Pelagic Fisheries of the Western Pacific Region

2005 Annual Report

June 2006
Western Pacific Regional Fishery Management Council
Honolulu, Hawaii

Cover photo:

Photograph of baskets of traditional longline or flag-line gear deployed by Hawaii longline sampans courtesy of the National Marine Fisheries Service Pacific islands Fisheries Science Center

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2005 Annual Report

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for the

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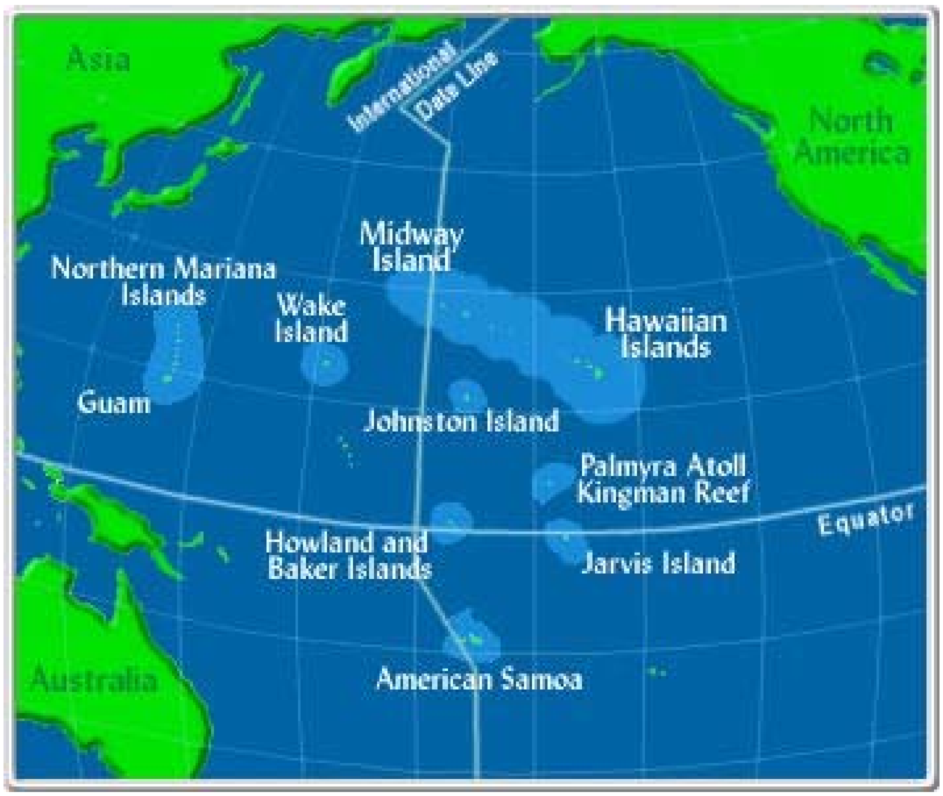
Pelagic Fisheries of the Western Pacific Region — 2005 Annual Report

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 2005 and responsible for compilation of this report are included in Appendix 1.

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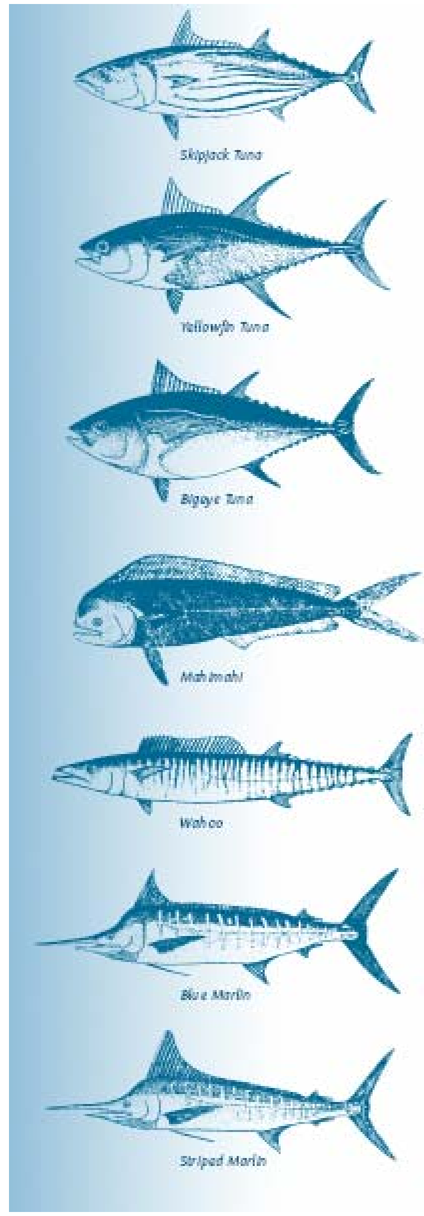
1 The Magnuson Act was amended to allow the inclusion of tunas in US fishery management authority as of January 1992. In the Pacific, tuna management is the responsibility of the regional fishery management councils. Pacific pelagic management unit species (PPMUS) includes former pelagic management unit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



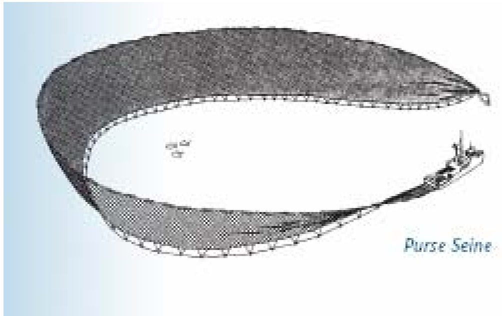
The previous MUS shark listing used to include oceanic species of the families *Alopiidae, Carcharinidae, Lamnidae, Sphynidae*. However, this could be construed to mean all members of these four shark families, which would also include nearshore and demersal sharks. The Pelagics Plan Team recommended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

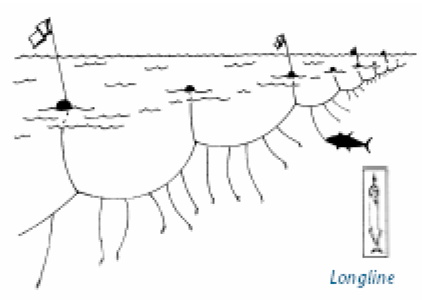
C. Pelagic Gear Types and Fisheries of the Western Pacific Region

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.



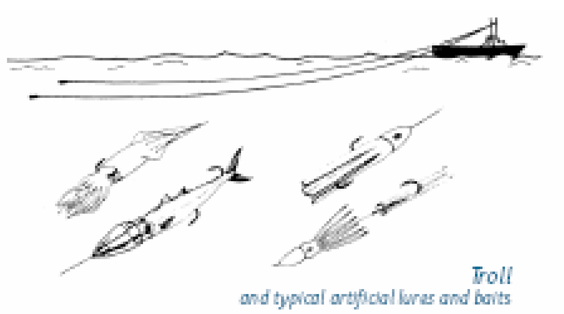
The largest fishery in terms of tonnage of fish landed is the U.S. purse-seine fishery, with catches of skipjack, yellowfin and bigeye tuna, amounting to 87,994 mt. However, this fleet has been decreasing in size from a peak in 1984 of 61 vessels to 14 vessels in 2004. Catches of blue marlins by this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



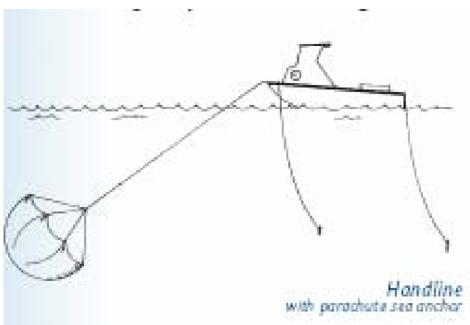
U.S. longline vessels in the Western Pacific Region are based primarily in Hawaii and American Samoa, although Hawaii-based vessels targeting swordfish have also fished seasonally out of California. The Hawaii fishery, with about 125 vessels targets a range of species, with vessels setting shallow longlines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

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.

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.

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.

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.

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

[1] http://oceanwatch.pifsc.noaa.gov/

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.).

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

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

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.

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.

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 2005 in the Western Pacific and the percentage change between 2004 and 2005 is shown in Table 2.

Table 2. Total pelagic landings in lbs in the Western Pacific Region in 2005

Species	Am Samoa	% change	Guam	% change	Hawaii	% change	CNMI	% change
Swordfish	7,836	-10.9			3,545,000	+492.8		
Blue marlin	42,100	+79.7	9,208	-80.9	1,080,000	+9.4	1,595	-20.3
Striped marlin	7,040	+78.5			1,194,000	+27.7		
Other billfish	9,407	+20.7	0	-100	507,000	+3.5	38	-91.2
Mahimahi	52,558	+21.2	107,179	-45.7	1,574,000	-31.8	26,891	-23.1
Wahoo	482,892	+2.3	43,926	-62.5	879,000	-4.1	3,349	-51.1
Opah (moonfish)	7,462	+66.5			1,094,000	+40.1		
Sharks (whole wgt)	906	-69.5			393,000	-6.0		
Albacore	6,445,869	+18.7			1,039,000	-10.0		
Bigeye tuna	291,690	-35.1			11,598,000	+9.9		
Bluefin tuna					2,000	+100		
Skipjack tuna	324,618	-39.5	99,357	-38.6	1,172,000	-0.6	258,911	+76.7
Yellowfin tuna	1,142,082	-41.9	24,910	-75.6	3,189,000	+1.2	52,014	+93.5
Other pelagics	7,316	-13.9	18,762	-71.1	1,105,000	-8.9	19,150	+8
Total	**8,821,808**	**-2.0**	**303,342**	**-56.4**	**28,370,000**	**+14.9**	**370,672**	**+57.5**

IV. 2005 Region-wide Pelagics Plan Team Recommendations

The Pelagics Plan Team met in Honolulu, Hawaii on May 2 – 4, 2006 and made the following recommendations to the Council:

1. The Pelagic Plan Team recommends that the Council develop a trial version of the 2006 Pelagics Annual Report that incorporates the revisions as suggested in the Council Contractor's report on modifications to its annual report.

2. The PPT recommends that an ecosystem approach be taken in deciding the priorities for stock assessment of pelagic species by the scientific committees of the Pacific regional fishery management organizations.

3. The PPT recommends that published assessment information on necessary reductions in fishing mortality (not catches) be used in quantifying the Council's objectives regarding ending overfishing of bigeye and yellowfin tuna as follows:
    a. Reduce WCPO fishing mortality on bigeye tuna by 20% (WCPFC 2005)
    b. Reduce WCPO fishing mortality on yellowfin tuna by 20% (WCPFC 2005)
    c. Reduce EPO fishing mortality on bigeye tuna by 32% (IATTC 2006)

4. To end overfishing of WCPO and EPO bigeye and WCPO yellowfin tuna, the PPT recommends that the Council focus on input controls rather than output controls, such as

quotas, by the use of such measures as elimination of a percentage of drifting FADS, requiring the remaining FADS to be registered, and setting limitations on longline sets, hooks, vessels, or trips.

5. The PPT recommends that the Council endorse an immediate end to overfishing of bigeye and yellowfin tuna with the following specific effort reduction goals:
   a. Reduce WCPO tuna (bigeye and yellowfin) longline effort by 20%
   b. Reduce WCPO purse seine effort on drifting FADs by 20%
   c. Reduce EPO tuna (bigeye) longline effort by 30%
   d. Reduce EPO purse seine effort on drifting FADs by 30%

V. Data Modules

A. American Samoa

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

In mid-1995 five alias began longlining. The number of alias grew to 12 boats involved in longline fishing in 1996. In 1997, 33 vessels had permits to longline of which 21 were actively fishing on a monthly basis. Also, in 1997 the first longline vessel of 60 plus feet in length (the 60 plus foot longliners are capable of making multi-day trips) began operating in American Samoa. In 1998, 50 local vessels received federal permits to longline but only 25 did longline. Fifty-nine local vessels received federal permits in 1999 to longline but only 29 participated in the longline fishery. In 2000, 37 vessels were active in the longline fishery. In the last half of 2000 the number of larger multi-day longline boats operating in American Samoa grew dramatically to over a half a dozen. In 2001, the number of vessels participating in the longline fishery increased dramatically by 68%, whereas the number of vessels participating in the trolling fishery slightly decreased by 5%. In 2002, 66 boats registered and 60 participated in the longline fishery while in 2003 the number of boats which registered dropped to 57 and the number effectively fishing dropped to 51.

Prior to 1985, only commercial landings were monitored. From October 1985 to the present, data was collected through an offshore 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) with 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 required to submit logs containing detailed data on each of their sets and the resulting catch. From 1996 to 1999, the logbooks submitted by the local longliners were edited in Samoa for any missing data and were then sent to the NMFS Honolulu Lab every week for further editing and data processing. Starting with 2000, logbook data was entered and maintained in Samoa and downloaded to NMFS in Hawaii periodically.

On July of 1999, in response to a problem with delinquent longline logs, the 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 boats 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.

“Peculiarities” in the historical data, the emergence of new, bigger boats that make multi-day trips required amending and supplementing the algorithms that expand American Samoa’s offshore creel survey data. WPacFIN staff 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 1986-2005 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 is no longer a sum of 12 monthly expansions. Note that there are some changes to the historical data due to the new re-expanded and adjusted data. As a result, the graph presentations have also changed.

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

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

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

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

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

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

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

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

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

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

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

The "other pounds" category in Table 1 includes pelagic species not caught by longlining or trolling. Examples are barracuda, rainbow runner and dogtooth tuna, caught with bottomfishing or spearfishing methods. In addition, "other sharks" as it is identified on Table 1, categorizes all species of sharks that could and could not be identified by the fishermen.

The Offshore Creel Survey System showed almost no By-Catch species during 2002 thus the bycatch for longlining was assumed to be the released species in the longline logbook system. In addition, the number of bycatch has impressively increased for this year. There was no fishing tournaments held during 2002.

The island of Tutuila is also a major base for the trans-shipment and processing of tuna taken by the distant-waters longliner and purse seine fleets. The domestic pelagic fishery is monitored by the Department of Marine and Wildlife Resources (DMWR), through a program established in conjunction with the Western Pacific Fishery Information Network (WPacFIN). This report was prepared by DMWR using information obtained and processed as explained above.

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

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

Summary
Landings (pound) - Total pounds landed of pelagic species was 8,000,000 and dominated by albacore caught using longline gear. The next four highest totaling species landed were yellowfin tuna, wahoo, skipjack tuna, and bluefin tuna, respectively. Commercial price was 0.90 to 1.00 dollar with total value figures mirroring landings except skipjack tuna which is less valuable. Estimated total landings of tunas decreased again for 2005, continuing the decline since 2002. However, the decrease was small, three percent between 2004 and 2005, and the landings-trend may be reaching a stabilizing level. Estimated total landings of non-tuna PMUS increased and appear to be continuing the upward trend with time.

Effort – Number of longline vessels, sets, hours and hooks fished have all decreased continuing trends downward over time that began in 2001-2003. Forty-six boats landed pelagic species in American Samoa during 2005; 35 using longline gear and 9 trolling. Nine vessels trolling is a 50% decrease in 2005, the lowest number reported in statistics, and less than one-third of the long-term average.

CPUE – For the dominant sector of the American Samoa pelagic fleet, monohull vessels greater than 50 feet, CPUE increased 35% in 2005, reversing the trend occurring since 2001. However, at 17.4, albacore CPUE is still approximately one-half the peak value of 2001. For other often caught pelagic species CPUE values down from higher values in 2004; however, CPUE values of these other species are still high or within the range of recent (01-04) values. Pelagic trolling CPUE increased continuing an overall trend since 2001 due primarily to wahoo catches. Alia longline CPUE continued a decline that has been the overall trend since 1996.

Fish Size – Average albacore size decreased 3.5 pounds (9.6%) continuing a general trend in the American Samoa Fishery since 1999. Yellowfin, bigeye, and skipjack tunas as well as mahimahi also decreased in average size landed for 2005, although a long-term decreasing size trend is less clear for these species due to variation between reported values. Average wahoo size increased for 2005 in what appears to be normal variation around a leveling value.

Revenues – Inflation-adjusted revenues from pelagic species decreased for 2005 by one-million dollars to $8,000,000, continuing a trend that began in 2003. The decreased and trend are primarily due to decreased albacore landings. Adjusted non-tuna PMUS revenues increased four percent to $500,000 continuing their 15-year increasing trend.

Released Fish – Released fish numbers are dominated by large monohull vessels returning pelagic sharks and skipjack tuna. Oilfish, blue marlin, yellowfin tuna and mahimahi are also released in relatively large numbers by monohull vessels longer than 50 feet. Smaller vessels release sharks and oilfish.

Conclusion - The CPUE increased in the beyond 50-mile albacore longline fishery indicating an ecologically stable point in the fishery may have been crossed. However, the number of boats, and hooks, landings, and revenue decreased indicating more social and economic adjustments are likely. Continued growth in the wahoo landings appears likely and sustainable at the current rate. The fishery for species other than albacore and wahoo do not appear stable and are likely to decrease given current data.

2004 Recommendations and **current status**:

1 The Pelagic Plan Team recommend that DMWR seek grants to develop infrastructure and processes to utilize bycatch, which may require hiring a contract grant writer. ***2 or 3 private operations are developing to utilize bycatch. DMWR's mandate does not include fishing infrastructure development. This appears to be well covered by private industuries in the Territory.***

2. The Pelagic Plan Team recommend to propose a limited number of longline permit in the AS EEZ (with a maximum size of line or number of hooks). ***Limited entery longline permits were issued in December of 2005.***

3. The Pelagic Plan Team recommend that an appropriate training be given to the technicians in order to increase their skills in identifying fish. The council should organize a standardized training for all the technicians of the American pacific territories. This training aims to give certification to the participant and should be provided every year. ***DMWR staff are fully trained in our pelagic species. DMWR and WPacFIN have conducted staff training.***

2005 Recommendations:

I. Report Format Changes
1. Include standardized length frequency plots for species (at least 5 years)
2. Include released fish numbers plot over time, excluding sharks. Eg. Table 3B
3. Include graph of beyond 50-mile longline CPUE over time. Eg. Figure 18-19
4. Graph by species – weight per fish over time using points (not lines). Eg. Table 8

5. Use points not line on all plots.
6. Include (number of fish) with pounds, CPUE and size per fish tables. Eg. Table 8
7. Calculate percent to one digit after decimal point and drop% symbol from the body of the table. Eg. Table 5a

II. Provide discussion on the idea and propose a funding mechanism for a commercial pelagic fishery scientist at the DMWR in American Samoa.

III. Future Analysis of 50 mile closure: Eg. Table 4

a. For 50-mile closure break out Swains and Tutuila;
b. For 50-mile closure try to ID line crossers during set and sets close to islands;
c. For 50-mile closure report: a new column grand-fathered vessels when fishing inside 50-mile line.

Table 1. American Samoa 2005 Estimated Total Landings by Pelagic Species by Gear Type.

Species	LongLine Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack Tuna	313,374	11,244	0	324,618
Albacore	6,445,869	0	0	6,445,869
Yellowfin Tuna	1,135,347	6,735	0	1,142,082
Kawakawa	0	33	0	33
BigeyeTuna	290,678	1,012	0	291,690
Tunas	511	0	0	511
TUNAS SUBTOTALS	8,185,779	19,024	0	8,204,803
Mahimahi	52,389	169	0	52,558
Black marlin	1,055	0	0	1,055
Blue marlin	41,793	306	0	42,100
Striped Marlin	7,040	0	0	7,040
Wahoo	482,021	854	17	482,892
All Pelagic Sharks	845	21	40	906
Swordfish	7,816	20	1	7,836
Sailfish	4,227	264	0	4,491
Spearfish	3,861	0	0	3,861
Moonfish	7,462	0	0	7,462
Oilfish	677	0	0	677
Pomfret	1,957	0	90	2,047
NON-TUNA PMUS SUBTOTALS	611,142	1,634	148	612,923
Barracudas	600	870	453	1,923
Rainbow runner	34	310	0	343
Dogtooth tuna	0	237	39	276
Other Pelagic Fish	1,538	0	0	1,538
OTHER PELAGICS SUBTOTALS	2,172	1,417	492	4,081
TOTAL PELAGICS	**8,799,093**	**22,075**	**640**	**8,821,808**

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

Table 2. American Samoa 2005 Estimated Commercial Landings, Value and Average Price by Pelagic Species.

	Longline			Troll/Non-Longline		
Species	**Pounds**	**Value($)**	**$/LB**	**Pounds**	**Value($)**	**$/LB**
Skipjack Tuna	309,000	$185,901	$0.60	7,628	$7,736	$1.01
Albacore	6,445,484	$6,072,465	$0.94	0	$0	
Yellowfin Tuna	1,110,585	$1,010,375	$0.91	4,512	$8,950	$1.98
BigeyeTuna	285,712	$315,286	$1.10	0	$0	
TUNAS SUBTOTALS	8,150,780	$7,584,026	$0.93	12,140	$16,686	$1.37
Mahimahi	8,360	$16,607	$1.99	128	$273	$2.14
Black marlin	957	$957	$1.00	0	$0	
Blue marlin	2,972	$3,097	$1.04	0	$0	
Wahoo	464,233	$428,173	$0.92	220	$323	$1.47
All Pelagic Sharks	0	$0		21	$10	$0.50
Swordfish	7,836	$18,227	$2.33	0	$0	
Sailfish	1,239	$1,127	$0.91	0	$0	
Moonfish	777	$664	$0.85	0	$0	
Oilfish	2	$2	$1.00	0	$0	
Pomfret	9	$18	$2.00	90	$180	$2.00
NON-TUNA PMUS SUBTOTALS	486,386	$468,872	$0.96	458	$787	$1.72
Barracudas	340	$594	$1.75	341	$469	$1.38
Rainbow runner	34	$64	$1.91	52	$99	$1.91
Dogtooth tuna	0	$0		104	$205	$1.98
OTHER PELAGICS SUBTOTALS	373	$659	$1.76	496	$773	$1.56
TOTAL PELAGICS	**8,637,539**	**$8,053,557**	**$0.93**	**13,094**	**$18,246**	**$1.39**

Table 3A. American Samoa 2005 Longline Effort and Number of Fish Kept by two kinds of longline vessels

EFFORT

	Alias	Monohulls
Boats	7	29
Trips	223	179
Sets	312	4,007
1000 Hooks	168	10,952
Lightsticks	1,185	981

KEPT (Number of Fish)

Species	Alias	Monohulls	All Vessels
Skipjack Tuna	169	24,137	24,306
Albacore	1,587	190,655	192,242
Yellowfin Tuna	1,111	27,721	28,832
BigeyeTuna	150	9,212	9,362
Tunas	0	31	31
TUNAS SUBTOTALS	3,017	251,756	254,773
Mahimahi	351	2,421	2,772
Black marlin	0	1	1
Blue marlin	24	356	380
Striped Marlin	7	64	71
Wahoo	373	14,970	15,343
All Pelagic Sharks	0	13	13
Swordfish	10	126	136
Sailfish	13	43	56
Spearfish	1	84	85
Moonfish	14	211	225
Oilfish	1	48	49
Pomfret	0	239	239
NON-TUNA PMUS SUBTOTALS	794	18,576	19,370
Barracudas	0	26	26
Other Pelagic Fish	7	32	39
OTHER PELAGICS SUBTOTALS	7	58	65
TOTAL PELAGICS	**3,818**	**270,390**	**274,208**

Table 3B. American Samoa 2005 Longline Number of Fish Released by two kinds of longline vessels

RELEASED (Number of Fish)

Species	Alias	Monohulls	All Vessels
Skipjack Tuna	21	5,856	5,877
Albacore	0	336	336
Yellowfin Tuna	68	1,155	1,223
BigeyeTuna	0	390	390
Tunas	0	4	4
TUNAS SUBTOTALS	89	7,741	7,830
Mahimahi	0	839	839
Black marlin	0	3	3
Blue marlin	0	1,360	1,360
Striped Marlin	2	159	161
Wahoo	0	430	430
All Pelagic Sharks	65	7,255	7,320
Swordfish	0	92	92
Sailfish	0	499	499
Spearfish	0	410	410
Moonfish	0	550	550
Oilfish	14	3,187	3,201
Pomfret	7	487	494
NON-TUNA PMUS SUBTOTALS	88	15,271	15,359
Barracudas	0	153	153
Other Pelagic Fish	0	904	904
OTHER PELAGICS SUBTOTALS	0	1,057	1,057
TOTAL PELAGICS	**177**	**24,069**	**24,246**

Interpretation: This table indicates the effort and catch data by two different types of vessels participating in the American Samoa longline fishery in the year 2005. Clearly it illustrates that the overwhelming majority of the effort and catch is performed by the monohulls. They account for 98.6% of the total pelagics caught, compared to 1.4% by the alias. It also shows that 99.27% of the releases are made by the monohulls while the alias fleet accounts for only 0.73% of the released fish.

Calculation: These values are sums of Longline Logbook data for the three types of longline vessels in Samoa. All species of sharks entered in the Longline Logs are combined in the Other Sharks species. Rays and Sunfish are included in the Other Pelagic Fish species. A trip is a unique combination of boats and return dates where the return date is in the current year.

Table 4. **American Samoa 2005 longline effort and catch by boats < 50' long and > 50' long inside and outside of restricted areas less than 50 miles from shore**

EFFORT

	Boats < 50' Inside	Boats < 50' Outside	Boats > 50' Inside	Boats > 50' Outside
Boats	6	3	14	27
Trips	208	13	32	147
Sets	270	46	69	3,919
1000 Hooks	154	31	135	10,763

CATCH (Number of Fish)

Species	Boats < 50' Inside	Boats < 50' Outside	Boats > 50' Inside	Boats > 50' Outside
Skipjack Tuna	209	86	415	29,473
Albacore	2,213	548	1,679	188,138
Yellowfin Tuna	1,100	115	604	28,236
BigeyeTuna	106	22	64	9,560
Tunas	0	0	0	35
TUNAS SUBTOTALS	3,628	771	2,762	255,442
Mahimahi	322	83	79	3,127
Black marlin	0	0	0	4
Blue marlin	15	13	8	1,704
Striped Marlin	4	0	3	225
Wahoo	325	87	158	15,203
All Pelagic Sharks	108	4	95	7,126
Swordfish	8	4	3	213
Sailfish	20	0	13	522
Spearfish	4	0	3	488
Moonfish	17	1	9	748
Oilfish	12	0	45	3,193
Pomfret	0	0	5	728
NON-TUNA PMUS SUBTOTALS	835	192	421	33,281
Barracudas	0	0	2	177
Other Pelagic Fish	0	0	22	921
OTHER PELAGICS SUBTOTALS	0	0	24	1,098
TOTAL PELAGICS	**4,463**	**963**	**3,207**	**289,821**

Interpretation: Ninety seven percent of hooks were set by boats greater that 50 feet outside of the 50-mile lines around Tutuila and Swains Atoll. Nearly equal numbers of hooks was reported by boats less than 50 feet and by boats greater than 50 feet inside the 50-mile lines. Ninety-eight percent of the albacore catch was recorded from boats greater than 50 feet outside the 50-mile lines.

Skipjack tuna catches outside the 50-mile line are second most common, approximately 1/6th of albacore catches. Yellowfin tuna catches are nearly equal to skipjack tuna outside the 50-mile line. Inside the 50-mile line, yellowfin tuna catch numbers are between 36 and 50 percent of albacore catch. Wahoo are the dominant non-tuna species in the catch inside and outside the 50-mile line. Mahimahi are nearly equal in catch to wahoo for boats less than 50 feet. However, non-tuna species catches are less than 10% of the albacore catch; except for small boats inside 50-miles where both wahoo and mahimahi catch is approximately 15 percent of albacore catch. It is important to note that while some part of a trip may be reported inside of 50-miles, the catch may come from outside the 50-mile line.

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 2005 Longline Bycatch Percentages for the two kinds of longline vessels

Species	Alias	Monohulls	All Boats
Skipjack Tuna	11.05 %	19.52 %	19.47 %
Albacore	0.00 %	0.18 %	0.17 %
Yellowfin Tuna	5.77 %	4.00 %	4.07 %
BigeyeTuna	0.00 %	4.06 %	4.00 %
Tunas	0.00 %	11.43 %	11.43 %
TUNAS SUBTOTALS	2.87 %	2.98 %	2.98 %
Mahimahi	0.00 %	25.74 %	23.23 %
Black marlin	0.00 %	75.00 %	75.00 %
Blue marlin	0.00 %	79.25 %	78.16 %
Striped Marlin	22.22 %	71.30 %	69.40 %
Wahoo	0.00 %	2.79 %	2.73 %
All Pelagic Sharks	100.0 %	99.82 %	99.82 %
Swordfish	0.00 %	42.20 %	40.35 %
Sailfish	0.00 %	92.07 %	89.91 %
Spearfish	0.00 %	83.00 %	82.83 %
Moonfish	0.00 %	72.27 %	70.97 %
Oilfish	93.33 %	98.52 %	98.49 %
Pomfret	100.0 %	67.08 %	67.39 %
NON-TUNA PMUS SUBTOTALS	9.98 %	45.12 %	44.23 %
Barracudas	0.00 %	85.47 %	85.47 %
Other Pelagic Fish	0.00 %	96.58 %	95.86 %
OTHER PELAGICS SUBTOTALS	0.00 %	94.80 %	94.21 %
TOTAL PELAGICS	**4.43 %**	**8.17 %**	**8.12 %**

Table 5B. American Samoa 2005 Trolling Bycatch

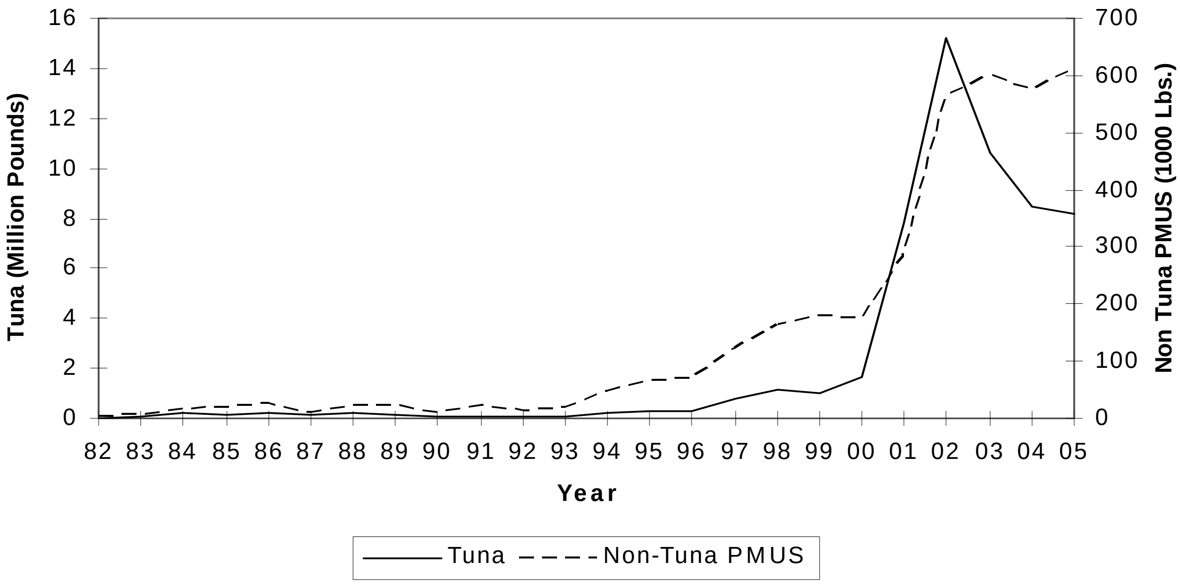
Species	Bycatch: Alive	Dead Inj	Unk	Total	Catch	%BC	Interviews: With BC	All	%BC
All Species (Comparison)					1686	0.000	0	328	0.00

Interpretation: Table 5A shows longline bycatch percentages for the two types of longline vessels in 2005. The fishery is focused on albacore with most wahoo, yellowfin tuna and bigeye tuna landed as well. There are high bycatch percentages for most non-tuna PMUS for monohull vessels as local or export markets are not developed for the volume of fish available from the vessels. Also alias fish close to port and are better able to market species not purchased by local canneries. The total bycatch percentages are low in spite of high percentages for some species because of the dominance of albacore which has very little bycatch.

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

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

Figure 1. American Samoa Annual Estimated Total Landings of Tuna and Non-Tuna PMUS



Interpretation: Estimated total landings were low from 1980s up to 1993. However, there was an increase in the number of total landings from 1993 to the present. This year there has been a 28.7% decrease in the total landings of tuna compared to the 92% increase from 2002. The total landings for other pelagic species also increase about 7% for 2003.

