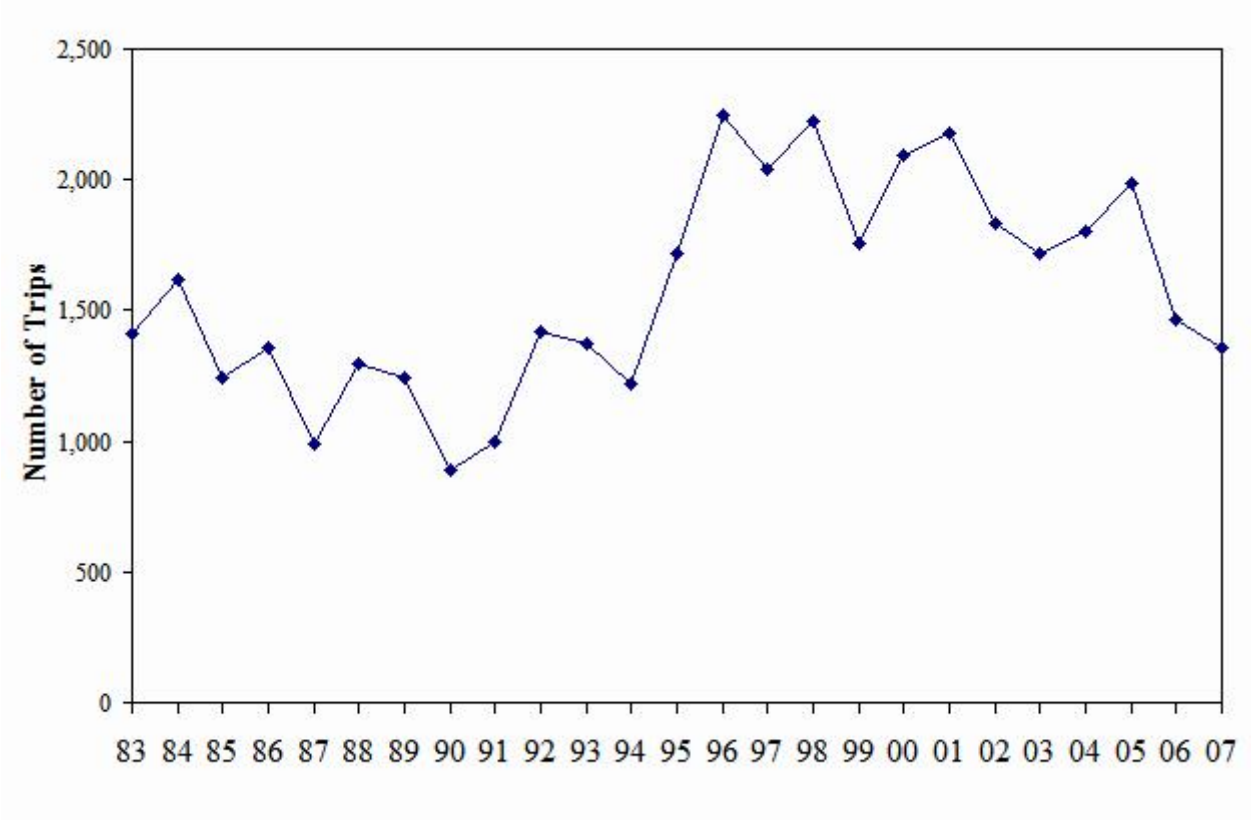
The number of fishermen making pelagic landings decreased 20% from 113 in 2001 to 90 in 2002. Data indicates a continued decline of 23% in 2003 and a 7% drop in 2004. The decrease is partly due to vendors whom own multiple fishing boats entering all their landings on a single receipt and at times combining monthly total landings onto a single receipt. Other factors that may have influenced a drop in fishermen making pelagic landings are the bad weather that plagued the Marianas throughout 2003 and early 2004. The continued increase in fuel price also has affected many fishing boat in the CNMI. There was a slight increase of 4% in 2005. In 2006, the number of fishermen decreased by 16% and continued to decline another 26% in 2007. This decrease is partly due to the increasing price of fuel, the continued decline in the average price per pound of Skipjack tuna and downward trend in the CNMI economy.

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

Fishermen Landing any Pelagic Species

Year	Num. of Fishmen
1983	92
1984	99
1985	82
1986	96
1987	62
1988	78
1989	77
1990	79
1991	76
1992	104
1993	55
1994	65
1995	89
1996	114
1997	111
1998	92
1999	106
2000	113
2001	113
2002	90
2003	73
2004	71
2005	77
2006	69
2007	**51**
Average	85
Standard Deviation	19

Figure 5. NMI Number of Trips Catching Any Pelagic Fish.



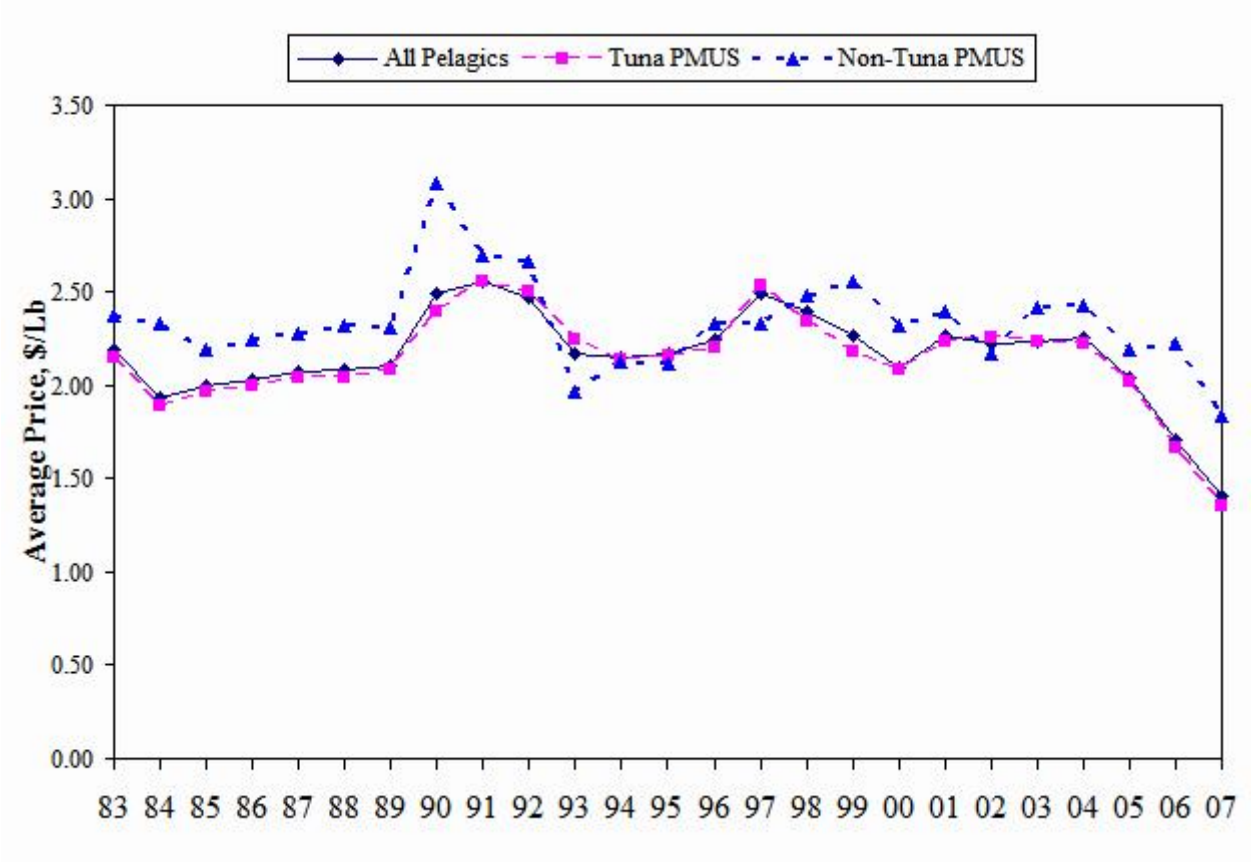
Interpretation: The number of pelagic trips rose in 1998, the decrease in 1999 figures may be caused by the refusal of vendors to participate in the Ticket System. The number of pelagic trips decreased in 2002 by 16% from 2,179 to 1835 and continued to decline in 2003 by 6% and remained near that level for 2004. There was a 10% increase in 2005 followed by a significant drop of 28% in 2006. Typhoons hit the Marianas region frequently, this may attributed to some decline in fishing trips from the chart above and the increasing price of fuel cost. In 2006, the CNMI saw the price of gasoline at $3.58 per gallon and prices continued rising to $4.33 per gallon in 2007. This is one of the main factors that currently affect the CNMI pelagic commercial fishery were the main method is trolling for Skipjack Tuna which is only sold for an average price of $1.28/lbs.

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.

NMI Numbers Of Trips Catching Any Pelagic Fish

Year	Num. of Trip
1983	1,408
1984	1,621
1985	1,240
1986	1,356
1987	992
1988	1,298
1989	1,242
1990	888
1991	999
1992	1,419
1993	1,372
1994	1,218
1995	1,721
1996	2,249
1997	2,042
1998	2,223
1999	1,759
2000	2,095
2001	2,178
2002	1,835
2003	1,715
2004	1,801
2005	1,990
2006	1,463
2007	**1,359**
Average	1,579
Standard Deviation	401

Figure 6. NMI Average Inflation-Adjusted Price of All Pelagics, Tuna PMUS, and Non-Tuna PMUS



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 increased by 7% from 2000 to 2001 and increased less than 1% for 2002. However since 2003 the inflation adjusted average price for tuna has decreased. There was a decline of 2% in 2004, 8% in 2005, 17% in 2006 and declined 18% in 2007.

Decline in price per pound for Skipjack Tuna is a direct result from strong competition among fishermen. Fishermen would land large amounts of Skipjack Tuna flooding markets causing prices to drop as low as $.75 per pound. This saturation of the local markets directly affects not only the Inflation-Adjusted Average prices but also the Inflation-Adjusted Revenues.

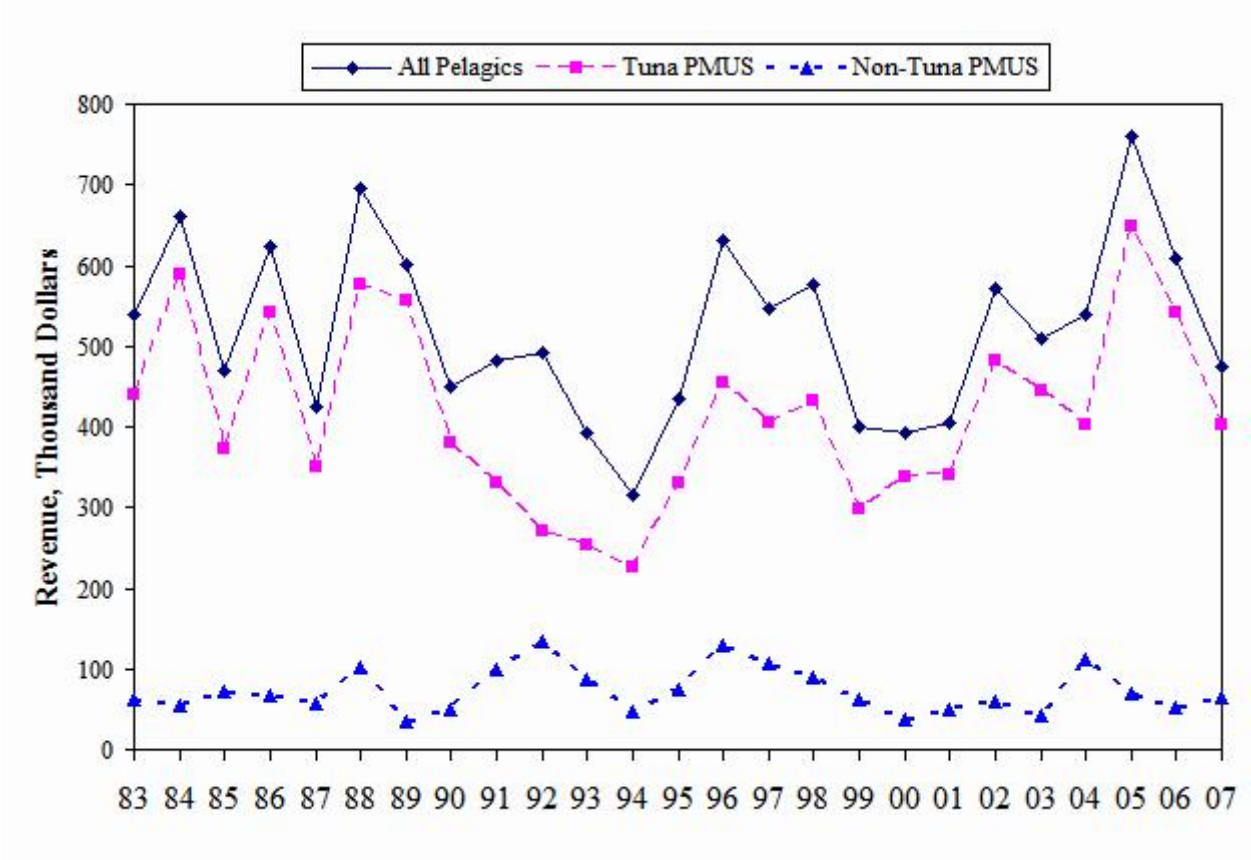
The average for the inflation-adjusted price of "Non-Tuna PMUS" increased to $2.14 or 11% in 2003 and remained at near that level for 2004. In 2005, there was a 9% decrease and continued to decline 1% in 2006 and another 18% decrease in 2007.

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.

Inflation-Adjusted Average Price ($/Lb)

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	1.01	2.19	0.99	2.15	1.09	2.38
1984	0.97	1.94	0.95	1.89	1.16	2.33
1985	1.04	2.00	1.02	1.96	1.14	2.19
1986	1.09	2.03	1.07	2.00	1.20	2.24
1987	1.16	2.07	1.14	2.04	1.27	2.27
1988	1.22	2.08	1.20	2.04	1.36	2.32
1989	1.30	2.10	1.29	2.08	1.43	2.31
1990	1.63	2.49	1.57	2.40	2.01	3.08
1991	1.80	2.55	1.80	2.56	1.90	2.70
1992	1.88	2.47	1.91	2.50	2.04	2.67
1993	1.72	2.16	1.78	2.24	1.56	1.97
1994	1.76	2.15	1.75	2.13	1.75	2.13
1995	1.81	2.17	1.80	2.16	1.76	2.11
1996	1.92	2.24	1.88	2.20	1.99	2.33
1997	2.17	2.49	2.20	2.53	2.03	2.33
1998	2.07	2.40	2.02	2.34	2.14	2.48
1999	1.98	2.26	1.91	2.18	2.24	2.55
2000	1.87	2.10	1.86	2.08	2.07	2.32
2001	2.00	2.26	1.97	2.23	2.12	2.40
2002	1.97	2.23	1.99	2.25	1.92	2.17
2003	1.96	2.23	1.96	2.24	2.12	2.42
2004	1.99	2.25	1.96	2.22	2.15	2.43
2005	1.82	2.04	1.80	2.02	1.95	2.19
2006	1.59	1.71	1.55	1.66	2.08	2.22
2007	**1.41**	**1.41**	**1.35**	**1.35**	**1.83**	**1.83**
Average	1.65	2.16	1.63	2.14	1.77	2.33
Standard Deviation	0.38	0.25	0.38	0.26	0.37	0.25

Figure 7. NMI Annual Commercial Inflation-Adjusted Revenues for All Pelagics, Tuna PMUS, and Non-Tuna PMUS



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 Pelagics" category.

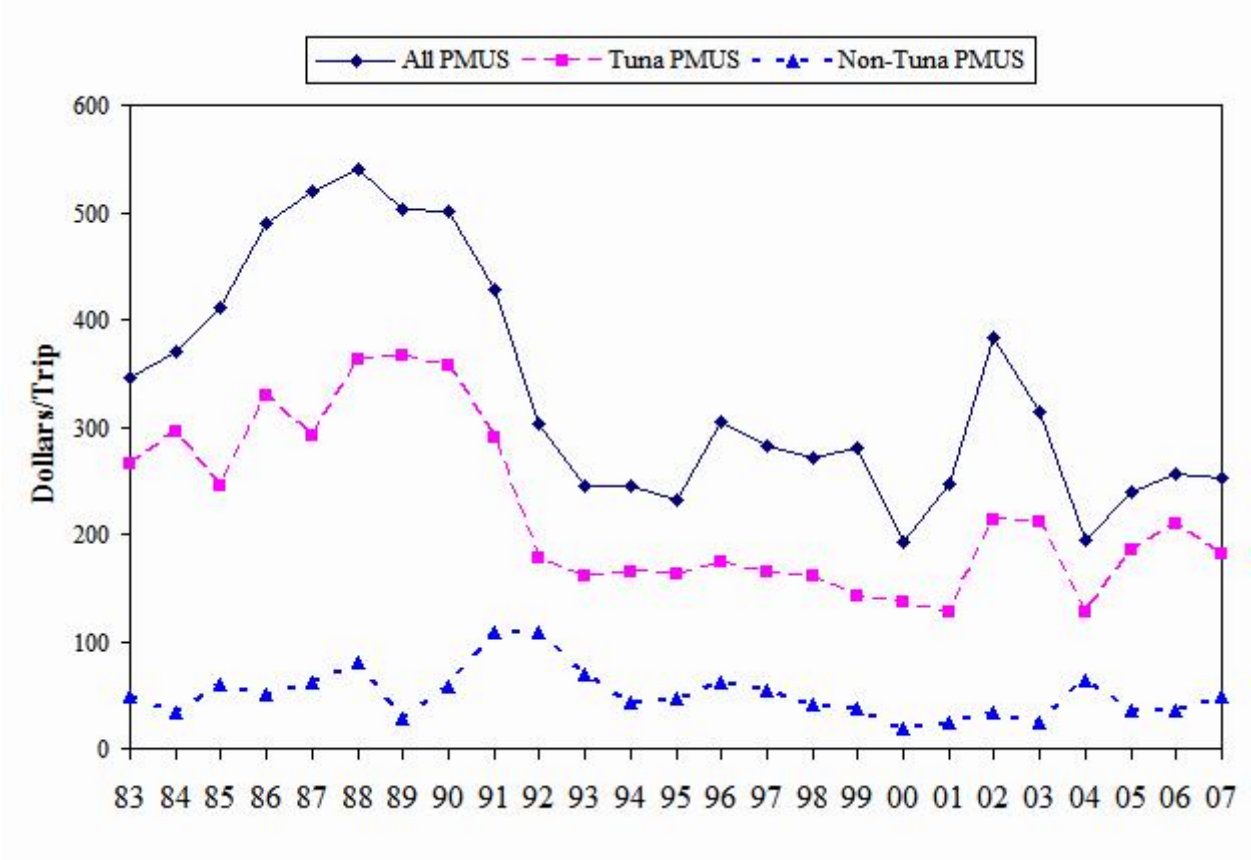
In 2003 the tunas' inflation-adjusted revenues decreased 8% from the 2002 figures and continued to decline to 11% for 2004. This is due to the decrease in landings of Skipjack tuna, which in 2004 comprised only of 67% of the total pelagic landings compared to 2003 where it comprised 87% of the total pelagic landings. The Tunas' Inflation-Adjusted Revenues increase significantly by 38% in 2005 but drop 19% in 2006 and again declined another 26% in 2007. In 2003 a drop of 31% occurred for the "Non-Tuna PMUS" inflation-adjusted revenues however 2004 data indicates an increase of 158% compared to the previous year. This is due to the mahimahi landings increasing by 387%. The 2005 Inflation Adjusted Revenues decreased by 36% and decreased in 2006 by 27% and another 25% in 2007.

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

Inflation-Adjusted Commercial Revenues ($)

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	248,387	539,000	202,800	440,076	29,059	63,058
1984	330,254	660,508	294,077	588,154	27,044	54,088
1985	244,171	468,808	193,920	372,326	37,882	72,733
1986	333,766	624,142	289,681	541,703	35,488	66,363
1987	237,687	425,460	195,793	350,469	32,344	57,896
1988	409,075	695,428	338,348	575,192	59,701	101,492
1989	373,927	602,022	345,839	556,801	20,917	33,676
1990	293,993	449,809	248,144	379,660	32,102	49,116
1991	338,643	480,873	232,077	329,549	70,235	99,734
1992	374,977	491,220	206,950	271,105	102,133	133,794
1993	311,342	392,291	201,350	253,701	69,592	87,686
1994	259,470	316,553	185,381	226,165	37,818	46,138
1995	361,511	433,813	275,080	330,096	62,920	75,504
1996	539,628	631,365	388,691	454,768	110,939	129,799
1997	474,509	545,685	351,492	404,216	93,306	107,302
1998	496,652	576,116	372,142	431,685	77,011	89,333
1999	351,062	400,211	261,394	297,989	55,404	63,161
2000	350,468	392,524	302,473	338,770	32,186	36,048
2001	358,656	405,281	300,154	339,174	44,987	50,835
2002	506,302	572,121	425,961	481,336	53,468	60,419
2003	447,647	510,318	390,100	444,714	36,764	41,911
2004	476,543	538,494	356,110	402,404	98,417	111,211
2005	678,773	760,226	578,914	648,384	62,759	70,290
2006	568,872	608,693	506,194	541,628	48,675	52,082
2007	**475,356**	**475,356**	**402,540**	**402,540**	**64,969**	**64,969**
Average	393,667	519,853	313,824	416,104	55,845	72,746
Standard Deviation	111,735	108,611	101,061	111,777	25,395	27,934

Figure 8. NMI Annual Inflation-Adjusted Revenue Per Trip for PMUS trips



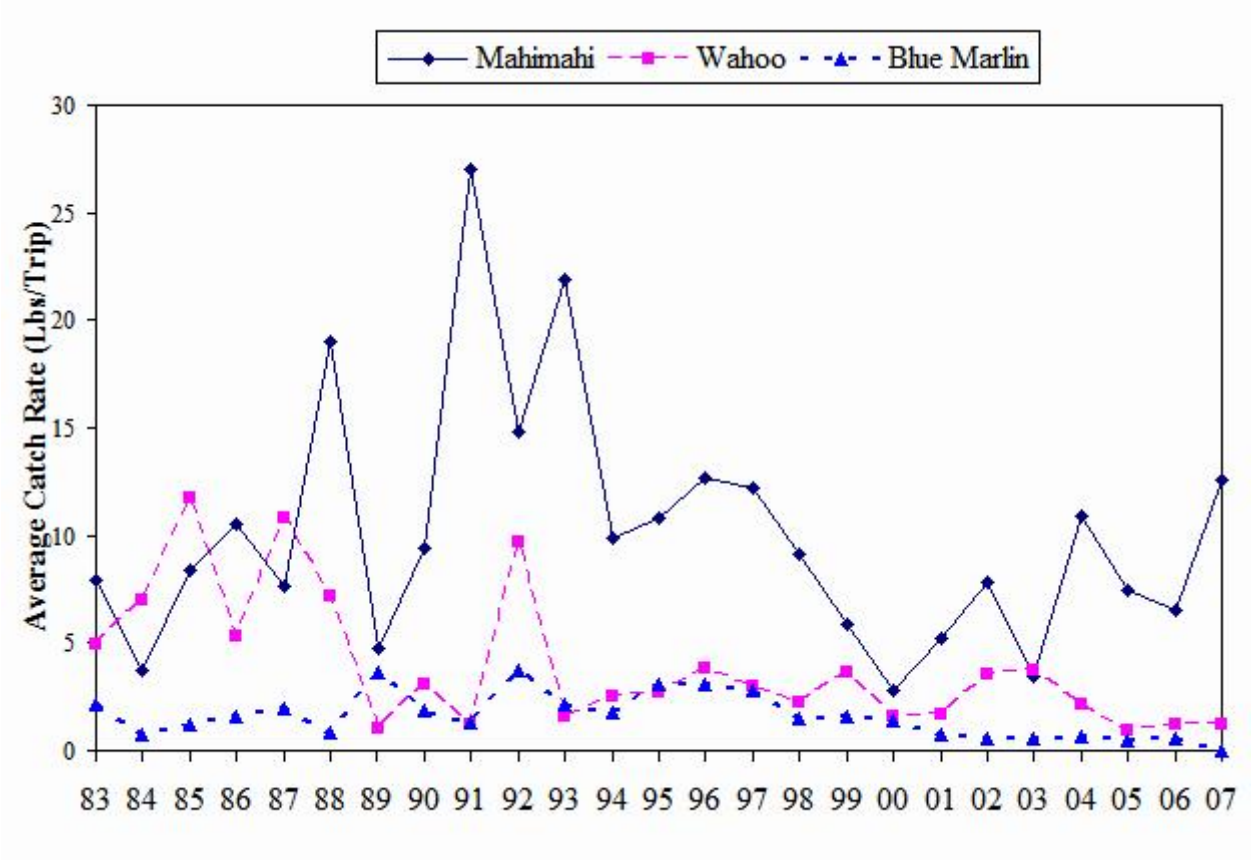
Interpretation: The inflation-adjusted revenue per trip for "All Species" decreased 4% in 2003 and 29% for 2004. Inflation-adjusted revenue per trip for "All Species" increased 19% in 2005, 6% in 2006 but decreased slightly 1% in 2007. "Non-Tuna PMUS" decreased 26% in 2003 however 2004 revenue increased significantly to 157% or 57$/per trip. In 2005 this drop by 43% but increased 4% in 2006 and continued to increase 35% in 2007. "Tunas" remained relatively stable in 2003 at 196 $/Trip but dropped significantly to 117 $/Trip in 2004. For 2005 the Inflation Adjusted revenues for "Tuna PMUS" increased 47% and increased another 13% in 2006. In 2007 Tuna PMUS decreased by 13% partly due to a drop in price per pound for Tuna.

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

Commercial Adjusted Revenues Per Trip ($/Trip)

Year	All PMUS		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	159.00	345.03	122.00	264.74	22.00	47.74
1984	185.00	370.00	148.00	296.00	17.00	34.00
1985	214.00	410.88	128.00	245.76	31.00	59.52
1986	262.00	489.94	176.00	329.12	27.00	50.49
1987	290.00	519.10	163.00	291.77	34.00	60.86
1988	318.00	540.60	213.00	362.10	47.00	79.90
1989	312.00	502.32	228.00	367.08	17.00	27.37
1990	327.00	500.31	233.00	356.49	38.00	58.14
1991	302.00	428.84	204.00	289.68	77.00	109.34
1992	231.00	302.61	135.00	176.85	83.00	108.73
1993	195.00	245.70	128.00	161.28	55.00	69.30
1994	200.00	244.00	135.00	164.70	35.00	42.70
1995	193.00	231.60	136.00	163.20	39.00	46.80
1996	261.00	305.37	148.00	173.16	53.00	62.01
1997	245.00	281.75	143.00	164.45	47.00	54.05
1998	234.00	271.44	138.00	160.08	36.00	41.76
1999	246.00	280.44	125.00	142.50	33.00	37.62
2000	172.00	192.64	121.00	135.52	16.00	17.92
2001	219.00	247.47	113.00	127.69	21.00	23.73
2002	339.00	383.07	189.00	213.57	30.00	33.90
2003	275.00	313.50	185.00	210.90	22.00	25.08
2004	172.00	194.36	112.00	126.56	56.00	63.28
2005	213.00	238.56	165.00	184.80	32.00	35.84
2006	239.00	255.73	196.00	209.72	34.00	36.38
2007	**253.00**	**253.00**	**182.00**	**182.00**	**49.00**	**49.00**
Average	242.24	333.93	158.64	219.99	38.04	51.02
Standard Deviation	51.59	108.56	36.42	77.62	17.29	23.15

Figure 9. NMI Trolling Catch Rate of Mahimahi, Wahoo, and Blue Marlin



Interpretation: The mahimahi catch rate drop significantly 57% from 2002, which also fell 67% below the twenty-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 twenty-two years. 2003 catch rate was 3.37lbs/trip. In 2004, mahimahi catch rate rebounded a surprising 218% or 10.94 lbs./trip. 2005 catch rates declined 11% from the 2004 figures but still above the 24 year mean. Mahi catch rates declined 11% in 2006 but in 2007 mahi catch rates increased significantly by 93%.

Prior to the 1989 record low, wahoo catch rates rivaled those for mahimahi. Wahoo catch rates have generally never regained those historical levels. The 2002 catch rate increased 114% from 2001, and again increased 4% for 2003. 2004 catch rates declined to 2.19 lbs/trip or 41% this decline continued in 2005 by another 56%. For 2006, Wahoo catch rates increased slightly by 28% from the 2005 figures but dropped 4% in 2007.

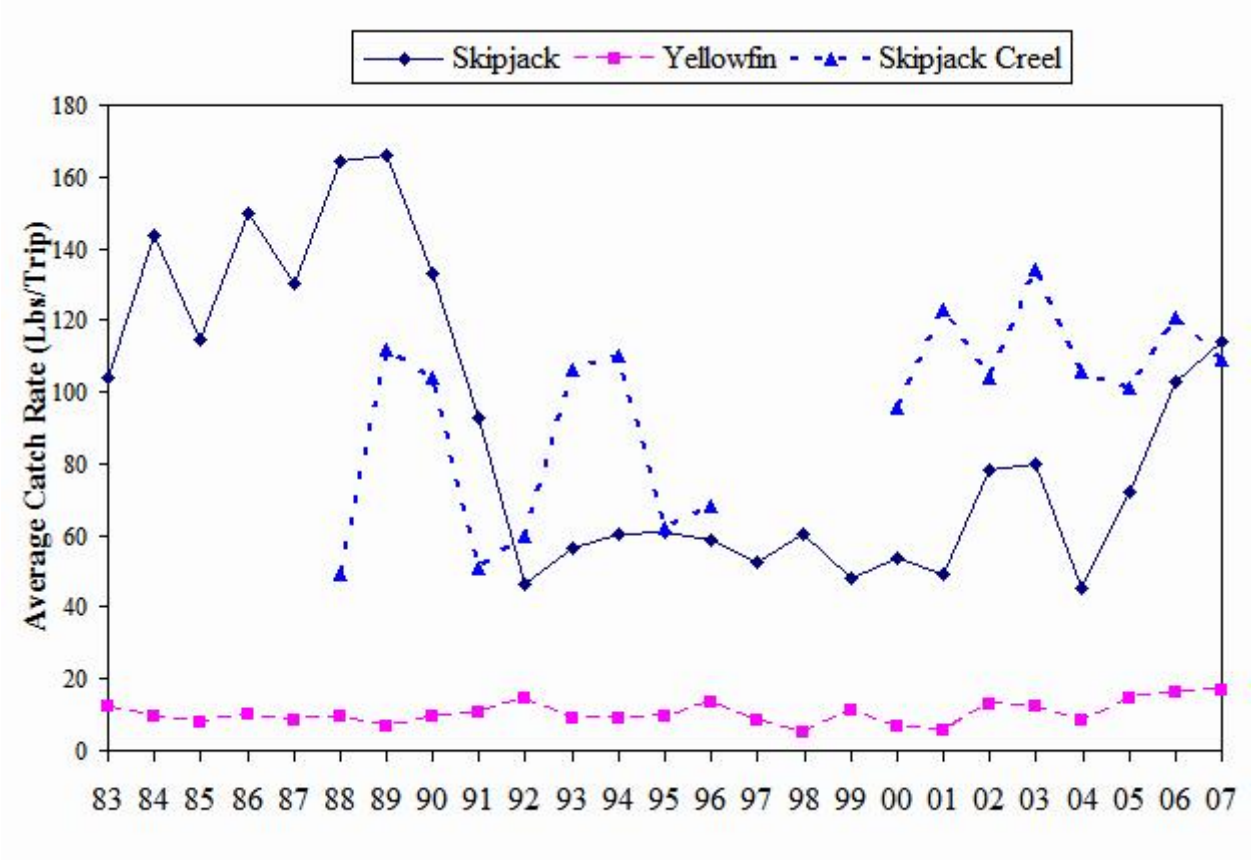
Blue marlins are not a marketable species and are rarely a target by fishermen except during fishing tournaments. When landed, it is rarely sold to vendors participating in the Commercial Purchase Data Collection Program; therefore it would not be recorded in the Commercial Purchase Data Base used to generate these reports. During the 2000 Saipan International Fishing Derby a 996-pound blue marlin was landed. 2005 catch rate decreased 28% from 2004 but increased slightly in 2006 by 23%.

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	Blue Marlin
1983	7.92	4.98	2.15
1984	3.76	6.95	0.76
1985	8.36	11.77	1.20
1986	10.50	5.35	1.57
1987	7.66	10.81	1.98
1988	18.98	7.21	0.81
1989	4.71	1.01	3.67
1990	9.40	3.12	1.83
1991	27.03	1.22	1.26
1992	14.80	9.68	3.72
1993	21.89	1.62	2.15
1994	9.89	2.54	1.73
1995	10.84	2.66	3.08
1996	12.68	3.84	3.06
1997	12.25	2.97	2.77
1998	9.13	2.27	1.51
1999	5.86	3.67	1.61
2000	2.80	1.56	1.38
2001	5.23	1.67	0.71
2002	7.87	3.58	0.55
2003	3.43	3.71	0.53
2004	10.94	2.12	0.61
2005	7.43	0.93	0.44
2006	6.53	1.23	0.53
2007	**12.62**	**1.18**	**0.04**
Average	10.10	3.91	1.59
Standard Deviation	5.75	3.11	1.04

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. Reason for pattern remains obscure despite several attempts to clarify. Catch rate based on the Commercial Purchase Data Base for 2003 of 80 lbs/trip increased 3% in comparison with the 2002 catch rate of 78. 2004 catch rates declined 44% or 45 lbs/trip but 2005 catch rates increased 60% or 72 lbs/trip. This increased continued in 2006 by 42% or 103 lbs/trip and increased another 11% in 2007. Previous discussions have suggested that non-tuna PMUS may be increasing in value and a slight shift in target troll fish may be occurring. Catch rates of yellowfin tuna per trip more than doubled from 1998 levels. However, 2000 catch rates declined by 39% and continued to decline 21% in 2001. Yellowfin catch rates in 2002 increased by 59% partly due to landings from the Northern Islands Bottom fishing feet and a longline experiment with gear less than 1 mile long that was conducted by a fishing company. In 2003 Yellowfin catch rates remain relatively stable at 12 lbs/trip despite bad weather that plagued through the Marianas nearly the entire 2003. 2004 yellowfin catch rates fell to 8 lbs/trip but in increased to 14 lbs/trip in 2005. This increase carried over in 2006 by 14% or 16 lbs/trip. In 2007, yellowfin catch rates increased slightly by 6% or 17 lbs/trip.

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. Creel skipjack CPUE was calculated by dividing the sum of skipjack weight from all trolling trip interviews by the number of trolling trips interviewed.

Trolling Catch Rate (Lb/Trip)

Year	Skipjack	Yellowfin	Skipjack Creel
1983	104	12	
1984	144	10	
1985	114	8	
1986	150	10	
1987	130	8	
1988	164	9	49
1989	166	7	112
1990	133	9	104
1991	93	10	51
1992	46	14	60
1993	57	9	106
1994	61	9	110
1995	61	10	62
1996	59	14	68
1997	52	8	
1998	60	5	
1999	48	11	
2000	54	7	95
2001	49	5	123
2002	78	13	104
2003	80	12	134
2004	45	8	106
2005	72	14	101
2006	103	16	121
2007	**114**	**17**	**109**
Average	90	10	95
Standard Deviation	40	3	26

Offshore Daytime Creel Survey Bycatch Summary
Based on the Interview Catch Data in Year 2000-2007
Method: Trolling

		Number Caught					Trip		
	Species	Released	Dead/Injd	Both	All	BC%	With BC	All	BC%
Non Charter							3	1,439	0.21
	Mahimahi	4		4	2,095	0.19			
	Yellowfin Tuna		1	1	1,499	0.07			
	Skipjack Tuna	1		1	32,083				
	Total			6	35,677	0.02			
	Compared With All Species			6	37,943	0.02			
Charter							0	141	0.00
	Compared With All Species			0	726	0.00			

Interpretation: With the assistance of NMFS staff, the implementation of an Offshore Day Time Creel Survey program began on April 2000. One of the main purposes of reimplementing the Offshore Creel Survey was to address the issue of bycatch.

A summary report from the year 2000 to 2007 by both non-charter and charter boats indicate less than 1% or 6 out of 35,677 of the total pelagic species landed is released. The only three species reported as bycatch was Mahimahi, Yellowfin Tuna and Skipjack Tuna. 4 out of 2,095 Mahimahi or .19% landed was released. And 1 out of 1,499 Yellowfin Tuna or .08% landed was released. There was 1 out of 32,083 Skipjack Tuna recorded to be released. Charter boats had no bycatch reported.