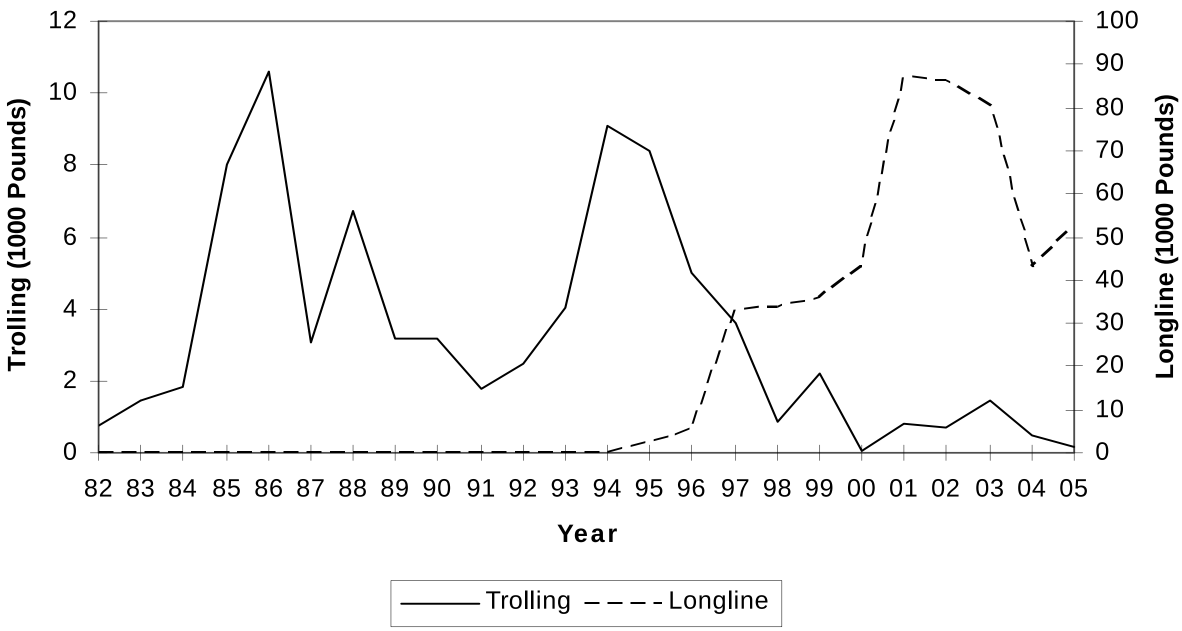
Estimated total landings were relatively low from 1982 through the early 1990s. Catches of tunas increased from below one million pounds to over 15 million pounds during 2002, primarily between 2000 and 2002. Tuna landings have dropped each year since 2002. Between 2004 and 2005 tuna catches dropped 247,227 pounds (2.9%) to 8,204,803 in American Samoa.

Catches of non-tuna PMUS were below 25,000 pounds from 1982 through 1993. From 1993 through 2000, non-tuna PMUS catches build steadily to 175,000 pounds. Non-tuna PMUS spiked to over 550,000 pounds between 2000 and 2002 and has remained high and generally increasing to 613,000 in 2005. Non-tuna PMUS catch increased 39,907 pounds between 2004 and 2005 (7%) in American Samoa.

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.

	Pounds Landed	
Year	**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	73,110	21,522
1992	102,147	12,530
1993	48,036	19,620
1994	190,295	48,154
1995	288,105	64,412
1996	318,457	68,721
1997	800,326	123,420
1998	1,160,077	163,625
1999	1,007,323	178,746
2000	1,678,168	175,098
2001	7,850,044	283,632
2002	15,182,822	566,217
2003	10,588,856	598,540
2004	8,452,030	573,016
2005	8,204,803	612,923
Average	**2,381,776**	**151,729**
Std. Dev.	**4,148,922**	**207,167**

Figure 2. American Samoa Annual Estimated Total Landings of Mahimahi by Gear.

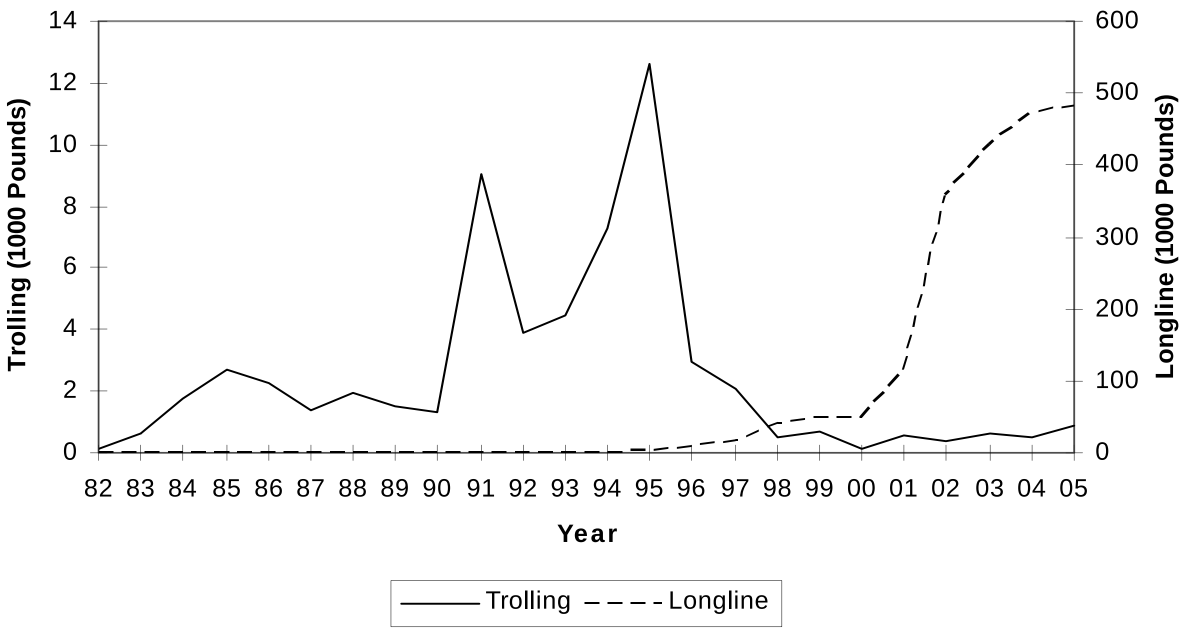


Interpretation: Through the years, Mahimahi landings have been variable. From 1984-1988, American Samoan fishermen exported mahimahi to Hawaii and landings valued between two and eleven thousand pounds. From 1994 through 2001, the longline mahimahi fishery expanded from 101 pounds to 87,000 pounds and dominates the catch. Since 2001, mahimahi catches decreased to 42,985 pounds in 2004. Mahimahi catches increased 9404 pounds (22%) to 52,389 pounds between 2004 and 2005. Trolling is a minor contribution to the mahimahi catch. Commercial mahimahi landings are reported to be 8,488 pounds in 2005. (Table 2).

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	777
1983	0	1,443
1984	0	1,844
1985	0	8,011
1986	0	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	52,389	169
Average	**33,514**	**3,328**
Std. Dev.	**31,181**	**3,010**

Figure 3. American Samoa Annual Estimated Total Landings of Wahoo by Gear.

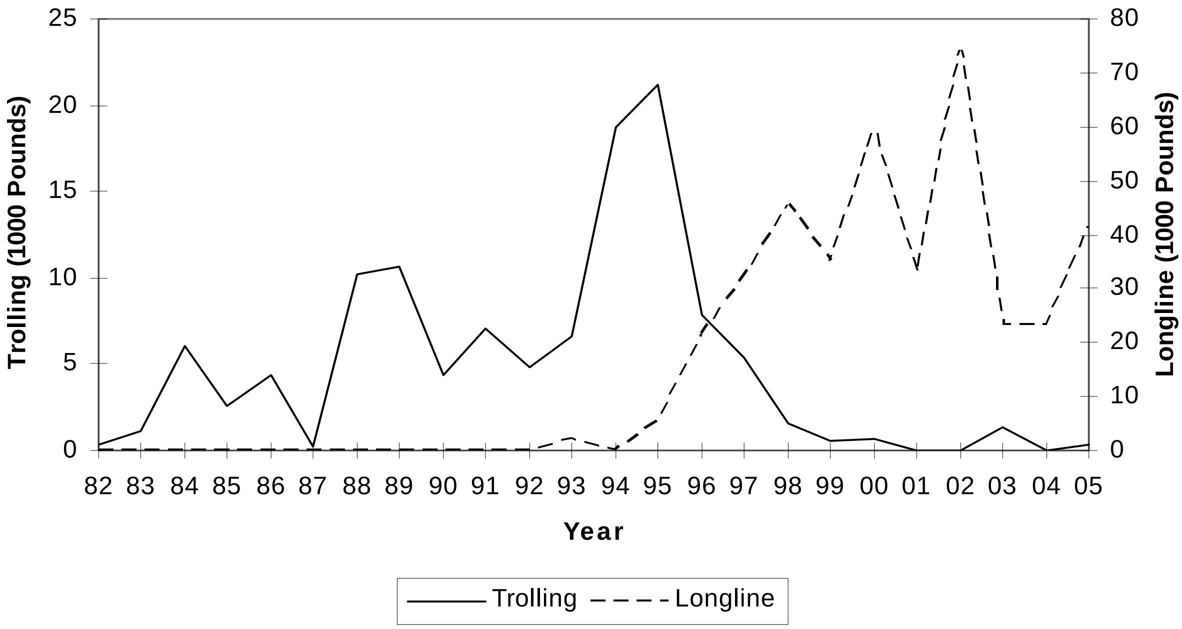


Interpretation: From 1984 through 1997, trolling capture thousands of pounds of wahoo. Longline catches of wahoo built from 1500 pounds in 1995 to 47,432 pounds in 2000. Wahoo catches expanded rapidly from 2000 to 2003 and continue to slowly increase since. Wahoo catch increased 8,775 pounds to 482,591 (1.8%) from 2004 to 2005 in American Samoa. Commercial wahoo landings are reported to be 464,503 pounds in 2005. (Table 2).

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	114
1983	0	632
1984	0	1,777
1985	0	2,678
1986	0	2,294
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	523
2005	482,021	854
Average	**112,114**	**2,506**
Std. Dev.	**176,651**	**3,016**

Figure 4. American Samoa Annual Estimated Total Landings of Blue Marlin by Gear.

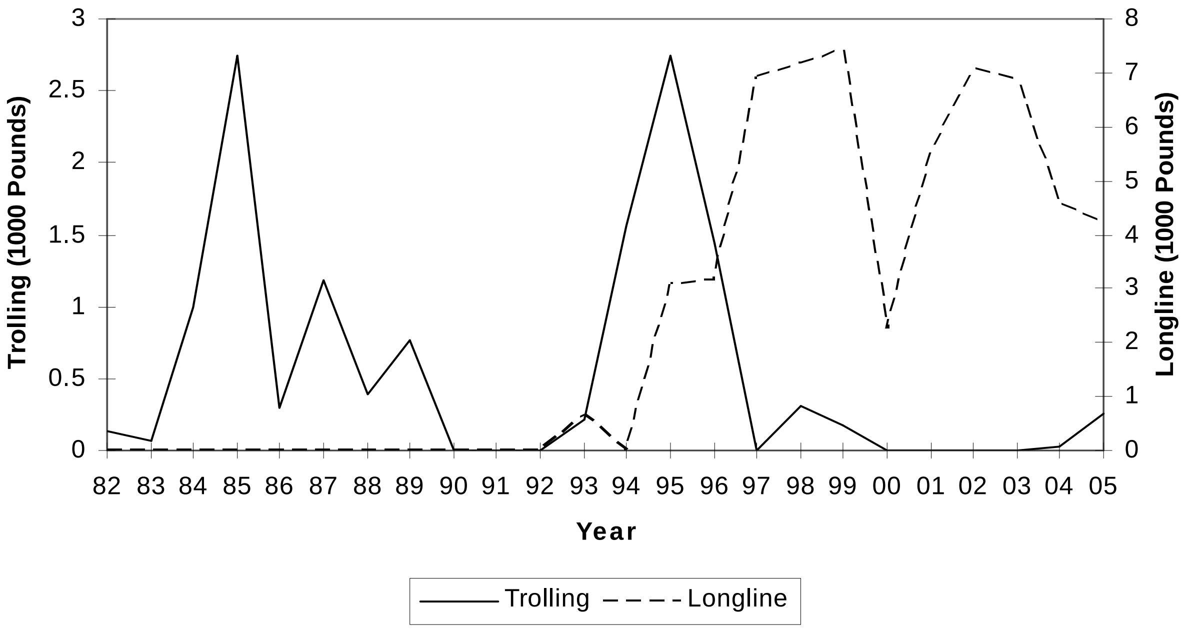


Interpretation: Historically catch of blue marlinwas variable generally increasing from 1982 through 1995 to the troll fishery peak of 20,196 pounds. The blue marlin troll fishery rapidly decreased 1995 through 1999 and has remained very low. Longline catches of blue marlin increased steadily from 5000 pounds in 1995 to 45,000 pounds during 1998. Longline catches of blue marlin were more variable between 1998 and 2002, increasing to a peak of 74,244 during 2002. Blue marlin longline catches dropped to 23,000 pounds in 2003 to 2004. The 2005 longline catch of blue marline increased by 18,371 pounds (44%) to 41,793 pounds between 2004 and 2005. Commercial landings of blue marlin are listed at 2,972 pounds. (Table 2).

Calculation: The estimated total annual landings of blue marlin is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when blue marlin are caught by other methods. 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	32,836	0
2002	74,244	0
2003	23,368	1,344
2004	23,422	0
2005	41,793	306
Average	**30,552**	**4,836**
Std. Dev.	**20,901**	**5,601**

Figure 5. American Samoa Annual Estimated Total Landings of Sailfish by Gear.



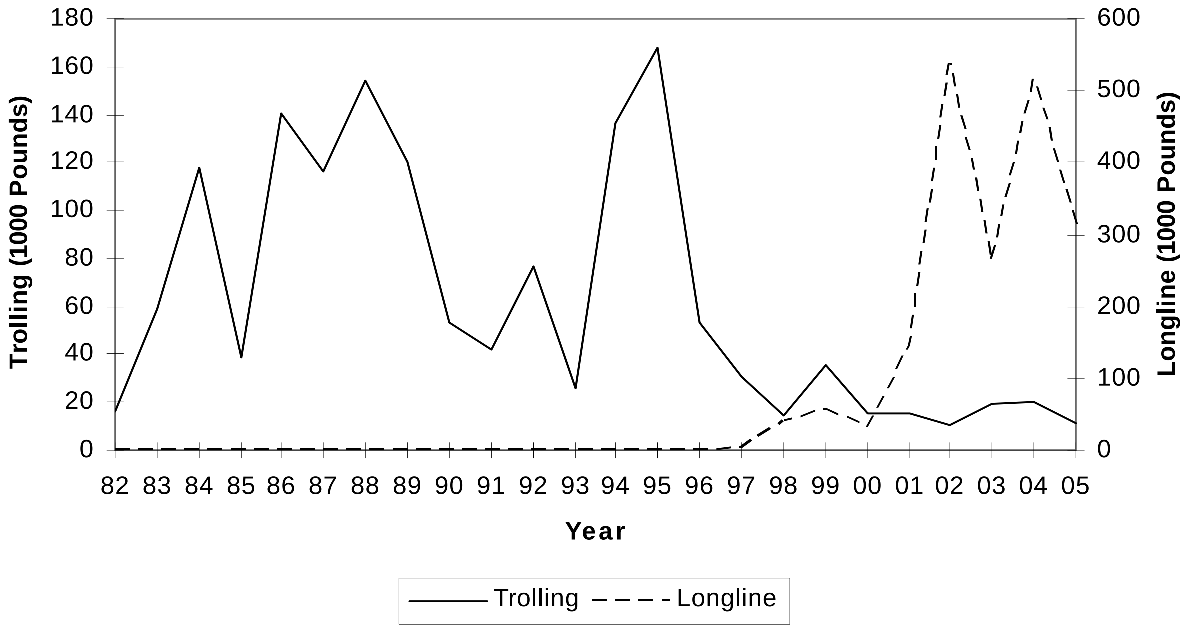
Interpretation: Sailfish troll landings have been variable with peaks near 2,700 pounds during 1985 and 1995 in American Samoa. Since 1996, Sailfish troll landings have been very low.

Sailfish longline landings began in 1993 and increased from zero to near 7,000 pounds for 1997 through 1999. Catches dropped during 2000 and 2001 returning to near 7,000 pounds for 2002 and 2003. Sailfish catches have decreased from 2002 to 2005. The 2005 longline catch of sailfish in American Samoa is 4,227 pounds down 310 pounds
(7%) from 2004. Commercial longline sales of sailfish in American Samoa for 2005 is 1,239 pounds. (Table 2).

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

	Pounds Landed	
Year	Longline	Trolling
1982	0	127
1983	0	74
1984	0	989
1985	0	2,744
1986	0	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	2,257	0
2001	5,535	0
2002	7,060	0
2003	6,862	0
2004	4,537	31
2005	4,227	264
Average	**4,526**	**556**
Std. Dev.	**2,465**	**808**

Figure 6. American Samoa Annual Estimated Total Landings of Skipjack Tuna by Gear.



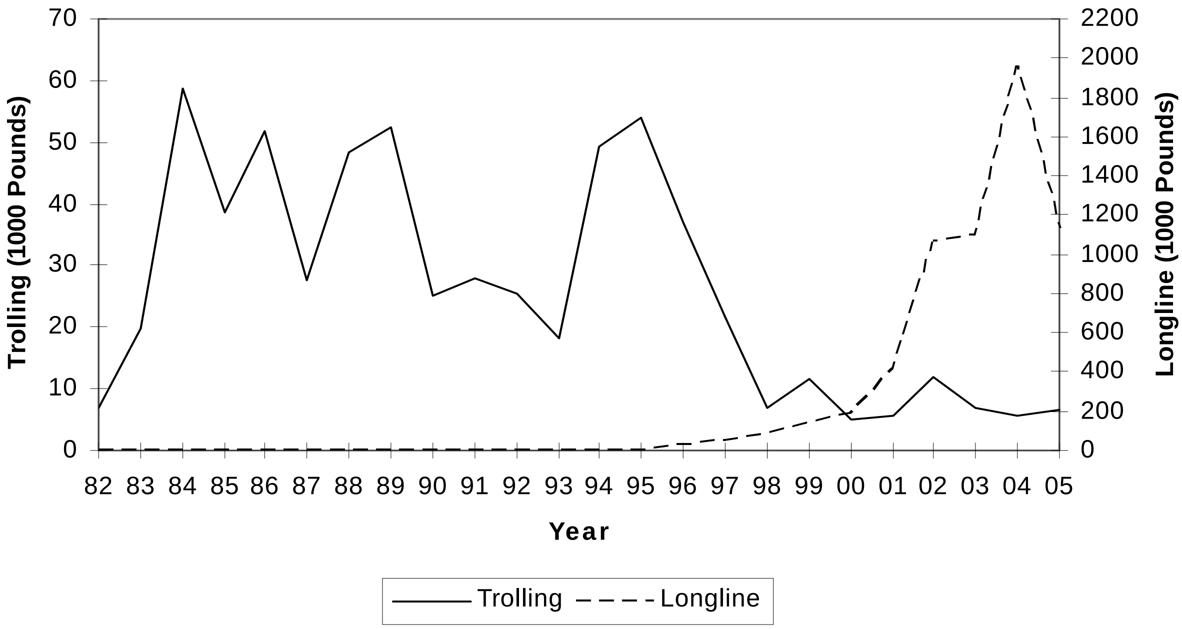
Interpretation: There was a gradual increase in skipjack landings for longlining since 1995, except for a 43% decrease in 2000, and a notable decrease of 49.4% in 2003, in 2004 skipjack landings increased 47% from the previous year.

The skipjack tuna fishery changed from a troll to longline dominated fishery between 1996 and 2000. Catch has been high, in the range of 250,000 to 550,000 pounds and variable since 2002. Longline skipjack tuna catch decreased in 2005 by 203,815 pounds (39%) to 313,374 pounds. Commercial longline catch of skipjack tuna is reported to be 309,000 pounds (Table 2).

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

	Pounds Landed	
Year	Longline	Trolling
1982	0	15,877
1983	0	58,997
1984	0	117,693
1985	0	38,902
1986	0	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	20,329
2005	313,374	11,244
Average	**127,431**	**62,103**
Std. Dev.	**184,137**	**51,077**

Figure 7. American Samoa Annual Estimated Total Landings of Yellowfin Tuna by Gear.



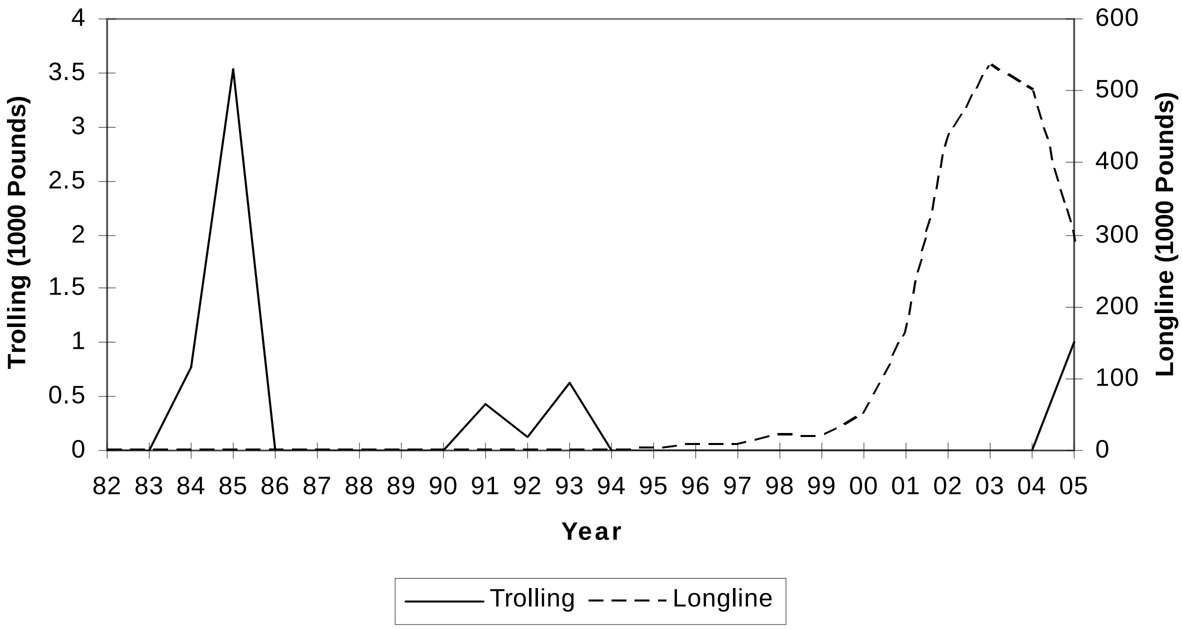
Interpretation: Trolling activities yielded nearly all of the yellowfin tuna landings in the 1980s. The landings were variable between 17 and 58 thousand pounds until 1997 as trolling activities began to decline. Trolling landings declined to approximately 7,000 pounds and have remained relatively stable except for landings of 11,800 pounds during 2002.

Longline yellowfin tuna landings began in 1988 with a gradual increase from 1995 through 2000. Between 2000 and 2004, landings increased ten fold to 1,960,000 pounds. Yellowfin tuna longline landings decreased 824,524 pounds (42%) to 1,135,000 pounds from 2004 to 2005. The 2005 commercial landings of yellowfin tuna were 1,110,585 pounds.

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	7,038
1983	0	19,789
1984	0	58,704
1985	0	38,586
1986	0	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	1,959,871	5,794
2005	1,135,347	6,735
Average	**343,417**	**25,963**
Std. Dev.	**557,247**	**18,036**

Figure 8. American Samoa Annual Estimated Total Landings of Bigeye Tuna by Gear.



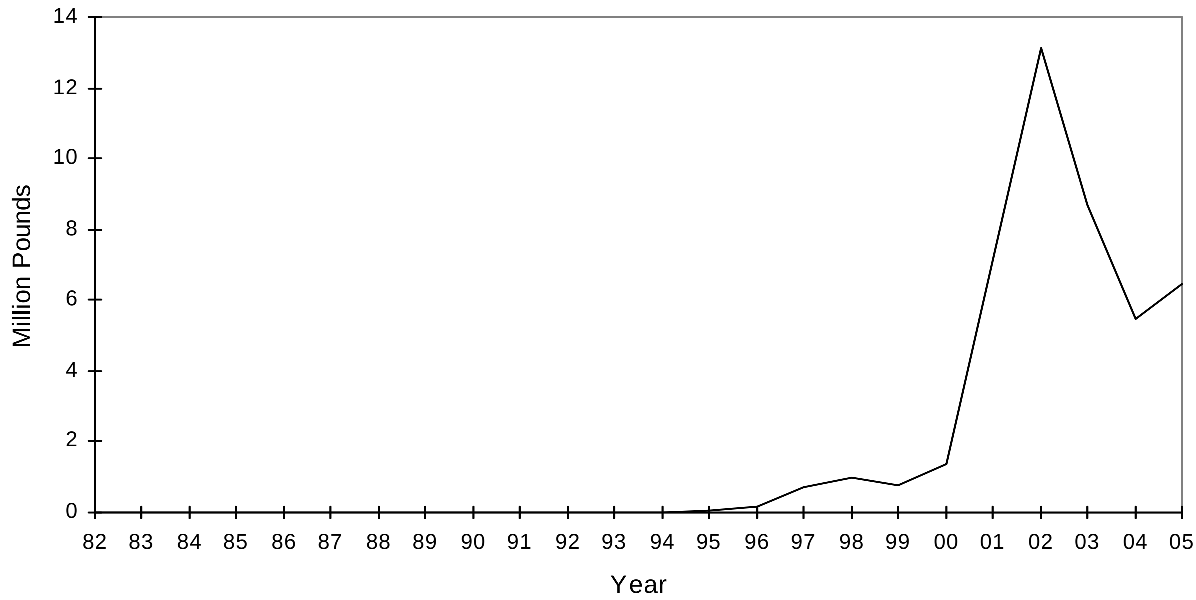
Interpretation: Before the Longline Fishery began, bigeye tuna was sometimes caught by trolling. In 1985 there was a high peak of 3,527 pounds of bigeye from trolling. Troll landings of bigeye tuna increased from nothing (1994 through 2004) to 1,012 pounds in 2005.

From 1995 to 2000, a gradual increase in longline landings of bigeye tuna occurred. Additional rapid increases in longline landings of bigeye tuna occurred from 2000 to 2003. Landings declined slightly in 2004. Longline landings of bigeye tuna decreased by 209,388 pounds (42%) to 290,678 pounds between 2004 and 2005. The 2005 commercial longline landings of bigeye tuna were 285,712 pounds. (Table 2).

Calculation: The estimated total annual landings of bigeye tuna is listed for longline and trolling fishing methods. The All methods landings may be greater than the sum of the longline and trolling landings when bigeye tuna are caught by other methods. The average and standard deviation for the Longline Method is calculated from 1991 onward.

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	0
1983	0	0
1984	0	769
1985	0	3,527
1986	0	0
1987	0	0
1988	0	0
1989	0	0
1990	0	0
1991	17	429
1992	0	128
1993	76	632
1994	0	0
1995	2,191	0
1996	8,738	0
1997	8,419	0
1998	22,287	0
1999	19,254	0
2000	47,484	0
2001	165,420	0
2002	432,426	0
2003	534,343	0
2004	500,066	0
2005	290,678	1,012
Average	**135,427**	**271**
Std. Dev.	**193,668**	**733**

Figure 9. American Samoa Annual Estimated Total Landings of Albacore by Longlining.

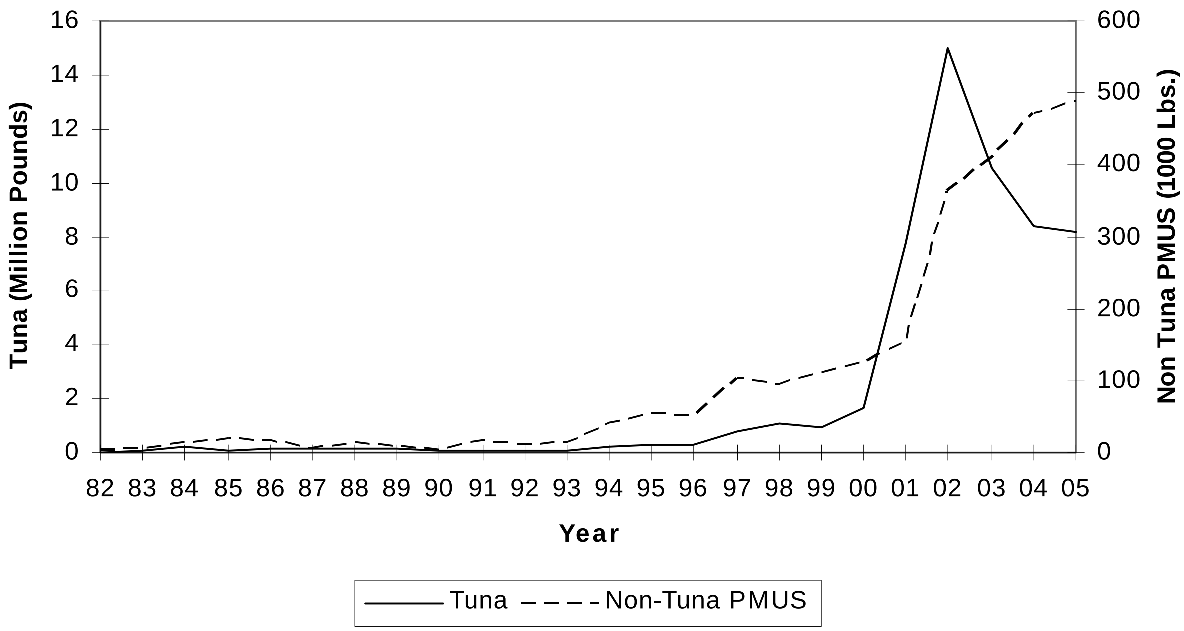


Interpretation: Since the Longline Fishery initially began, it has been the most commonly used method of fishing for pelagic species. Longline albacore landings increased gradually between 1994 and 2000, and increased rapidly between 2000 and 2002. Landings peaked at 13,000,000 in 2002 and declined both in 2003 and 2004. Between 2004 and 2005, longline albacore landings increased 997,786 (18%) to 6,445,869 pounds.

Calculation: The estimated total annual landings of albacore tuna is listed for the longline and trolling fishing methods. The All methods landings may be greater than the sum of longline and trolling landings when albacore are caught by other methods. 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	5,448,083
2005	6,445,869
Average	**2,491,309**
Std. Dev.	**3,809,135**

Figure 10. American Samoa Annual Commercial Landings of Tunas and Non Tuna PMUS.



Interpretation: Commercial landings of tunas were below 200,000 pounds, after below 100,000 from 1982 through 1994. Between 1994 and 1999, tuna landings gradually rose to 1,000,000 pounds, from 1999 tuna landings exponentially increased to 15,000,000 pounds in 2002 with a exponential decrease to 8,400,000 in 2004. The 2005 tuna landings are 97% of 2004 landing at 8,162,920 pounds.

Non-tuna PMUS remained below 16,000 pounds for 1982 through 1993, and gradually increased to 153,754 pounds in 2001. A 2.4 times increase in non-tuna PMUS occurred in 2002 with landings since 2002 steadily increasing approximately 10% per year to the 2005 level of 486,844 pounds.

Note that in this figure commercial landings of non-tuna PMUS are steadily increasing since 2002 and that in (Figure 1) total landings of non-tuna PMUS are relatively stable since 2002.

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.