Bycatch in the CNMI has been believed in the past not to exist, which is further supported by the results of the Offshore (Boat Based) Creel Survey. The CNMI will continue sampling in order to monitor this issue however it is a common practice by fishermen to keep all species caught regardless of size, species or condition.

Source: Offshore (Boat Based) Creel Survey Expansion Program.

E. International Pelagic Fisheries

The U.S Pacific island Exclusive Economic Zones managed 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 Pacific Island nations and distant water fishing nations (DWFN) and information for a Stock Assessment and Fishery Evaluation (SAFE) report that includes the most recent assessment information in relation to status determination criteria. The spatial distribution of catch is illustrated in 2006 for the purse seine fishery and 2004 for longline and pole-and-line fisheries. Fishery trends in the entire Pacific Ocean are illustrated for the purse seine, longline and pole-and-line fisheries.

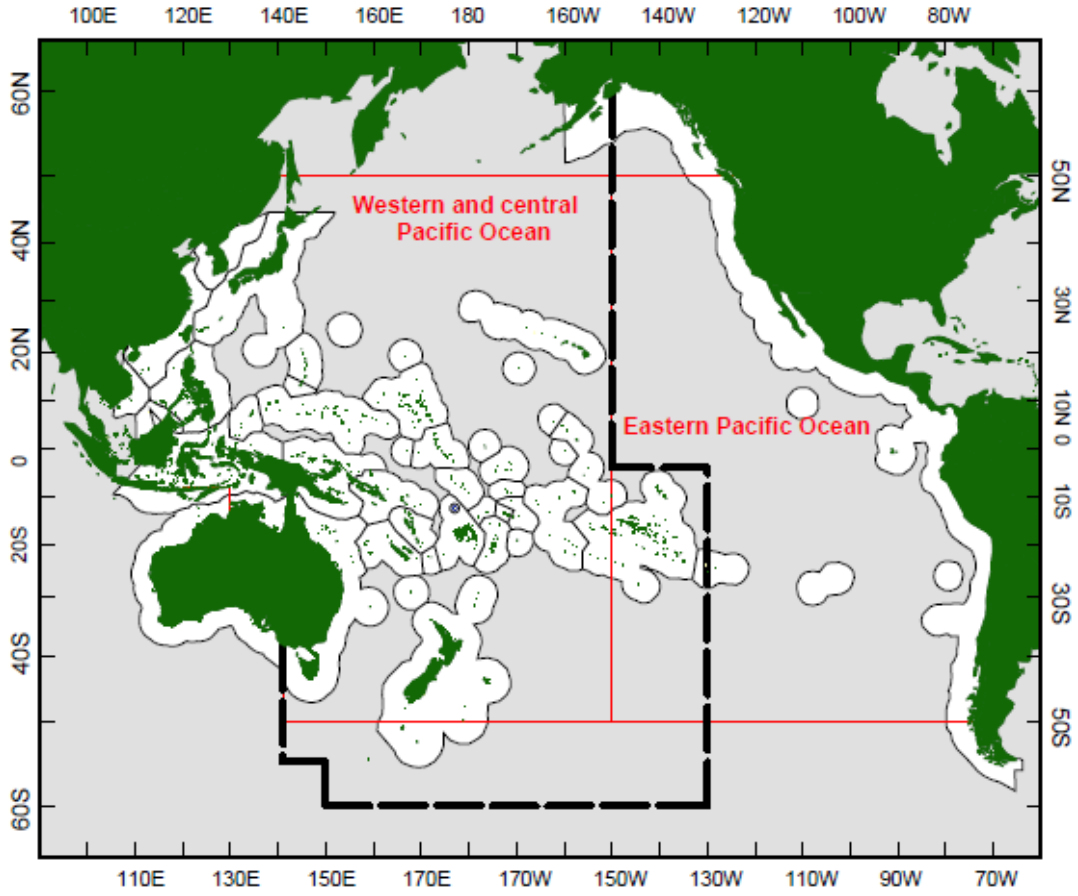


Figure 1. The western and central Pacific Ocean (WCPO), the eastern Pacific Ocean (EPO) and the WCPFC Convention Area (WCP–CA in dashed lines).

The 2007 purse-seine fishery in the WCPFC Convention Area (WCP-CA). Source: WCPFC-SC4-2008 GN-WP-1

Vessels

The majority of the historic WCP–CA purse seine catch has come from the four main DWFN fleets – Japan, Korea, Chinese-Taipei and USA, which numbered 147 vessels in 1995, but has gradually declined in numbers to 110 vessels in 2007. In contrast, there has been a steady increase in the number of vessels from Pacific Islands fleets, which totalled 66 vessels in 2007. The remainder includes a large number of smaller vessels in the Indonesian and Philippines domestic fisheries, and a variety of other domestic and foreign fleets, including several relatively recent distant-water entrants into the tropical fishery (e.g. China, New Zealand and Spain).

The fleet sizes and effort by the Japanese and Korean purse seine fleets have been relatively stable for most of this time series. Several Chinese-Taipei vessels reflagged in 2002, dropping the fleet from 41 to 34 vessels, with fleet numbers stable since. The increase in annual catch by the FSM Arrangement fleet until 2005 corresponds to an increase in vessel numbers, and coincidently, mirrors the decline in US purse seine catch, vessel numbers and effort over this period. However, as noted above, the US purse-seine fleet commenced a significant rebuilding phase in late 2007, with vessels numbers in mid-2008 close to double that of recent years.

Catch

During the mid-1980s, the purse seine fishery (400,000-450,000 mt) accounted for only 40% of the total catch, but has grown in significance to a level now contributing around 73% of total tuna catch volume (~1,700,000 mt). The provisional **2007 purse-seine catch of 1,739,859 mt** was the highest on record, with most fleets catching more than in 2006, particularly the Chinese Taipei, PNG and Marshall Islands fleets. The 2007 purse-seine catch was dominated by a record catch of skipjack tuna (1,472,746 mt – 85% of the total catch). The purse-seine skipjack catch increased by more than 500,000 mt (or 59%) since 2001, at an average of about 90,000 mt per year. The 2007 purse-seine catch of yellowfin tuna (228,426 mt – 13%) was lower than catches in recent years, but still higher than the average for the period since 2000 (~218,000 mt). The provisional catch estimate for bigeye tuna for 2007 (38,324 mt – 2%) was the second highest on record but may be revised once all observer data for 2007 have been received and processed. The Chinese-Taipei fleet had been the highest producer in the tropical purse seine fishery until 2004, when surpassed by the combined Pacific Islands purse seine fleets fishing under the FSM Arrangement; in the past two years, the Korean and FSM Arrangement fleets have been the highest producers.

Fleet distribution

The purse seine catch distribution in tropical areas of the WCP–CA is strongly influenced by El Nino–Southern Oscillation Index (ENSO) events with fishing effort typically distributed further to the east during El Nino years and a contraction westwards during La Nina periods. The weak La Nina established at the end of 2005 continued into the first part of 2006, but soon dissipated and a weak El Nino event then presided over the remainder of 2006. During the first half of 2007, the WCP–CA was in an ENSO-neutral state, but then moved into a well-established La Nina state, which persisted into the 2nd quarter 2008. Fishing activity during 2007 remained concentrated in the PNG, FSM and Solomon Islands area and was restricted from extending east beyond the 175°E longitude (compared to activity in recent years) due to cooler surface water temperatures flowing in from the east, in line with the prevailing ENSO conditions.

Table 1. Total reported purse seine catch (metric tonnes) of skipjack, yellowfin and bigeye tuna in the Pacific Ocean. Source: WCPFC Yearbook 2007.

Year	Skipjack	Yellowfin	Bigeye	Total
1968	67,229	93,648	4,801	165,678
1969	51,077	117,522	1,141	169,740
1970	58,051	148,707	3,137	209,895
1971	111,536	115,703	5,235	232,474
1972	51,468	176,056	4,836	232,360
1973	62,546	211,100	4,420	278,066
1974	95,048	211,200	2,943	309,191
1975	138,767	198,414	7,902	345,083
1976	153,452	232,184	18,524	404,160
1977	125,400	203,431	12,748	341,579
1978	216,403	173,061	19,690	409,154
1979	199,520	202,014	14,128	415,662
1980	213,612	178,743	24,098	416,453
1981	214,152	231,156	19,189	464,497
1982	274,400	189,744	12,190	476,334
1983	381,751	193,317	14,017	589,085
1984	397,330	254,585	18,476	670,391
1985	359,786	317,790	13,000	690,576
1986	433,772	370,874	10,398	815,044
1987	439,284	420,254	12,392	871,930
1988	584,165	376,462	9,755	970,382
1989	577,719	441,303	14,659	1,033,681
1990	677,716	442,448	18,332	1,138,496
1991	839,578	450,184	18,620	1,308,382
1992	809,417	467,483	26,330	1,303,230
1993	693,134	459,803	23,586	1,176,523
1994	826,684	426,743	45,529	1,298,956
1995	877,322	402,506	57,398	1,337,226
1996	874,104	355,506	83,663	1,313,273
1997	845,448	503,639	106,132	1,455,219
1998	1,156,199	518,799	71,232	1,746,230
1999	1,155,642	488,637	88,244	1,732,523
2000	1,159,056	458,956	132,219	1,750,231
2001	1,071,752	600,447	89,650	1,761,849
2002	1,268,466	597,292	83,872	1,949,630
2003	1,363,232	592,960	80,202	2,036,394
2004	1,394,862	449,134	97,100	1,941,096
2005	1,551,211	530,031	104,777	2,186,019
2006	1,647,804	411,704	117,436	2,176,944
2007	1,674,419	401,391	100,061	2,175,871
Average	627,313	340,373	39,802	1,007,488
STD Deviation	502,127	150,040	39,839	668,681

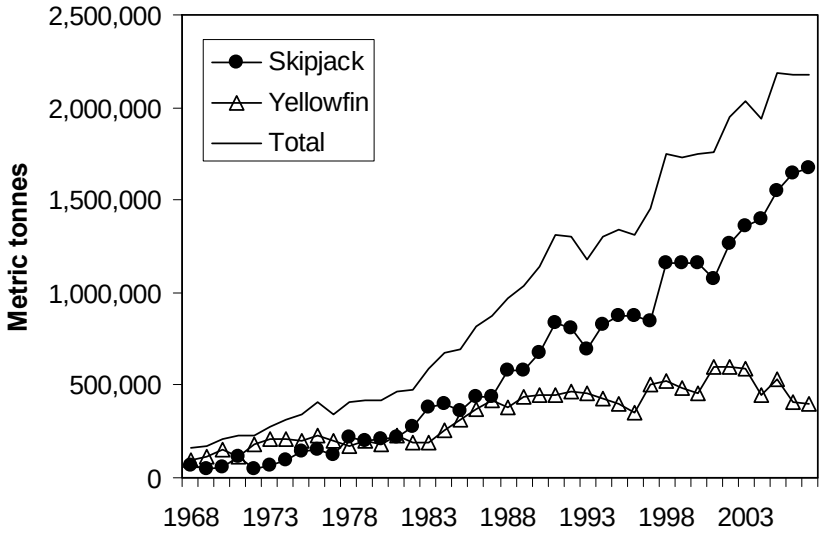


Figure 2. Total purse seine catch of skipjack and yellowfin tuna in the Pacific Ocean, 1968–2007. Source: WCPFC Yearbook 2007.

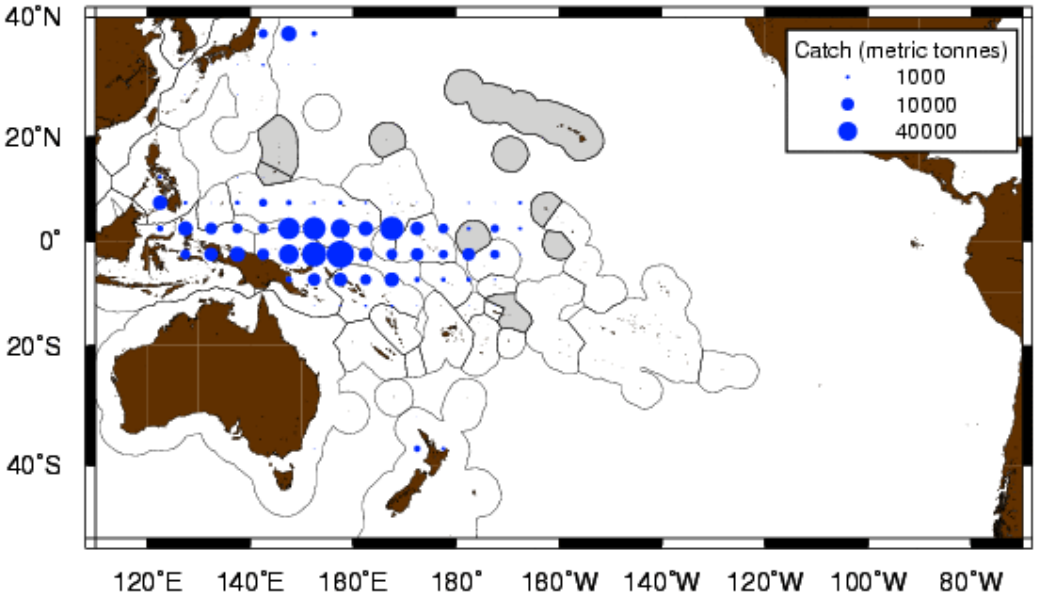


Figure 3. Distribution of total purse seine WCP-CA skipjack catch in 2006. Source: SPC public domain data.

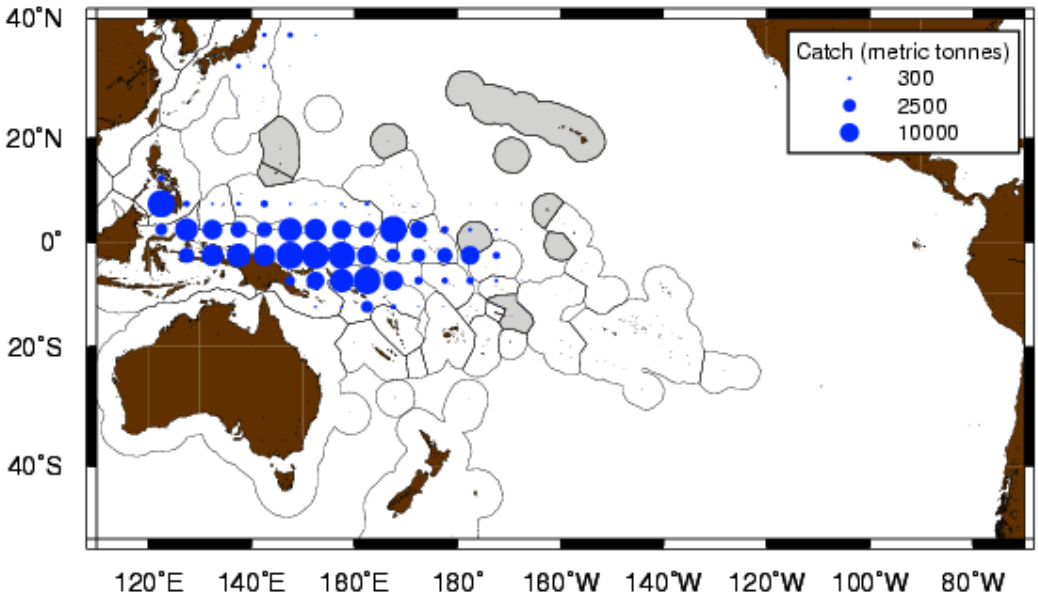


Figure 4. Distribution of total purse seine WCP-CA yellowfin catch in 2006. Source: SPC public domain data.

Vessels

The total number of vessels involved in the fishery has generally fluctuated between 4,000 and 5,000 for the last 30 years. The fishery involves two main types of operation –

• large (typically >250 GRT) **distant-water** freezer vessels which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical (yellowfin, bigeye tuna) or subtropical (albacore tuna) species.

• smaller (typically <100 GRT) **offshore** vessels which are usually **domestically-based**, undertaking trips less than one month, with ice or chill capacity, and serving fresh or air-freight sashimi markets, or [albacore] canneries.

The following broad categories of longline fishery, based on type of operation, area fished and target species, are currently active in the WCP–CA :

• **South Pacific offshore albacore fishery** comprises Pacific-Islands domestic "offshore" vessels, such as those from American Samoa, Cook Islands, Fiji, French Polynesia, New Caledonia, Samoa, Solomon Islands, Tonga and Vanuatu; these fleets mainly operate in subtropical waters, with **albacore** the main species taken.

• **Tropical offshore bigeye/yellowfin-target fishery** includes "offshore" sashimi longliners from Chinese-Taipei, based in Micronesia, Guam, Philippines and Chinese-Taipei, mainland Chinese vessels based in Micronesia, and domestic fleets based in Indonesia, Micronesian countries, Philippines, PNG, the Solomon Islands and Vietnam.

• **Tropical distant-water bigeye/yellowfin-target fishery** comprises "distant-water" vessels from Japan, Korea, Chinese-Taipei, mainland China and Vanuatu. These vessels primarily operate in the eastern tropical waters of the WCP–CA (and into the EPO), targeting bigeye and yellowfin tuna for the frozen sashimi market.

• **South Pacific distant-water albacore fishery** comprises "distant-water" vessels from Chinese-Taipei, mainland China and Vanuatu operating in the south Pacific, generally below 20°S, targeting albacore tuna destined for canneries.

• **Domestic fisheries in the sub-tropical and temperate WCP–CA** comprise vessels targeting different species within the same fleet depending on market, season and/or area. These fleets include the domestic fisheries of Australia, Japan, New Zealand and Hawaii. For example, the Hawaiian longline fleet has a component that targets swordfish and another that targets bigeye tuna.

• **South Pacific distant-water swordfish fishery** is a relatively new fishery and comprises "distant-water"

vessels from Spain.

• **North Pacific distant-water albacore and swordfish fisheries** mainly comprise “distant-water” vessels from Japan (swordfish and albacore), Chinese-Taipei (albacore only) and Vanuatu (albacore only).