	Pounds Landed	
Year	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	58,484	15,453
1992	98,001	11,230
1993	44,511	14,547
1994	189,013	41,337
1995	281,256	55,145
1996	312,199	51,325
1997	798,160	101,496
1998	1,114,700	94,933
1999	949,355	109,960
2000	1,640,058	124,944
2001	7,781,751	153,754
2002	15,003,985	363,140
2003	10,524,510	409,158
2004	8,412,827	471,189
2005	8,162,920	486,844
Average	**2,350,928**	**107,732**
Std. Dev.	**4,118,312**	**152,668**

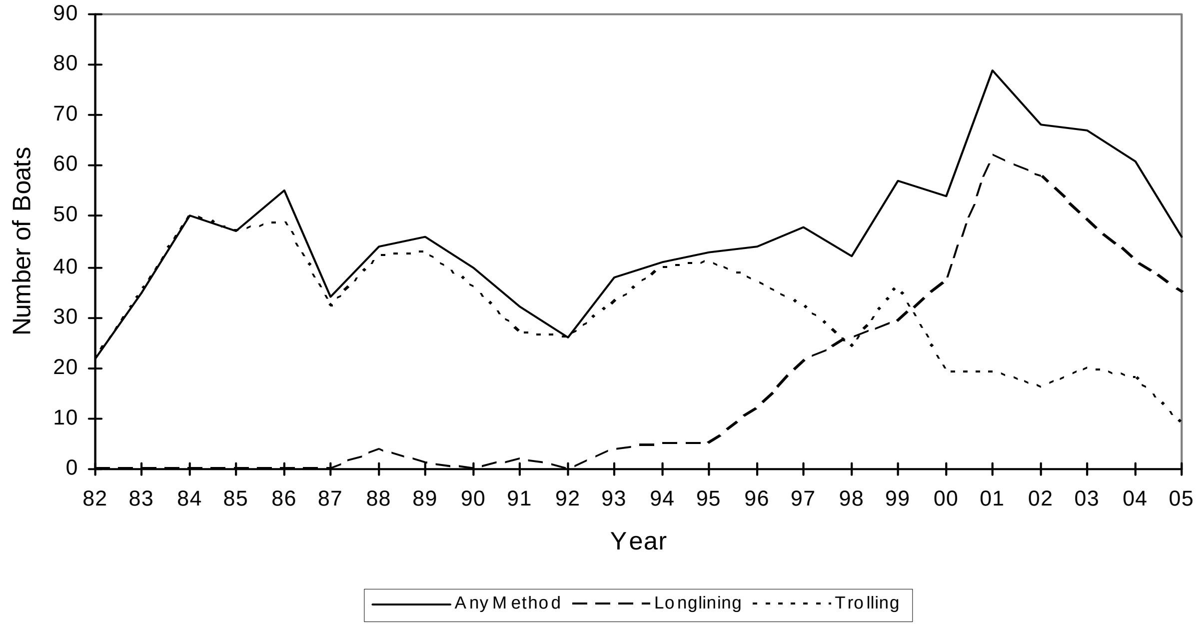
Figure 11. Number of American Samoa Boats Landing Any Pelagic Species, Tunas and Non-tuna PMUS.

Interpretation: Since 1982, the number of vessels landing pelagic species in American Samoa has ranged between 22 and 79. The number of pelagic fishing vessels peaked in 1986 at 55 and in 2001 at 79. The number of vessels landing pelagic species in American Samoa has steadily decreased since 2002 to 46 in 2005. The years decrease has brought the number down to and one below the average overtime.

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	46	44	45
Average	**47**	**44**	**37**
Std. Dev	**13**	**13**	**15**

Figure 12. **Number of American Samoa Boats Landing Any Pelagic Species by Longlining, Trolling and All Methods.**



Interpretation: The number of vessels trolling for pelagic species has varied over time but with a general decline since 1984. Between 2004 and 2005, the number of troll vessels landing pelagic species in American Samoa declined 50% to nine. Nine vessels landing troll caught pelagic species is the lowest recorded since 1982.

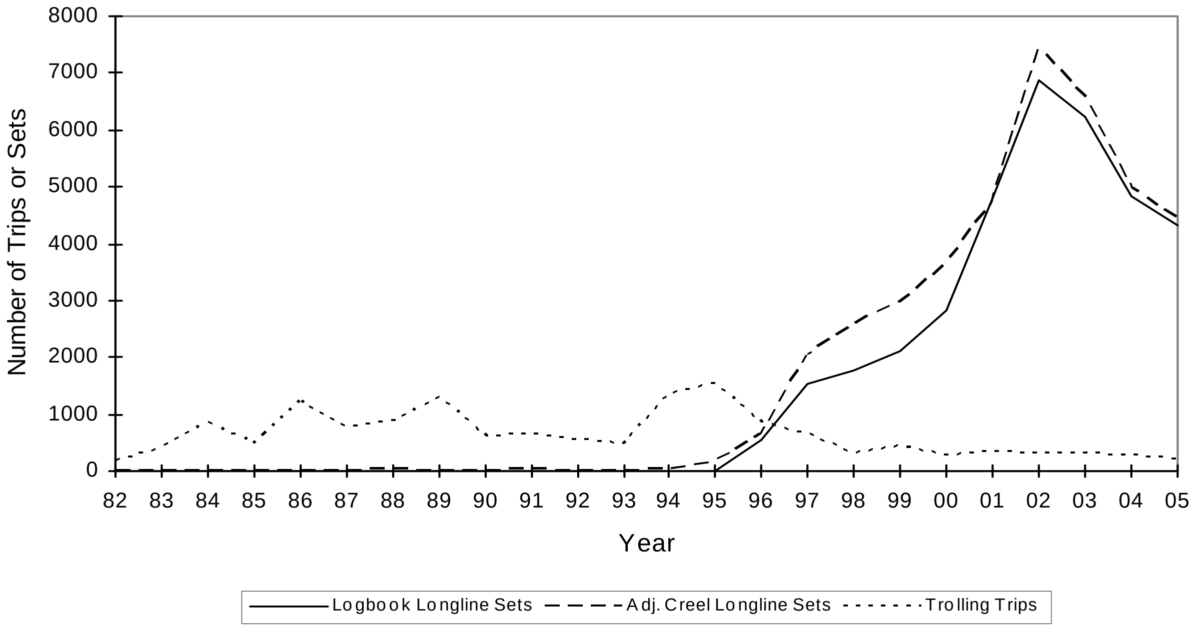
Year	Number of Boats Using		
	Any Method	**Longlining**	**Trolling**
1982	22	0	22
1983	35	0	35
1984	50	0	50
1985	47	0	47
1986	55	0	49
1987	34	0	32
1988	44	4	42
1989	46	1	43
1990	40	0	36
1991	32	2	27
1992	26	0	26
1993	38	4	33
1994	41	5	40
1995	43	5	41
1996	44	12	37
1997	48	21	32
1998	42	26	24
1999	57	29	36
2000	54	37	19
2001	79	62	19
2002	68	58	16
2003	67	49	20
2004	61	41	18
2005	46	35	9
Average	**47**	**22**	**31**
Std. Dev.	**13**	**21**	**11**

Longline vessels landing pelagic species have been recorded in American Samoa most years since 1988. A rapid increase in the number of longline vessels occurred after 1995 to 37 in 2000. Twenty-five more longline vessels joined the American Samoa fleet during 2001 to reach the territory high of 62. Since 2001, numbers of longline vessels landing pelagic species in American Samoa have steadily declined. In 2005, 35 longline vessels landed pelagic species 85% of the 2004 number.

Total pelagic fleet in American Samoa followed troll fleet size nearly exactly between 1982 and 1995. Since 1996, there has clearly been two components to the fleet number with the trend dominated by the longline fleet since 2000.

Calculation: Prior to 1997, each boat counted in the Any Method column made at least one landing in an offshore creel survey interview of at least one species in Table 2 in the given year. Each boat counted in the Longlining and Trolling columns made at least one landing in an offshore creel survey interview of at least one species in Table 2, using the longline or troll or combined troll/bottom fishing methods in the given year. In 1997 and after the count of non-interviewed boats that made at least one landing of the species in Table 2 in a longline log during the given year was added to the count of interviewed boats from the offshore creel survey in the Any Method and Longlining columns. The average and standard deviation for the number of boats using Longlining is calculated from 1988 onward.

Figure 13. Number of American Samoa Fishing Trips or Sets for All Pelagic Species by Method.



Interpretation: The number of trolling trips per year varied between 1982 and 2000 generally following the peaks in number of boats (Figure 12). Since 2000, the number of trolling trips has shown a general decline combining information from Figure 12 and 13.

Troll, fishermen made 215 trips in 2005 (24 per boat) which is slightly above the all time low of 177 trips (8 trips per boat) in 1982. The all-time high recorded was 1545 trips (38 trips per boat) in 1995. On average, although the fleet has decreased, pelagic trollers are fishing more regularly in 2005 than the previous 8 years.

		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	645	0	21
1992	550	0	0
1993	478	0	17
1994	1,355	0	20
1995	1,545	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	287	2,814	3,650
2001	331	4,801	4,723
2002	291	6,872	7,433
2003	310	6,220	6,557
2004	273	4,830	4,954
2005	215	4,319	4,440
Average	**633**	**3,577**	**4,001**
Std. Dev.	**382**	**2,025**	**1,954**

Longline sets were not recorded prior to 1988 and remained below 32 until 1995. From 1995 to 2002, longline sets increased rapidly to a peak of 7,433 and have decreased steadily since. The 2005 figure of 4,440 sets is 90% of the 2004 amount and 60% of the 2002 peak.

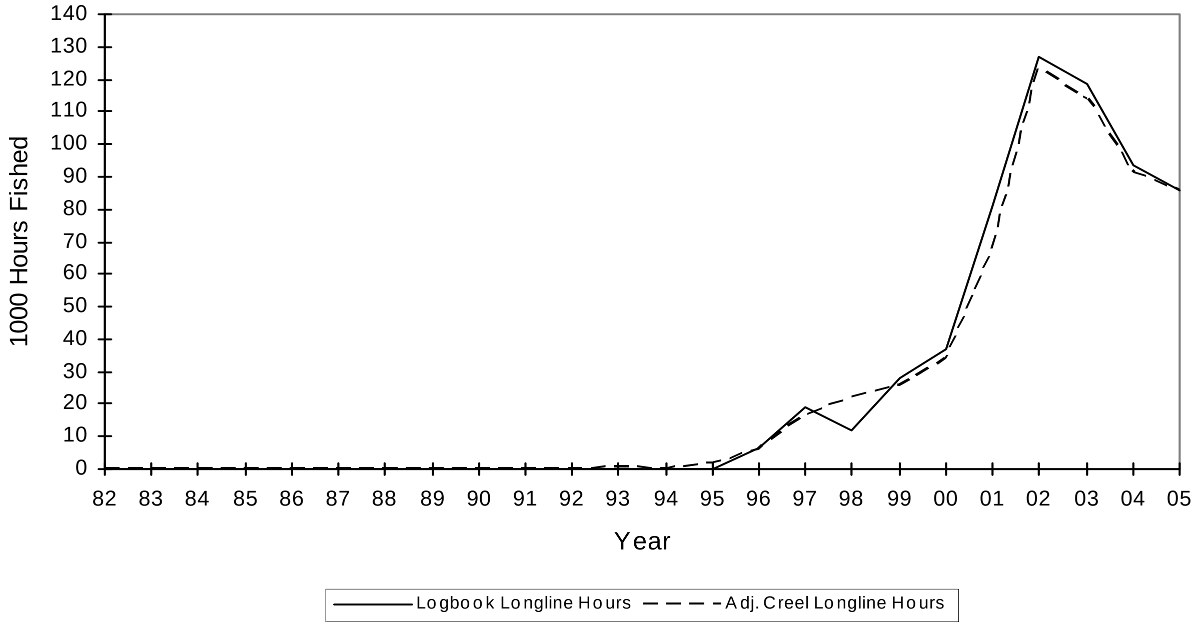
The number of sets reported by the Adjusted Creel Survey has always been more than that reported in the Longline Logbook System due to delinquency in turning in longline logs primarily by alias. The delinquency problem was almost eliminated in 2001 resulting in the logbook number of sets actually being more than those reported in the Adjusted Creel Survey Data.

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

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

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

Figure 14. Number of American Samoa Hours Fished for All Pelagic Species by Longlining.



Interpretation: The number of longline hours fished follows a similar pattern to commercial tuna landing (Figure 10), number of longline boats (Figure 12), longline sets (Figures 13), starting in 1995 with a high peak in 2002 and declining since. A total of 85,848 hours were reported fish in the logbook data for 2005. Figures are very similar for the adjusted creel numbers. Hours fish decreased 92% between 2004 and 2005, with a 68% decrease from the peak in 2002.

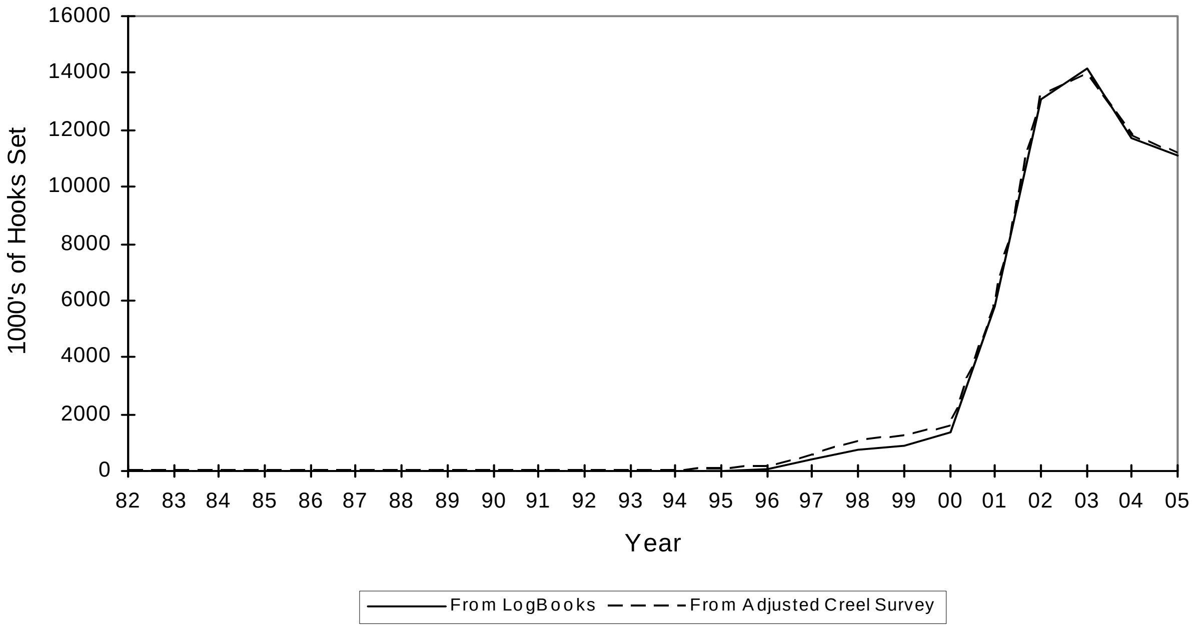
The hours fished reported by the Longline Logbook system in the early years before the large boats dominated the fishery is usually larger than that reported by the adjusted Creel Survey System because the logbook hours are calculated from actual beginning of set times and end of haul times while many 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	118,393	113,749
2004	93,570	91,296
2005	85,848	85,633
Average	**60,822**	**58,590**
Std. Dev.	**43,098**	**40,785**

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.

Figure 15. **Thousands of American Samoa Longline Hooks Set from Logbook and Creel Survey Data.**

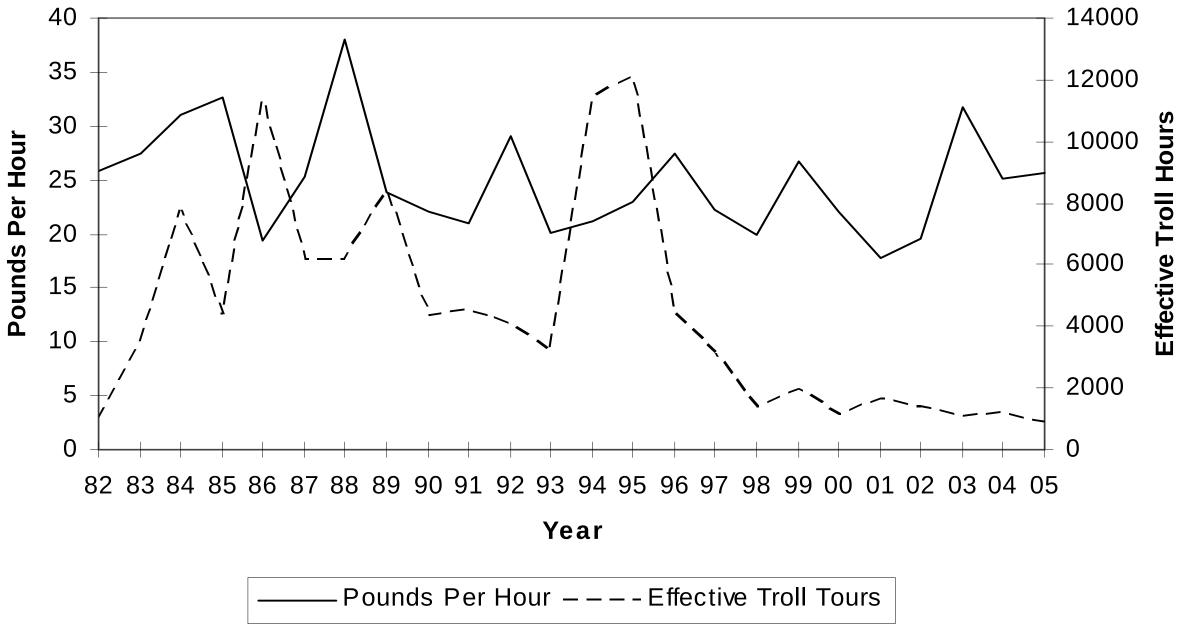


Interpretation: Number of longline hooks set follows a similar pattern to the number of longline boats (Figure 12), number of hours (Figure 14), number of sets (Figure 15), and commercial tuna catch (Figure 10); except that the peak number of hooks was in 2003 not 2002 as in the other figures listed. Six percent more hooks were set in 2003 than in 2002. After 2003, the number of hooks set declined. A total of 11,147,000 hooks were set in 2005 down 5% from 2004 and down 20% from the peak in 2003.

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	11,685	11,746
2005	11,119	11,147
Average	**5,940**	**6,046**
Std. Dev.	**5,626**	**5,539**

Figure 16. **American Samoa Pelagic Catch per Hour of Trolling and Number of Trolling Hours.**



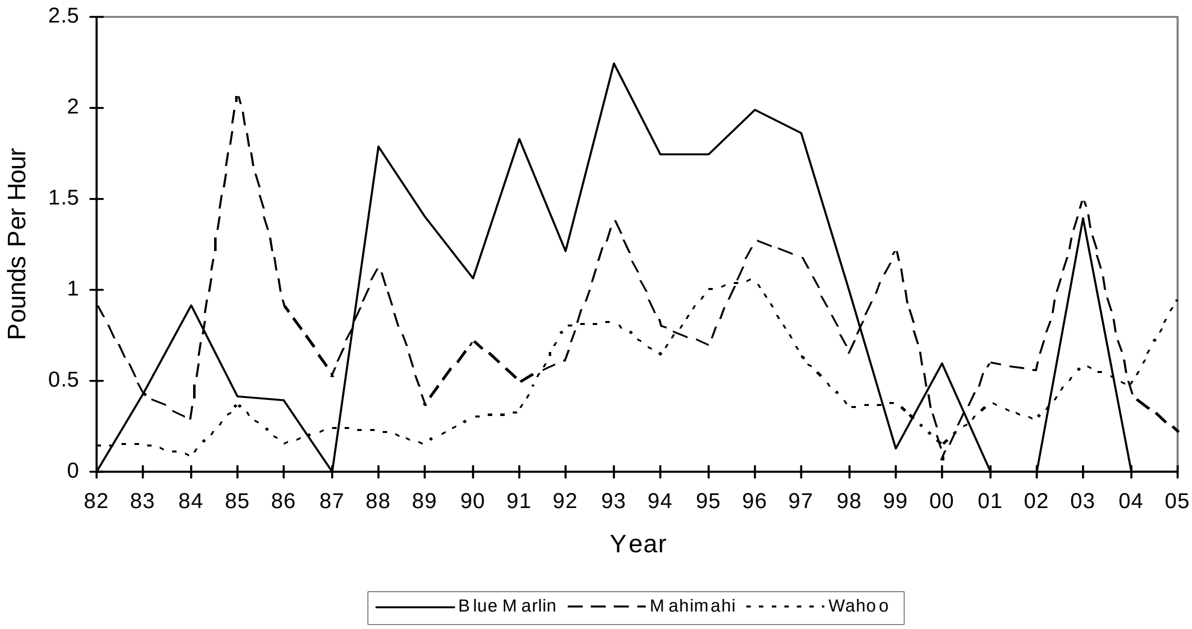
Interpretation: Troll pounds per hours varied between 17.7 and 38 with no obvious trend through time. Pounds per hour changed only slightly over the last year with both years being average. Number of troll hours dropped below 1000 continuing the gradual decline since 1998.

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	4,503
1992	28.99	4,098
1993	20.08	3,200
1994	21.23	11,450
1995	22.93	12,119
1996	27.36	4,422
1997	22.31	3,159
1998	19.93	1,405
1999	26.81	1,971
2000	22.01	1,131
2001	17.72	1,661
2002	19.58	1,378
2003	31.78	1,044
2004	25.19	1,197
2005	25.64	886
Average	**24.91**	**4,448**
Std. Dev.	**4.86**	**3,433**

Figure 17. American Samoa Trolling Catch Rates for Blue Marlin, Mahimahi, and Wahoo.



Interpretation: Wahoo pounds per troll hour doubled between 2004 and 2005 reaching 0.95 slightly more than twice the long-term average. Average wahoo size also increased 15% (Table 8), however, not nearly enough to account for a doubling in pounds per hour.

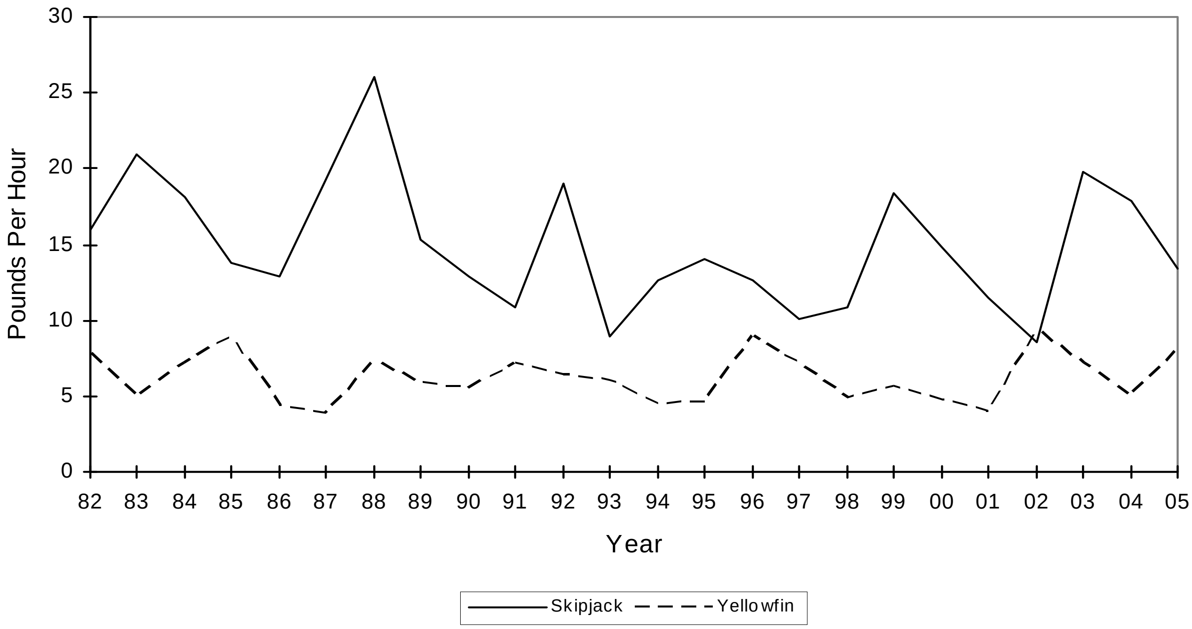
Mahimahi pounds per troll hour dropped by 50% since 2004 to 0.21, 27% of the long-term average. Blue marlin pounds per troll hour is tabulated as 0.00 for the second year in a row. Blue marlin pounds per troll hour has been variable; was high between 1988 and 1997; and low since 1999 with the exception of 2003.

We can observe that the trend in CPUE are similar for mahimahi and wahoo if we exclude 1983, 87, 88 and 95. However, it is difficult to interpret the small amount of data we have this year.

	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	0.47
2005	0.00	0.21	0.95
Average	**0.92**	**0.79**	**0.44**
Std. Dev.	**0.76**	**0.46**	**0.29**

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

Figure 18. American Samoa Trolling Catch Rates for Skipjack and Yellowfin Tuna



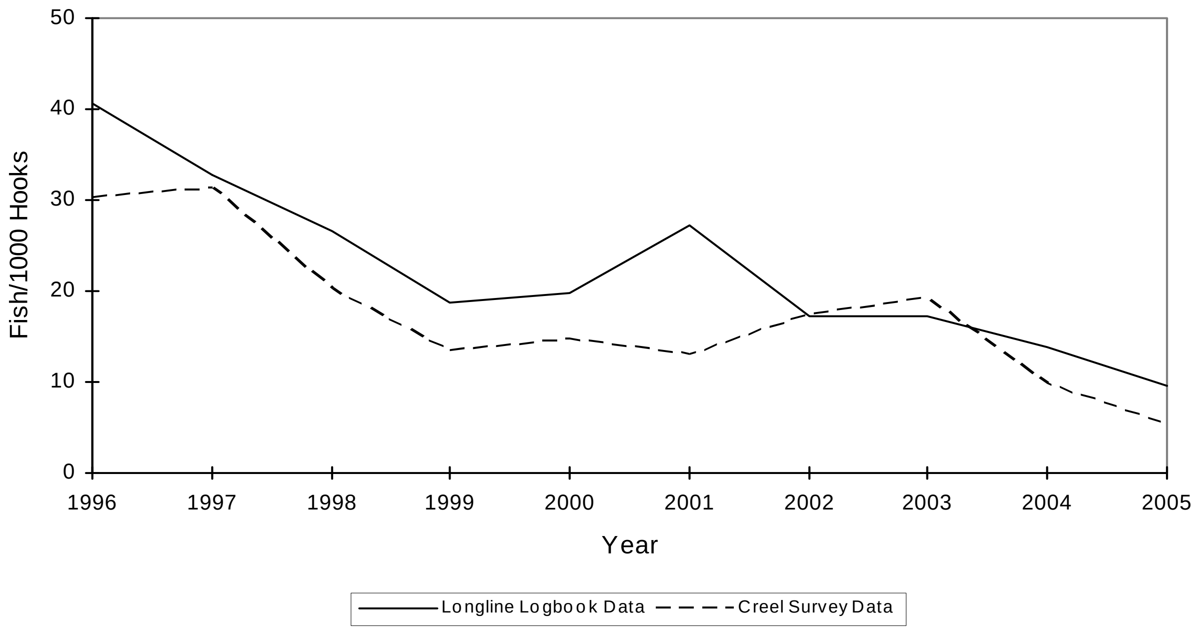
Interpretation: Pounds per troll hour for yellowfin tuna has ranged from 3.9 to 9.4 averaging 6.2. Yellowfin tuna pounds per troll hour trend over time appears stable; the value increased 61% between 2004 and 2005 to 8.0.

Skipjack tuna pounds per troll hour is variable with an apparent decrease between 1982 and 1994. Since 1994, there is no apparent trend. For 2005, skipjack tuna pounds per troll-hour now decreased a second year in a row to 13.4 slightly below the average over time.

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.

Year	Pounds Caught Per Trolling Hour	
	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	4.99
2005	13.40	8.04
Average	**14.94**	**6.22**
Std. Dev.	**4.18**	**1.62**

Figure 19. **American Samoa Catch per 1000 hooks of Albacore for the Alia longline fishery, Comparing Logbook and Creel Survey Data**



Interpretation: Number of fish caught per 1000 hooks for the Alia fleet continued the historic steady decline. The decline in number is compounded by a 16% decline is fish size since 1997 Table 8). Since 1997, the umber of albacore caught per thousand hooks has dropped 71% to the current value of 9.47 (Table 6B). Further analysis of the number of alias and number of hook set by alias is needed; along with analysis of all catches inside the 50-mile boundries by island.

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

Table 6A. American Samoa 1996-2000 catch per 1000 hooks by Species for the Alia Longline Fishery; Comparing Logbook and Creel Survey Data

	Number of Fish Per 1000 Hooks									
	1996		1997		1998		1999		2000	
Species	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**
Skipjack Tuna	0.06	0.29	1.16	0.60	3.71	4.01	4.97	4.77	2.02	1.94
Albacore	40.60	30.29	32.78	31.20	26.59	20.23	18.82	13.44	19.73	14.75
Yellowfin Tuna	6.50	4.31	2.74	2.47	2.18	2.27	6.73	4.49	6.20	3.23
BigeyeTuna	1.33	1.06	0.30	0.14	0.27	0.11	0.68	0.20	0.40	0.22
Tunas					0.01					
Mahimahi	2.29	1.31	2.23	2.83	1.70	1.83	2.24	1.76	1.71	1.75
Black marlin			0.09	0.02			0.18	0.03	0.11	
Blue marlin	0.93	0.90	0.65	0.62	0.55	0.49	0.50	0.38	0.46	0.49
Striped Marlin			0.02		0.03		0.02		0.06	
Wahoo	0.83	0.51	0.90	0.85	2.20	2.03	2.03	1.57	1.15	0.90
All Pelagic Sharks	0.28	0.37	0.12	0.17	0.12	0.08	0.06	0.03	0.01	0.04
Swordfish	0.03	0.01	0.06	0.01	0.03	0.02	0.03	0.01	0.02	
Sailfish	0.18	0.23	0.17	0.21	0.05	0.14	0.01	0.13	0.03	0.06
Spearfish					0.03			0.01	0.01	
Moonfish			0.10	0.15	0.07	0.07	0.07	0.13	0.07	0.20
Oilfish					0.01	0.04	0.01	0.01		
Pomfret							0.01		0.02	0.04
Barracudas		0.57		0.87		0.42		0.19		0.30
Rainbow runner				0.01		0.01		0.02		
Dogtooth tuna						0.00				
Other Pelagic Fish	0.02	0.11	0.02	0.01	0.22	0.01	0.25			

Table 6B. **American Samoa 2000-2005 catch per 1000 hooks by Species for the Alia Longline Fishery;** Comparing Logbook and Creel Survey Data.