Catch

The provisional WCP–CA longline catch (232,388 mt) for 2007 was the lowest since 2000 and around 12% lower than the highest on record which was attained in 2004 (264,465 mt). The WCP–CA albacore longline catch (76,151 mt – 33%) for 2007 was the lowest since 2000. The provisional bigeye catch (82,735 mt – 36%) for 2007 was close to the average for the period 2000–2007, and the yellowfin catch (69,857 mt – 30%) was the lowest for 8 years. A significant change in the WCP–CA longline fishery over the past 10 years has been the growth of Pacific Islands domestic albacore fishery, which has gone from taking 33% of the total south Pacific albacore longline catch in 1998, to accounting for over 57% of the catch in 2007.

The clear shift in effort by some vessels in the Chinese-Taipei distant-water longline fleet to targeting bigeye in the eastern equatorial waters of the WCP–CA resulted in a reduced contribution to the albacore catch in recent years and a significant increase in bigeye catches. During the 1990s, this fleet consistently took less than 2,000 mt of bigeye tuna each year, but in 2002, the bigeye catch went up to 8,741 mt, and by 2004 it was up to 16,888 mt. The bigeye catch by the Chinese-Taipei distant-water longline fleet has since declined to 9,108 mt, related to a significant drop in vessel numbers (142 vessels in 2003 down to 90 vessels in 2007). The Korean distant-water longline fleet has also experienced a large decline in bigeye and yellowfin catches in recent years, with a corresponding drop in vessel numbers – from 184 vessels active in 2002 down to 122 vessels in 2007 (33% decline).

Fleet distribution

Effort by the **large-vessel, distant-water fleets** of Japan, Korea and Chinese-Taipei account for most of the effort but there has been some reductions in vessel numbers in some fleets over the past decade. Effort is widespread as sectors of these fleets target bigeye and yellowfin for the frozen sashimi market in central and eastern tropical waters, and albacore in the more temperate waters for canning. Activity by the **foreign-offshore fleets** from Japan, mainland China and Chinese-Taipei are restricted to the tropical waters, targetting bigeye and yellowfin for the fresh sashimi market; these fleets have limited overlap with the distant-water fleets. The substantial "**offshore**" effort in the west of the region is primarily by the Indonesian and Chinese-Taipei **domestic fleets** targeting yellowfin and bigeye. The growth in **domestic fleets** in the South Pacific over recent years has been noted; the most significant examples are the increases in the American Samoan, Fijian and French Polynesian fleets and the recent establishment of the Niue fleet.

The 2007 longline fishery in the WCP-CA. Source: WCPFC-SC4-2008 GN-WP-1

Table 2. Total reported longline catch (metric tonnes) of PMUS in the Pacific Ocean. Source: WCPFC Yearbook 2007 and SPC public domain data. 2005−2007 data are not available for non-tuna species.

Year	Albacore	Yellowfin	Bigeye	Striped Marlin	Black Marlin	Blue Marlin	Swordfish	Total
1962	50,990	65,758	80,945	26,639	2,229	18,169	11,216	255,946
1963	44,566	72,158	109,157	29,733	2,342	18,341	11,414	287,712
1964	38,312	62,216	77,257	41,462	1,876	13,055	8,615	242,793
1965	39,420	61,107	59,008	34,712	2,375	10,068	9,665	216,355
1966	63,990	70,720	66,749	29,485	2,172	9,462	11,615	254,193
1967	73,468	45,005	68,669	32,841	1,825	8,804	12,041	242,652
1968	57,038	60,558	62,432	40,280	1,883	8,026	11,477	241,694
1969	43,459	66,701	84,442	26,463	2,073	9,118	14,358	246,613
1970	52,522	68,124	67,689	37,376	1,605	11,301	10,329	248,945
1971	51,773	64,940	66,602	33,168	2,127	6,727	9,410	234,746
1972	55,252	77,110	85,462	22,663	1,884	8,129	9,102	259,602
1973	63,607	73,515	91,062	20,333	1,935	8,313	9,604	268,369
1974	47,002	64,680	78,748	19,930	1,620	7,634	8,693	228,308
1975	37,142	79,056	99,356	16,308	1,845	5,797	9,434	248,938
1976	46,902	91,995	122,804	16,903	1,056	7,244	11,259	298,162
1977	55,402	105,035	140,335	9,623	936	7,244	10,892	329,467
1978	46,463	118,743	121,034	10,309	1,624	8,196	10,887	317,257
1979	40,794	116,538	112,621	16,658	1,950	8,658	11,162	308,380
1980	46,568	133,850	120,888	18,449	1,652	9,722	17,675	348,804
1981	51,395	101,124	94,980	21,430	2,067	10,875	22,507	304,378
1982	46,101	94,975	98,569	22,641	2,277	10,943	19,151	294,657
1983	40,383	94,557	101,455	14,917	1,916	8,615	20,666	282,509
1984	36,002	80,603	92,823	12,530	1,524	11,252	16,323	251,056
1985	41,787	87,164	117,651	13,164	1,234	9,744	18,698	289,441
1986	45,781	85,422	149,166	17,411	1,250	11,335	20,542	330,907
1987	37,323	93,003	159,478	20,728	1,814	12,580	25,285	350,210
1988	43,737	99,462	122,421	19,071	2,726	12,845	24,294	324,555
1989	32,221	82,555	124,136	13,763	1,510	10,437	16,527	281,150
1990	35,628	105,657	164,110	9,661	1,806	9,845	14,941	341,648
1991	41,093	87,068	151,439	10,553	2,047	10,601	17,413	320,214
1992	50,281	88,474	146,779	8,948	2,045	10,296	18,962	325,785
1993	61,129	88,040	128,864	10,715	1,646	11,377	18,923	320,694
1994	64,861	100,466	137,464	10,807	1,786	14,048	15,580	345,011
1995	62,214	99,230	114,723	11,934	1,332	13,675	13,956	317,064
1996	63,106	91,927	92,963	8,352	818	8,511	15,180	280,858
1997	74,989	91,698	111,020	9,956	1,510	9,808	15,850	314,832
1998	85,624	79,615	119,023	6,752	1,838	9,318	15,071	317,241
1999	77,971	69,850	101,490	5,600	1,597	8,876	14,404	279,787
2000	74,838	98,329	108,198	4,703	2,170	9,837	17,949	316,024
2001	84,926	101,965	131,660	4,599	1,583	11,180	18,007	353,921
2002	93,037	98,237	152,789	4,092	1,439	10,235	16,907	376,736
2003	87,084	99,477	129,207	6,345	944	14,510	19,574	357,141
2004	84,818	97,392	130,895	4,998	1,211	20,306	21,843	361,463
2005	84,900	80,921	112,195					
2006	94,870	81,696	115,075					
2007	87,125	68,501	103,181					
Average	57,346	85,766	109,283	17,605	1,746	10,583	15,056	295,726
STD deviation	18,013	17,598	27,457	10,341	417	3,031	4,529	42,064

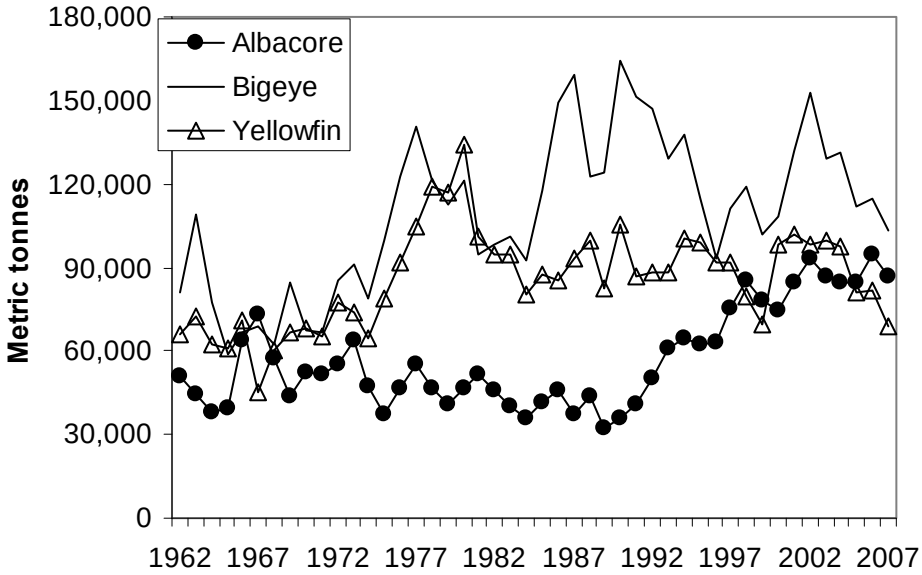


Figure 5. Reported longline tuna catches in the Pacific Ocean. Source: WCPFC Yearbook 2007.

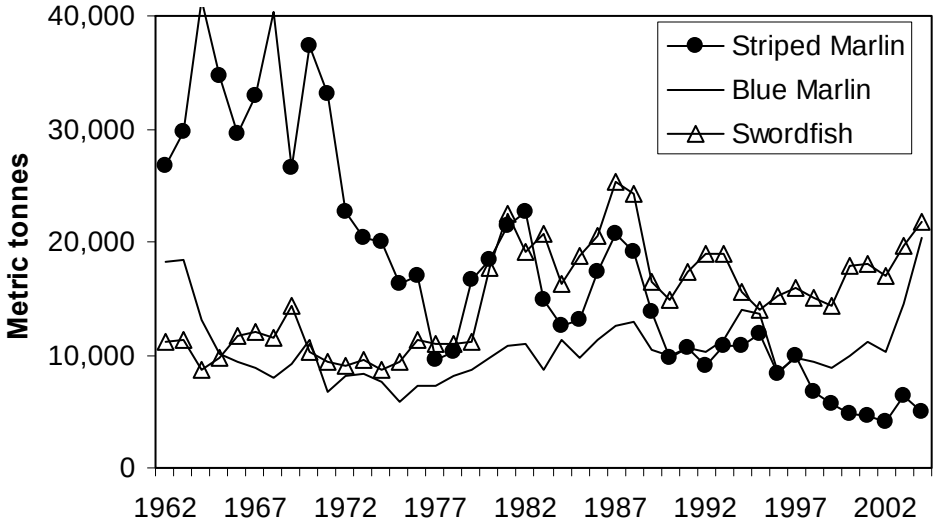


Figure 6. Reported longline billfish catches in the Pacific Ocean. Source: SPC public domain data.

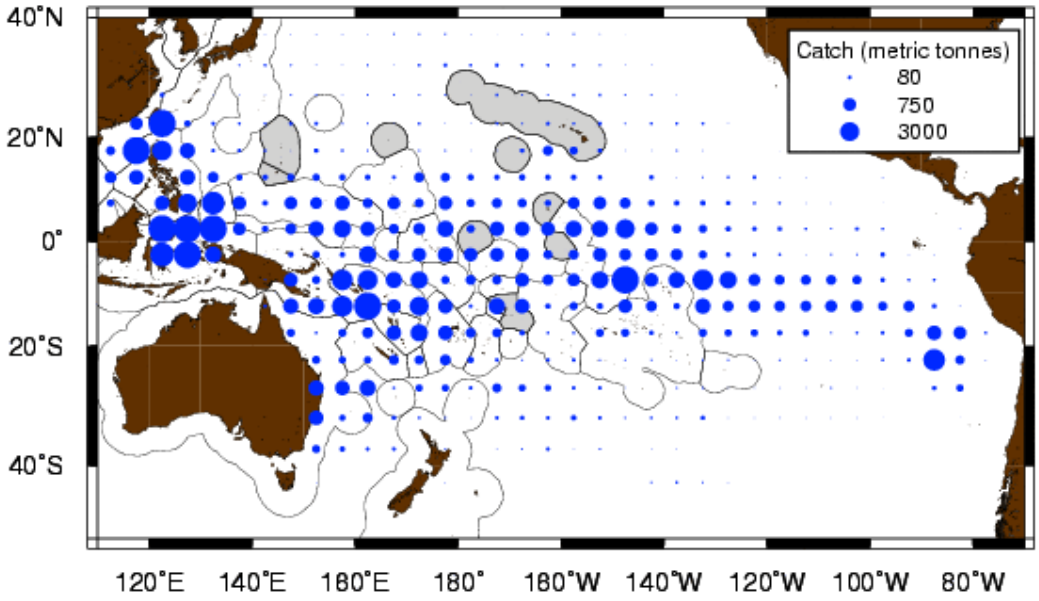


Figure 7. Distribution of longline catches of yellowfin tuna reported in 2004. Source: SPC public domain data.

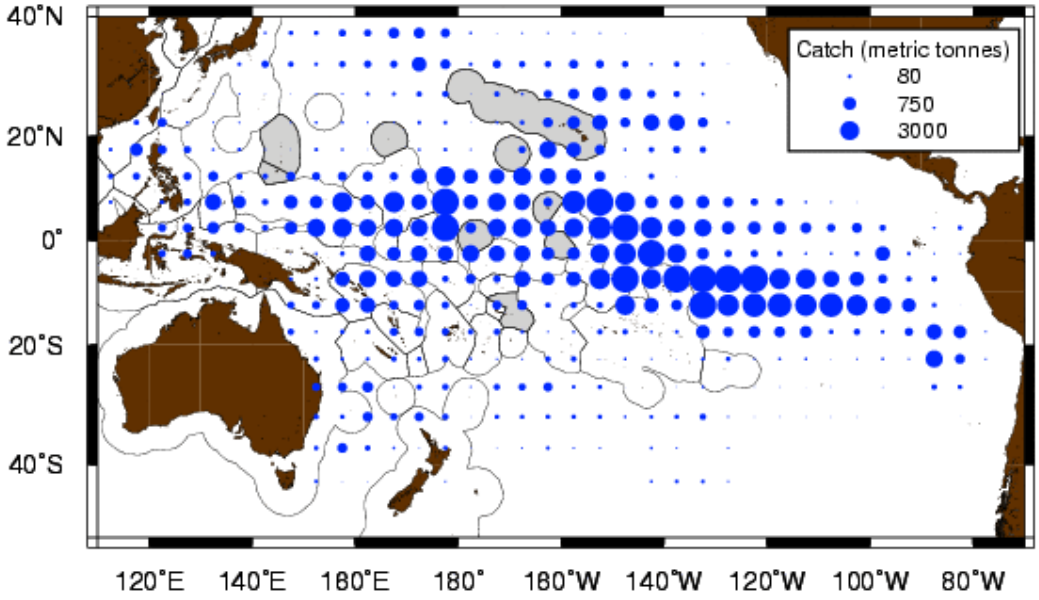


Figure 8. Distribution of longline catches of bigeye tuna reported in 2004. Source: SPC public domain data.

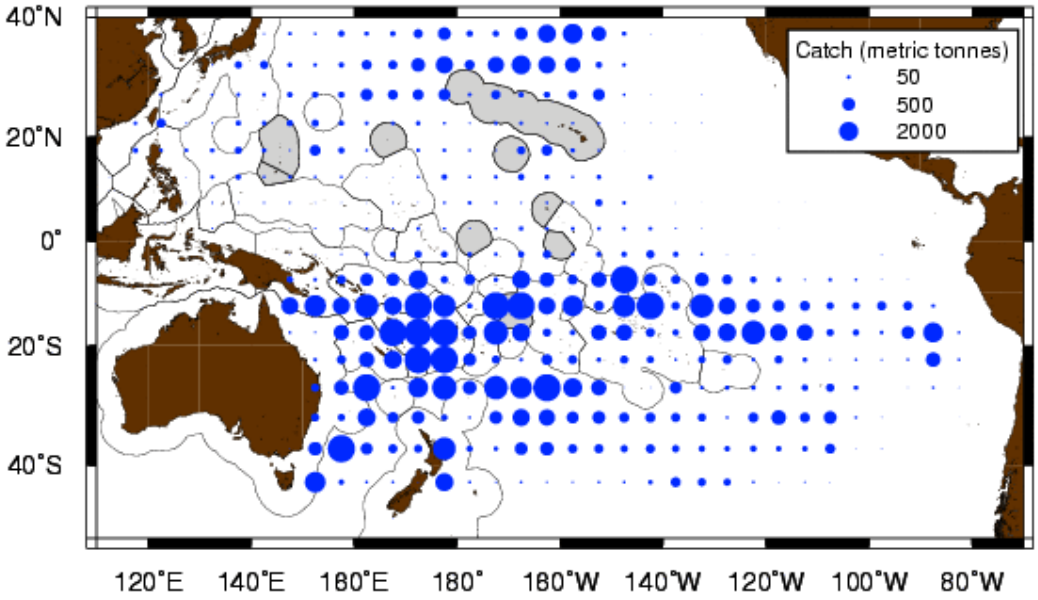


Figure 9. Distribution of longline catches of albacore tuna reported in 2004. Source: SPC public domain data.

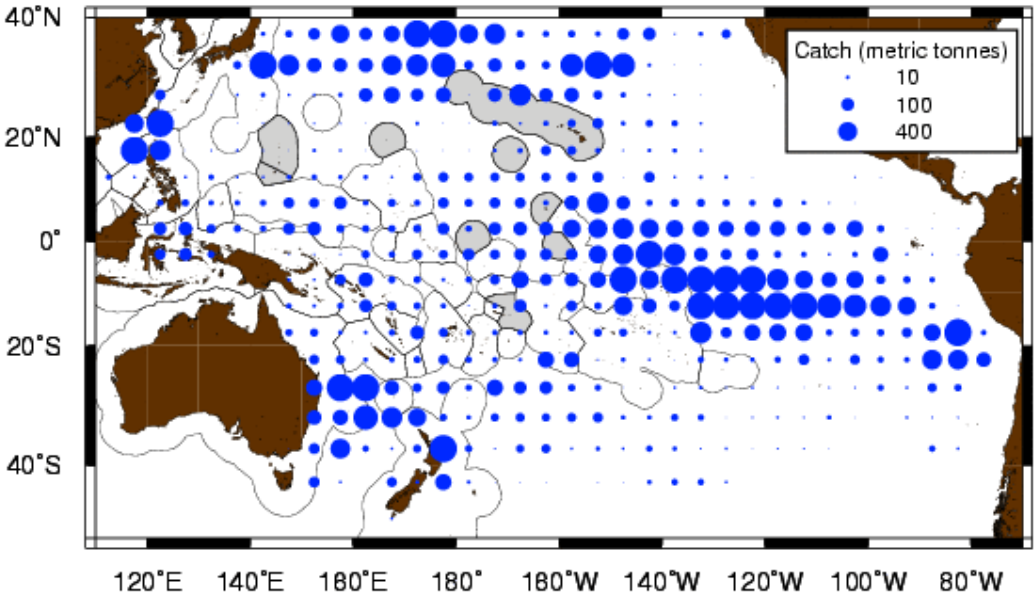


Figure 10. Distribution of longline catches of swordfish reported in 2004. Source: SPC public domain data.