	Number of Fish Per 1000 Hooks									
	2001		2002		2003		2004		2005	
Species	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**	**Log**	**Creel**
Skipjack Tuna	3.01	3.35	5.99	5.43	4.68	3.93	2.97	2.90	1.01	0.91
Albacore	27.23	12.94	17.22	17.53	17.31	19.15	13.74	9.84	9.47	5.40
Yellowfin Tuna	3.27	4.19	7.10	10.65	5.85	7.15	8.79	7.54	6.63	4.13
BigeyeTuna	0.61	0.35	0.59	0.48	1.63	0.47	0.82	0.56	0.90	0.44
Tunas					0.01		0.01			
Mahimahi	3.35	4.46	4.02	2.96	2.11	3.18	2.12	1.45	2.09	1.72
Black marlin	0.07	0.03		0.07		0.13		0.04		0.06
Blue marlin	0.38	0.26	0.23	0.35	0.12	0.13	0.11	0.17	0.14	0.12
Striped Marlin	0.03		0.05		0.01		0.11		0.04	
Wahoo	1.43	1.44	2.66	2.37	1.75	2.69	3.06	2.66	2.23	2.04
All Pelagic Sharks	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01		
Swordfish	0.10	0.02	0.11	0.02	0.05	0.10	0.10	0.09	0.06	0.07
Sailfish	0.04	0.13	0.06	0.17	0.04	0.19	0.04	0.12	0.08	0.15
Spearfish			0.02				0.01	0.02	0.01	
Moonfish	0.10	0.07	0.08	0.05	0.05	0.11	0.09	0.10	0.08	0.04
Oilfish	0.03	0.10	0.02		0.02	0.04	0.01	0.02	0.01	0.01
Pomfret	0.02		0.02	0.11			0.04	0.19		0.02
Barracudas	0.02	0.14		0.26	0.01	0.47		0.49		0.17
Rainbow runner				0.03				0.15		0.02
Dogtooth tuna		0.02		0.02				0.01		
Other Pelagic Fish	0.03				0.01				0.04	

Table 7A. American Samoa catch/1000 Hooks for the three sizes of longline vessels for 2000 and 2001

Species	2000 Alias	2000 Mono-hull	2001 Alias	2001 Monohull < 50'	2001 Monohull > 50'
Skipjack Tuna	2.02	1.69	3.11	2.31	2.12
Albacore	19.76	28.01	27.26	29.02	33.37
Yellowfin Tuna	6.21	3.07	3.31	1.42	1.41
BigeyeTuna	0.40	0.98	0.63	0.40	1.03
TUNAS SUBTOTALS	28.39	33.75	34.31	33.15	37.92
Mahimahi	1.71	0.36	3.36	0.64	0.50
Black marlin	0.11	0.10	0.07	0.00	0.02
Blue marlin	0.46	0.23	0.39	0.57	0.20
Striped Marlin	0.06	0.32	0.03	0.02	0.07
Wahoo	1.15	1.05	1.45	0.43	0.66
All Pelagic Sharks	0.01	0.70	0.04	1.42	0.63
Swordfish	0.02	0.01	0.10	0.04	0.03
Sailfish	0.03	0.04	0.05	0.03	0.03
Spearfish	0.01	0.09	0.00	0.01	0.04
Moonfish	0.07	0.15	0.10	0.12	0.08
Oilfish	0.00	0.12	0.03	0.15	0.21
Pomfret	0.02	0.12	0.02	0.07	0.09
NON-TUNA PMUS SUBTOTALS	3.66	3.29	5.64	3.50	2.56
Barracudas	0.00	0.00	0.02	0.00	0.03
Rainbow runner	0.00	0.00	0.00	0.00	0.00
Other Pelagic Fish	0.00	0.00	0.03	0.00	0.04
OTHER PELAGICS SUBTOTALS	0.00	0.00	0.05	0.01	0.07
TOTAL PELAGICS	**32.06**	**37.04**	**40.00**	**36.65**	**40.56**

Table 7B. American Samoa catch/1000 Hooks for the three sizes of longline vessels for 2002 and 2003

	2002			2003		
	Alias	Monohull		Alias	Monohull	
Species		< 50'	> 50'		< 50'	> 50'
Skipjack Tuna	5.99	1.34	5.09	4.68	1.12	2.92
Albacore	17.22	21.17	26.02	17.31	15.87	16.39
Yellowfin Tuna	7.10	0.80	1.33	5.85	0.40	2.05
BigeyeTuna	0.59	0.42	0.94	1.63	0.15	1.15
Tunas	0.00	0.00	0.01	0.01	0.01	0.01
TUNAS SUBTOTALS	30.89	23.73	33.38	29.48	17.54	22.51
Mahimahi	4.02	0.91	0.57	2.24	0.20	0.38
Black marlin	0.00	0.00	0.00	0.02	0.00	0.00
Blue marlin	0.23	0.22	0.29	0.19	0.17	0.20
Striped Marlin	0.05	0.00	0.03	0.01	0.02	0.02
Wahoo	2.66	1.14	1.00	1.76	0.58	1.12
All Pelagic Sharks	0.02	1.15	0.81	0.30	1.33	0.78
Swordfish	0.11	0.04	0.04	0.06	0.00	0.03
Sailfish	0.06	0.01	0.03	0.10	0.04	0.04
Spearfish	0.02	0.01	0.02	0.06	0.00	0.03
Moonfish	0.08	0.03	0.07	0.11	0.07	0.07
Oilfish	0.02	0.22	0.52	0.29	0.27	0.53
Pomfret	0.02	0.01	0.09	0.09	0.05	0.08
NON-TUNA PMUS SUBTOTALS	7.29	3.74	3.48	5.22	2.73	3.28
Barracudas	0.00	0.00	0.09	0.01	0.00	0.03
Other Pelagic Fish	0.00	0.00	0.27	0.17	0.04	0.21
OTHER PELAGICS SUBTOTALS	0.01	0.00	0.36	0.18	0.04	0.24
TOTAL PELAGICS	**38.19**	**27.47**	**37.22**	**34.87**	**20.31**	**26.03**

Table 7C. American Samoa catch/1000 Hooks for two kinds of longline vessels for 2004 and 2005

Species	2004 Alias	2004 Monohulls	2005 Alias	2005 Monohulls
Skipjack Tuna	2.97	3.94	1.13	2.74
Albacore	13.74	12.88	9.47	17.44
Yellowfin Tuna	8.79	3.18	7.04	2.64
BigeyeTuna	0.82	1.27	0.90	0.88
Tunas	0.01	0.00	0.00	0.00
TUNAS SUBTOTALS	26.33	21.27	18.54	23.69
Mahimahi	2.12	0.19	2.09	0.30
Black marlin	0.00	0.00	0.00	0.00
Blue marlin	0.11	0.18	0.14	0.16
Striped Marlin	0.11	0.02	0.05	0.02
Wahoo	3.06	1.56	2.23	1.41
All Pelagic Sharks	0.05	0.86	0.39	0.66
Swordfish	0.10	0.03	0.06	0.02
Sailfish	0.04	0.07	0.08	0.05
Spearfish	0.01	0.08	0.01	0.05
Moonfish	0.09	0.06	0.08	0.07
Oilfish	0.01	0.69	0.09	0.30
Pomfret	0.04	0.10	0.04	0.07
NON-TUNA PMUS SUBTOTALS	5.74	3.85	5.26	3.09
Barracudas	0.00	0.04	0.00	0.02
Other Pelagic Fish	0.00	0.10	0.04	0.09
OTHER PELAGICS SUBTOTALS	0.00	0.14	0.04	0.10
TOTAL PELAGICS	**32.07**	**25.26**	**23.84**	**26.89**

Interpretation: Since the development of the longline fishery in 1995, a growing number of boats with a range of different sizes entered the fishery. These boats include alias, averaging around 28 to 30 feet, monohulls less than 50 feet, and monohulls greater than 50 feet in length. In 2000, 2004 and 2005 there were 3 or less monohulls < 50 feet long which violated confidentiality rules so all monohulls were combined in one category for those years. Table 7 has been included in this report to better represent the catch per 1000 hooks for each type of longline vessel. Additionally, total catch rates for pelagic species dropped this year for the monohulls compared to rates in 2001 and 2002 while the catch rates for alias increased. This indicates that the 50 mile closed areas around the islands for the monohulls is benefiting the alias. When compared to the albacore catch rate this shows that the fishery in American Samoa is becoming more diverse and not just all albacore catch.

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

Table 8. American Samoa Estimated Average Weight per Fish by Species from the Offshore Creel Survey Interviews and from Cannery Sampling

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

Table 8B. 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**
Skipjack Tuna				16.8	11.3	9.9	13.6	13.1
Albacore	41.0	47.2	40.7	39.8	39.1	37.8	36.5	33.0
Yellowfin Tuna				57.0	62.4	44.3	52.1	39.4
BigeyeTuna				40.6	46.7	37.4	35.9	31.0
Mahimahi				16.1	13.5	20.7	13.0	17.0
Black marlin				36.3				
Blue marlin								45.8
Wahoo				30.6	30.7	30.0	27.4	31.6
Swordfish							72.3	
Sailfish					34.0			25.0
Moonfish				147.6	117.5			95.5
Pomfret				5.1	6.2			7.8
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 in the northern areas of the American Samoa EEZ while the table from the Creel Survey represents fish caught by alias near Tutuila.

Average pounds per albacore has decreased in cannery data since 1999 and in creel surveys since 2002. For 2005 data, the cannery average is 33.0 and the creel average is 36.8. As calculated, pounds per fish is a crude measure and should be interpreted as flag indicating that further investigation of the fish size is needed. Numbers of fish sampled, and size distributions from more specific locations need to be examined to determine what, if anything, is driving the size change in albacore.

Skipjack and yellowfin tuna are more obvious time trend. Both skipjack and yellowfin pounds per fish have been consistently larger in cannery than creel data since 2001. Bigeye pounds per fish has been larger in creel than in cannery data since 2001 except 2003 when average was approximately equal. Average size of bigeye tuna has decreased steadily since 2002 for cannery data. Average size of bigeye tuna in the creel data is more variable including both increases and decreases; however, the general trend in creel data is a decrease since 1997. This creel data – bigeye decrease needs to be examined more closely (e.g. number of measurements) as the decrease is from approximately 80 pounds in 1997-98 to 42.4 pounds in 2005.

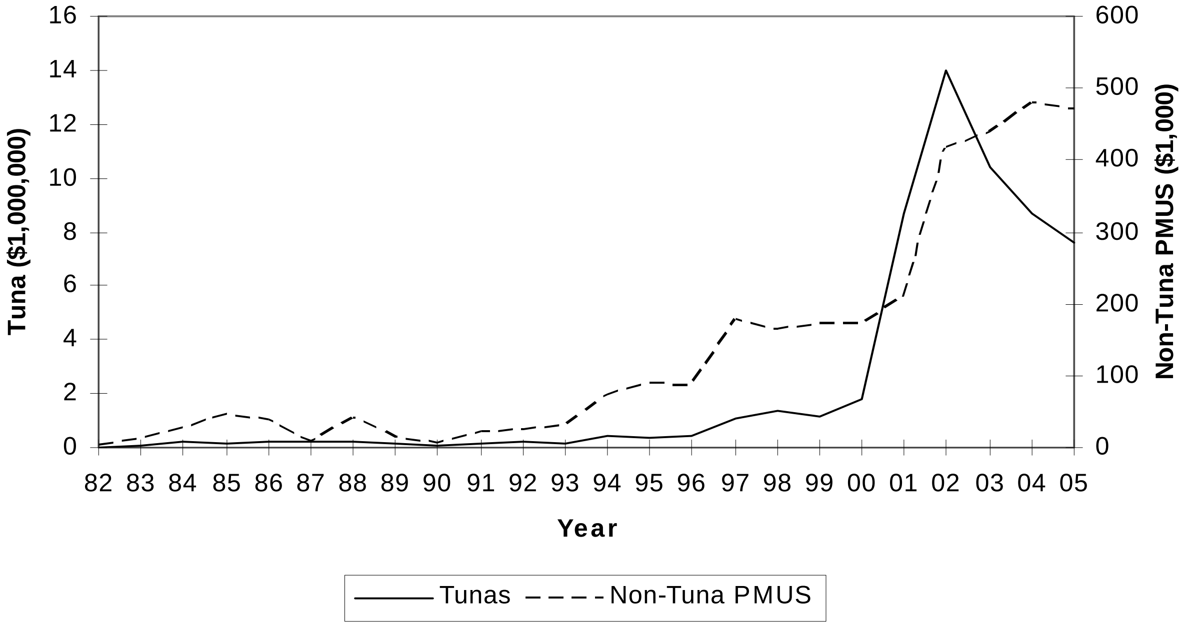
The average wahoo pounds per fish has remained stable between 28 and 32 in both data sets since 2000 except for 2004 cannery data. For 2005, average pounds per wahoo is 31.6 for cannery and 29.5 for creel data. Since 2001, mahimahi has normally been several pounds smaller in cannery data as compared to creel data. For 2005, the average pound per fish for mahimahi was 17.0 from cannery sampling and 19.0 from creel data.

Other things of note are a steady drop in the average pounds per swordfish over the last three years in creel data (117, 38, 26) and a two year up-down cycle for moonfish. Creel data shows a very low average size for both pomfret and oilfish during 2005. Sample size and size distributions can be investigated to better identify the significance of the average pounds per fish data.

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 20. American Samoa Annual Inflation-Adjusted Revenue in 2003 dollars for Tuna and Non-Tuna PMUS.



Interpretation: Inflation adjusted tuna revenue followed the build up of the fleet through the late 1990s and exponentially spiked in 2001 and 2002. Since 2002, the figures have continued to drop. Inflation adjusted tuna revenue dropped one million dollars between 2004 and 2005 to $7,600,000 approximately 50% of the 2002 peak valve.

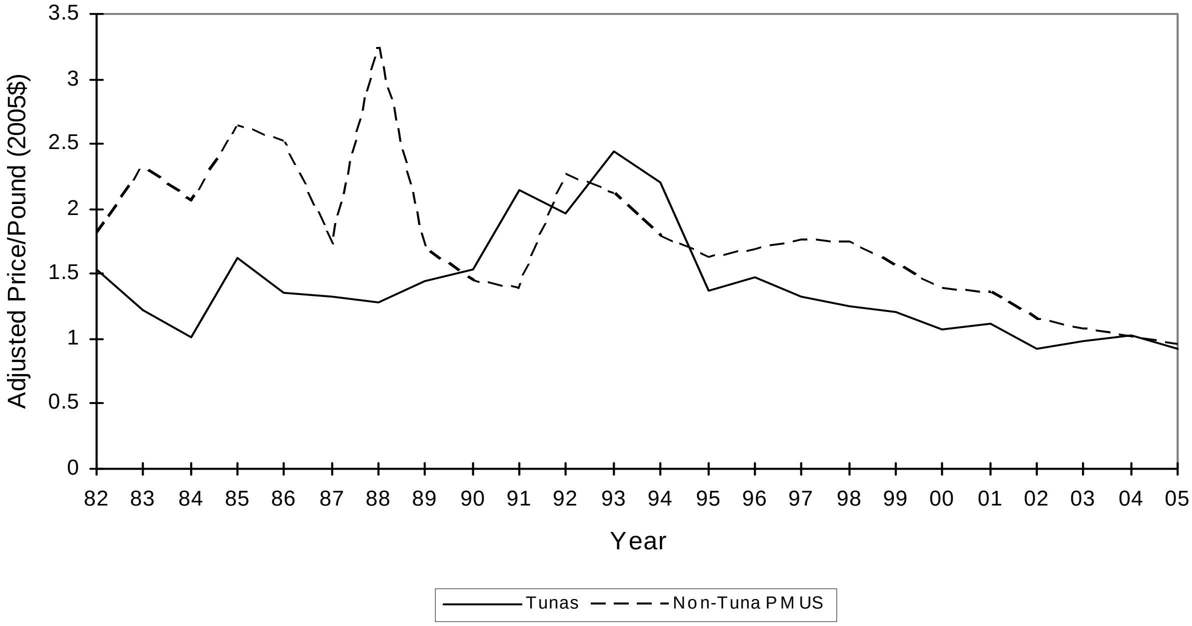
Inflation adjusted non-tuna PMUS revenue climbed $9,700 dollars to the highest valve recorded ($469,659). From the early 1980's to 1995, the primary gear type for the fishery was trolling, however, from 1995 to the present the dominant form of fishing was longlining.

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	$33,783	$1,534	$2,729
1983	100.8	$58,561	$103,477	$5,828	$10,298
1984	102.7	$114,981	$199,147	$15,938	$27,605
1985	103.7	$95,157	$163,289	$26,800	$45,989
1986	107.1	$139,680	$232,148	$23,246	$38,634
1987	111.8	$110,076	$175,242	$5,270	$8,389
1988	115.3	$143,613	$221,738	$25,383	$39,192
1989	120.3	$111,425	$165,021	$9,425	$13,959
1990	129.6	$63,229	$86,940	$3,809	$5,238
1991	135.3	$94,809	$124,864	$16,344	$21,526
1992	140.9	$152,243	$192,282	$20,160	$25,462
1993	141.1	$85,972	$108,497	$24,435	$30,837
1994	143.8	$338,038	$418,492	$59,276	$73,384
1995	147.0	$318,724	$386,293	$73,567	$89,163
1996	152.5	$394,679	$460,591	$74,213	$86,606
1997	156.4	$930,138	$1,059,428	$156,395	$178,134
1998	158.4	$1,240,616	$1,394,452	$146,629	$164,811
1999	159.9	$1,018,884	$1,135,037	$153,750	$171,277
2000	166.7	$1,650,593	$1,762,833	$161,668	$172,661
2001	168.8	$8,217,502	$8,669,464	$198,741	$209,671
2002	169.2	$13,311,300	$14,003,487	$397,249	$417,905
2003	169.5	$9,890,729	$10,385,266	$417,614	$438,495
2004	171.2	$8,345,598	$8,679,422	$460,955	$479,393
2005	178.1	$7,600,712	$7,600,712	$469,659	$469,659
Average	**139.6**	**$2,268,594**	**$2,406,746**	**$122,829**	**$134,209**
Std. Dev.	**25.63**	**$3,835,800**	**$3,986,991**	**$152,267**	**$154,952**

Figure 21. American Samoa Average Inflation-Adjusted Price per Pound of Tunas and Non-Tuna PMUS.



Interpretation: The average inflation-adjusted price per pound for both tunas and non-tuna PMUS continued their decline, which began in 1992 and 1993, respectively. In 2005, average tuna price was again below $1.00 at $.93. Average non-tuna PMUS dropped below $1.00 for the first time reaching $.96. This gradual decrease may be due to the lower price that the canneries pay per pound of tuna compared to the price the local stores and restaurants pay. The decreasing percentage of longline catches that make it to the higher revenue local markets after 1993 probably contribute to this decline in prices for tuna.

Additionally, this decline in prices could be due to competition from frozen fish

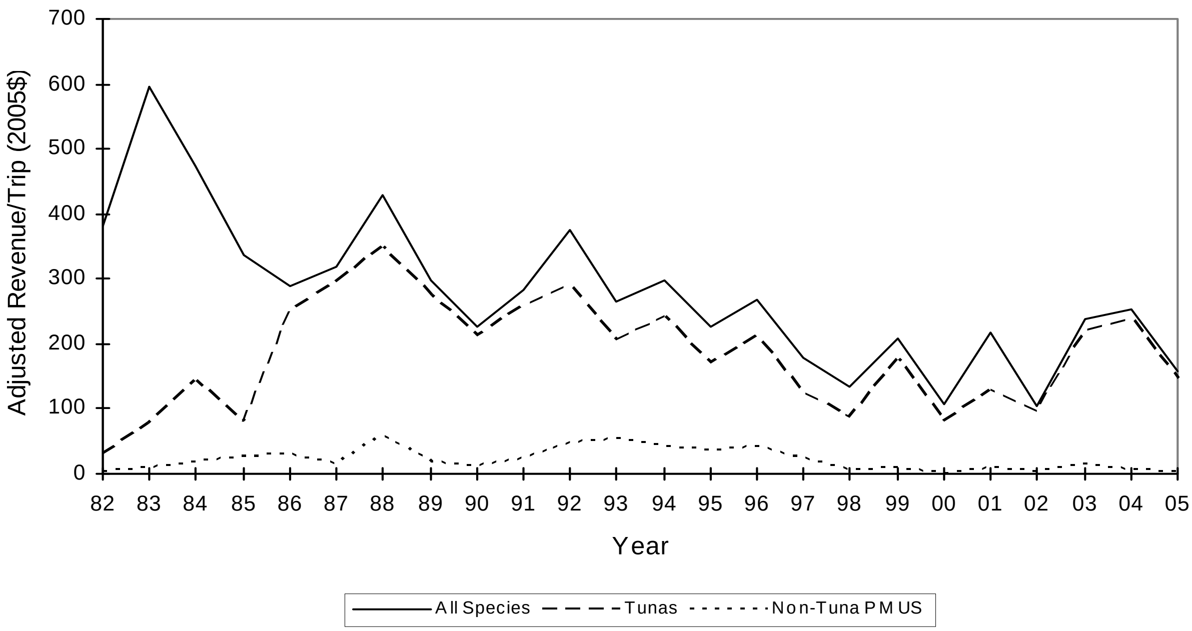
	Average Price/Pound ($)			
	Tunas		Non-Tuna PMUS	
Year	Unadjust.	Adjusted	Unadjust.	Adjusted
1982	$0.86	$1.53	$1.01	$1.80
1983	$0.69	$1.22	$1.31	$2.32
1984	$0.59	$1.02	$1.18	$2.05
1985	$0.95	$1.63	$1.53	$2.63
1986	$0.82	$1.36	$1.51	$2.51
1987	$0.83	$1.32	$1.09	$1.73
1988	$0.83	$1.28	$2.10	$3.24
1989	$0.97	$1.44	$1.14	$1.69
1990	$1.12	$1.54	$1.05	$1.45
1991	$1.62	$2.14	$1.06	$1.39
1992	$1.55	$1.96	$1.80	$2.27
1993	$1.93	$2.44	$1.68	$2.12
1994	$1.79	$2.21	$1.43	$1.78
1995	$1.13	$1.37	$1.33	$1.62
1996	$1.26	$1.48	$1.45	$1.69
1997	$1.17	$1.33	$1.54	$1.76
1998	$1.11	$1.25	$1.54	$1.74
1999	$1.07	$1.20	$1.40	$1.56
2000	$1.01	$1.07	$1.29	$1.38
2001	$1.06	$1.11	$1.29	$1.36
2002	$0.89	$0.93	$1.09	$1.15
2003	$0.94	$0.99	$1.02	$1.07
2004	$0.99	$1.03	$0.98	$1.02
2005	$0.93	$0.93	$0.96	$0.96
Average	**$1.09**	**$1.41**	**$1.33**	**$1.76**
Std. Dev.	**$0.33**	**$0.40**	**$0.28**	**$0.54**

purchased from foreign longline vessels moored in Pago Harbor and from fishes imported from neighboring islands.

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 2000 consumer price index (CPI) divided by the CPI for that year.

Figure 22. American Samoa Average Inflation-Adjusted Revenue per Trolling Trip Landing Pelagic Species



Interpretation: For tunas inflation adjusted revenue per trolling trip has been variable and dominates the figures. Between 2004 and 2005 inflation adjusted revenue per trolling trip for tuna dropped nearly $100, bringing the figure to $147 or $35 below the average.

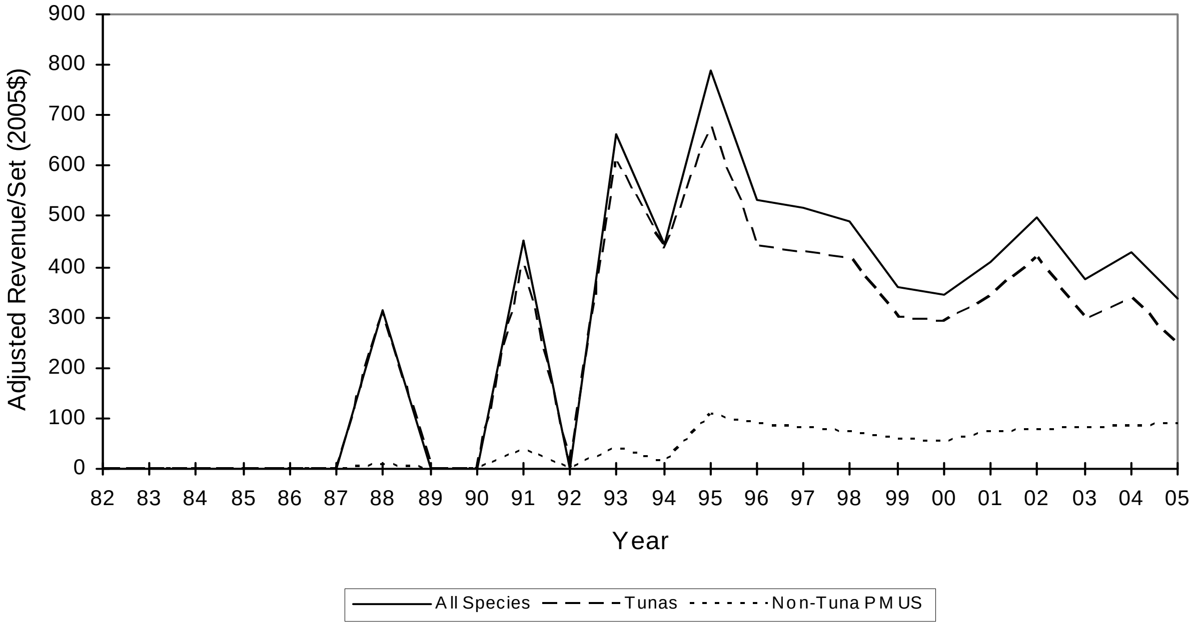
For non-tuna PMUS inflation-adjusted revenue per trolling trip has varied between $0.9 and $59 dollars. For 2005, inflation-adjusted revenue per trolling trip dropped over $1.00 to $4.30, approximately 1/5 of the average for this figure.

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.

Year	All Species		Tunas		Non-Tuna PMUS	
	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.
1982	$381	$214	$28	$16	$2.3	$1.3
1983	$597	$338	$76	$43	$9.2	$5.2
1984	$474	$274	$142	$82	$18.2	$10.5
1985	$337	$196	$80	$47	$27.1	$15.8
1986	$288	$173	$249	$150	$28.9	$17.4
1987	$320	$201	$294	$185	$14.5	$9.1
1988	$430	$278	$347	$225	$59.6	$38.6
1989	$299	$202	$274	$185	$18.5	$12.5
1990	$228	$166	$212	$154	$10.7	$7.8
1991	$283	$215	$258	$196	$22.4	$17.0
1992	$376	$298	$288	$228	$46.5	$36.8
1993	$266	$211	$204	$162	$52.6	$41.7
1994	$298	$241	$240	$194	$41.7	$33.7
1995	$227	$187	$169	$139	$36.0	$29.7
1996	$269	$231	$210	$180	$40.8	$35.0
1997	$178	$156	$125	$110	$22.4	$19.7
1998	$134	$119	$88	$78	$6.9	$6.1
1999	$208	$187	$175	$158	$8.2	$7.4
2000	$107	$100	$81	$76	$0.9	$0.8
2001	$217	$206	$127	$121	$9.4	$8.9
2002	$106	$100	$96	$91	$4.0	$3.8
2003	$239	$227	$220	$209	$14.8	$14.1
2004	$253	$244	$239	$230	$5.4	$5.2
2005	$158	$158	$147	$147	$4.3	$4.3
Average	**$278**	**$205**	**$182**	**$142**	**$21.1**	**$15.9**
Std. Dev.	**$114**	**$57**	**$82**	**$61**	**$16.7**	**$12.6**

Figure 23. American Samoa Average Inflation-Adjusted Revenue per Longline Set by Alias Landing Pelagic Species.



Interpretation*:* Average inflation-adjusted tuna revenue per alia longline set continued a general decline that has occurred since 1995. Between 2004 and 2005 adjusted tuna revenue dropped $91 to a value of $247, approximately seventy-five percent of the long-term average value. Non-tuna PMUS average inflation-adjusted revenue continued an increase occurring since 2000, rising seven dollars to $89 non-tuna PMUS contributes nearly one-third as much as tuna revenue for alias and this non-tuna value is growing in importance since 1999.

Calculation: The longline interviews in the offshore creel survey system catching any of the species listed in Table 1 and selling all or part of their catch are counted and adjusted for multiset trips for the given year to get the number of sets. The unadjusted revenue/set for Tunas and Non-Tuna PMUS is calculated by first summing the value of the species in these pelagic subgroups caught by these sets and then dividing this by the number of sets. The unadjusted revenue/set for all species is the sum of the value of all species, listed in Table 1 or not, caught by these longline sets divided by the number of such sets.

The unadjusted revenue/set values for the pelagic species subgroups above and for all species were adjusted for inflation by multiplying the given year's revenue/set 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	$0	$0	$0	$0	$0.0	$0.0
1983	$0	$0	$0	$0	$0.0	$0.0
1984	$0	$0	$0	$0	$0.0	$0.0
1985	$0	$0	$0	$0	$0.0	$0.0
1986	$0	$0	$0	$0	$0.0	$0.0
1987	$0	$0	$0	$0	$0.0	$0.0
1988	$314	$203	$306	$198	$8.3	$5.4
1989	$0	$0	$0	$0	$0.0	$0.0
1990	$0	$0	$0	$0	$0.0	$0.0
1991	$451	$343	$406	$308	$37.7	$28.6
1992	$0	$0	$0	$0	$0.0	$0.0
1993	$662	$524	$607	$481	$43.9	$34.8
1994	$444	$359	$432	$349	$11.4	$9.2
1995	$789	$651	$678	$559	$107	$87.9
1996	$531	$455	$441	$378	$87.4	$74.9
1997	$518	$455	$431	$378	$80.5	$70.7
1998	$491	$437	$418	$372	$71.1	$63.3
1999	$359	$323	$300	$269	$59.0	$53.0
2000	$345	$323	$291	$272	$54.4	$50.9
2001	$412	$390	$340	$322	$70.9	$67.2
2002	$497	$473	$418	$398	$77.8	$74.0
2003	$376	$358	$293	$279	$79.1	$75.3
2004	$428	$411	$338	$325	$85.3	$82.0
2005	$338	$338	$247	$247	$89.0	$89.0
Average	**$386**	**$336**	**$330**	**$285**	**$53.5**	**$48.1**
Std. Dev.	**$206**	**$176**	**$181**	**$151**	**$34.6**	**$32.1**

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 24-year time series. The 2005 total pelagic landings were approximately 303,344 pounds, a decrease of 56% compared with 2004, and the lowest total for any year in the 24-year time series. 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*), 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 caught during 2005. 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 had been increasing until last year. There were 358 boats involved in Guam's pelagic fishery in 2005, a decrease of 11% from 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 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. All five species showed a drop from 2004 levels. 2005 mahimahi catch decreased more than 45% from 2004, wahoo catch totals decreased 63% from 2004, and Pacific blue marlin catch decreased 76% from 2004, and was 92% below the 24-year average. The catches of yellowfin tuna, wahoo, and blue marlin were the lowest in the time series. While the totals on Guam for these species have routinely fluctuated wildly, continued low catch numbers in conjunction with lower CPUE and increased effort may indicate a fishery in danger of being over exploited.

Aggregate landings of all pelagics, tuna, and non-tuna Pelagic Management Unit Species (PMUS) decreased substantially in 2005. Landings of all pelagics decreased 56%, with tuna PMUS decreasing 55% and non-tuna PMUS decreasing 56%. The number of trolling boats decreased by 11%, the number of trolling trips decreased by 13% and hours spent trolling decreased by 24%. Fewer boats are making trips shorter in length. This may be reflecting an increase in the price of fuel.

Trolling catch rates (pounds per hour fished) showed a significant decrease compared with 2004. Total CPUE was down 43%, with wahoo, marlin, and yellowfin tuna showing the greatest decreases. Wahoo CPUE decreased by 51%, marlin CPUE declined by 72%, and yellowfin tuna CPUE declined by 70%.

Commercial landings and revenues decreased in 2005, with total adjusted revenues decreasing 22%. The adjusted average price for all pelagics decreased 2.5%, and non-tuna PMUS decreasing 6%. Conversely, tuna PMUS prices increased 6%, Adjusted revenue per trolling trip decreased 3.5% for all pelagics, decreased 5% for tuna PMUS, and decreased 4% for non-tuna PMUS. Commercial landings have shown a decreasing trend over the past five 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 seven 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. However, increasing fuel costs have made fishing more difficult for the average fishermen to participate, and probably accounts for the decreased number of boats participating in the pelagic fishery on Guam.

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.

Two boats that practice jigging for pelagics at the FADs and along current lines sold more than 36,300 pounds of pelagic fish more than 61,600 dollars last year, accounting for 15.9% of total commercial weight and 17.4% of total commercial sales in 2005.

In October, 2005, one 35 foot boat began shortlining for sharks at the southern banks, with the expectation to sell shark meat to Mexico. After this venture failed, the vessel tried vertical longlining, shortlining, deep bottom fishing, all without commercial success. The fisherman is proposing to try deep pelagic fishing (i.e. big eye tuna) before ceasing operations.

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 spearfishing 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 new wave buoy deployed south of the ramp off Talofofo 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. The few attempts in 2005 to informally obtain fishing data resulted in either incomplete information being given or an interview decline. 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.

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 one-third 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.

2005 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.

Table 1. Guam 2005 Creel Survey - Pelagic Species Composition

Species	Total Landing (Lbs)	Non-Charter	Charter
Skipjack Tuna	99,357	85,008	14,349
Yellowfin Tuna	24,910	23,177	1,733
Kawakawa	987	921	66
Albacore	0	0	0
Bigeye Tuna	0	0	0
Other Tuna PMUS	0	0	0
Tuna PMUS	**125,254**	**109,106**	**16,148**
Mahimahi	107,179	79,990	27,189
Wahoo	43,926	32,521	11,405
Blue Marlin	9,208	7,258	1,950
Black Marlin	0	0	0
Striped Marlin	0	0	0
Sailfish	0	0	0
Shortbill Spearfish	0	0	0
Swordfish	0	0	0
Oceanic Sharks	0	0	0
Pomfrets	550	550	0
Oilfish	494	494	0
Moonfish	0	0	0
Misc. Longline Fish	0	0	0
Non-tuna PMUS	**161,357**	**120,813**	**40,544**
Dogtooth Tuna	4,359	4,359	0
Rainbow Runner	9,060	8,114	946
Barracudas	3,312	3,269	43
Oceanic Sharks	0	0	0
Misc. Troll Fish	0	0	0
Non-PMUS Pelagics	**16,731**	**15,742**	**989**
Total Pelagics	**303,342**	**245,661**	**57,681**

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 2005 Annual Commercial Average Price of Pelagic Species

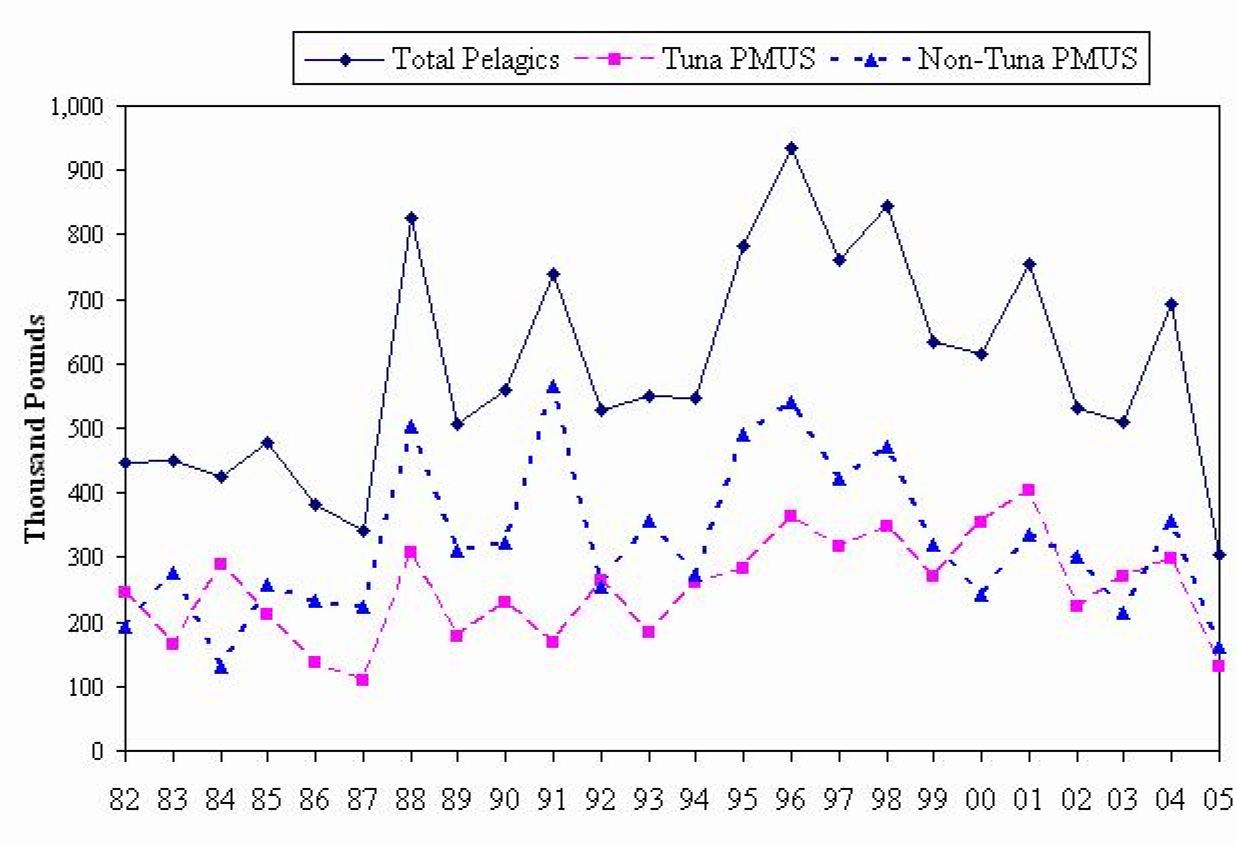
Species	Average Price ($/Lb)
Yellowfin Tuna	2.04
Bonita/skipjack Tuna	1.06
Tunas Subtotal	**1.51**
Monchong	2.16
Sharks	2.50
Spearfish	1.03
Sailfish	1.26
Marlin	1.07
Wahoo	1.95
Mahi / Dolphinfish	**1.50**
Non-tuna PMUS **Subtotal**	1.54
Troll Fish	2.00
Barracuda	1.81
Rainbow Runner	**1.65**
Dogtooth Tuna	1.09
Non-PMUS Pelagic Subtotal	**1.52**
Pelagic Total	**1.53**

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**

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 2004, total pelagic and non-tuna PMUS both decreased by 56%, while tuna landings decreased 55%. Generally, tuna species are consistently caught year round, with the other major pelagic species being more seasonal.

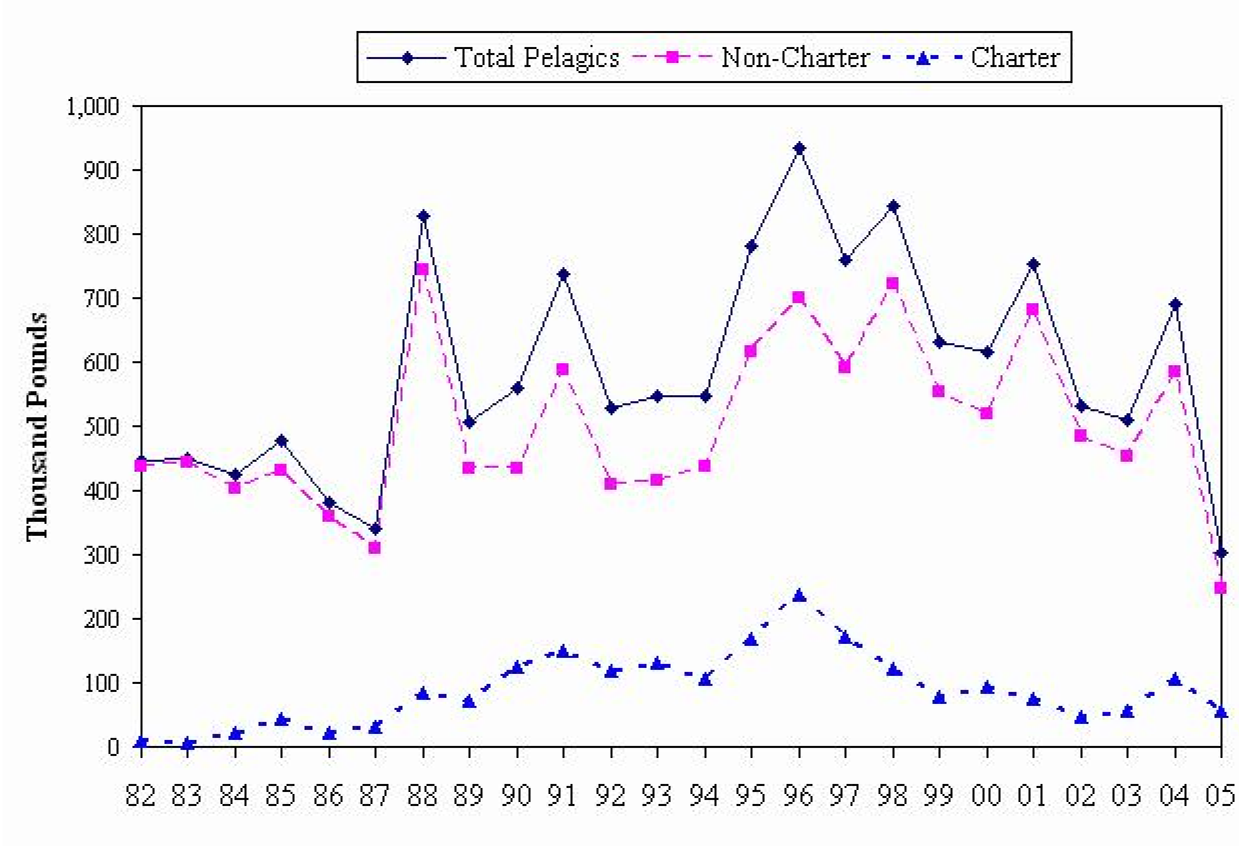
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey.

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	446,995	245,076	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	753,988	403,265	336,036
2002	531,568	222,659	300,227
2003	508,770	269,046	215,261
2004	691,063	297,619	355,679
2005	**303,344**	**129,614**	**161,358**
Average	588,864	250,602	323,317
Standard Deviation	169,414	79,069	120,213

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 2005, total pelagic and non-charter landings decreased 56% and 58% respectively, while charter landings decreased 46%. Non-charter boats landed 81% of all pelagics in 2005.

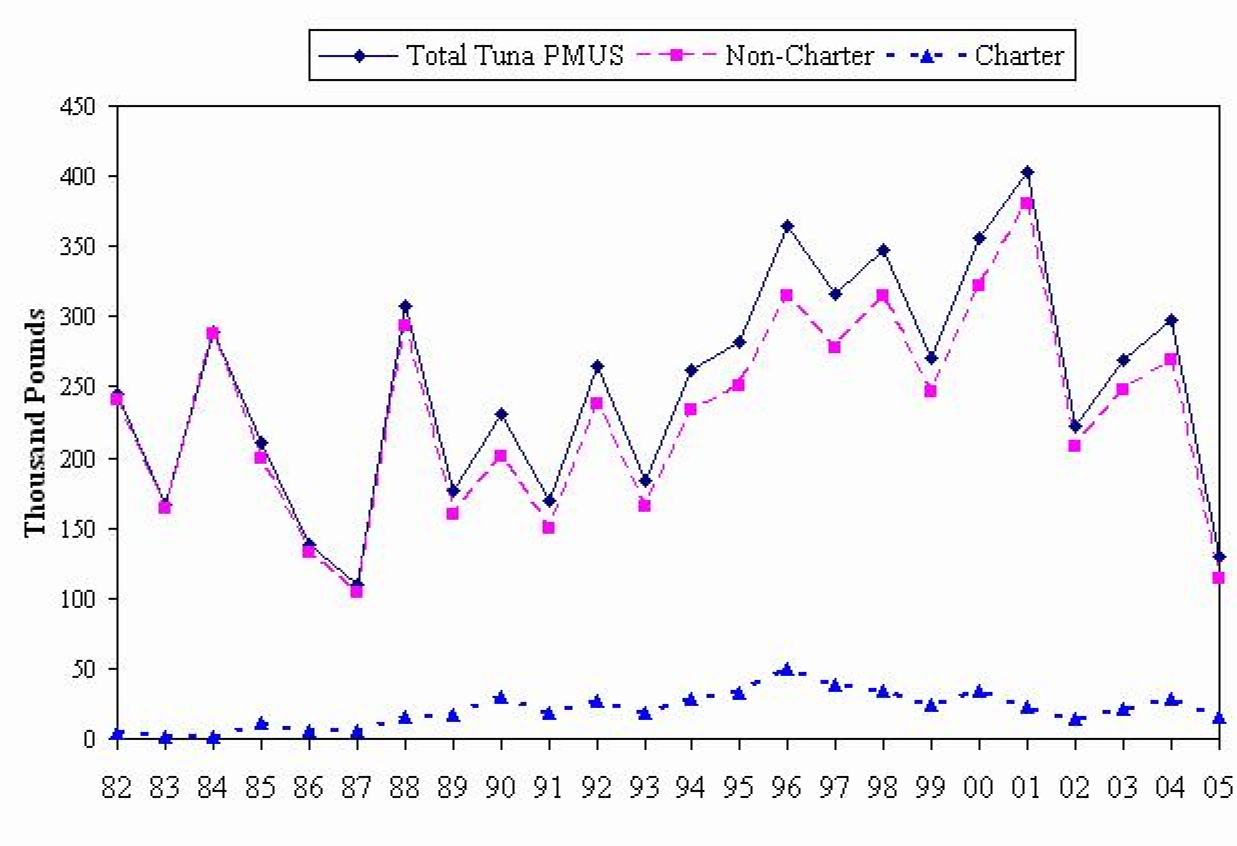
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey data.

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	446,995	437,860	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	753,988	680,236	73,753
2002	531,568	483,916	47,651
2003	508,770	452,696	56,074
2004	691,063	584,534	106,529
2005	**303,344**	**245,662**	**57,681**
Average	588,864	499,836	89,028
Standard Deviation	169,414	130,422	57,556

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 2005, 88% of tuna were caught by non-charter boats. In 2005, total tuna, non-charter, and charter tuna landings decreased 56%, 58%, and 44% respectively. The 2005 estimated tuna PMUS landings were 48% lower than the 24 year average, and the second lowest total in the 24 year time series.

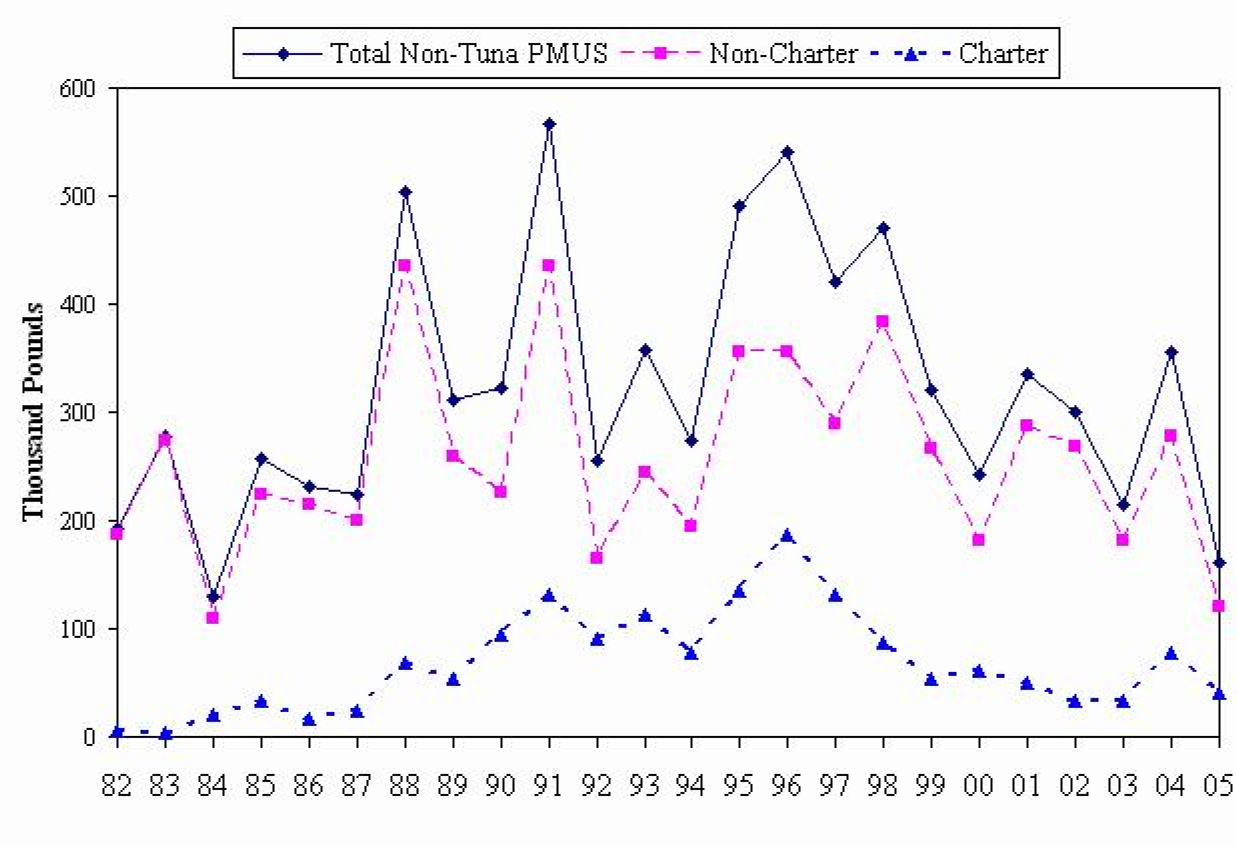
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

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	245,076	241,086	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	403,265	379,838	23,427
2002	222,659	207,945	14,714
2003	269,046	247,501	21,545
2004	297,619	268,771	28,848
2005	**129,614**	**113,466**	**16,148**
Average	250,602	229,661	20,941
Standard Deviation	79,069	71,830	12,389

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 2005, total non-tuna PMUS and non-charter non-tuna PMUS decreased 55% and 57% respectively, compared with 2004. Charter non-tuna PMUS decreased 48%. Non-charter boats accounted for 75% of non-tuna PMUS catch in 2005.

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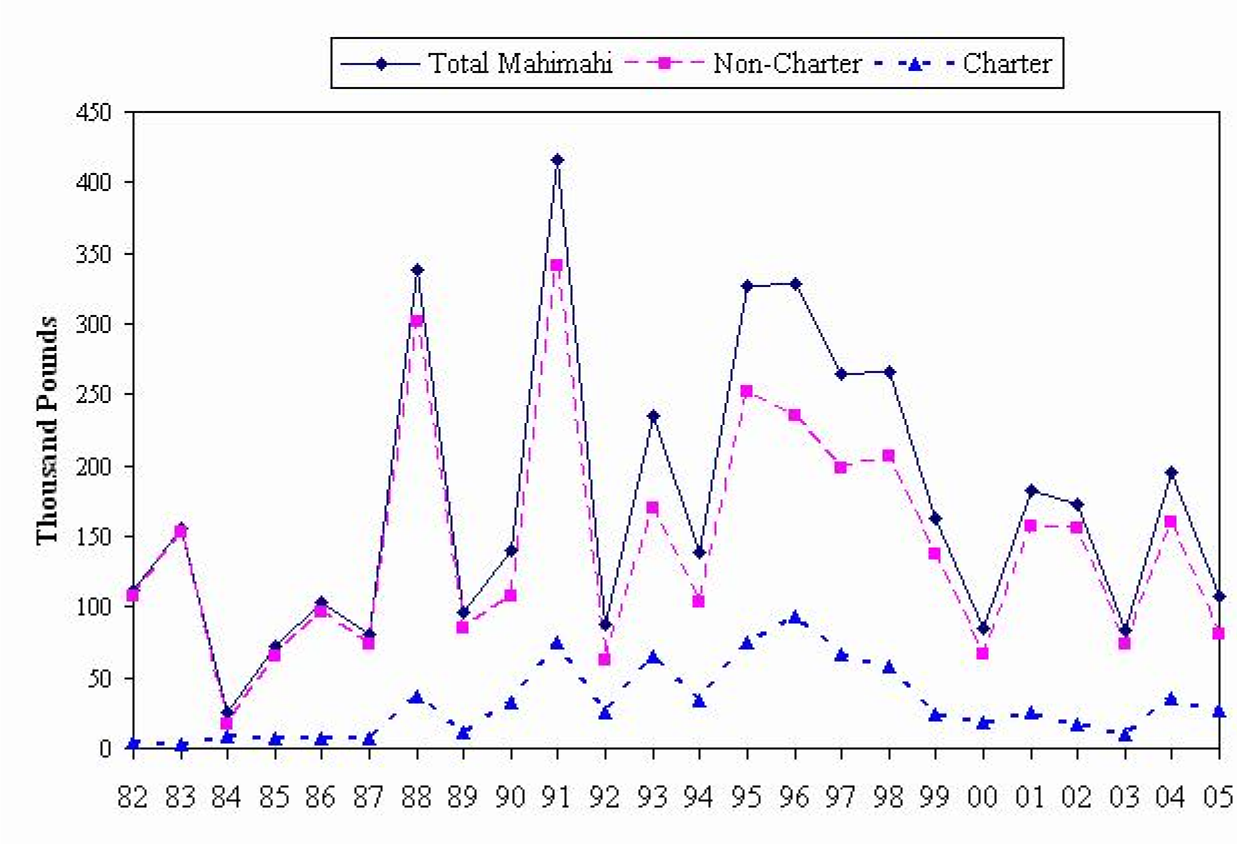
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

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	336,036	286,816	49,221
2002	300,227	267,709	32,517
2003	215,261	181,488	33,773
2004	355,679	278,382	77,297
2005	**161,358**	**120,813**	**40,545**
Average	323,317	255,709	67,609
Standard Deviation	120,213	87,945	46,784

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 2005, mahimahi landings decreased, with total and non-charter landings decreasing 45% and 49%, respectively. Charter landings decreased by 23%. 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. This may have negatively affected the mahimahi catch 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 mahimahi harvests of 1995-6, 1991, 1987-8, and 1985 (NOAA website).

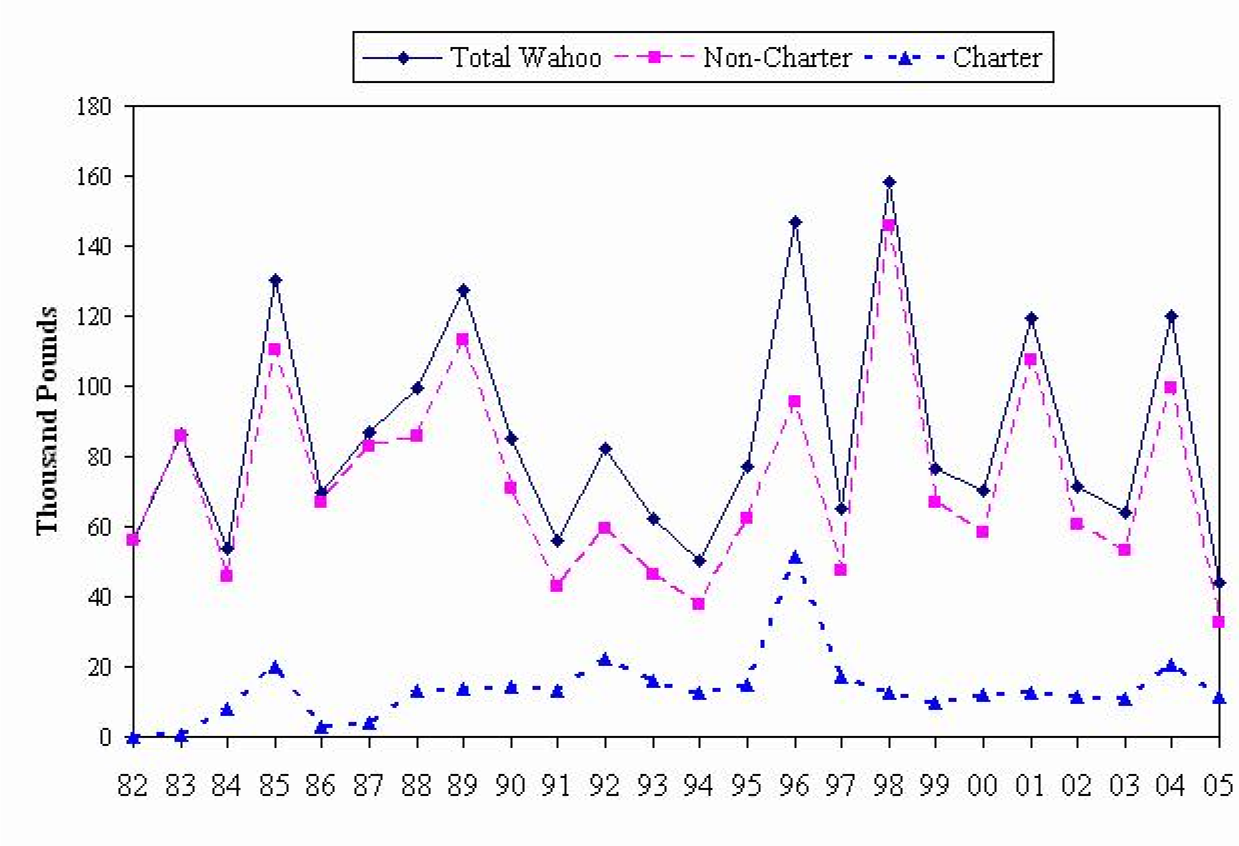
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	182,967	157,293	25,674
2002	172,317	155,477	16,839
2003	84,113	74,141	9,973
2004	194,802	159,410	35,392
2005	**107,179**	**79,990**	**27,189**
Average	174,027	141,906	32,121
Standard Deviation	102,198	80,992	26,334

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 2005, total, non-charter, and charter harvest of wahoo decreased 63%, 67%, and 43% respectively from 2004. Non-charter boats harvested 74% of the total wahoo harvest. Wahoo harvest for 2005 was the lowest for the 24 year time series.

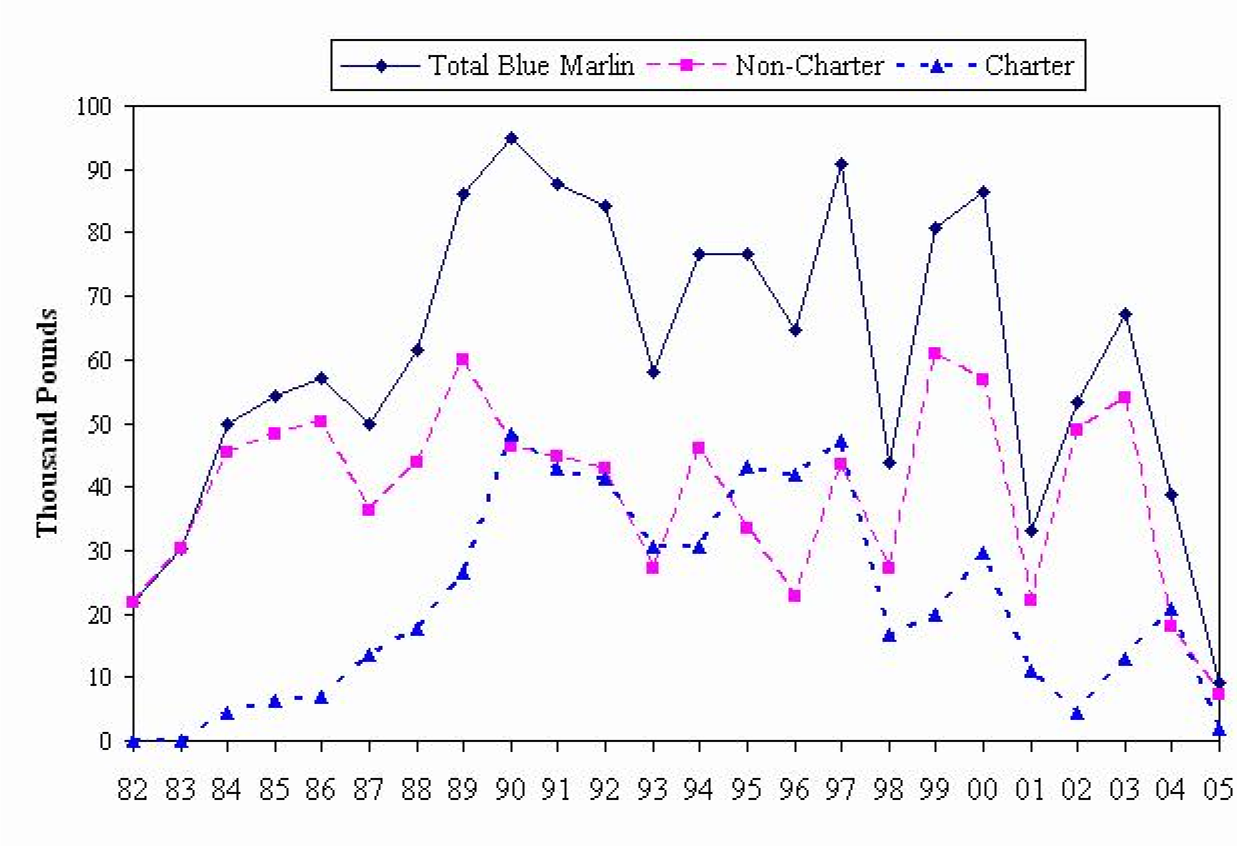
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	119,647	107,150	12,497
2002	71,654	60,505	11,150
2003	63,851	53,090	10,761
2004	119,942	99,617	20,325
2005	**43,926**	**32,521**	**11,405**
Average	85,825	72,228	13,597
Standard Deviation	31,857	28,292	9,882

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 2005, the overall, and non-charter blue marlin landings decreased 76%, and 59% respectively. Charter blue marlin catch decreased by 90%, accounting for 21% of the total blue marlin harvest. Blue marlin landings were the lowest in the time series across all categories.

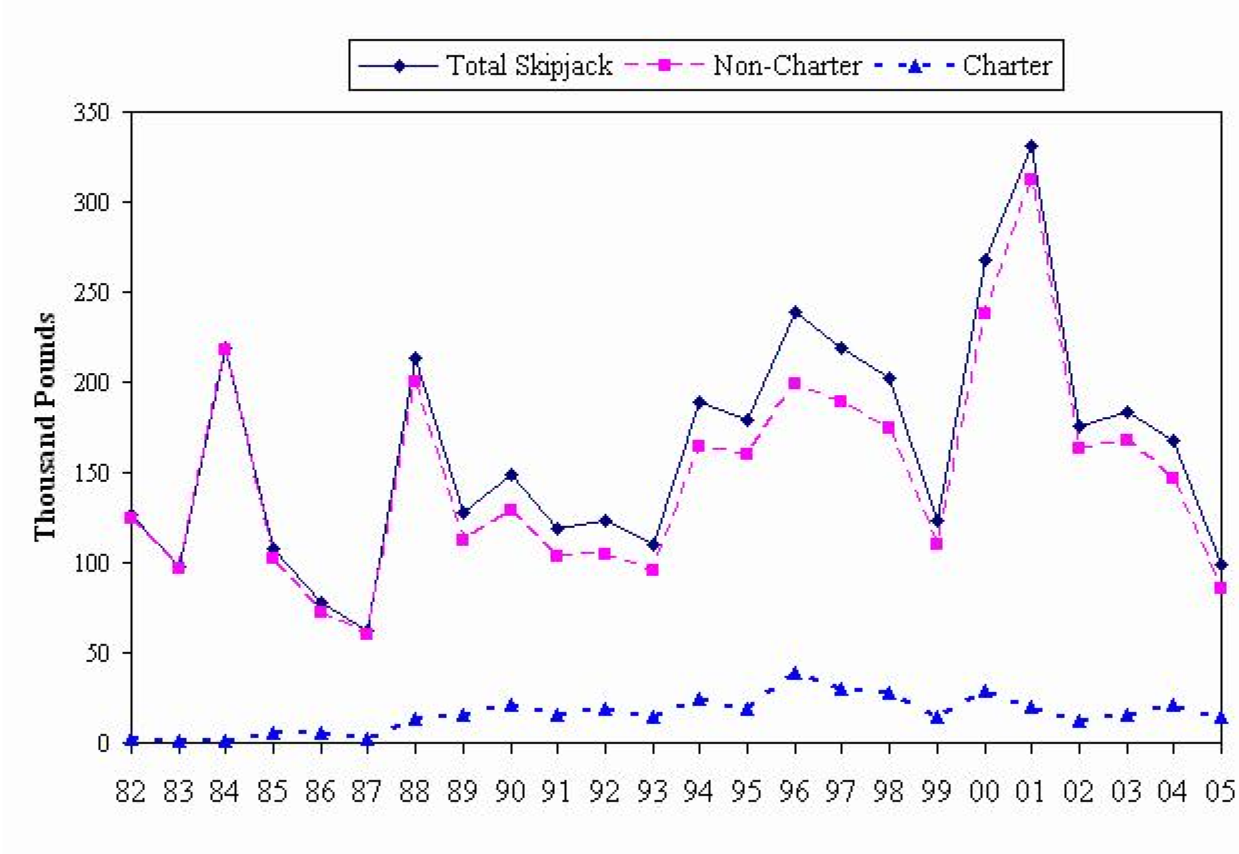
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	33,196	22,148	11,049
2002	53,466	48,938	4,528
2003	67,035	53,996	13,039
2004	38,829	18,020	20,809
2005	**9,208**	**7,258**	**1,950**
Average	60,741	39,109	23,599
Standard Deviation	23,407	14,301	15,402

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 supertyphoons, 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 decreased in 2005 by 40% and 42% respectively. Charter landings decreased by 32%. Charter landings are 10% lower than the 24-year average, while the other two categories are near 40% below the 24-year averages.

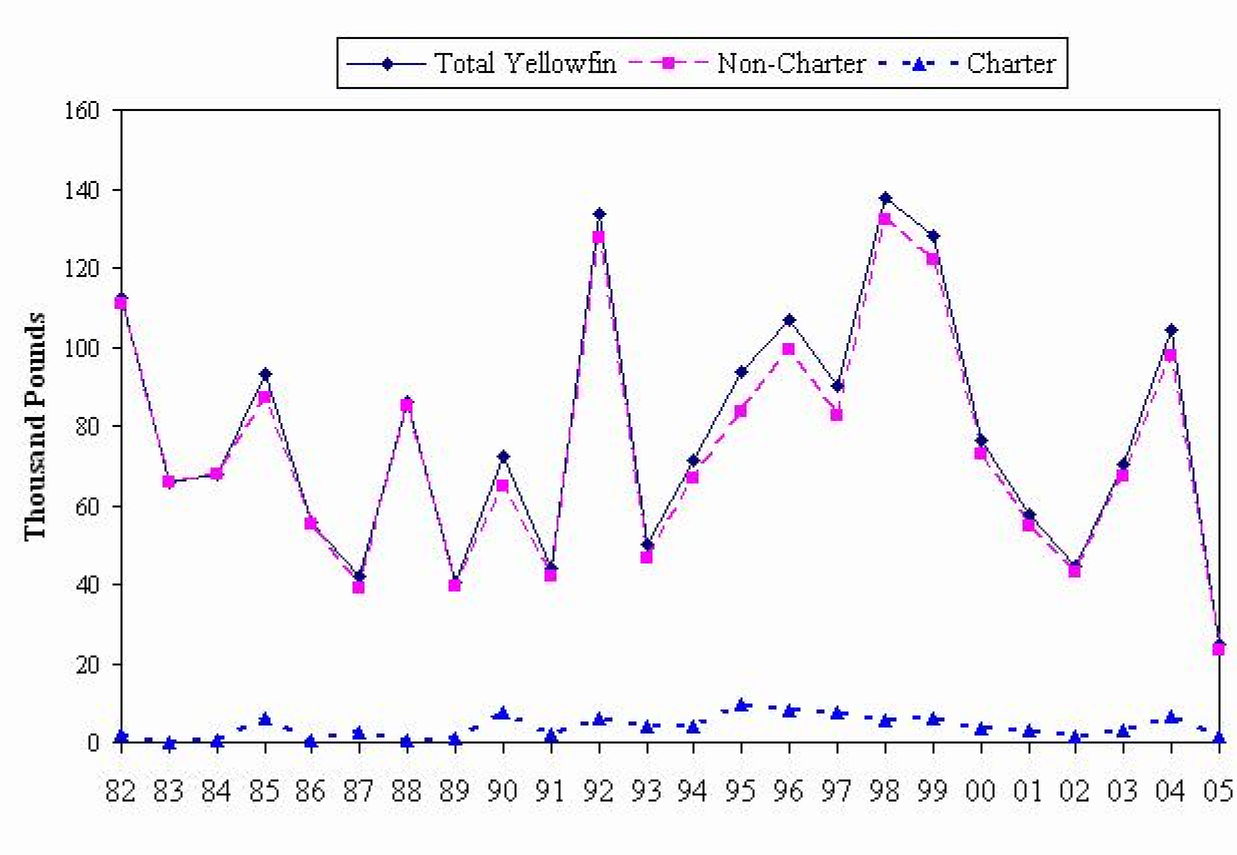
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	331,516	312,001	19,515
2002	175,501	162,796	12,705
2003	183,247	168,024	15,223
2004	167,596	146,205	21,391
2005	**99,357**	**85,008**	**14,349**
Average	162,912	146,943	15,968
Standard Deviation	64,683	59,452	9,879

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



Interpretations: The overall yellowfin landings show wide fluctuations during the 24-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 down dramatically in 2005, with total catch, non-charter catch, and charter catch down 76%, 76%, and 74%, respectively. Non-charter boats harvested 93% of the total yearly catch of yellowfin. Total catch of yellowfin tuna was at the lowest level for the 24 year time series.