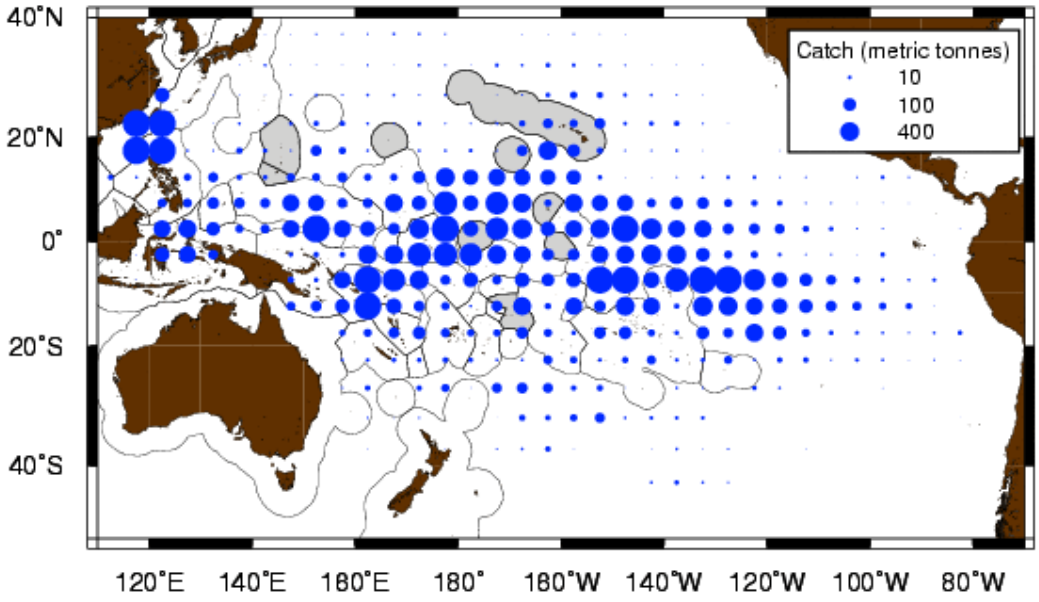


Figure 11. Distribution of longline catches of blue marlin reported in 2004. Source: SPC public domain data.

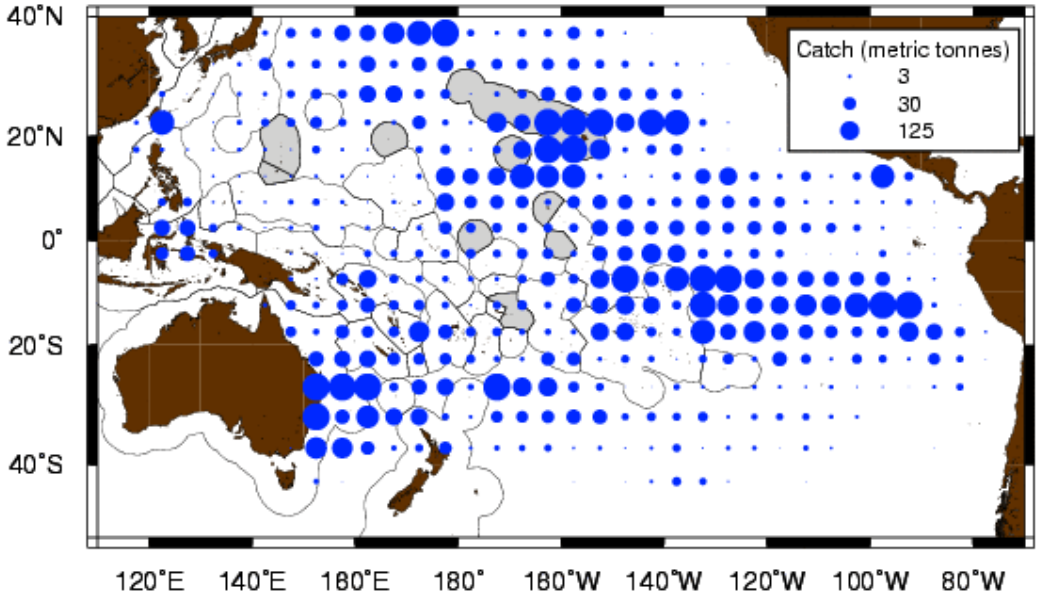


Figure 12. Distribution of longline catches of striped marlin reported in 2004. Source: SPC public domain data.

The 2007 pole-and-line fishery in the WCP-CA. Source: WCPFC-SC4-2008 GN-WP-1

Vessels

The pole-and-line fleet was composed of approximately 500 vessels in the 2007 fishery which excludes vessels in the Indonesia domestic fishery.

Catch

The 2007 catch estimates for the key pole-and-line fleets operating in the WCP–CA have yet to be provided, although the total catch estimate is expected to be similar to the level of recent years (i.e. 200,000–220,000 mt). Skipjack tends to account for the vast majority of the catch (typically more than 85% of the total catch in tropical areas), while albacore, taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific, yellowfin (5–7%) and a small component of bigeye (1–4%) make up the remainder of the catch. The Japanese distant-water and offshore (115,568 mt in 2006) and the Indonesian fleets (60,415 mt in 2006) account for most of the WCP–CA pole-and-line catch. The 2006 catch by the Japanese distant-water and offshore fleet was clearly the lowest in the available time series of annual catch estimates which date back to 1972, and appears to be related to a reduction in vessels numbers (which for 2006 was also the lowest on record). The Solomon Islands fleet recovered from low catch levels experienced in the early 2000s (only 2,778 mt in 2000 due to civil unrest), but with vessel numbers dwindling, the catch in recent years (only 3,937 mt in 2007) is not expected to attain the level (of over 20,000 mt annually) experienced during the 1990s.

Fleet distribution

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

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

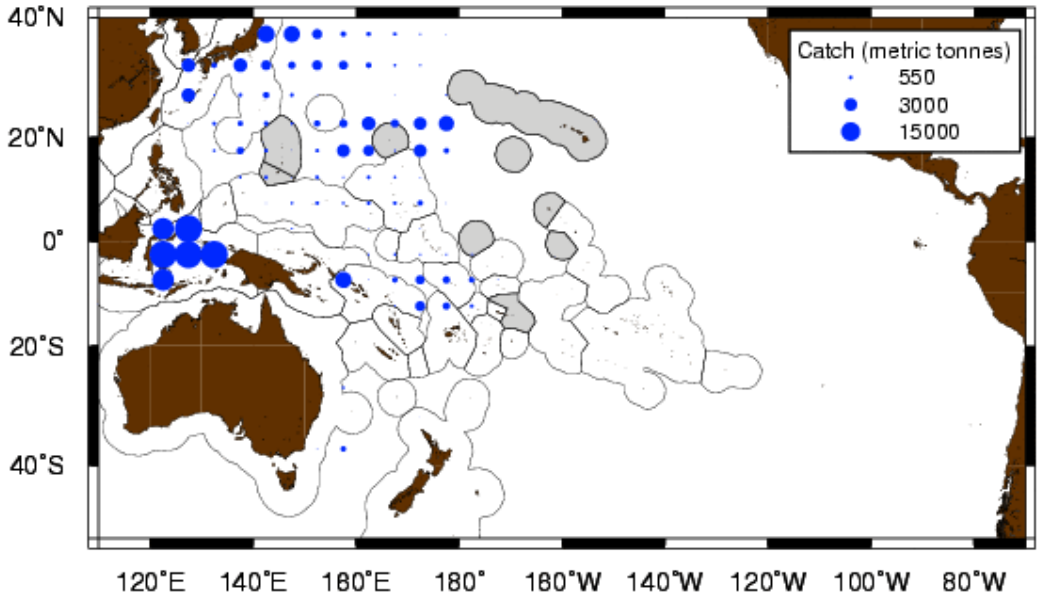


Figure 13. Distribution of pole-and-line catch of skipjack reported in 2004. Source: SPC public domain data.

Table 3. Total reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: WCPFC Yearbook 2007.

Year	Skipjack
1970	205,343
1971	192,624
1972	179,383
1973	262,352
1974	296,831
1975	232,119
1976	287,838
1977	302,163
1978	337,448
1979	292,205
1980	338,682
1981	300,198
1982	266,004
1983	304,149
1984	382,358
1985	250,956
1986	338,616
1987	264,700
1988	305,356
1989	292,646
1990	225,415
1991	294,667
1992	253,674
1993	283,838
1994	231,161
1995	262,400
1996	213,963
1997	228,872
1998	246,131
1999	237,783
2000	223,783
2001	163,776
2002	152,927
2003	172,434
2004	147,329
2005	176,546
2006	175,481
2007	173,412
Average	249,883
STD deviation	58,738

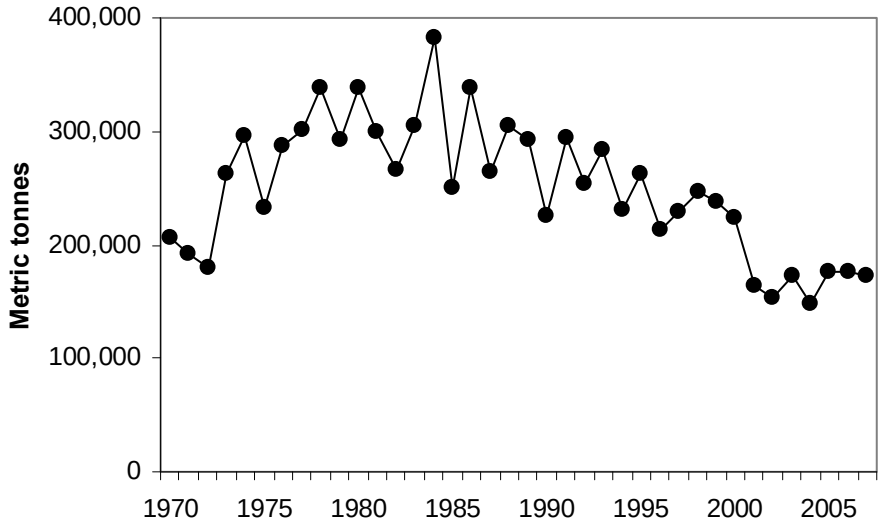


Figure 14. Reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: WCPFC Yearbook 2007.

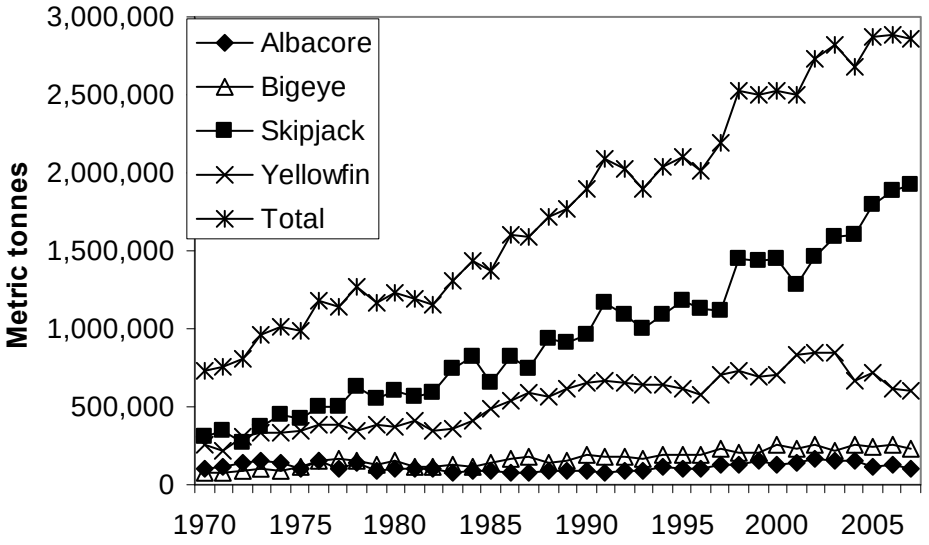


Figure 15. Estimated total annual catch of tuna species in the Pacific Ocean. Source: WCPFC Yearbook 2007.

Table 4. Estimated annual catch (metric tonnes) of tuna species in the Pacific Ocean. Source: WCPFC Yearbook 2007.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	98,305	75,217	304,362	257,495	735,379
1971	120,642	75,918	341,418	222,483	760,461
1972	136,245	95,683	275,192	303,500	810,620
1973	148,301	101,188	377,345	338,385	965,219
1974	138,084	87,417	443,711	338,863	1,008,075
1975	106,915	113,443	423,046	339,991	983,395
1976	152,197	148,796	494,450	385,618	1,181,061
1977	103,460	161,998	497,376	380,888	1,143,722
1978	136,879	148,054	630,030	347,958	1,262,921
1979	95,831	133,787	555,100	381,519	1,166,237
1980	105,698	151,490	596,725	371,952	1,225,865
1981	106,684	121,580	561,758	404,251	1,194,273
1982	99,482	119,530	590,617	348,491	1,158,120
1983	80,074	124,503	741,078	356,746	1,302,401
1984	95,825	119,864	819,594	405,607	1,440,890
1985	91,451	140,987	653,114	485,363	1,370,915
1986	83,055	168,812	816,317	536,677	1,604,861
1987	76,933	180,533	747,748	589,686	1,594,900
1988	86,478	142,671	931,240	559,376	1,719,765
1989	94,851	149,991	913,778	613,093	1,771,713
1990	89,480	195,207	957,293	654,964	1,896,944
1991	72,203	182,595	1,172,457	660,537	2,087,792
1992	93,718	183,032	1,094,683	653,393	2,024,826
1993	87,351	161,855	1,005,386	638,051	1,892,643
1994	112,337	196,727	1,092,640	639,089	2,040,793
1995	103,964	188,016	1,185,160	619,919	2,097,059
1996	105,892	193,124	1,129,913	577,796	2,006,725
1997	128,066	230,316	1,121,626	708,941	2,188,949
1998	133,835	204,425	1,452,014	732,560	2,522,834
1999	154,078	203,867	1,440,281	696,737	2,494,963
2000	122,549	256,334	1,442,374	706,723	2,527,980
2001	146,867	235,168	1,281,670	837,701	2,501,406
2002	171,229	252,098	1,466,831	843,496	2,733,654
2003	159,074	224,231	1,593,365	845,043	2,821,713
2004	156,258	257,334	1,604,866	661,227	2,679,685
2005	121,188	241,107	1,791,950	717,158	2,871,403
2006	131,581	253,746	1,889,711	614,412	2,889,450
2007	100,766	224,921	1,929,069	603,800	2,858,556
Average	114,785	168,126	930,709	534,478	1,748,098
STD deviation	26,465	53,193	445,130	176,784	664,326

Stock status and WPRFMC reference points

This section contains a brief review of the stock status for several pelagic species and the status of these stocks in relation to WPRFMC reference points. Stock assessments are presented annually at the Scientific Committee (SC) of the WCPFC and at the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). In August 2008, the SC reviewed an assessment for bigeye and skipjack tuna in the WCPO and south Pacific albacore. In addition, recent assessments from previous fora are available for Pacific blue marlin, North Pacific blue shark and swordfish (Tables 5 and 6). Stock status for the four tuna species are summarized from the SC species summary statements http://www.wcpfc.int/sc4/pdf/0_SC4%20Summary%20Report%20%5BEdited%20Version%5D.pdf and http://www.wcpfc.int/sc4/pdf/SC4-GN-WP1%20final_.pdf which also contains additional information on recent developments in the fishery, sizes of fish and trends in catch per unit effort (CPUE), recruitment, biomass and fishing mortality. In July 2008, the 8th meeting of the ISC reviewed assessments for North Pacific albacore and Pacific bluefin tuna and summary statements from the meeting are available (http://isc.ac.affrc.go.jp/isc8/pdf/FINAL%20ISC8%20PLENARY%20Aug19.pdf).

Amendment 10 of the WPRFMC Pelagic FMP provided new specifications of overfishing criteria and control rules that trigger Council action based on the status of pelagic stocks. Amendment 10 defined Maximum Sustainable Yield (MSY) as a control rule that specifies the relationship of Fishing Mortality (*F*) to Biomass (B) and other indicators of productive capacity under a MSY harvest policy. Because fisheries must be managed to achieve optimum yield, not MSY, the MSY control rule is a benchmark control rule rather than an operational one. However, the MSY control rule is useful for specifying the "objective and measurable criteria for identifying when the fishery to which the plan applies is overfished" that are required under the MSA. The National Standard Guidelines (50 CFR 600.310) refer to these criteria as "status determination criteria" and state that they must include two limit reference points, or thresholds: one for *F* that identifies when overfishing is occurring and a second for *B* or its proxy that indicates when the stock is overfished (Figure 16). The status determination criterion for *F* is the maximum fishing mortality threshold (MFMT). Minimum stock size threshold (MSST) is the criterion for *B*. If fishing mortality exceeds the MFMT for a period of one year or more, overfishing is occurring. If stock biomass falls below MSST in a given year, the stock or stock complex is overfished. A Council must take remedial action in the form of a new FMP, an FMP amendment, or proposed regulations when it has been determined by the Secretary of Commerce that overfishing is occurring, a stock or stock complex is overfished, either of the two thresholds is being approached, or existing remedial action to end previously identified overfishing has not resulted in adequate progress.

Table 5. Schedule of completed stock assessments for WPRFMC PMUS.