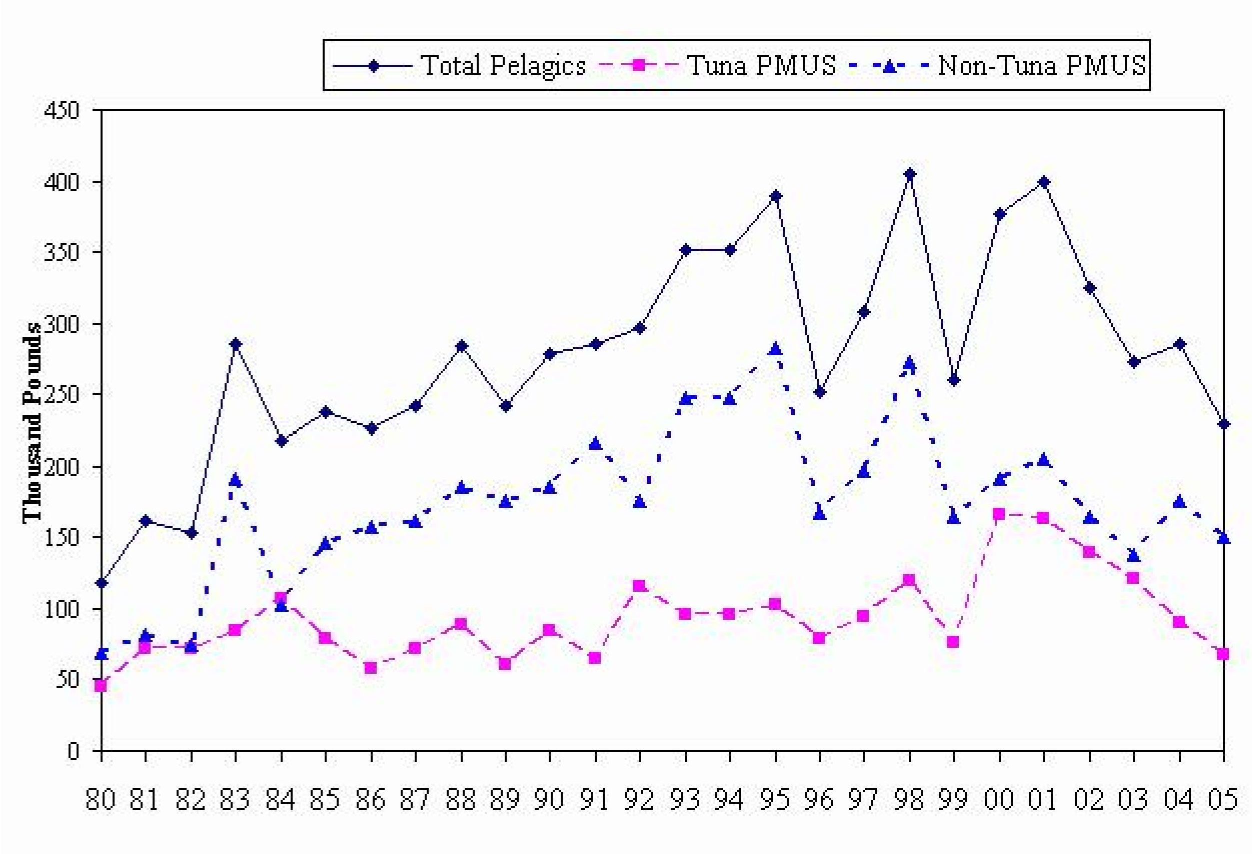
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	57,910	54,668	3,242
2002	44,810	43,075	1,735
2003	70,236	67,183	3,053
2004	104,479	97,779	6,700
2005	**24,911**	**23,177**	**1,733**
Average	77,919	74,032	4,056
Standard Deviation	31,213	29,770	2,703

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 26-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 supertyphoons, 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 2005.

Landings for all pelagics and non-tuna PMUS decreased by 20% and 25%, respectively, while commercial tuna PMUS landings decreased by 14%. All three categories were well below the 26 year averages.

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**
Average	278,404	92,652	174,156
Standard Deviation	73,717	30,368	54,497

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 2005, the number of boats was 358, a decrease of 11% from 2004.

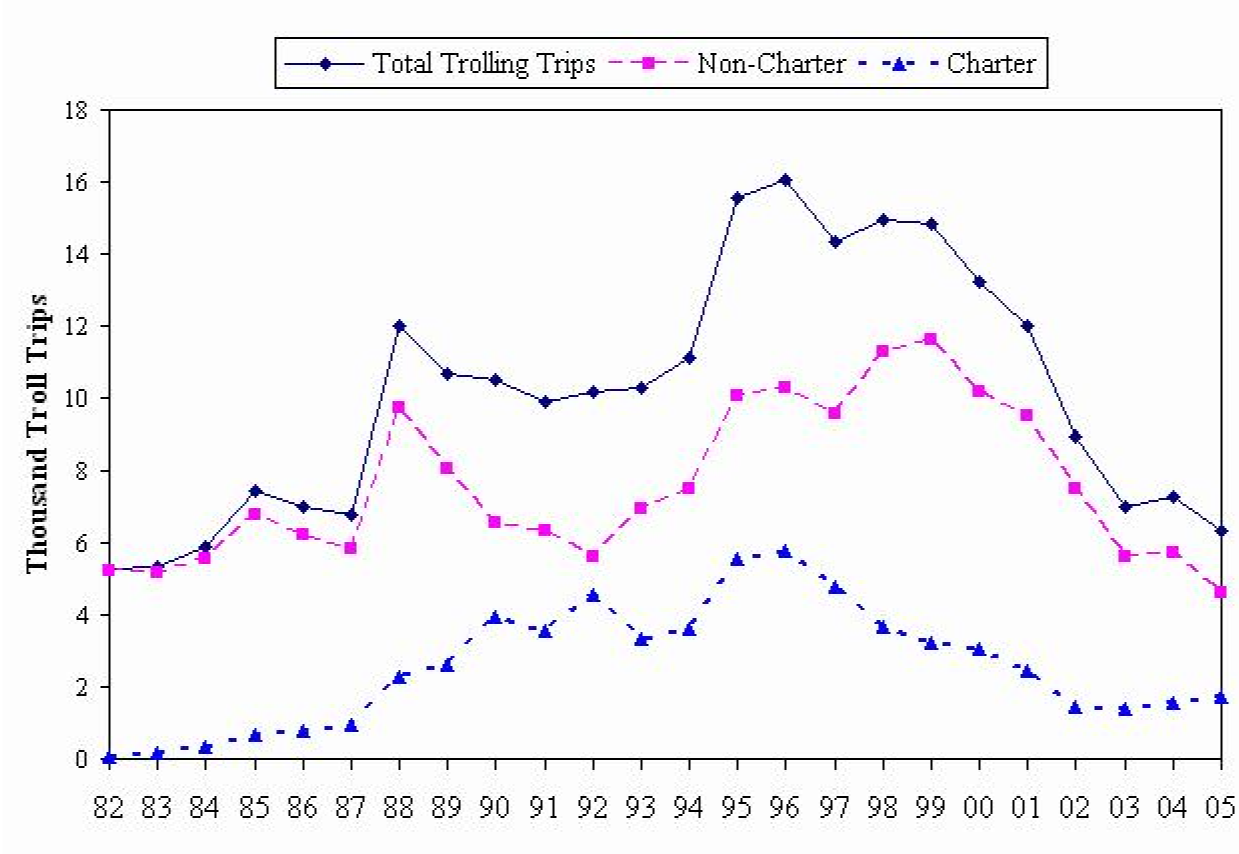
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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 2005 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**

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 24-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 2005, the total number of troll trips decreased by 13%. The number of non-charter decreased, by 20%, while the number of charter trips increased by 13%. The decrease in the number of non charter trips may be due to the increased cost of fuel. The increase in charter trips can be attributed to an increase in tourism to Guam, as well as an increasing military presence on Guam. All three categories are below the 24-year averages.

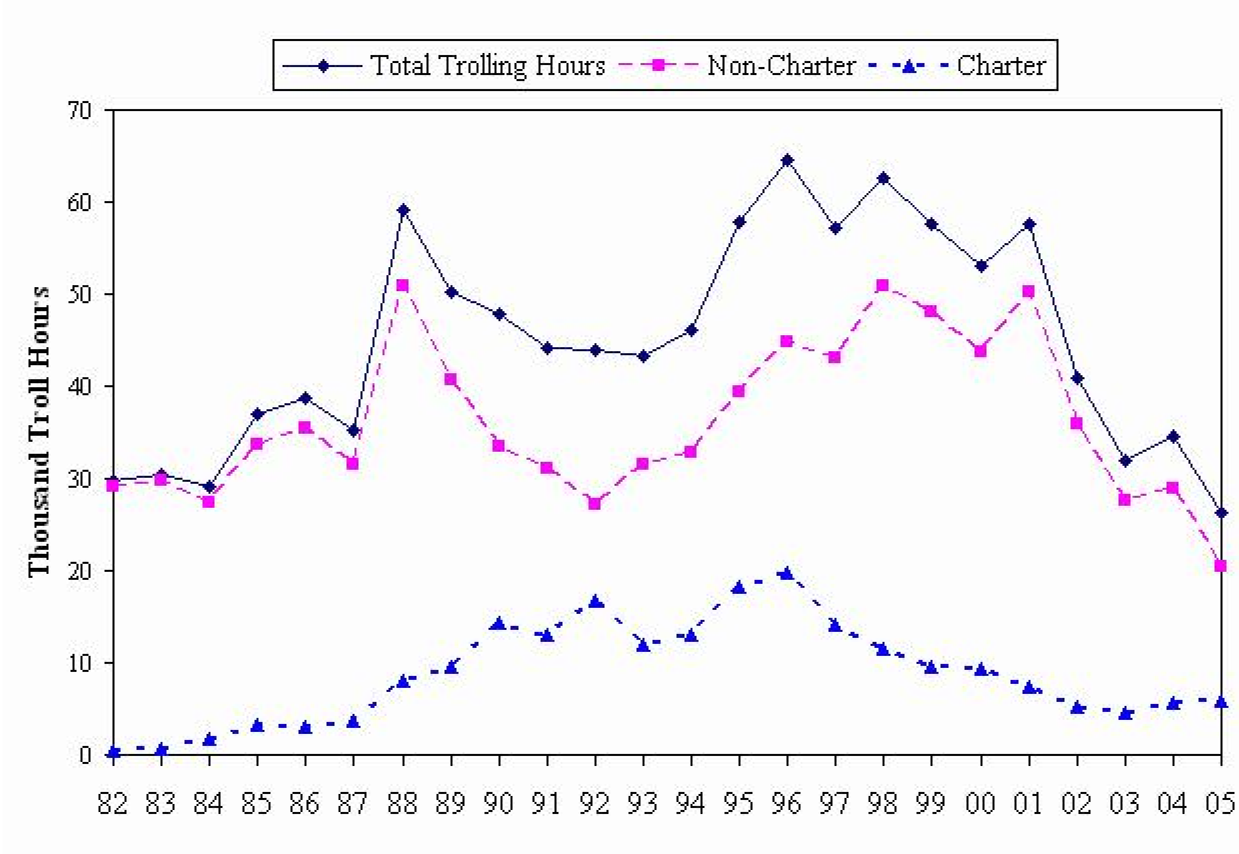
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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	**6,344**	**4,596**	**1,748**
Average	10,119	7,562	2,557
Standard Deviation	3,436	2,151	1,683

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 2004, the number of troll hours increased, but this trend did not continue in 2005. Total and non-charter totals decreased by 24%, and 29%, respectively, while charter hours increased by 3%. These changes reflect the changes in the number of trips made during 2005. All three totals are below the 24-year average.

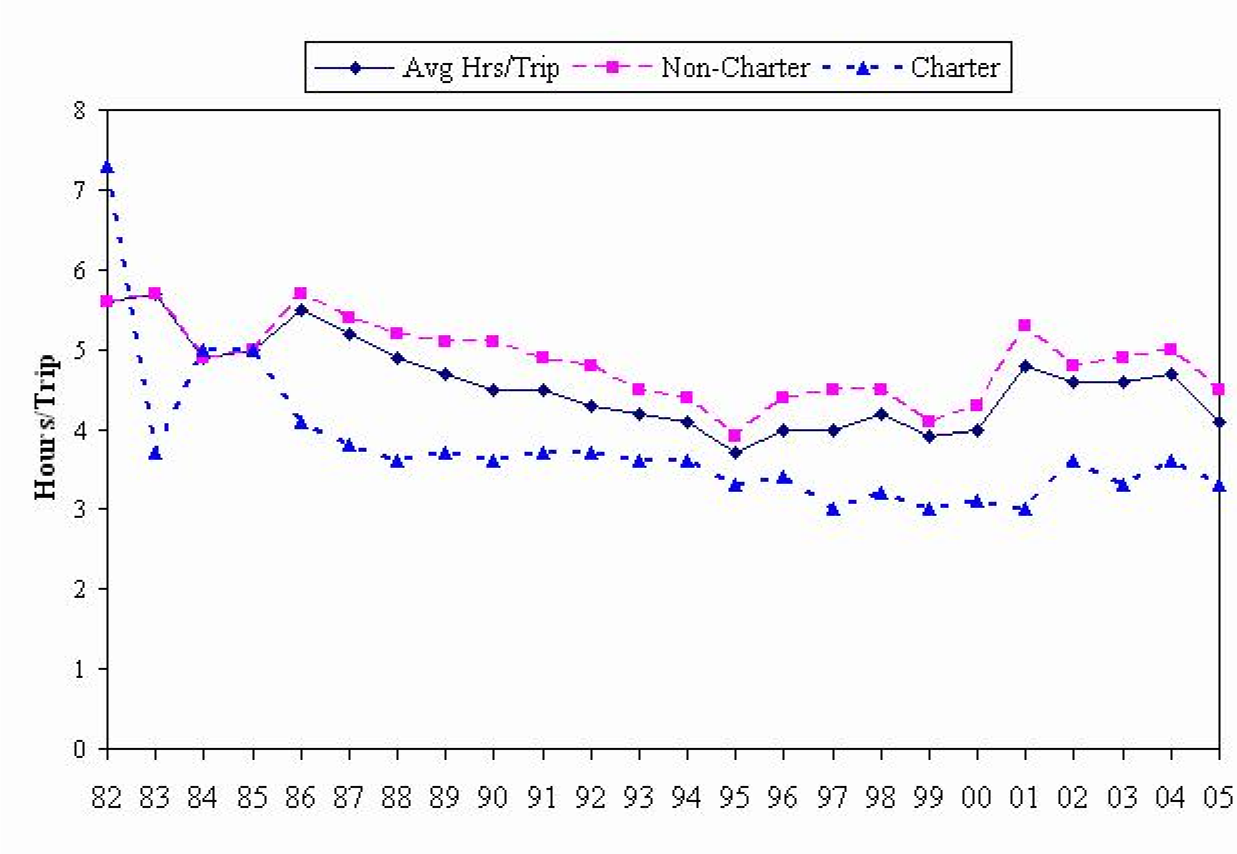
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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	**26,290**	**20,487**	**5,802**
Average	44,926	36,141	8,785
Standard Deviation	11,735	8,605	5,586

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



Interpretations: The overall average trolling trip decreased slightly from 2004. 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 constant throughout the 24-year time series. In 2005, all three categories show a slight decrease in the number of hours per trip, decreasing 11% for all trips, 10% for non-charter trips and 8% for charter trips. This decrease in trip length may be due to a sharp increase in fuel prices over the past year. This increase, without a corresponding increase in the price of fish, reduces the desirability of long trolling trips. All three categories are slightly under the 24 year average.

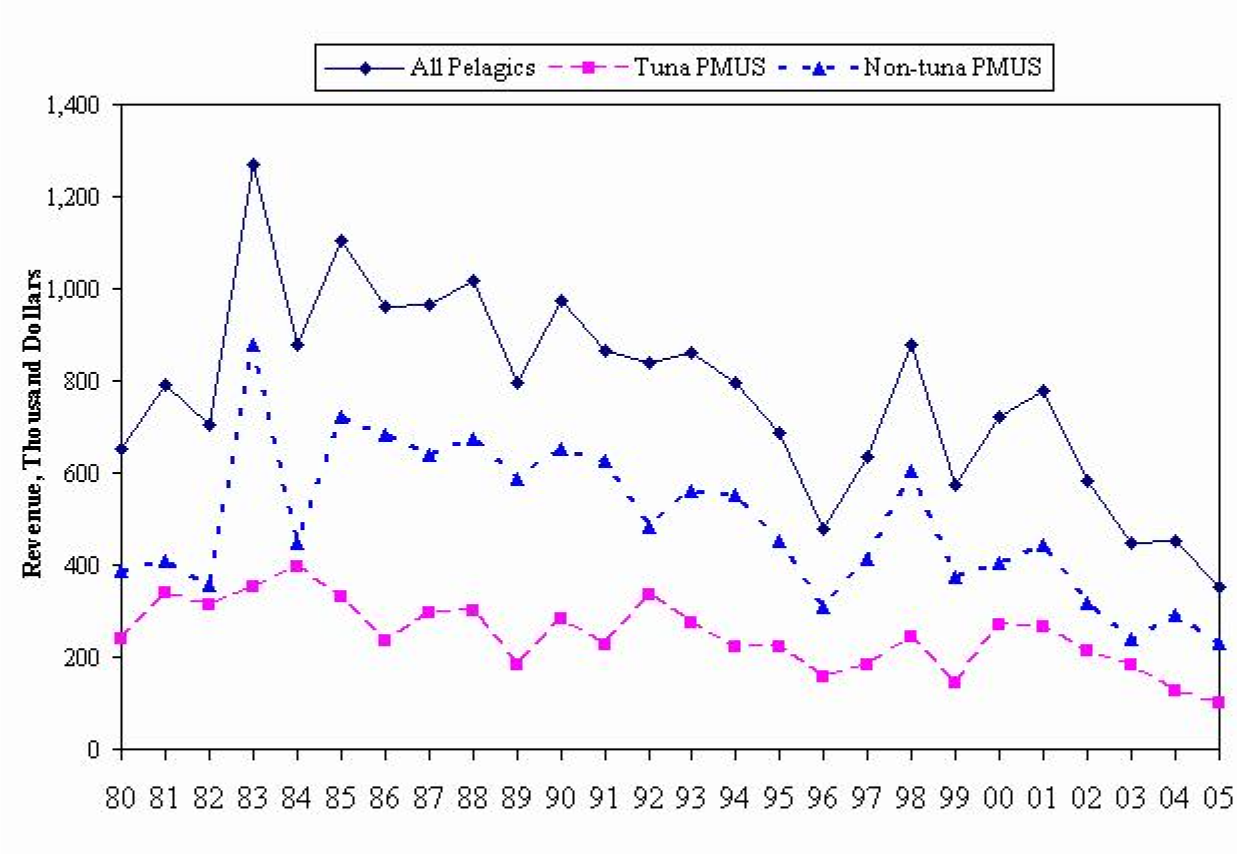
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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 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	**4.1**	**4.5**	**3.3**
Average	4.6	4.9	3.8
Standard Deviation	0.6	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 2005 decreased 21% for tuna PMUS, decreased 22% for total, and 20% for non-tuna PMUS. Overall, commercial revenues have shown a slow 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 2005, with all three adjusted revenue categories well below the 26-year averages.

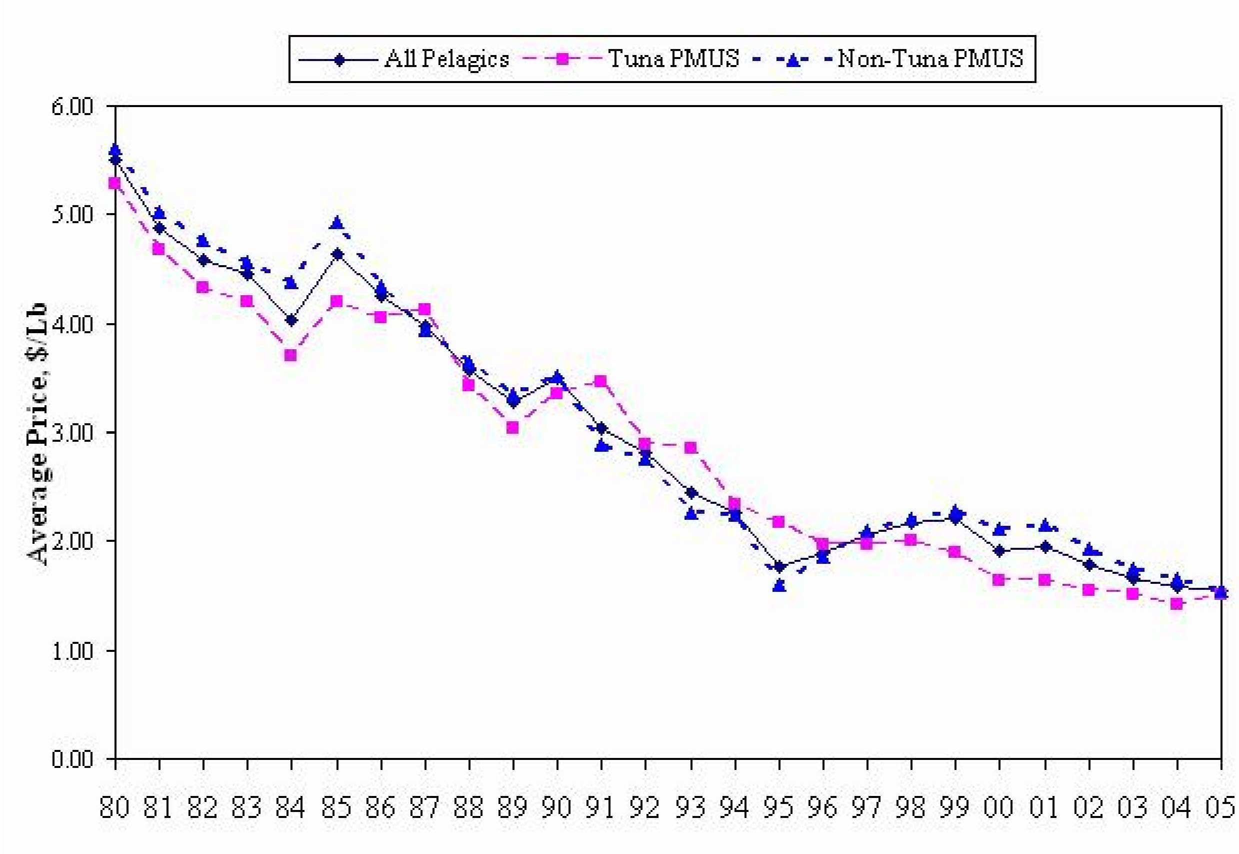
Source: The WPACFIN-sponsored commercial landings system.

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**
Average	433,128	771,811	137,385	247,128	274,867	490,220
Standard Deviation	141,443	216,160	47,015	74,596	96,071	163,773

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. The adjusted price for all pelagics decreased 2.5%, and decreased 6% for non-tuna PMUS species. Tuna PMUS increased by 6%. The increase in tuna may be due the lower tuna catch in 2005. The Guam market was not saturated by tuna, as in earlier years, and fishermen were able to command a slightly higher price. 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.

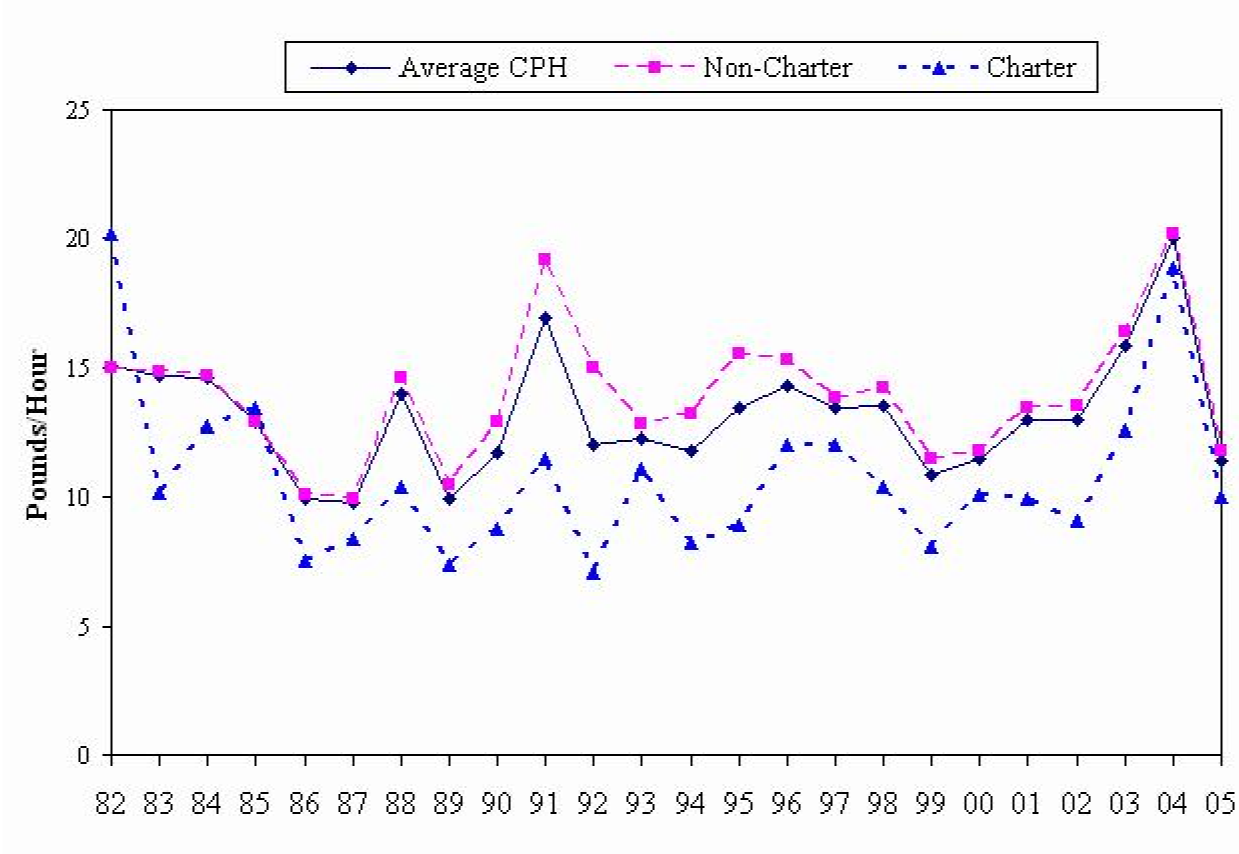
Source: The WPACFIN-sponsored commercial landings system.

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**
Average	1.53	2.99	1.48	2.89	1.56	3.05
Standard Deviation	0.16	1.22	0.20	1.16	0.18	1.27

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 2005, total overall, non-charter, and charter trolling catch rate decreased 43%, 42%, and 47%, respectively. 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.

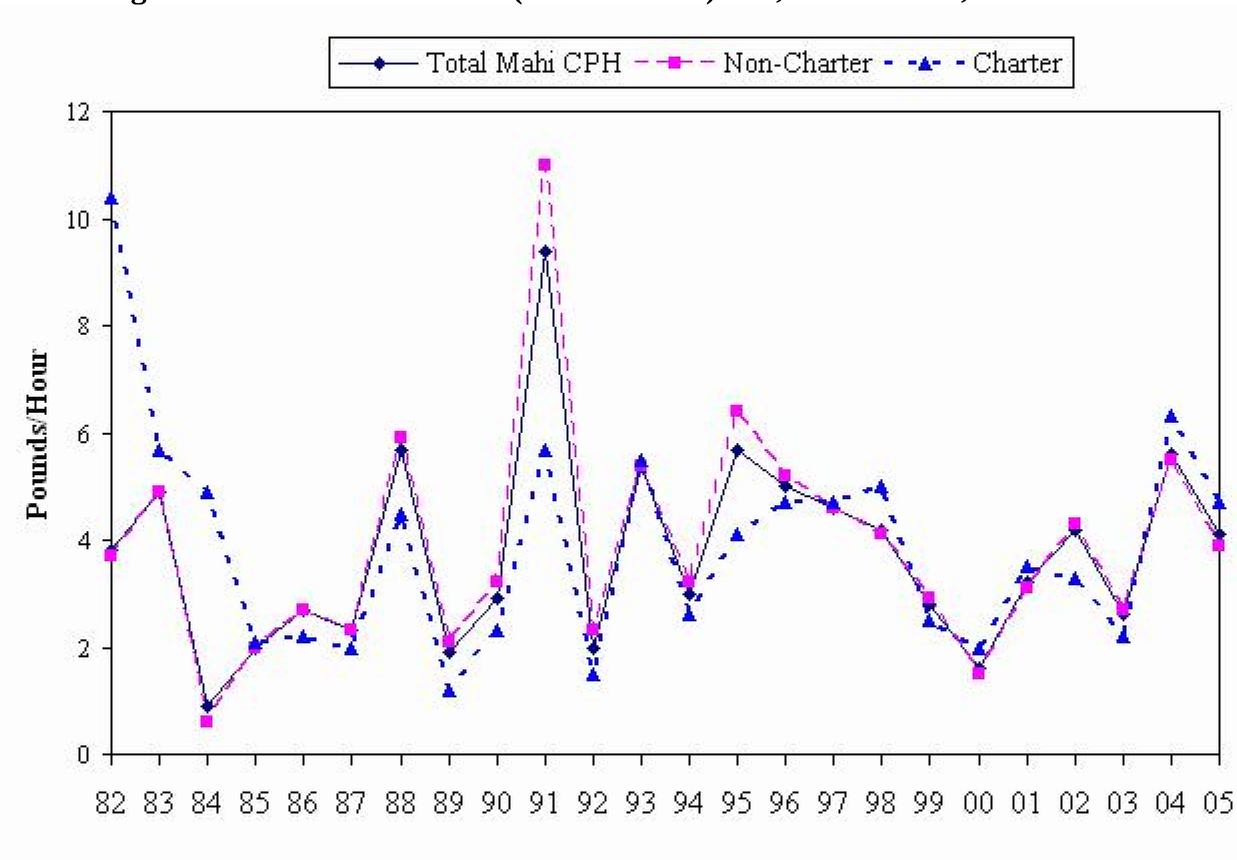
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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	9.9
2002	13.0	13.5	9.1
2003	15.8	16.4	12.6
2004	20.0	20.2	18.9
2005	**11.4**	**11.8**	**10.0**
Average	13.2	13.9	10.8
Standard Deviation	2.4	2.5	3.2

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 2005, the catch rate for total, non-charter, and charter mahimahi decreased 26%, 29%, and 25%, respectively. Despite the decrease, all three categories are above the 24-year averages.

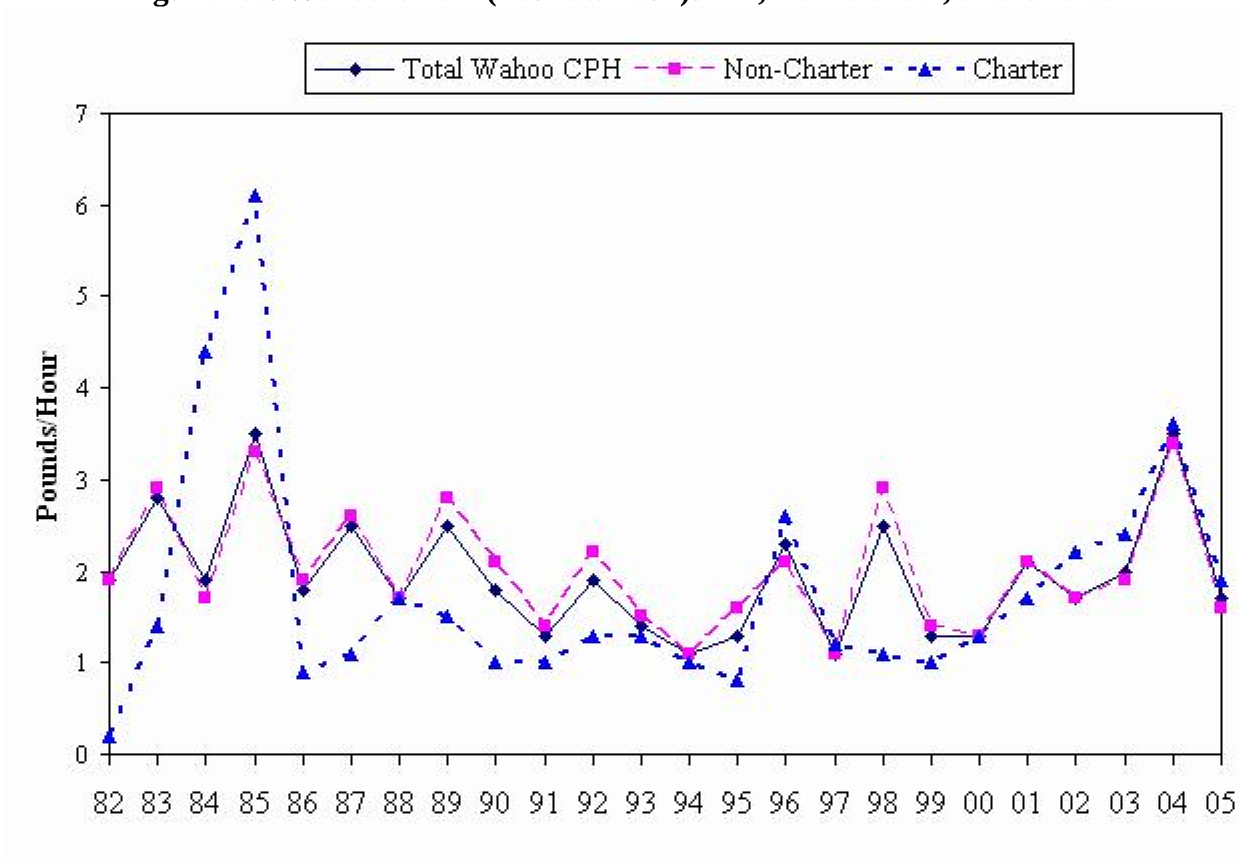
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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	4.3	3.3
2003	2.6	2.7	2.2
2004	5.6	5.5	6.3
2005	**4.1**	**3.9**	**4.7**
Average	3.8	3.9	3.9
Standard Deviation	1.9	2.1	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. However, it is not possible to allocate species-specific effort, since effort used to target other species can result in artificially high or low catch rates for a given species. In 2005, the total non-charter, and charter catch rates for wahoo all decreased. Total wahoo CPUE decreased by 51%, with non-charter CPUE decreasing by 53% and charter CPUE decreasing by 47%. Only charter CPUE was above the 24-year average in 2005.

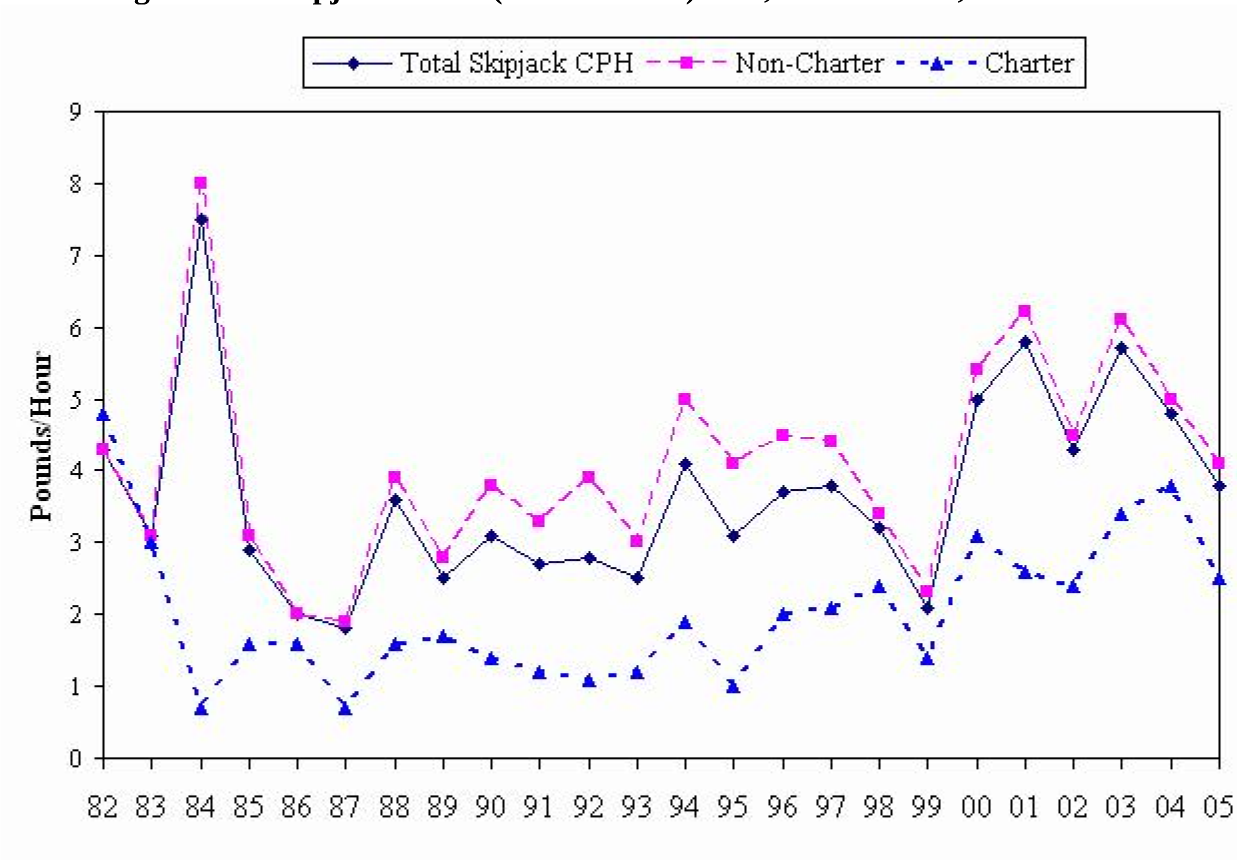
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

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	1.7	1.7	2.2
2003	2.0	1.9	2.4
2004	3.5	3.4	3.6
2005	**1.7**	**1.6**	**1.9**
Average	2.0	2.0	1.8
Standard Deviation	0.7	0.7	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 2005, the catch rates for total, non-charter, and charter skipjack tuna decreased 21%, 18%, and 34% respectively. Despite these drops, all three categories were still equal to or above their 24-year averages.

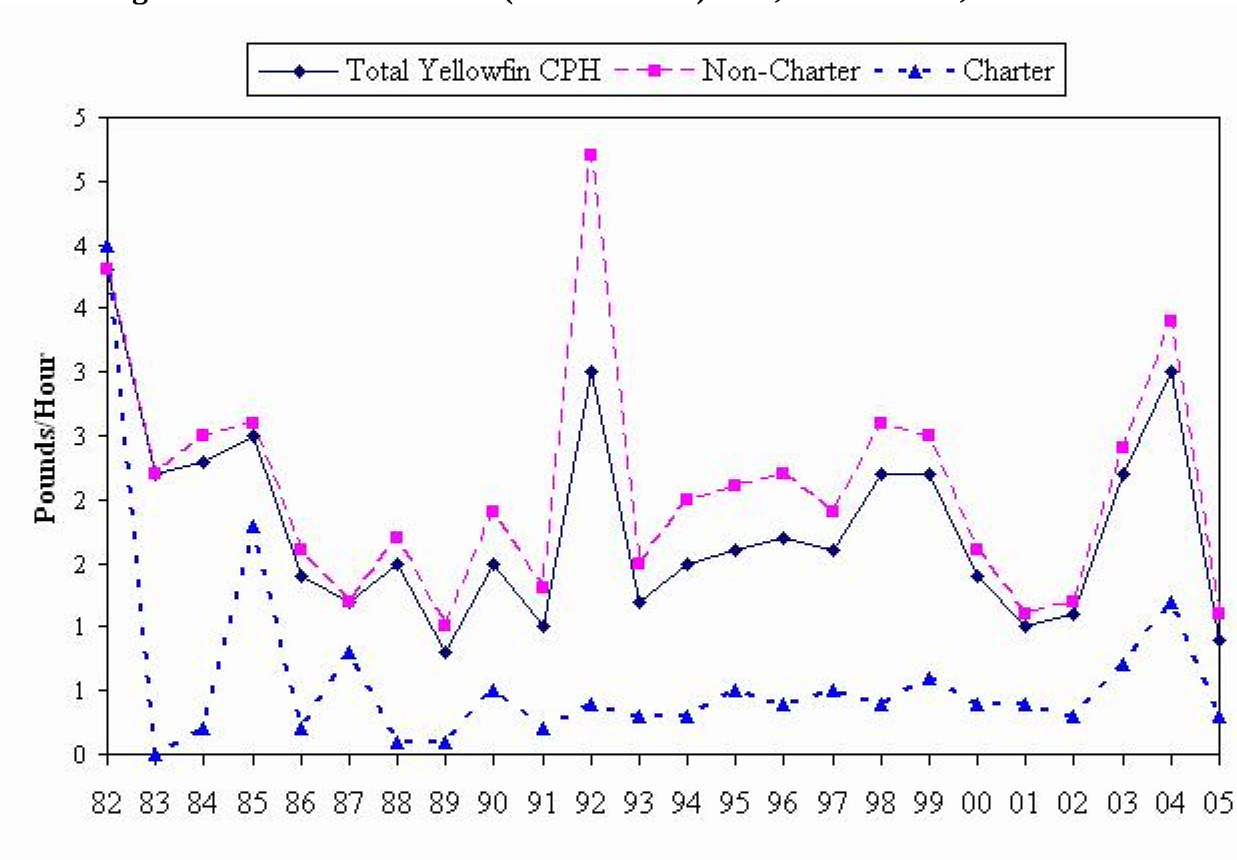
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	2.6
2002	4.3	4.5	2.4
2003	5.7	6.1	3.4
2004	4.8	5.0	3.8
2005	**3.8**	**4.1**	**2.5**
Average	3.7	4.1	2.1
Standard Deviation	1.4	1.4	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 2005, the yellowfin catch rates for total, non-charter, and charter catch decreased 70%, 68%, and 75% respectively. All three categories are about half their 24-year averages.

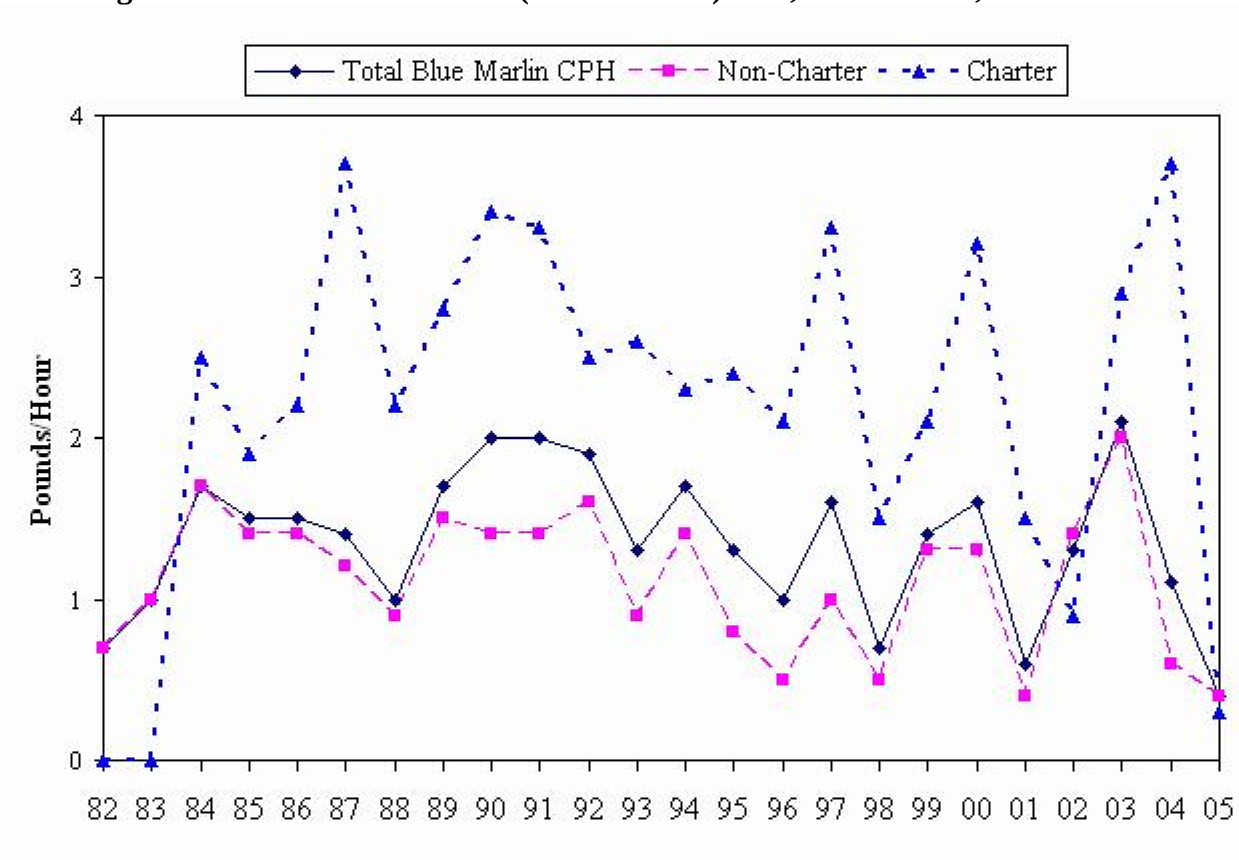
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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	2.4	0.7
2004	3.0	3.4	1.2
2005	**0.9**	**1.1**	**0.3**
Average	1.8	2.1	0.6
Standard Deviation	0.8	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 2005 blue marlin catch rates decreased for total and non-charter by 72% and 50%, respectively. Charter blue marlin catch decreased by 92%. All three categories were at the lowest levels in the 24-year reporting record.

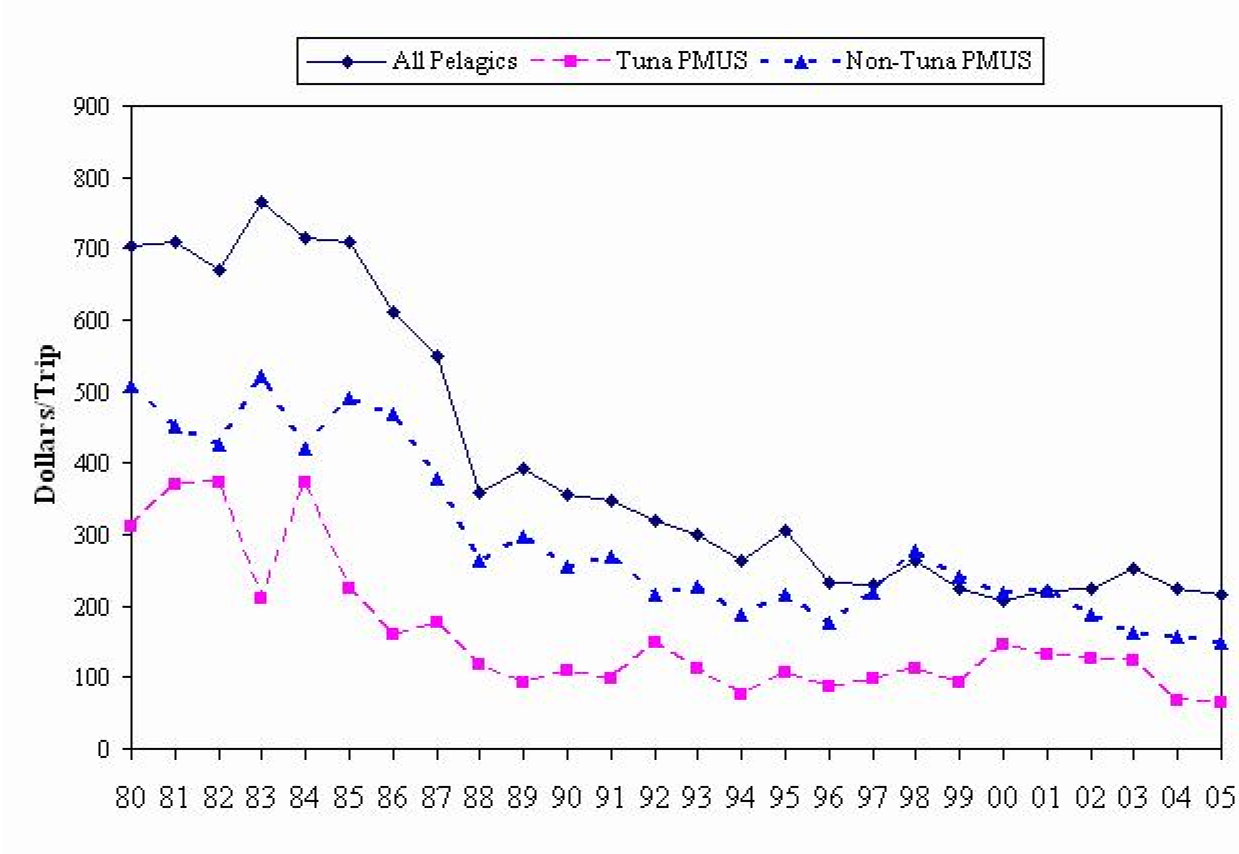
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

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**
Average	1.4	1.1	2.4
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 8 years. In 2005, the adjusted revenue per trip decreased for all pelagics, for tuna PMUS, and for non-tuna PMUS, by 3.5%, 5%, and 4%, respectively. 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.

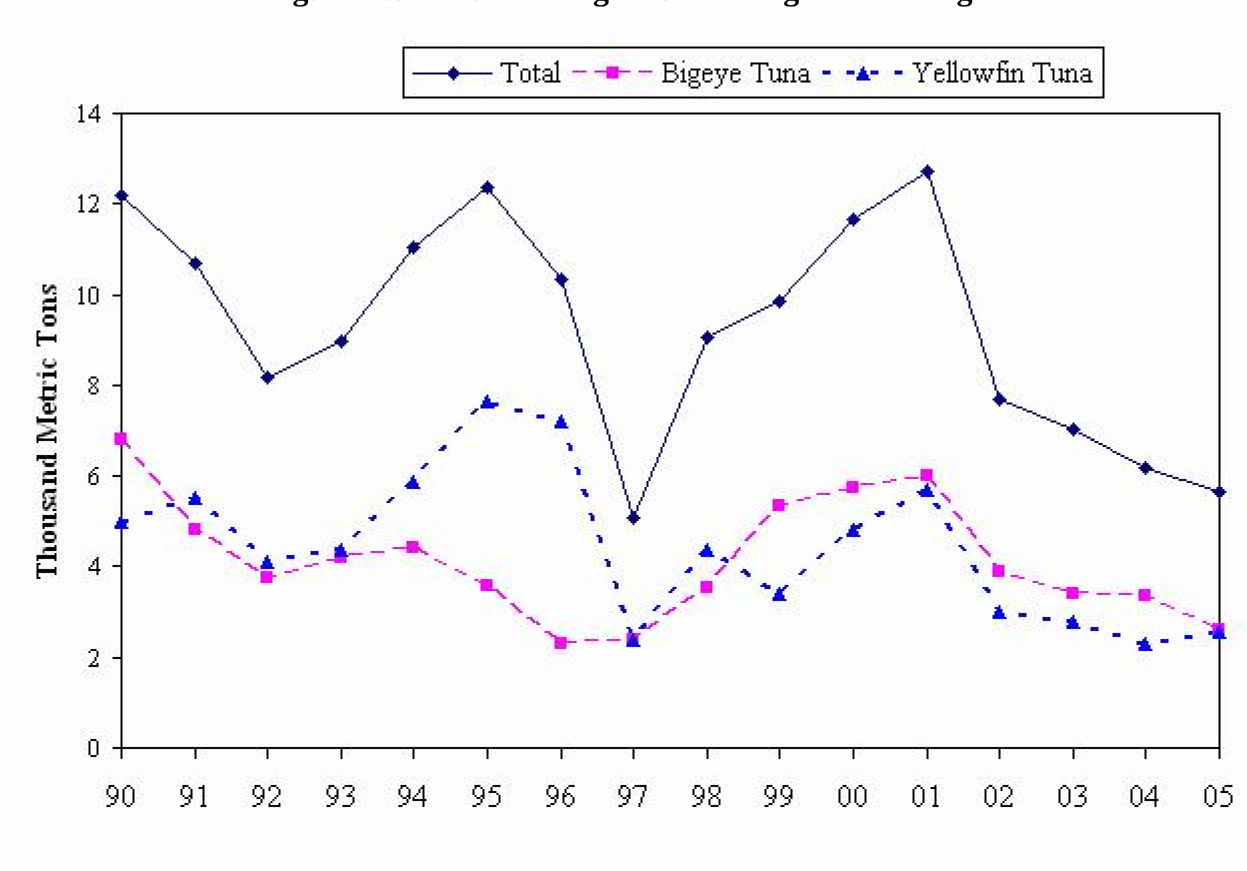
Source: The WPacFIN-sponsored commercial landings system.

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**
Average	198.35	399.08	79.43	158.06	151.95	292.72
Standard Deviation	24.75	199.85	24.70	95.43	29.69	121.00

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 2004, the 2005 total longline landings decreased 9%, with bigeye landings decreasing 22% and yellowfin landings increasing 13%.

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**
Average	9,294	4,130	4,442
Standard Deviation	2,468	1,311	1,662

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

Species Name	Number Released			Caught All	Bycatch (%)
	Alive	Dead/Injured	Both		
Charter					
Makaira mazara	1	0	1	3	33.33
Carcharhinus amblyrhynchos	1	0	1	1	100.00
Charter Bycatch Total	**2**	**0**	**2**	**4**	**50.00**
Compare with All Caught				**661**	**0.30**
Non Charter					
Carcharhinus melanopterus	1	0	1	1	100.00
Non Charter Bycatch Total	**1**	**0**	**1**	**1**	**100.00**
Compare with All Caught				**1971**	**0.05**
All Bycatch Total	**3**	**0**	**3**	**5**	**60.00**
Compare with All Caught				**2632**	**0.11**

*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	2631	.01	3		

*"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 bottomfishing method.

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

C. Hawaii

*Updated April 12, 2007

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 28 million pounds worth about $67 million (ex-vessel revenue) in 2005. The longline fishery was the largest of all commercial pelagic fisheries in Hawaii and represented 82% 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 species are also landed with some regularity. The largest component of the pelagic landings was tunas, which comprised 60% of the total in 2005. Bigeye tuna alone accounted for 68% of the tunas and 41% of all pelagic landings. Billfish landings made up 22% of the total landings in 2005. Swordfish was the largest of these, at 56% of the billfish and 12% of the total landings. Landings of other pelagic species represented 18% of the total landings in 2005 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

[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.

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 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 Commercial Marine 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 CML 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 Value 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 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 and reviewed by William A. Walsh University of Hawaii (UH), Joint Institute for Marine and Atmosphereic Research (JIMAR), Pelagic Fisheries Research Program (PFRP). 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 Commercial Marine License at time of licensing. This does not preclude fishermen from using other gears or methods.

A total of 3,136 fishermen were licensed in 2005, including 2,069 (66%) 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 (68%) and longline fishermen (24%). The remainder was issued to ika shibi and palu ahi (handline) (7%) and aku boat fishers (1%).

[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.

Primary Fishing Method	Number of licensees required to report	
	2004	2005
Trolling	1,378	1,406
Longline	390	489
Ika Shibi & Palu Ahi	172	147
Aku Boat (Pole and Line)	25	27
Total Pelagic	1,965	2,069
Total All Methods	3,083	3,136

2005 Plan Team Recommendations:

1. The Pelagic Plan Team recommends that the HMRFS program consider an alternative sampling design for registered recreational boat fishermen, instead of the random digit dialing telephone survey. It is envisaged that this would lead to more precise estimates of catch and effort from the HMRFS survey, by concentrating on the universe of known recreational boat fishermen.

2. With respect to the offshore (Cross Seamount, NOAA weather buoys, Private FADs) mixed line tuna fishery, the Pelagic Plan team notes the following:

1. The advent of the use of multiple shortlines (longlines less than 1 nautical mile (nm) in length) means that pelagic longline fishing can be conducted which is not subject to federal regulations (permits, logbooks, observers, VMS, area closures, turtle bycatch mitigation, seabird bycatch mitigation etc). The Council's intent for the provision for longlines less than 1 nm in length was not intended to be interpreted in this manner, and was a provision for fishermen employing a 'kaka' line. The Pelagic Plan Team recommends that the Council revisit the definition of longline gear less than 1 nm in length, and considers regulations for this gear, particularly the number of units that may be deployed by each vessel.

2. While there has been great improvement on the reporting of bigeye tuna (BET) catches through the State of Hawaii's fishermen and dealer report systems, there are concerns that the volume of reported landings do not match the perceived volumes of fish landed by troll and handline/mixed-line fisheries in Hawaii. The Plan Team recommends that WPacFIN and DAR convene two workshops: the first to review the catch and effort reporting systems, and algorithms for the expansion of BET and yellowfin (YFT) landings; and the second to review the results of any changes in the application of these modified algorithms in estimating the BET and YFT landings in the troll and handline/mixed-line fisheries in Hawaii

3. There was a lack of consensus for the perceived need for federal permitting of the offshore mixed line fishery and the following aspects should be investigated prior to proposing additional regulations on this fishery:

- Strengthening the existing mechanisms for the State of Hawaii reporting of catch and effort from this fishery.

- Estimating the administrative burden of federally permitting the various fisheries sectors that are catching BET and YFT. This includes:

  i. Federal permit for all pelagic small boat fishermen
  ii. Federal permit and reporting for offshore mixed line fishery
  iii. Federal permit and reporting for recreational pelagic small boat fishermen

- Accurately estimating the magnitude of BET catches by the non-longline fisheries sectors in Hawaii in relation to the total domestic BET catch.

Table 1. Hawaii commercial pelagic landings, revenue, and average price by species, 2004-2005.

	2004			2005		
Species	**Pounds Landed (1000 lbs)**	**Ex-vessel Revenue ($1000)**	**Average Price ($/lb)**	**Pounds Landed (1000 lbs)**	**Ex-vessel Revenue ($1000)**	**Average Price ($/lb)**
Tuna PMUS						
Albacore	1,154	$1,546	$ 1.37	1,039	$1,492	$ 1.50
Bigeye Tuna	10,556	$29,818	$ 3.03	11,598	$36,059	$ 3.30
Bluefin Tuna	1	$2	$10.69	2	$1	$ 2.81
Skipjack Tuna	1,179	$1,193	$ 1.36	1,172	$1,131	$ 1.17
Yellowfin Tuna	3,151	$7,322	$ 2.37	3,189	$7,319	$ 2.30
Tuna PMUS subtotal	**16,042**	**$39,881**	**$2.67**	**17,000**	**$46,002**	**$2.86**
Billfish PMUS						
Swordfish	598	$1,269	$ 2.44	3,545	$7,780	$ 2.26
Blue Marlin	987	$1,154	$ 1.29	1,080	$971	$ 1.05
Striped Marlin	935	$1,399	$ 1.50	1,194	$1,537	$ 1.29
Other Billfish	490	$470	$ 1.02	507	$431	$ 0.90
Billfish PMUS subtotal	**3,010**	**$4,291**	**$1.53**	**6,326**	**$10,718**	**$3.81**
Other PMUS						
Mahimahi	2,308	$5,089	$ 2.29	1,574	$3,592	$ 2.50
Ono (wahoo)	917	$2,277	$ 2.68	879	$2,243	$ 2.75
Opah (moonfish)	781	$1,350	$ 1.79	1,094	$1,896	$ 1.75
Sharks (whole weight)	418	$75	$ 0.33	393	$101	$ 0.37
Other Pelagics	1,213	$1,987	$ 1.73	1,105	$2,171	$ 2.04
Other PMUS subtotal	**5,638**	**$10,779**	**$2.07**	**5,044**	**$10,004**	**$2.14**
Total Pelagics	**24,690**	**$54,951**	**$2.39**	**28,370**	**$66,724**	**$2.49**

Interpretation: The total commercial pelagic landings in 2005 were 28.4 million pounds, up 15% (+3. million pounds) from 2004. Tunas represented 60% of the total landings. Bigeye tuna landings reached a record 11.6 million pounds in 2005, up 1 million pounds from the previous year. Bigeye tuna was the largest component of the landings (41%). Swordfish (12%) was the next largest, followed by yellowfin tuna (11%).

Total Hawaii commercial ex-vessel revenue ($66.7 million) increased by 21% in 2005. Tunas comprised 69% of this total. Bigeye tuna alone accounted for 54% of the total revenue at $36.1 million. Swordfish was the next highest contributor to total revenue at $7.8 million. Billfish revenue increased the most of all groups (up 150%) while landings of other pelagic species decreased modestly (down 7%) in 2005. The total pelagic fish price increased slightly in 2005. Average prices for tuna and other PMUS increased modestly by 7% and 3%, respectively, in 2005. Average price for billfish was almost 2.5 times higher in 2005.

Source and Calculations: NMFS longline logbook and 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, 2004-2005.

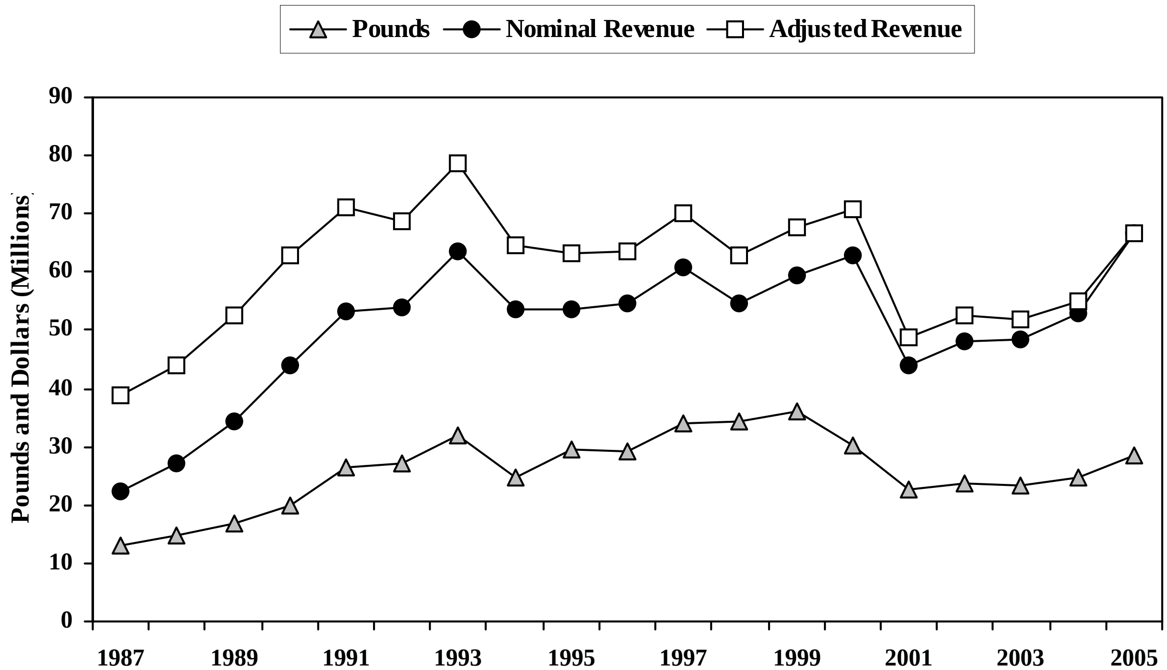
	2004			2005		
Fishery	**Pounds Landed (1000 lbs)**	**Ex-vessel Revenue ($1000)**	**Average Price ($/lb)**	**Pounds Landed (1000 lbs)**	**Ex-vessel Revenue ($1000)**	**Average Price ($/lb)**
Longline	18,480	$42,937	$2.53	23,275	$57,979	$2.61
MHI trolling	3,354	$7,022	$2.21	2,517	$5,028	$2.27
MHI Handline	1,387	$2,576	$1.89	1,193	$2,020	$1.78
Offshore Handline	485	$892	$1.90	313	$387	$1.94
Aku boat	656	$894	$1.36	931	$1,074	$1.16
Other Gear	339	$629	$1.89	155	$236	$2.03
Total	**24,701**	**$54,951**	**$2.39**	**28,384**	**$66,724**	**$2.49**

Interpretation: The longline fishery is the largest commercial fishery in Hawaii. Longline landings and revenue were 23.3 million pounds and $58.0 million, respectively, in 2005. Landings increased by almost 5 million pounds while revenue decreased by $15 million. The average price for the longline fishery was slightly higher in 2005. The MHI troll fishery is the second largest commercial fishery. It produced 2.5 million pounds worth $5.0 million in 2005. Landings and revenue decreased from 2004 by 800,000 pounds and $2 million in 2005. The MHI handline fishery produced 1.2 million pounds of pelagic landings worth $2.0 million while the offshore handline fishery total landings was 313,000 pounds worth $387,000 in 2005. Landings and revenue for both these fisheries decreased in 2005. Aku boat fishery landings and revenue increased by 275,000 pounds and $180,000, respectively, in 2005.