Albacore Tuna (S. Pacific)	2008	Swordfish (N. Pacific)	2004
Albacore Tuna (N. Pacific)	2006	Wahoo	
Other tuna relatives (*Auxis* sp.)		Yellowfin Tuna (WCPO)	2007
(*allothunnus* sp., *Scomber* sp.)		Kawakawa	
Bigeye Tuna (WCPO)	2008	Bluefin Tuna (Pacific)	2008
Black Marlin		Common Thresher Shark	
Blue Marlin	2002	Pelagic Thresher Shark	
Mahimahi		Bigeye Thresher Shark	
Oilfishes		Shortfin Mako Shark	
Opah		Longfin Mako Shark	
Pomfrets		Blue Shark (N. Pacific)	2006
Sailfish		Silky Shark	
Shortbill Spearfish		Oceanic Whitetip Shark	
Skipjack Tuna (WCPO)	2008	Salmon Shark	
Striped Marlin	2006		

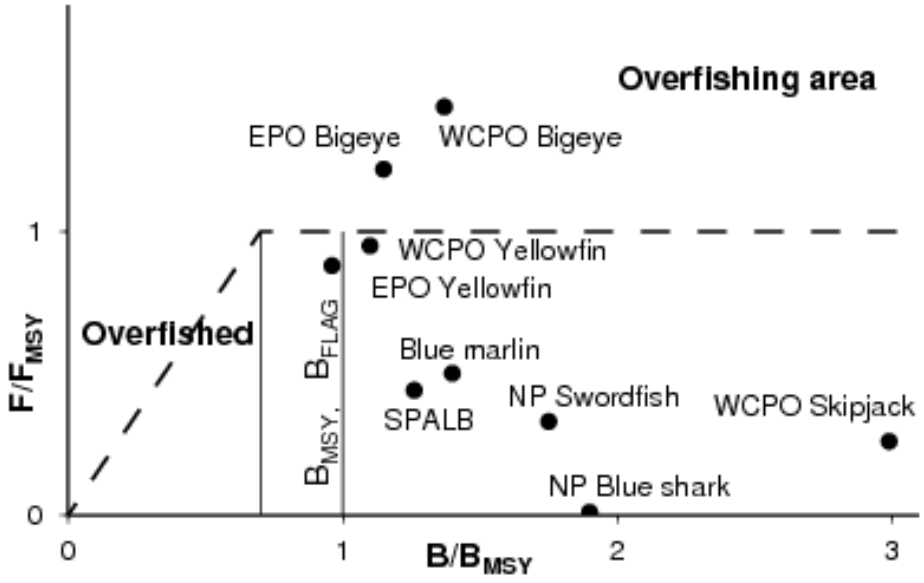


Figure 16. Specification of fishing mortality and biomass reference points in the WPRFMC Pelagics FMP and current stock status in the western-central (WCPO) and eastern Pacific Ocean (EPO).

Skipjack tuna in the WCP-CA

Stock status: A stock assessment was undertaken for skipjack during 2008. The major conclusions of the skipjack assessment are essentially unchanged from the last three assessments (2002, 2003, and 2005). The 2008 stock assessment indicates that for the skipjack stock in the WCP-CA overfishing is not occurring (Fcurrent / FMSY < 1), that the stock is not in an overfished state (Bcurrent / BMSY > 1), and that exploitation is modest relative to the stock's biological potential (Figure 17, Table 6).

Management advice and implications: The WCPFC Scientific Committee acknowledged that skipjack catches in 2007 increased to a historical high of ~1.7 million mt. The SC noted the increasing trend in estimated recruitment throughout the entire time series of the fishery. This trend may reflect skipjack's high productivity relative to other tuna species and its position in the ecosystem. These high recent catches are considered to be sustainable unless recruitment falls persistently below the long-term average. However, any increases in purse-seine catches of skipjack may result in a corresponding increase in fishing mortality for bigeye and yellowfin tunas.

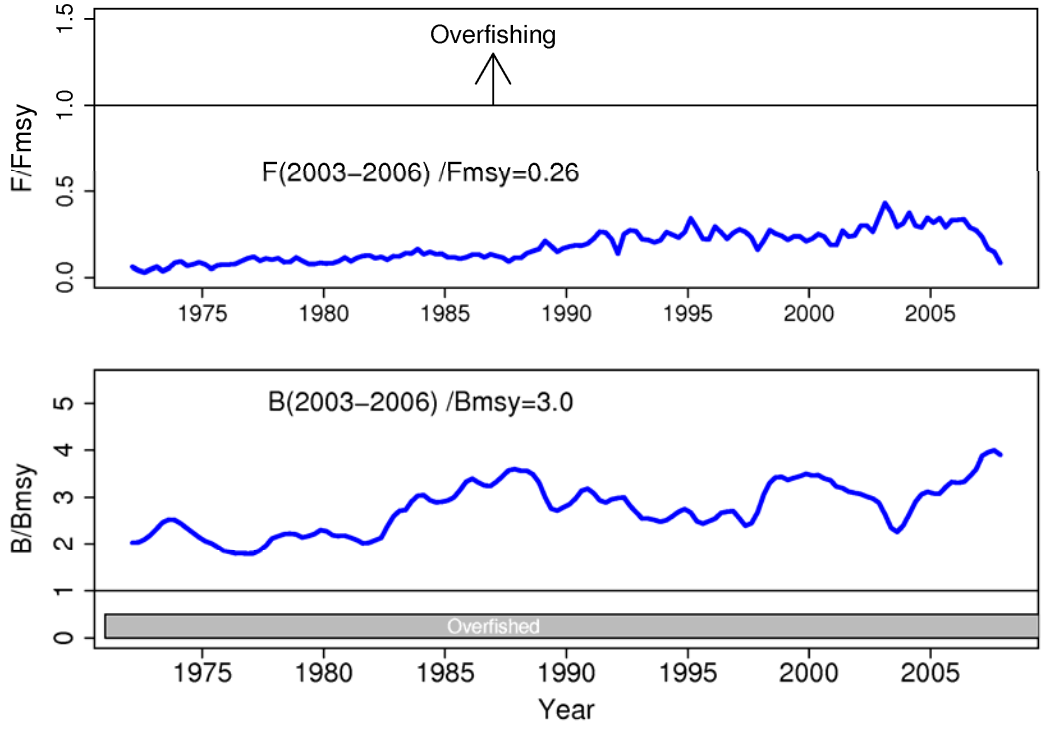


Figure 17. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for skipjack tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

Yellowfin tuna in the WCP-CA

Stock status: The 2007 stock assessment conclusions differ slightly from the 2006 assessment, particularly in relation to the Fcurrent/FMSY with the 2007 assessment being slightly more optimistic than the 2006 assessment. While the point estimate of Fcurrent/FMSY is slightly less than 1 (0.95), the probability distribution associated with fishing mortality-based reference point indicates that there is almost an equal probability that the value of Fcurrent/FMSY is less than or greater than the reference point. Therefore, the possibility of overfishing is still relatively high (47%). The reference points that predict the status of the stock under equilibrium conditions are Bcurrent/BMSY (1.10) and SpawningBcurrent/SpawningBMSY ~ (1.12), which indicate that the long-term average biomass would remain slightly above the level capable of producing MSY at 2002–2005 average fishing mortality. Overall, current biomass exceeds the estimated biomass at MSY (Bcurrent/BMSY >1.0) (i.e. the yellowfin stock in the WCPO is not in an overfished state, although there is a small probability (6.2%) that it is in an overfished state).

The attribution of depletion to various fisheries or groups of fisheries indicates that the Indonesian and Philippine domestic fisheries have the greatest impact and contribute significantly to the impact in adjacent regions through fish movement. The purse-seine fishery also has a high impact in the tropical Pacific and accounts for a significant component (~40%) of the recent (2002–2005) impacts in all other regions, except the southwest region. It is notable that the composite longline fishery is responsible for biomass depletion of about 10% in the WCPO during recent years and generally catches larger, older size classes, while purse-seine fisheries are responsible for a larger percentage of the impacts and generally the catch consists of smaller and younger fish.

Management advice and implications: The WCPO yellowfin tuna fishery can be considered to be fully exploited. Both the 2006 and 2007 assessments indicate that there is a high probability that overfishing is occurring (73% for the base case 2006 assessment and 47% for the base case 2007 assessment). In order to reduce the likelihood of overfishing, and if the Commission wishes to maintain average biomass at levels greater than 5% above BMSY, reductions in the fishing mortality rate would be required. Stock projections for 2007–2011, which attempt to simulate the conservation and management measures adopted at WCPFC2 and WCPFC3, indicate that the point estimate of B/BMSY remains above 1.0 throughout the projection period. However, the increasing uncertainty in future projections is likely to result in an increased probability of the biomass declining below BMSY by the end of the projection period.

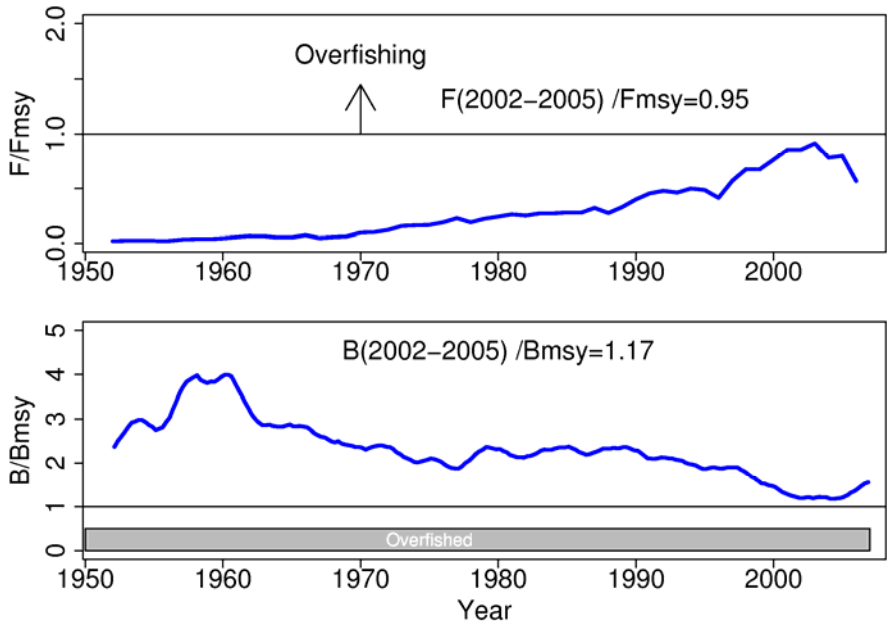


Figure 18. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for yellowfin tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point (MSST).

Bigeye tuna in the WCP-CA

Stock status: The 2008 assessment results approximate the results from the 2006 assessment, with inclusion of the additional fisheries and changes in the fishery configurations. The estimate of $F_{current}/F_{MSY}$ indicates that overfishing of bigeye tuna is occurring in the WCPO (Figure 19) with a very high probability (100%). While the stock is not yet in an overfished state with respect to total biomass ($B_{current} / B_{MSY} > 1$), the situation is less optimistic with respect to adult biomass and a number of plausible model options indicate that adult biomass has been below the SB_{MSY} level for a considerable period ($SB_{current} / SB_{MSY} < 1$). For the assessment base-case, there is also a 42.8% probability that the recent spawning biomass (SB_{2006t} / SB_{MSY}) is less than 1.0. Further, both the adult and total biomass are predicted to become over-fished at 2003−2006 levels of fishing mortality and long-term average levels of recruitment. This is consistent with a recent decline in biomass under increasing levels of fishing mortality resulting in an increase in the probability of the stock becoming overfished over time.

Management advice and implications: The WCPFC Scientific Committee recommended a minimum 30% reduction in fishing mortality from the average levels for 2003–2006 with the goal of returning the fishing mortality rate to FMSY. The point estimate of the $F_{current\ (2003–2006)}/F_{MSY}$ ratio (1.44) in the 2008 assessment was higher than the point estimate (1.32) in the 2006 assessment. A recommendation of a 30% reduction in fishing mortality is consistent with the SC recommendation issued in 2006 of a 25% reduction. The SC acknowledged that projections indicate that the bigeye tuna stock may become overfished (biomass<BMSY, spawning biomass<SBMSY) in the future with regard to both total biomass and spawning biomass even with a 30% reduction in fishing mortality. Therefore, it may be necessary to recommend additional reductions in fishing

mortality in the future if assessments indicate that fishing mortality is greater than FMSY. The SC also provided alternative schemes to achieve this reduction in fishing mortality and suggested that these results be seriously considered when management measures are discussed. The SC reiterated SC2 advice that exploitation rates differ between regions and that exploitation rates were highest in the western equatorial region; therefore, the SC recommended a reduction in fishing mortality throughout the WCPO from all major fishing types with priority in the western equatorial region.

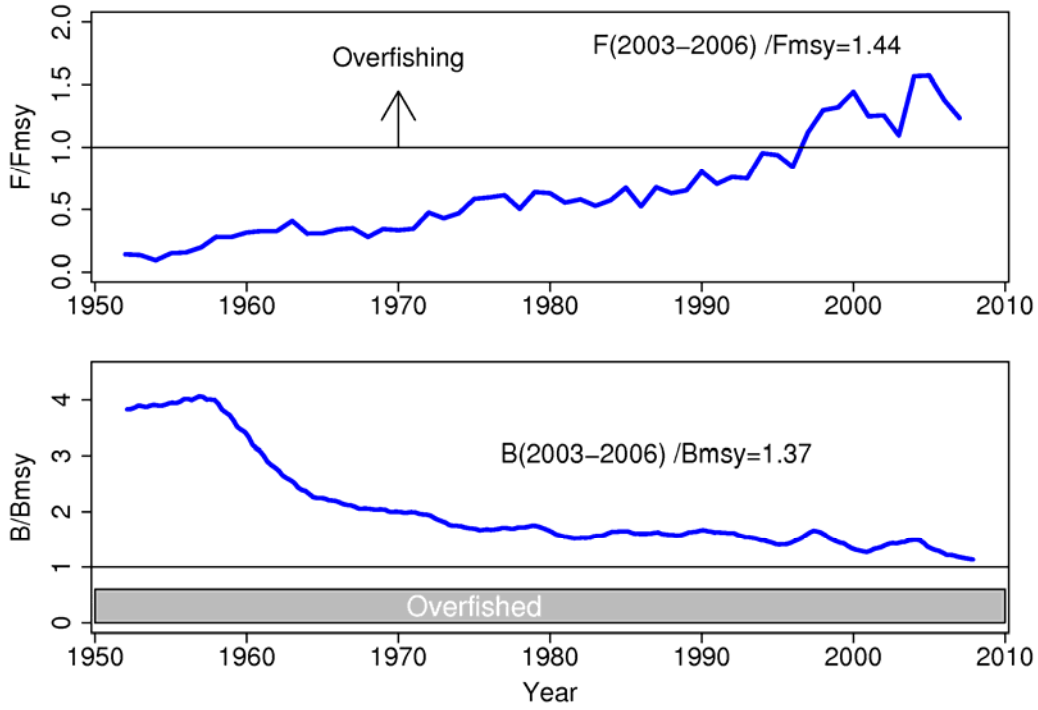


Figure 19. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for bigeye tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

South Pacific albacore

Stock status: The 2008 assessment results from the base-case model differ substantially from results from the 2006 assessment, due to the changes in relative abundance indices, selectivity and biological parameters for natural mortality and reproductive potential. These changes represent both refinements to the model and substantive changes to model structure which reduced the biomass estimates and raised fishing mortality.

The key conclusions of the models presented is that overfishing is not occurring and the stock is not in an overfished state (Figure 20). Reference point levels estimated in the 2008 assessment were more pessimistic than the 2006 assessment, depletion levels estimated in 2008 were 0.70 compared to 0.90 in 2006, $F_{current}$ /F_{MSY} was 0.44 compared to 0.04 in 2006, $B_{current}$ / B_{MSY} was 1.26 compared to 1.34 in 2006 and $SB_{current}$ / SB_{MSY} was 2.21 compared to 4.10 in 2006.

Management implications: The current assessment indicates lower levels of stock size and maximum sustainable yield which appear to be more realistic than previous assessments. There is uncertainty regarding the sustainability of the south Pacific albacore stock and the WCPFC Scientific Committee recommended that catches of south Pacific albacore remain at current levels considering the current rates of fishing mortality on adult albacore.

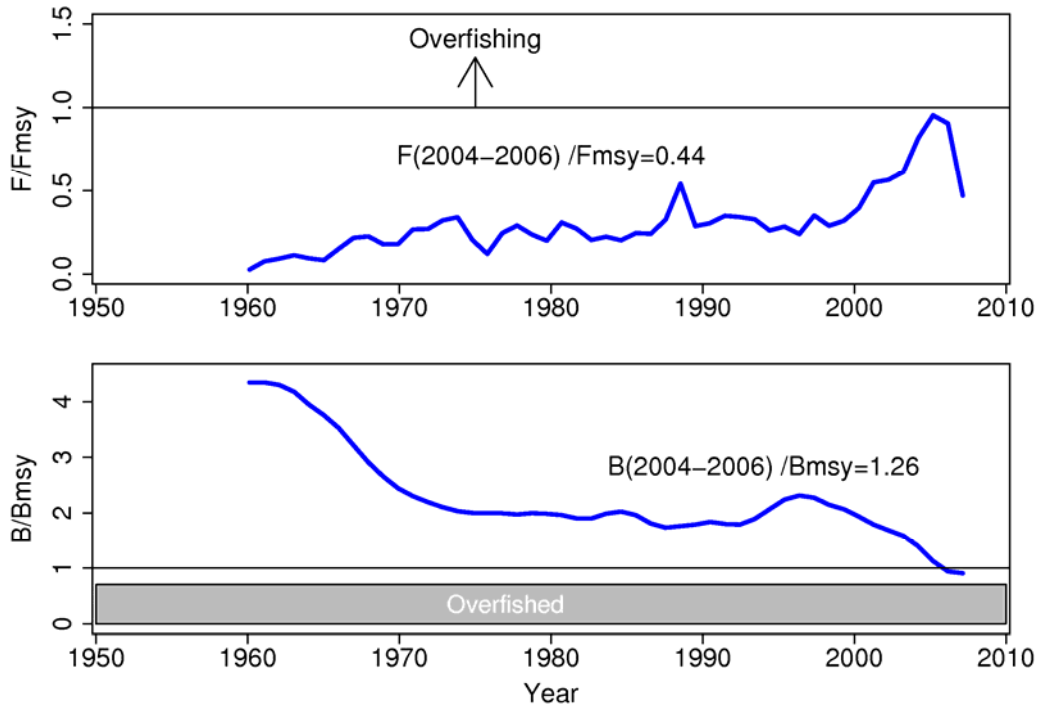


Figure 20. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for South Pacific albacore. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

Stock status – North Pacific albacore

ISC members agreed that stock assessment results indicated that 2006 estimate of spawning stock biomass (SSB) is the second highest in history (roughly, 153,000 t). This high level of SSB is reflective of strong year classes in 1999, 2001 and 2003. On the other hand, it is also indicated that the current fishing mortality rate (F=0.75) is high relative to commonly used reference points. Projected levels of SSB are forecasted to decline from a high level of 166,000 t in 2007 to the equilibrium level of roughly 92,000 t by 2015, if the population is fished at the current F of 0.75, which is near the long-term average (1966−2005).

Stock status – North Pacific striped marlin

Spawning biomass has declined from around 40,000 mt in the early 1970s to about 5,000 mt in the early 2000s. Spawning biomass in 2003 was estimated to be 14–15% of the 1970 level, depending on model scenario. Recruitment estimates also exhibited a long-

term decline since the 1970s. Recent average recruitment (1996–2003) is roughly one-half of the long-term average (1965–2003) under both model scenarios. Stock projections from 2004 through 2009 based on re-sampling the distribution of recent average recruitment indicate that both spawning biomass and landings will continue to decline if the current fishing mortality rate (average of F2001−F2003) is maintained, regardless of model scenario. Fishing mortality has increased more than three-fold, from roughly F=0.20 in the early 1970s to over F=0.6 in the early 2000s. The current fishing mortality rate exceeds the F20% reference point by roughly 60% under both model scenarios. It was also noted that the current fishing mortality rate corresponds to maintaining only 9% of maximum spawning potential (F9%).

Stock status – North Pacific swordfish

Assessments of north Pacific swordfish in 2004 included: 1) several different analyses for standardizing CPUE – generalized linear model (GLM) and habitat-based both showing declining CPUE trend, with greater decreases in the northwest Pacific Ocean and 2) a MULTIFAN-CL modeling effort – difficulty with size sampling protocols that ignore small fish (e.g., in Japan) complicate the analysis; overall impact of the fishery is minor at worst; use of a simulation data set to test MULTIFAN-CL indicated a significant tendency to overestimate natural mortality (M) and thus underestimate stock levels. Conclusions reached by the ISC Swordfish Working Group on the status of swordfish in the North Pacific are: 1) GLM and habitat-based standardization of CPUE based data from Japanese longline vessels show declining trends mainly driven by declines in CPUE in the northwestern portion of the study area; 2) a MULTIFAN-CL assessment also detected such a decline in the northwestern region of the fishery; and 3) in all MULTIFAN-CL model runs, the model showed fisheries as playing no more than a modest role in causing declines in abundance.

Stock status – Pacific bluefin tuna

The Pacific Bluefin tuna stock assessment has undergone a major revision over the past two years, and represents a substantial advancement in understanding of the population dynamics and the fisheries that exploit the stock. While there remain significant uncertainties in the assessment results, the following key factors regarding stock status emerge:

1. Recruitment has fluctuated without trend over the assessment period (1952−2004); and does not appear to have been adversely affected by the relatively high rate of exploitation. Recent recruitment (2005−present) is highly uncertain – making short-term forecasting difficult. In particular, the 2005 year class strength may have been underestimated in this assessment.
2. Spawning stock biomass (SSB) in 2005 is near the median level over the assessment period. If the future fishing mortality rate (F) continues at the current F level, the short-term outlook (2009−2010) indicates SSB will either (i) decline until 2010 or (ii) remain at approximately the 2005 level. In the longer term, SSB is expected to be at a level comparable to the SSB in 2005.
3. No relationship between SSB and recruitment is apparent over the range of "observed" SSB from the assessment. The assessment structure tacitly assumes that at least over

the SSB levels "observed," recruitment is more environmentally-driven than SSB-driven.

4. Current F (2002−2004) is greater than commonly used biological reference points (BRP) that may serve, in principle, as potential target reference points. This includes F_{MAX} – a BRP that given the assessment structure and assumptions is theoretically equivalent to F_{MSY}. But the magnitude by which the $F_{current}$ exceeds the target BRPs is variable.
5. Conversely, current F is less than commonly used BRPs that may serve, in principle, as potential recruitment overfishing threshold BRPs, e.g. F_{MED} and $F_{SSB\text{-}Min}$ (probability based reference point) i.e. Fs above which, the likelihood of recruitment failure is high.
6. Fishing mortality on recruits (age 0) and on juveniles (ages 1-3) have been generally increasing for more than a decade (1990−2005). The catch (in weight) is dominated by recruits and juveniles (ages 0-3).
7. Total catch has fluctuated widely in the range of 9,000−40,000 t during the assessment time period. Recent catch is near the average for the assessment period (~22, 000 t). Over the entire catch history, annual catch has never attained the equilibrium catch at F_{MAX} (45,000t).

Table 6. Estimates of stock status in relation to overfishing and overfished reference points for WPRFMC PMUS.

Stock	Overfishing reference point	Is overfishing occurring?	Approaching Overfishing (2 yr)	Overfished reference point	Is the stock overfished?	Approaching Overfished (2 yr)	Assessment results	Natural mortality[1]	MSST
Skipjack Tuna (WCPO)	F/F_{MSY}=0.26	No	No	B/B_{MSY}=2.99	No	No	Langley and Hampton 2008	>0.5 yr^{-1}	0.5 B_{MSY}
Yellowfin Tuna (WCPO)	F/F_{MSY}=0.95	No	Yes	B/B_{MSY}=1.17	No	No	Langley et al. 2007	0.8-1.6 yr^{-1}	0.5 B_{MSY}
Albacore Tuna (S. Pacific)	F/F_{MSY}=44	No	No	B/B_{MSY}=1.26	No	No	Hoyle et al. 2008	0.3 yr^{-1}	0.7 B_{MSY}
Albacore Tuna (N. Pacific)		Unknown			Unknown			0.3 yr^{-1}	0.7 B_{MSY}
Bigeye Tuna (WCPO)	F/F_{MSY}=1.44	Yes	Not applicable	B/B_{MSY}=1.37	No	No	Langley et al. 2008	0.4 yr^{-1}	0.6 B_{MSY}
Blue Marlin (Pacific)	F/F_{MSY}=0.50	No	Unknown	B/B_{MSY}=1.4	No	Unknown	Kleiber et al. 2002	0.2 yr^{-1}	0.8 B_{MSY}
Swordfish (N. Pacific)[2]	F/F_{MSY}=0.33	No	Unknown	B/B_{MSY}=1.75	No	Unknown	Kleiber & Yokawa 2004	0.3 yr^{-1}	0.7 B_{MSY}
Blue Shark (N. Pacific)	F/F_{MSY}=0.01	No	Unknown	B/B_{MSY}=1.9	No	Unknown	Kleiber et al. 2001	Unknown	
Other Billfishes		Unknown			Unknown			Unknown	
Other Pelagic Sharks		Unknown			Unknown			Unknown	
Other PMUS		Unknown			Unknown			Unknown	

[1] Estimates based on Boggs et al. 2000

[2] Asssment results based on natural mortality fixed at 0.2 yr^{-1}

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F. Recreational Pelagic Fisheries in the Western Pacific

Introduction

Fishing, either for subsistence or recreation continues to be an extremely important activity throughout the Western Pacific Region in the four major populated island areas of the Western Pacific Region, Hawaii, American Samoa, Guam and the Commonwealth of the Northern Mariana Islands (CNMI). Fish consumption in Micronesia and Polynesia typically averages about 130 lb/per capita/yr (Dalzell et al 1996) and even in more culturally diverse Hawaii, fish consumption is almost three times the US national average at about 42 lb/person/yr (Dalzell & Paty 1996).

Recreational fisheries in the Western Pacific Region

In Hawaii, recreational shoreline fishing was more popular than boat fishing up to and after WW II. Boat fishing during this period referred primarily to fishing from traditional canoes (Glazier 2000). 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 (Brock 1947). 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 2002/January 2003 issue).

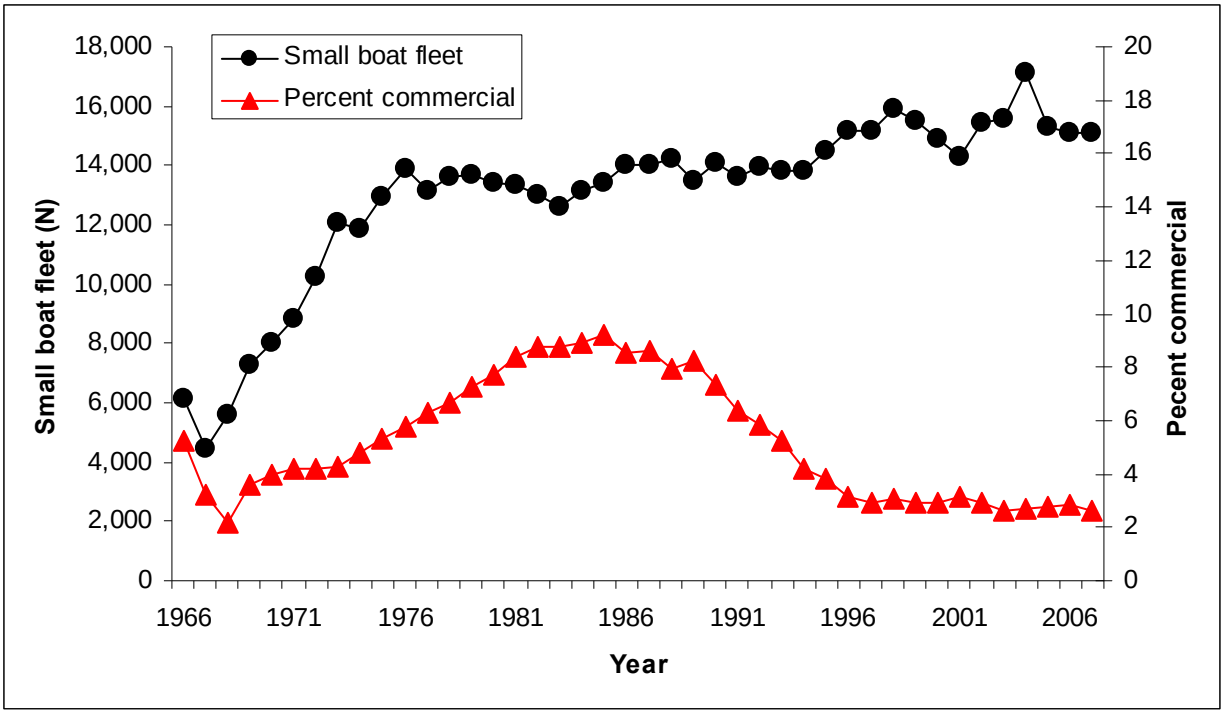

Figure 1: Annual number of small vessel fleet registrations in Hawaii. Figure shows total fleet size, and percentage of vessels being registered for commercial fishing (Source: Hawaii Division of Boating and Ocean Resources)

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. Four such clubs were founded in Guam during the past 20 years, but none lasted for more than a 2-3 years (Gerry Davis, Guam DAWR pers. comm.). These was also a Guam Boating Association comprising mostly fishermen, with several hundred members. This organization functioned as a fishing club for about 10 years and then disbanded. Some school groups and the boy scouts have formed fishing clubs focused on rod and reel fishing, and there is still one spearfishing club that has only a handful of members, but appears to be still be active. There are also some limited fishing tournaments on Guam, including a fishing derby for children organized by the local Aquatic and Wildlife Resources Division (Anon 2000).There are few fishing clubs in the in the Northern Mariana Islands. The Saipan Sportfishing Association (SSA) has been in existence for at least 16 years, and is the sponsor of the annual Saipan International Fishing Tournament, which is usually held in August or September. In 1997, the SSA listed approximately 40 members. There is also a Tinian Sportfishing Association, but the status of this club is unknown at this time.

The founding of the American Samoa Game Fishing Association in 1974 in Pago Pago led to fishing tournaments being held on a regular basis in the territory (Tulafono 2001). A total of 64 tournaments, averaging two to three tournaments per year and 10 to 20 vessels in each competition, were conducted in Pago Pago between 1974 and 1998. However interest in fishing tournaments waned during the late 1990s, with only three vessels participating in the last tournament held in 1998. The reason for this decline was not entirely clear, but may be related to the expansion of the longline fishery in American Samoa and the shift from commercial trolling to longlining. According to Tulafono, fishermen were more interested in earning income and it was time consuming to switch from longline to troll gear for a weekend of tournament fishing. Tulafono (2001) noted that tag and release programs, which are gaining popularity with recreational and charter-vessel fishermen elsewhere in the U.S., would not be popular in American Samoa. In common with many Pacific islands, fish were caught to keep for food in American

Samoa, and fish landings and their distribution through the community were important in order to meet social obligations. Releasing fish would be considered a failure to meet these obligations (Tulafono 2001).

There is also some recreational fishing activity at some of the Pacific Remote Island Areas (PRIAs), namely at Midway, Wake, Johnston and Palmyra Islands. There are no resident populations at Howland & Baker and Jarvis Islands and fishing activity at these locations is likely minimal. There was a tourist facility at Midway until 2002, which operated a charter boat fishery targeting primarily pelagic fish at Midway Atoll. The company operated five vessels using for charter fishing at Midway: three 22-26 ft catamarans for lagoon and nearshore fishing operations and two 38 ft sportfishing vessels used for blue water trolling. In addition there were approximately seven small vessels maintained and used by Midway residents for recreational fishing. Of this total, three vessels engaged primarily in offshore trolling for PMUS including yellowfin tuna, ono and marlin. All vessels fishing at Midway were required to file a float plan prior to a fishing trip and complete the "Midway Sports Fishing Boat Trip Log" upon completion of each trip. The US Fish and Wildlife Service was responsible for compiling these catch data.

At Palmyra Atoll, an island privately owned by The Nature Conservancy, a 22 ft catamaran is used for offshore trolling and four small boats operated within the lagoon used for bonefish angling. There are several craft used for recreational fishing at the two military bases on Johnson and Wake Islands. These include eight Boston whalers, two cabin cruisers and a landing craft at Johnson, and two landing craft and two small vessels at Wake.

Recreational fisheries in the Western Pacific Region

Estimates of recreational catch for the Western Pacific are given in Table 1. The data for Guam, Northern Mariana Islands and American Samoa are based on the proportion of catches landed for sale and catches retained and not sold, in all landings sampled by creel surveys in each area. The ratio of unsold to sold catch in the samples was used in conjunction with the total catch estimate expanded from the creel survey data. This was adjusted downwards based on the creel surveys by the ratio of landings by vessels retaining 100 % of their catch to the total unsold catch. This accounts for that fraction of the catch not sold by commercial fishing vessels. The volume of fish landed by vessels retaining all their catch was labeled the nominal recreational catch. A similar exercise is conducted by the Honolulu Laboratory to generate recreational catch figures for Hawaii.

Table 1. Estimated recreational fish catches in the four principal island groups of the Western Pacific Region in 2007

Location	Year	Total catch (lbs)	Unsold catch (lb)	Nominal recreational catch (lb)	Recr. catch as % of total catch	Recr. fishing trips
American Samoa	2007	11,712,000	6,523	6,136	0.05	38
Guam	2007	1,261,938	645,958	590,292	46.8	7,480
Hawaii	2007	NA	NA	NA	NA	NA
NMI	2007	677,195	140,475	124,384	18.4	1,835

Charter vessel sportsfishing

Tables 2 present summaries of the charter vessel sportsfishing in the Western Pacific. Most charter fishing in Hawaii is focused on catching blue marlin, which in 2004 formed about 50 % of the total

annual charter vessel catch by weight (Table 3). Although commercial troll vessels also take blue marlin, these only form about a quarter of their catch, with the majority of the target species being yellowfin, mahimahi, aku and ono (Table 3). Unlike other parts of the US, there is little recreational fishery interest in catching sharks in Hawaii.

Guam has a charter fishing sector, which unlike Hawaii caters for both pelagic and bottomfish fishing. Until recently the troll charter fishery was expanding, but, over the past three years the number of vessels involved, and level of fishing, has decreased in response to lower tourist volume from Japan due to the Asian economic recession in the late 1990s. Nonetheless, although compromising only 5 % of Guam's commercial troll fleet, the Guam troll charter industry accounts for 11% of the troll catch and 25 and 20% of the Guam blue marlin and mahi mahi catch respectively. (See Guam module in this volume). The Guam bottomfish charter fishery has continued to increase despite the drop in tourist volume from Japan, and accounts for about 10% of Guam's bottomfish fishing effort. The primary catch of the bottomfish charter fishery are goatfish and triggerfish, which are mostly released.

Charter fishing in NMI is limited, with about ten boats operating on Saipan, and a few vessels on Tinian conducting occasional fishing charters. 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 2006

Location	Catch (lb)	Effort (trips)	Principal species
Guam	78,928	2,027	mahimahi, skipjack, wahoo, blue marlin
Hawaii	475,156	8,797	blue marlin, mahimahi, yellowfin, wahoo
Northern Mariana Islands	10,822	273	skipjack, yellowfin, mahimahi, 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 patron's 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 in Hawaii reflects the different targeting in the two fisheries. Blue marlins are the dominant feature of charter vessels in Hawaii, while in Guam (Tables 3 & 4), composition of the charter catch is being broadly similar to the mix of species in the commercial troll catches

Table 3. Comparison of species composition of landings made by Hawaii pelagic charter vessels versus commercial troll vessels, 2007

Species	Charter vessels		Commercial trollers	
	Landings	**Percent**	**Landings**	**Percent**
Mahimahi	133,538	28.1%	446,314	22.4%
Yellowfin tuna	122,826	25.8%	752,293	37.8%
Blue marlin	104,524	22.0%	119,153	6.0%
Ono	49,195	10.4%	366,832	18.4%
Aku	26,075	5.5%	140,271	7.0%
Striped marlin	12,521	2.6%	13,637	0.7%
Shortnose spearfish	7,527	1.6%	4,720	0.2%
Other pelagics	18,951	4.0%	147,550	7.4%
Total	**475,157**	**100.0%**	**1,990,770**	**100.0%**

Table 4. Comparison of species composition of landings made by Guam pelagic charter vessels versus commercial troll vessels, 2007

Species	Commercial trollers		Charter vessels	
	Landings (lb)	**Percent**	**Landings (lb)**	**Percent**
Mahimahi	216,953	45.05%	41,307	52.77%
Blue marlin	14,148	2.94%	4,846	6.19%
Yellowfin tuna	44,649	9.27%	3,184	4.07%
Wahoo	30,992	6.44%	13,362	17.07%
Skipjack	142,122	29.51%	14,529	18.56%
Others	32742	6.80%	1056	1.35%
Total	481,606	100.00%	78,284	100.00%

In Hawaii there is considerable variation in charter vessel catches between the various islands (Table 5), with the largest charter vessel fishery based on the island of Hawaii. In 2007, charter vessel catches on the island of Hawaii accounted for nearly 40% of the total charter vessel landings within the state, with Oahu, Kauai, and Maui County charter vessels forming the remaining charter vessel catch.

Table 5. Charter vessel catches in Hawaii by island, 2007					
Island	Catch	Percent	Trips	Percent	CPUE (lb/trip)
Hawaii	179,029	37.68%	4456	50.65%	40.18
Kauai	71283.6	15.00%	935	10.63%	76.24
Maui County*	57662.1	12.14%	1736	19.73%	33.22
Oahu	167181	35.18%	1670	18.98%	100.11
Total	475,156	100.00%	8797	100.00%	54.01
* DAR confidentiality protocols prevent reporting 2007 charter vessel activity for Molokai and Lanai separately, and these are aggregated with data for Maui, reported collectively as Maui County					

Most charter vessel fishing on the island of Hawaii is conducted from Kona's small boat harbor at Honokohau, and about one thirds of the charter vessel catch comprises blue marlin (Table 6). Blue marlin used to amount to about two-thirds of the catch, but this number has fallen considerable with the spread of a stronger catch ands release ethic for billfish in general operators at Honokohau. Elsewhere, mahimahi dominates charter vessel landings, with blue marlin comprising between 2% and 30% of catches. Other important species in the charter vessel catches, depending on location, comprise yellowfin, wahoo, spearfish and skipjack.

Table 6. Composition of charter vessel catches in the Main Hawaiian Islands, 2007

Hawaii	**Landings (lb)**	**Percent**	**Kauai**	**Landings (lb)**	**Percent**
Blue marlin	63,379	35.40%	Yellowfin tuna	24,117	33.83%
Yellowfin tuna	41,125	22.97%	Skipjack	12,913	18.11%
Mahimahi	29,338	16.39%	Mahimahi	12,476	17.50%
Wahoo	25,214	14.08%	Wahoo	8,508	11.94%
Shortnose spearfish	5,007	2.80%	Blue marlin	5,339	7.49%
Striped marlin	4,404	2.46%	Striped marlin	1,543	2.16%
Bigeye tuna	3,669	2.05%	Others	6,388	8.96%
Skipjack	3,484	1.95%			
Others	3412	1.91%			
Total	**179,029**	**100.00%**	**Total**	**71,284**	**100.00%**

Maui	**Landings (lb)**	**Percent**	**Oahu**	**Landings (lb)**	**Percent**
Mahimahi	26,049	45.18%	Mahimahi	65,675	39.28%
Blue marlin	11,831	20.52%	Yellowfin tuna	52,112	31.17%
Wahoo	7,706	13.36%	Blue marlin	23,975	14.34%
Yellowfin tuna	5,473	9.49%	Skipjack	8,542	5.11%
Striped marlin	2,049	3.55%	Wahoo	7,767	4.65%
Skipjack	1,136	1.97%	Striped marlin	4,525	2.71%
Others	3418	5.93%	Shortnose spearfish	1,808	1.08%
			Other	2777	1.66%
Total	**57,662**	**100.00%**	**Total**	**167,181**	**100.00%**

Recreational Fishing Data Collection in Hawaii

Currently unavailable. This section will be updated as information is made available.

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G. Pelagic fisheries production from the Pacific West Coast States

The following tables include time series for pelagic fisheries production along the US West Coast between 1986 and 2007 (1987-2007 for time series by State). All data comes from the Pacific Fisheries Information Network website at http://www.psmfc.org/pacfin/woc.html

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
1986	5,243	21,517	1,361	29	4,731	2,530	974	<.05	48	312	2
1987	3,160	23,201	5,724	50	823	1,803	562	2	20	403	2
1988	4,908	19,520	8,863	6	804	1,636	500	1	9	322	3
1989	2,214	17,615	4,505	1	1,019	1,357	504	<.05	17	255	6
1990	3,030	8,509	2,256	2	925	1,236	357	1	31	373	20
1991	1,676	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	4,885	3,350	2,586	7	1,087	1,546	292	<.05	22	142	1
1993	6,151	3,795	4,539	26	559	1,771	275	1	44	122	0
1994	10,686	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	6,528	3,038	7,037	49	714	1,161	270	5	31	95	5
1996	14,173	3,347	5,455	62	4,688	1,191	319	1	20	96	1
1997	11,292	4,774	6,070	82	2,251	1,448	319	35	32	132	1
1998	13,785	5,799	5,846	53	1,949	1,378	326	2	11	98	3
1999	9,629	1,353	3,759	105	179	1,992	320	10	5	6	0
2000	9041	1148	780	87	312	2652	295	5	3	80	1
2001	11,183	655	58	53	196	2195	373	2	2	46	2
2002	10,028	544	236	10	11	1697	315	0	0	82	42
2003	16,643	465	349	35	36	2126	294	5	4	69	<1
2004	14,469	488	307	22	38	1185	115	5	2	54	<1
2005	9,083	285	522	0	206	294	178	10	<1	33	<1
2006	12,749	77	48	0	<1	539	159	4	<1	46	<1
2007	11,586	104	5.1	0	45	550	204	5	2	45	10

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
1986	8,895,672	25,475,289	1,367,387	129,108	6,618,473	18,256,026	2,412,160	277	95,181	611,399	1,886
1987	7,085,992	33,183,108	5,982,568	244,701	2,902,340	15,405,478	1,638,772	2,560	30,721	989,632	2,566
1988	12,280,116	34,161,742	12,618,821	33,772	4,445,064	13,007,930	1,310,935	1,097	13,328	868,676	2,923
1989	4,873,362	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,202,991	191	31,313	707,408	4,631
1990	6,911,021	10,485,225	2,361,619	10,928	1,433,788	8,811,042	786,534	2,067	42,599	909,368	15,834
1991	3,349,988	4,721,908	3,130,649	50,650	137,612	7,497,271	1,145,001	0	28,944	491,477	892
1992	13,214,373	4,412,452	1,606,563	51,444	1,360,230	8,709,765	521,922	693	17,108	266,344	2,056
1993	13,001,721	6,440,417	3,498,178	238,527	841,129	10,062,551	520,120	509	32,498	248,651	681
1994	22,293,343	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,555	46	37,579	270,088	17,572
1995	12,377,227	3,260,929	5,125,387	268,465	1,129,006	7,013,279	510,733	9,389	26,730	177,076	2,994
1996	28,583,043	3,388,536	4,185,411	273,321	4,238,678	6,363,798	634,493	1,635	18,591	174,621	616
1997	20,529,493	5,254,042	5,639,463	370,331	2,896,450	6,297,358	609,285	64,543	35,781	232,737	287
1998	19,068,271	5,976,102	5,322,183	277,238	3,058,769	6,052,792	574,795	2,635	9,513	173,349	6,094
1999	17,515,551	1,468,743	2,748,208	639,668	961,423	8,309,539	616,407	18,424	5,876	109,767	83
2000	17,154,639	1,294,388	483,242	579,384	577,095	11,772,245	587,702	2,738	4,636	132,970	909
2001	20,687,195	465,558	33,633	320,855	473,821	8,696,689	595,542	2,767	8,428	75,780	1,501
2002	14,291,939	588,677	128,425	87,304	43,512	6,320,439	517,715	N.A.	N.A.	124,522	18,598
2003	24,424,823	450,925	159,961	262,768	75,396	7,797,738	476,067	2,907	3,463	113,689	714
2004	27,345,860	447,555	109,254	147,696	53,613	4,824,309	196,360	2,500	4,060	97,280	972
2005	21,002,429	316,368	292,121	0	136,848	1,872,431	271,451	588	6,234	57,758	1,610
2006	23,759,098	175,646	40,384	0	3,790	2,695,302	299,709	271	4,509	79,313	632
2007	21,663,546	149,568	4,361	0	58,106	3,131,178	337,770	2,903	4,334	78,569	1,984

[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, 1986-2006

	Landings (mt)										
Year	**Albacore**	**Yellowfin**	**Skipjack**	**Bigeye**	**Bluefin**	**Swordfish**	**Common Thresher**	**Pelagic Thresher**	**Bigeye Thresher**	**Shortfin Mako**	**Blue Shark**
Washington											
1987	529	N.A.	0	N.A.	0	0	65	N.A.	N.A.	N.A.	<.05
1988	1,900	N.A.	0	N.A.	0	2	6	N.A.	N.A.	N.A.	<.05
1989	855	N.A.	0	N.A.	0	0	3	N.A.	N.A.	N.A.	0
1990	1,225	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1991	428	N.A.	<.05	N.A.	0	0	<.05	N.A.	N.A.	N.A.	<.05
1992	1,864	N.A.	<.05	N.A.	0	0	1	N.A.	N.A.	N.A.	<.05
1993	2,167	N.A.	0	N.A.	0	1	<.05	N.A.	N.A.	N.A.	<.05
1994	5,377	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1995	3,413	N.A.	0	N.A.	0	<.05	5	N.A.	N.A.	N.A.	<.05
1996	4,969	N.A.	0	N.A.	0	0	4	N.A.	N.A.	N.A.	<.05
1997	3,775	N.A.	0	N.A.	0	0	2	N.A.	N.A.	N.A.	<.05
1998	6,517	N.A.	0	N.A.	0	0	6	N.A.	N.A.	N.A.	<.05
1999	2,074	N.A.	0	N.A.	12	4	65	N.A.	N.A.	N.A.	0
2000	3,185	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<0.5
2001	4,152	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2002	5,358	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2003	0	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2004	8,310	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2005	4,900	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2006	8,677	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2007	5,980	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Oregon											
1987	1,038	0	0	N.A.	<.05	0	92	N.A.	N.A.	0	0
1988	1,799	0	0	N.A.	0	0	81	N.A.	N.A.	0	0
1989	490	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	0
1990	943	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1991	571	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1992	1,764	0	0	N.A.	0	0	1	N.A.	N.A.	0	<.05
1993	2,157	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1994	2,131	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1995	2,283	<.05	<.05	N.A.	<.05	3	1	N.A.	N.A.	0	<.05
1996	4,059	<.05	0	N.A.	<.05	16	<.05	N.A.	N.A.	0	1
1997	4,158	<.05	<.05	N.A.	1	6	<.05	N.A.	N.A.	0	<.05
1998	4,808	0	0	N.A.	3	35	<.05	N.A.	N.A.	1	2
1999	2,064	<.05	0	N.A.	6	6	1	N.A.	N.A.	<.05	<.05
2000	3,972	0	0	N.A.	0	0	0	N.A.	N.A.	0	1
2001	4,058	0	0	N.A.	0	0	0	N.A.	N.A.	0	2
2002	1,979	0	0	N.A.	0	0	0	N.A.	N.A.	0	<0.5
2003	4,139	0	0	N.A.	0	0	0	N.A.	N.A.	0	<1
2004	4,807	0	0	N.A.	0	0	0	N.A.	N.A.	0	<0.5
2005	3,704	0	0	N.A	0	0	0	N.A.	N.A.	0	<1
2006	3,864	0	0	N.A.	0	0	<1	N.A.	N.A.	0	<1
2007	4,781	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<1
California											
1987	1,592	23,201	5,724	50	823	1,803	405	2	20	403	2
1988	1,209	19,520	8,863	6	804	1,634	414	1	9	322	3
1989	870	17,615	4,505	1	1,019	1,357	501	<.05	17	255	6
1990	862	8,509	2,256	2	925	1,236	356	1	31	373	20
1991	677	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	1,257	3,350	2,586	7	1,087	1,546	291	<.05	22	142	1
1993	1,827	3,795	4,539	26	559	1,770	275	1	44	122	<.05
1994	3,177	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	832	3,038	7,037	49	714	1,159	264	5	31	95	5
1996	5,146	3,347	5,455	62	4,687	1,175	316	1	20	96	<.05
1997	3,358	4,774	6,070	82	2,250	1,442	317	35	32	132	<.05
1998	2,459	5,799	5,846	53	1,946	1,343	319	2	11	97	1
1999	5,491	1,353	3,759	105	161	1,982	253	10	5	62	<.05
2000	1,884	1,148	780	87	312	2,612	250	3	5	80	<0.5
2001	2,972	642	57	53	196	2,194	360	2	2	46	0
2002	2,692	544	236	10	9.7	1,697	315	N.A.	N.A.	82	41
2003	1,711	465	349	35	36	2,126	294	4	5	68	0
2004	1,352	488	307	22	38	1,185	114	2	5	53	0
2005	478	285	522	0	206	294	178	<1	9	33	0
2006	208	77	48	0	<1	539	159	<1	4	46	0
2007	858	104	5	N.A.	45	550	203	2	5	45	N.A.

Table 4. Pacific coast real commercial ex-vessel revenues (1999)[1] from highly migratory species by state

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
					Revenues ($)						
Washington											
1987	1,160,514	N.A.	0	N.A.	0	0	298,466	N.A.	N.A.	N.A.	580
1988	4,666,429	N.A.	0	N.A.	0	13,526	31,385	N.A.	N.A.	N.A.	65
1989	1,730,680	N.A.	0	N.A.	0	0	10,541	N.A.	N.A.	N.A.	0
1990	2,693,806	N.A.	0	N.A.	0	0	33	N.A.	N.A.	N.A.	0
1991	818,179	N.A.	17	N.A.	0	0	287	N.A.	N.A.	N.A.	52
1992	5,014,569	N.A.	82	N.A.	0	0	655	N.A.	N.A.	N.A.	39
1993	4,603,209	N.A.	0	N.A.	0	5,907	953	N.A.	N.A.	N.A.	34
1994	10,609,267	N.A.	0	N.A.	0	0	102	N.A.	N.A.	N.A.	0
1995	6,429,656	N.A.	0	N.A.	0	328	16,541	N.A.	N.A.	N.A.	16
1996	9,515,982	N.A.	0	N.A.	0	0	11,619	N.A.	N.A.	N.A.	44
1997	7,000,641	N.A.	0	N.A.	0	0	10,922	N.A.	N.A.	N.A.	10
1998	8,962,842	N.A.	0	N.A.	0	0	19,243	N.A.	N.A.	N.A.	71
1999	3,637,282	N.A.	0	N.A.	27,772	9,445	144,232	N.A.	N.A.	N.A.	0
2000	5,837,871	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	9
2001	7,951,774	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2002	7,441,030	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2003	0	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2004	15,891,469	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2005	11,009,583	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2006	15,176,684	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2007	10,481,053	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Oregon											
1987	2,319,249	0	0	N.A.	9	0	214,998	N.A.	N.A.	0	0
1988	4,444,898	0	0	N.A.	0	0	180,477	N.A.	N.A.	0	0
1989	1,142,060	0	0	N.A.	0	0	19	N.A.	N.A.	0	0
1990	2,167,028	0	0	N.A.	0	0	664	N.A.	N.A.	0	69
1991	1,166,314	0	0	N.A.	0	0	0	N.A.	N.A.	0	73
1992	4,554,091	0	0	N.A.	0	0	1,228	N.A.	N.A.	0	99
1993	4,350,334	0	0	N.A.	0	0	498	N.A.	N.A.	0	130
1994	4,103,617	0	0	N.A.	0	0	0	N.A.	N.A.	0	93
1995	4,332,302	336	9	N.A.	454	25,141	1,681	N.A.	N.A.	0	192
1996	7,801,152	9	0	N.A.	1,203	125,422	234	N.A.	N.A.	0	438
1997	7,567,729	536	424	N.A.	3,332	51,790	199	N.A.	N.A.	0	209
1998	6,665,217	0	0	N.A.	15,783	263,820	114	N.A.	N.A.	2,726	5,628
1999	3,782,057	198	0	N.A.	38,117	46,955	2,588	N.A.	N.A.	787	48
2000	7,487,569	0	0	N.A.	0	0	1,190	N.A.	N.A.	0	529
2001	7,544,089	0	0	N.A.	0	0	0	N.A.	N.A.	0	1,211
2002	2,951,707	0	0	N.A.	0	0	0	N.A.	N.A.	0	244
2003	6,125,406	0	0	N.A.	0	0	0	N.A.	N.A.	0	677
2004	9,006,482	0	0	N.A.	0	0	0	N.A.	N.A.	0	871
2005	8,890,821	0	0	N.A.	0	0	0	N.A.	N.A.	0	1,391
2006	8,046,824	0	0	N.A.	0	0	693	N.A.	N.A.	0	374
2007	9,467,854	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	520
California											
1987	3,606,229	33,183,108	5,982,568	244,701	2,902,331	15,405,478	1,125,308	2,560	30,721	989,632	1,986
1988	3,168,789	34,161,742	12,618,821	33,772	4,445,064	12,994,405	1,099,073	1,097	13,328	868,676	2,858
1989	2,000,622	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,192,430	191	31,313	707,408	4,631
1990	2,050,187	10,485,225	2,361,619	10,928	1,433,788	8,811,042	785,836	2,067	42,599	909,368	15,765
1991	1,365,494	4,721,908	3,130,632	50,650	137,612	7,497,271	1,144,714	0	28,944	491,477	767
1992	3,645,713	4,412,452	1,606,481	51,444	1,360,230	8,709,765	520,038	693	17,108	266,344	1,918
1993	4,048,179	6,440,417	3,498,178	238,527	841,129	10,056,643	518,669	509	32,498	248,651	517
1994	7,580,459	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,452	46	37,579	270,088	17,479
1995	1,615,269	3,260,593	5,125,378	268,465	1,128,552	6,987,810	492,511	9,389	26,730	177,076	2,785
1996	11,265,909	3,388,527	4,185,411	273,321	4,237,475	6,238,375	622,640	1,635	18,591	174,621	135
1997	5,961,123	5,253,506	5,639,039	370,331	2,893,118	6,245,568	598,164	64,543	35,781	232,737	67
1998	3,440,213	5,976,102	5,322,183	277,238	3,042,986	5,788,972	555,437	2,635	9,513	170,623	395
1999	10,102,663	1,468,544	2,748,208	639,668	895,534	8,253,140	469,587	18,424	5,876	108,980	35
2000	3,829,200	1,294,388	483,242	579,384	576,439	11,770,080	485,073	2,736	4,636	136,698	294
2001	5,191,333	445,861	32,878	320,753	472,785	8,695,855	584,636	2,767	8,428	75,572	0
2002	3,899,203	588,677	128,245	87,304	33,148	6,320,439	517,427	N.A.	N.A.	124,522	18,351
2003	2,600,649	450,925	159,961	262,768	73,863	7,796,022	475,014	2,907	3,463	113,502	0
2004	2,447,909	447,555	109,254	147,696	53,483	4,824,134	195,373	2,500	4,060	97,141	0
2005	1,102,025	316,368	292,121	0	136,848	1,872,431	270,449	588	6,234	57,577	0
2006	535,590	175,646	40,346	0	3,790	2,695,302	298,843	271	4,509	79,144	0
2007	1,714,639	149,568	4,361	N.A.	58,106	3,131,178	337,145	2,903	4,334	78,569	N.A.