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, 1987-2005.

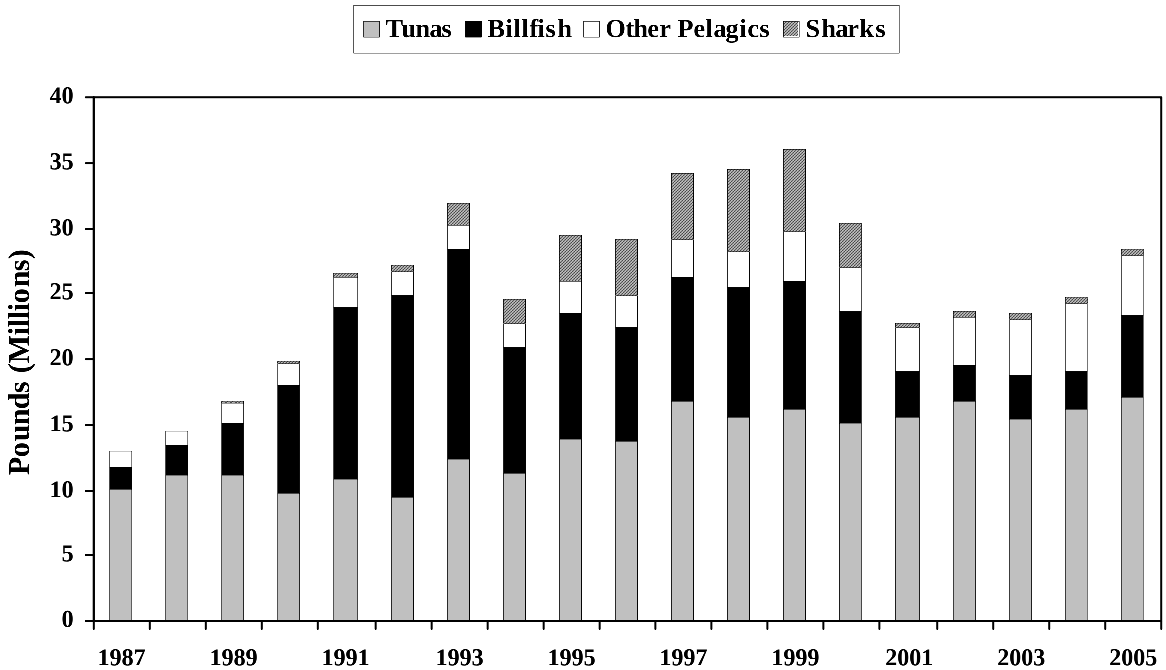


<u>Interpretation</u>: Commercial landings in 2005 were the eighth since 1987, and the adjusted revenues were ranked seventh. The landings increased by 3.7 million pounds (15%) after four years when the landings remained within a narrow range (22.8 to 24.7 million pounds). The revenue increase was even greater (21%).

<u>Source and Calculations:</u> 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 (x1000)	Nominal revenue ($1000)	Adjusted revenue ($1000)	Honolulu CPI
1987	13,023	$22,493	$38,721	114.9
1988	14,566	$27,090	$44,029	121.7
1989	16,836	$34,166	$52,511	128.7
1990	19,881	$43,850	$62,807	138.1
1991	26,534	$53,170	$71,061	148.0
1992	27,167	$53,810	$68,624	155.1
1993	31,931	$63,680	$78,676	160.1
1994	24,565	$53,610	$64,463	164.5
1995	29,427	$53,720	$63,212	168.1
1996	29,146	$54,710	$63,396	170.7
1997	34,150	$60,840	$70,007	171.9
1998	34,447	$54,628	$63,005	171.5
1999	35,975	$59,320	$67,706	173.3
2000	30,353	$63,020	$70,706	176.3
2001	22,787	$43,939	$48,718	178.4
2002	23,602	$48,035	$52,697	180.3
2003	23,466	$48,316	$51,799	184.5
2004	24,701	$52,950	$54,951	190.6
2005	28,384	$66,724	$66,724	197.8
Average	**25,839**	**$50,425**	**$60,727**	
Std. Dev.	**6,352**	**$11,595**	**$10,133**	

Figure 2. Hawaii commercial tuna, billfish, shark, and other pelagic landings, 1987-2005.



Interpretation: The 15% increase in pelagic landings in 2005 was primarily attributed to billfish landings, which more than doubled relative to 2004. There was a small increase in tuna landings, but this was counterbalanced by decreases in landings of other pelagics and sharks. As shown previously, the increase in billfish landings was primarily attributable to swordfish from the shallow-set longline fishery. The increases in marlin landings were much smaller than that of swordfish.

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

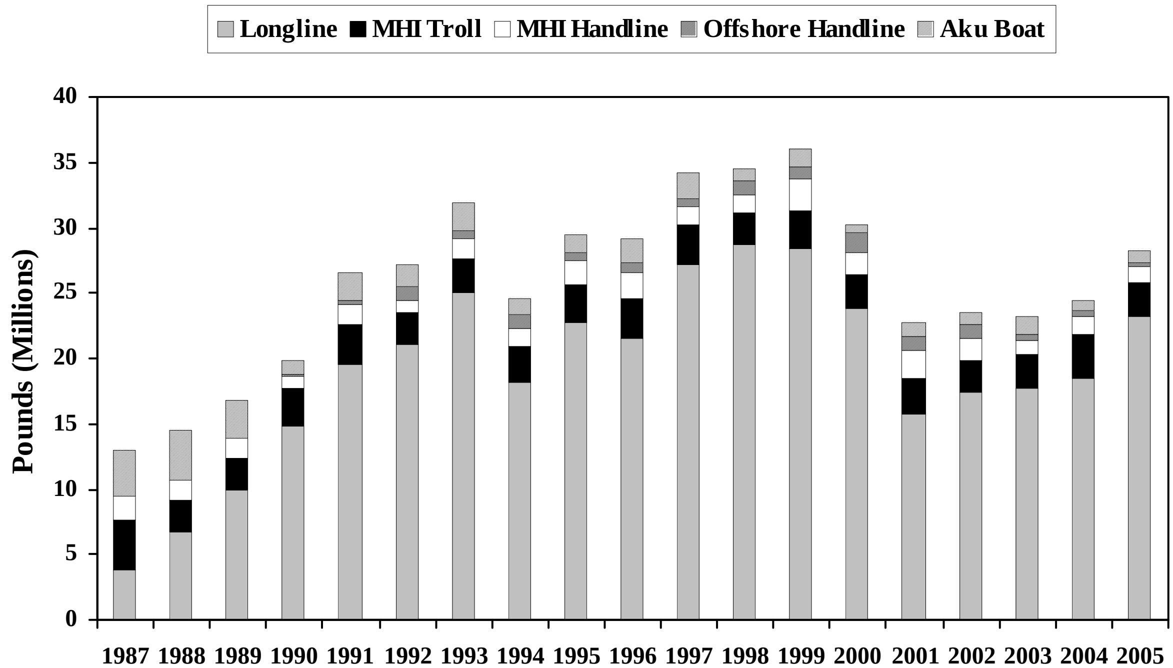
Other pelagics: Barracuda, Beltfish, Flying fish, Frigate mackeral, Mahimahi, Moonfish

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	1,292	43	13,023
1988	11,197	2,301	975	94	14,566
1989	11,223	3,880	1,529	203	16,836
1990	9,726	8,278	1,655	222	19,881
1991	10,794	13,129	2,293	318	26,534
1992	9,461	15,355	1,941	410	27,167
1993	12,417	15,928	1,850	1,736	31,931
1994	11,309	9,526	1,973	1,757	24,565
1995	13,820	9,723	2,416	3,468	29,427
1996	13,685	8,796	2,338	4,327	29,146
1997	16,813	9,492	2,835	5,010	34,150
1998	15,556	9,923	2,756	6,212	34,447
1999	16,145	9,758	3,799	6,273	35,975
2000	15,160	8,546	3,347	3,300	30,353
2001	15,556	3,482	3,412	337	22,787
2002	16,766	2,738	3,732	366	23,602
2003	15,362	3,483	4,265	356	23,466
2004	16,108	3,010	5,165	418	24,701
2005	17,033	6,326	4,633	393	28,384
Average	**13,593**	**7,644**	**2,748**	**1,855**	**25,839**
Std. Dev.	**2,598**	**4,251**	**1,149**	**2,133**	**6,352**

Figure 3. Total commercial pelagic landings by gear type 1987-2005.

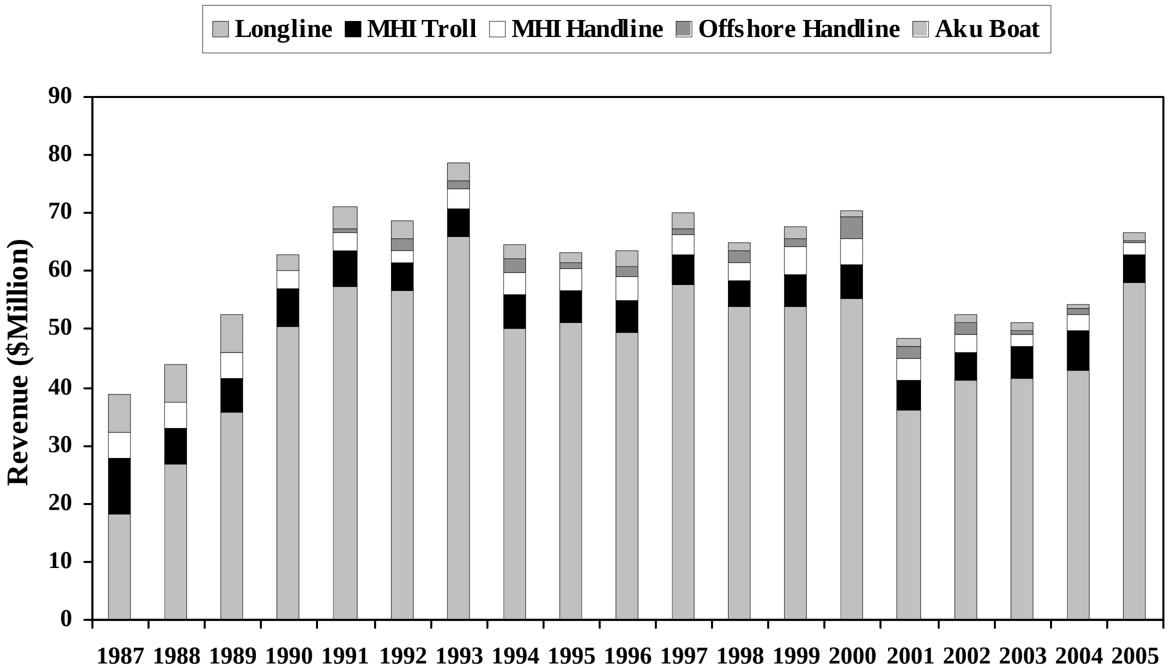


Interpretation: Hawaii commercial pelagic landings in 2005 were dominated by longline landings. Longline landings recovered in 2005 with the reopening of the shallow-set swordfish fishery. Landings by the MHI troll and MHI handline fisheries are the next two largest fisheries in Hawaii. Landings from these fisheries have remained relatively constant since 1987. The offshore handline fishery grew in the early 1990s with landings leveling off thereafter. 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 column is greater than the sum of the other five fisheries as it includes contributions from the "Other Gear" fishery.

	Hawaii Pelagic Total Landings (1000 pounds)					
Year	**Longline**	**MHI Troll**	**MHI Handline**	**Offshore Handline**	**Aku Boat**	**Total**
1987	3,891	3,709	1,914	-	3,503	13,023
1988	6,710	2,445	1,471	-	3,940	14,566
1989	9,942	2,401	1,487	-	2,962	16,836
1990	14,738	2,901	1,060	66	1,116	19,881
1991	19,478	3,102	1,477	331	2,146	26,534
1992	21,105	2,394	946	987	1,735	27,167
1993	25,005	2,578	1,532	679	2,137	31,931
1994	18,134	2,810	1,287	1,175	1,159	24,565
1995	22,723	2,966	1,733	714	1,291	29,427
1996	21,553	2,994	1,962	793	1,844	29,146
1997	27,145	3,016	1,479	563	1,947	34,150
1998	28,629	2,471	1,368	1,134	845	34,447
1999	28,348	3,013	2,414	888	1,312	35,975
2000	23,817	2,564	1,732	1,482	708	30,353
2001	15,804	2,742	2,077	1,087	994	22,787
2002	17,393	2,390	1,707	1,059	932	23,602
2003	17,645	2,693	1,097	400	1,375	23,466
2004	18,480	3,354	1,387	485	656	24,701
2005	23,275	2,517	1,193	313	931	28,384
Average	**19,148**	**2,793**	**1,543**	**640**	**1,660**	**25,839**
Std. Dev.	**6,664**	**349**	**363**	**440**	**913**	**6,352**

Figure 4. Total commercial pelagic ex-vessel revenue by gear type 1987-2005.

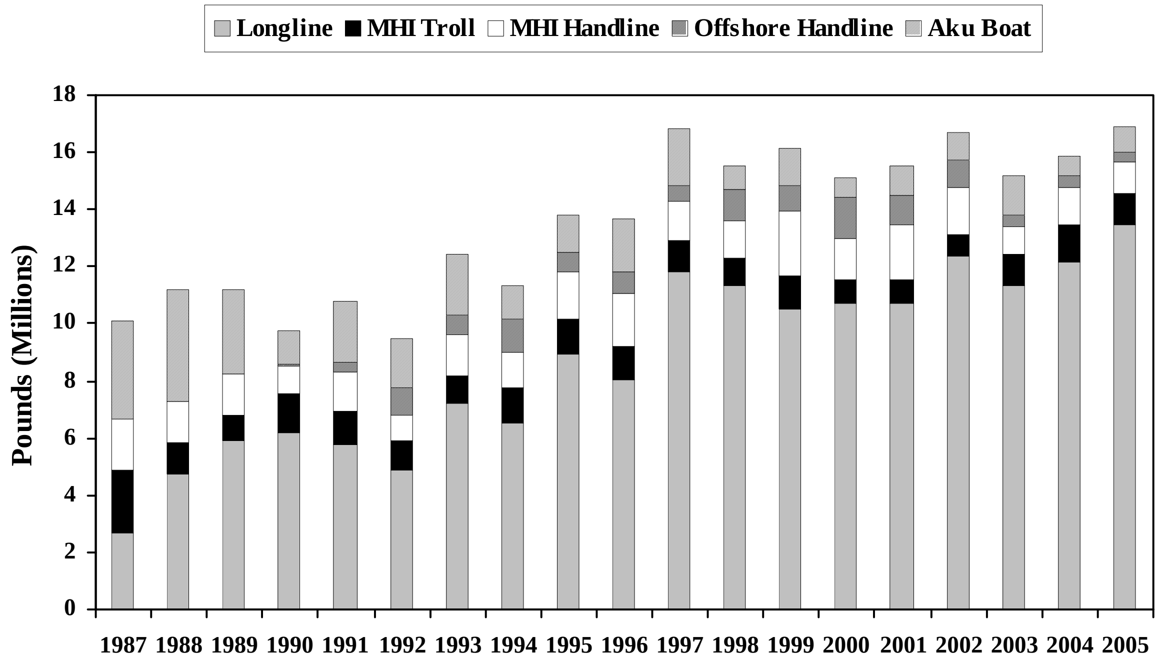


Interpretation: Ex-vessel revenue from Hawaii's pelagic fisheries in 2005 increased 35% due to the reopening of the shallow-set longline fishery for swordfish. The MHI troll and MHI handline fisheries were ranked as the next two fisheries with the highest revenue. The offshore handline fishery grew in the early 1990s with revenue leveling off thereafter. In contrast, aku boat revenue declined from the late 1980s due fleet attrition and lower landings. The Offshore handline and aku boat fisheries were the two lowest at 1% and 2%, respectively, of the total ex-vessel revenue.

Source and Calculations: The ex-vessel revenue values were obtained by adding the revenue for all species 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 the other five fisheries as it includes contributions from the "Other Gear" fishery.

	Hawaii Pelagic Total Revenue ($1000)					
Year	**Longline**	**MHI Troll**	**MHI Handline**	**Offshore Handline**	**Aku Boat**	**Total**
1987	$18,211	$9,530	$4,486	-	$6,457	$38,721
1988	$26,768	$6,298	$4,314	-	$6,604	$44,029
1989	$35,655	$5,992	$4,491	-	$6,372	$52,511
1990	$50,574	$6,437	$2,985	-	$2,683	$62,807
1991	$57,378	$6,010	$3,384	$712	$3,617	$71,061
1992	$56,607	$4,798	$2,237	$1,884	$3,080	$68,624
1993	$65,932	$4,715	$3,613	$1,390	$2,984	$78,676
1994	$50,248	$5,888	$3,770	$2,341	$2,206	$64,463
1995	$51,341	$5,261	$3,694	$1,134	$1,824	$63,212
1996	$49,479	$5,388	$4,251	$1,509	$2,768	$63,396
1997	$57,594	$5,163	$3,503	$933	$2,754	$70,007
1998	$53,757	$4,626	$3,182	$1,956	$1,276	$63,005
1999	$54,085	$5,347	$4,909	$1,434	$1,911	$67,706
2000	$55,171	$6,144	$4,181	$3,764	$1,310	$70,706
2001	$36,071	$5,084	$3,895	$1,939	$1,551	$48,718
2002	$41,105	$4,931	$3,199	$1,807	$1,378	$52,697
2003	$41,400	$5,566	$2,258	$620	$1,423	$51,799
2004	$42,937	$7,022	$2,576	$892	$894	$54,951
2005	$57,979	$5,028	$2,020	$387	$1,074	$66,724
Average	**$47,489**	**$5,749**	**$3,523**	**$1,202**	**$2,745**	**$60,727**
Std. Dev.	**$11,622**	**$1,095**	**$813**	**$942**	**$1,778**	**$10,133**

Figure 5. Hawaii commercial tuna landings by gear type, 1987-2005.

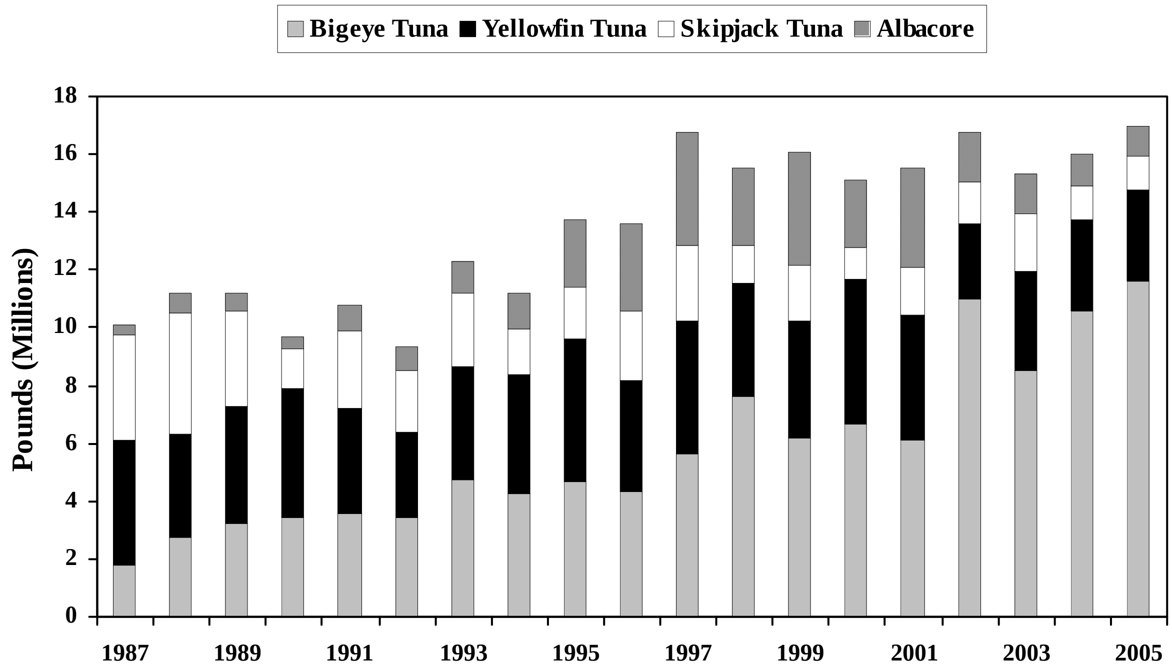


Interpretation: Longline gear was the largest single contributor to Hawaii commercial tuna landings since 1988 and reached a record level in 2005. Tuna landings by the MHI troll fishery were highest in 1987, dropped the following year, and remained around its long-term average thereafter. Landings by the MHI handline fishery were near the low end of annual total for the past three years. Offshore handline tuna landings were on a decline from its peak in 2000 and at its second lowest level in 2005. The aku boat fishery was on a declining trend with landings below 1 million pounds in 6 of the past 8 years.

	Hawaii Total Tuna Landings (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	1,722	9,461
1993	7,205	964	1,458	656	2,134	12,417
1994	6,540	1,240	1,213	1,157	1,159	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	10,694	878	1,444	1,403	707	15,160
2001	10,729	801	1,940	1,039	993	15,556
2002	12,344	804	1,598	1,011	932	16,766
2003	11,332	1,081	1,016	380	1,374	15,362
2004	12,179	1,304	1,266	461	654	16,108
2005	13,458	1,105	1,116	306	931	17,033
Average	**8,704**	**1,132**	**1,439**	**620**	**1,658**	**13,593**
Std. Dev.	**3,072**	**288**	**345**	**425**	**912**	**2,598**

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 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. Hawaii tuna landings by species, 1987-2005.

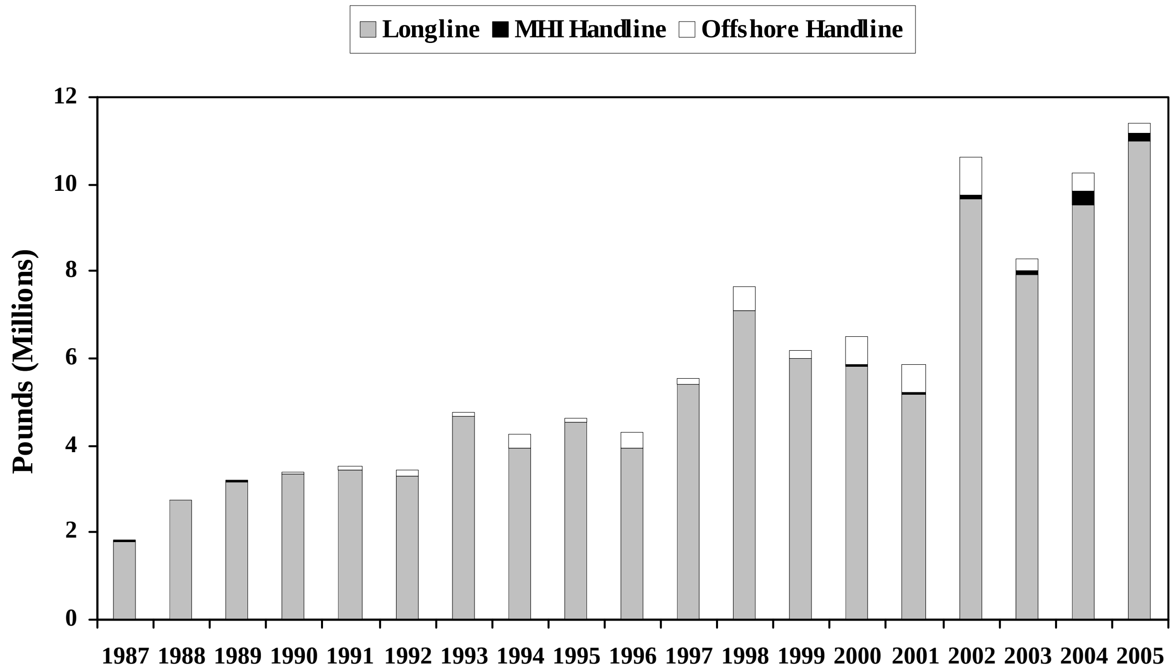


Interpretation: Bigeye tuna was the largest component of the tuna landings and reached a record level in 2005. The longline fishery accounted for majority of the bigeye tuna landings. Yellowfin tuna landings were below its long-term average for the past 4 years. The longline fishery was the largest contributor to yelllowfin tuna landings from 2000 but a respectable amount is also landed by the MHI troll and MHI handline fisheries. Skipjack tuna landings were near its lowest levels in 2004 and 2005. The aku boat (pole and line) fishery was the largest skipjack tuna fishery in Hawaii. Albacore landings grew rapidly peaking in 1999 and declining thereafter. The longline fishery was responsible for majority of the landings for this tuna `species.

	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	5,038	1,127	2,334	15,160
2001	6,113	4,315	1,694	3,419	15,556
2002	10,971	2,663	1,441	1,668	16,766
2003	8,503	3,472	1,988	1,348	15,362
2004	10,556	3,151	1,179	1,154	16,108
2005	11,598	3,189	1,172	1,039	17,033
Average	**5,796**	**3,902**	**2,108**	**1,740**	**13,593**
Std. Dev.	**2,804**	**629**	**849**	**1,145**	**2,598**

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, yellowfin tuna, and unclassified tunas.

Figure 7. Hawaii bigeye tuna landings, 1987-2005.



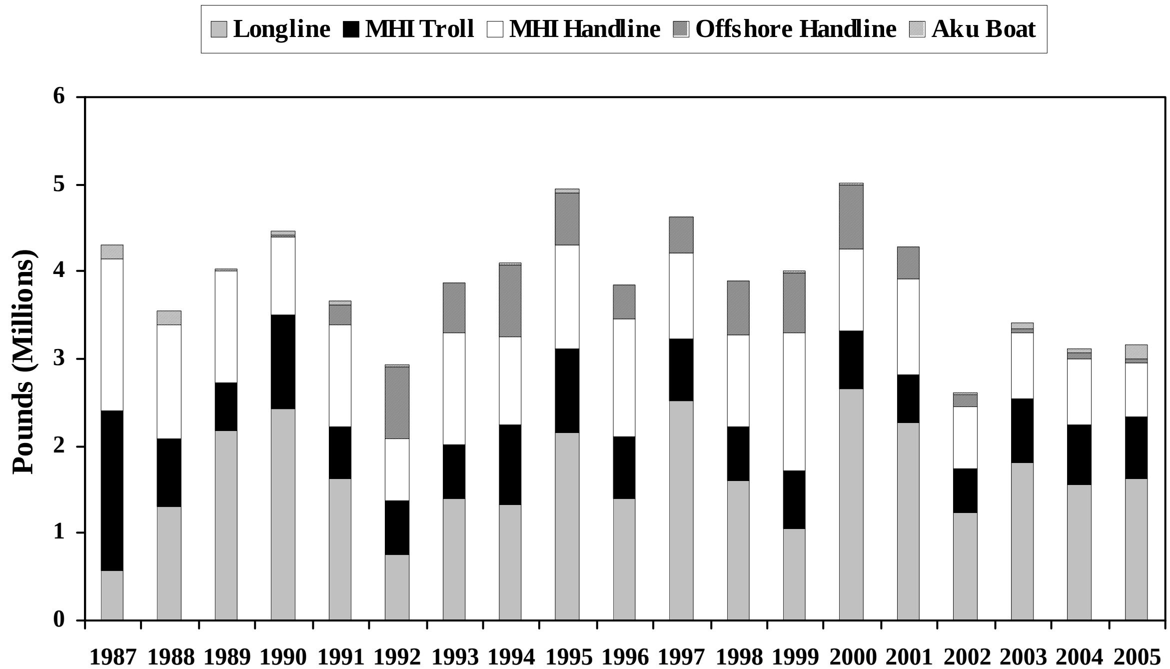
Interpretation: Annual bigeye tuna landings have increased more than six-fold over the 19 year period with a record 11.6 million pounds in 2005. The longline fishery typically produces over 90% of the bigeye tuna. Bigeye landings by this fishery reached a record 11.0 million pounds in 2005. The offshore handline fishery was the second largest producer of bigeye tuna in Hawaii accounting for 2% of the total in 2005. Combined MHI troll and MHI handline landings of bigeye tuna yielded 3% 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

	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	5,830	15	141	656	6,642
2001	5,190	23	222	655	6,113
2002	9,676	86	354	851	10,971
2003	7,916	80	74	314	8,503
2004	9,532	328	125	385	10,556
2005	10,975	187	100	258	11,598
Average	**5,392**	**44**	**71**	**268**	**5,796**
Std. Dev.	**2,508**	**80**	**87**	**244**	**2,804**

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.

Figure 8. Hawaii yellowfin tuna landings, 1987-2005.

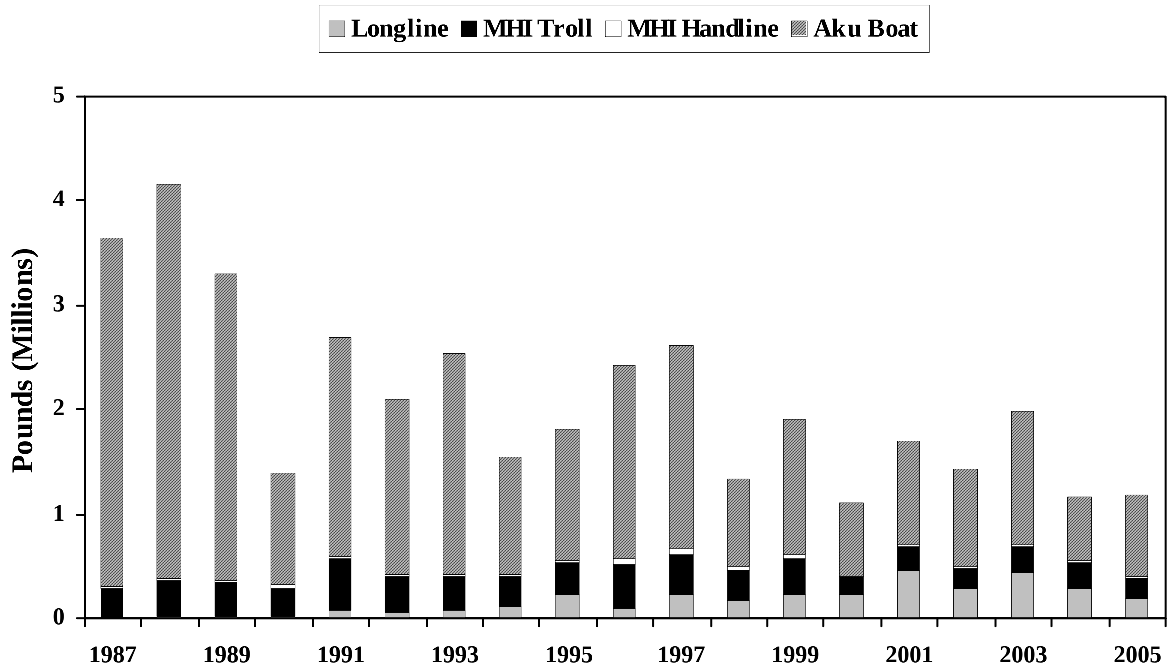


Interpretation: Annual landings of yellowfin tuna were low during the past four year. Yellowfin tuna landings for the longline and MHI troll fisheries in 2005 were close to their long-term average. The two handline fisheries were well below the long-term average. Aku boat landings were more than three times the long-term average in 2005. Yellowfin tuna is usually landed by the aku boat fishery when landings of skipjack tuna are 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	5,038
2001	2,278	545	1,082	379	4	4,315
2002	1,235	499	711	151	5	2,663
2003	1,815	727	746	53	72	3,472
2004	1,559	681	762	75	38	3,151
2005	1,620	708	632	47	149	3,189
Average	**1,655**	**764**	**1,072**	**350**	**44**	**3,902**
Std. Dev.	**569**	**288**	**293**	**298**	**55**	**629**

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, 1987-2005.

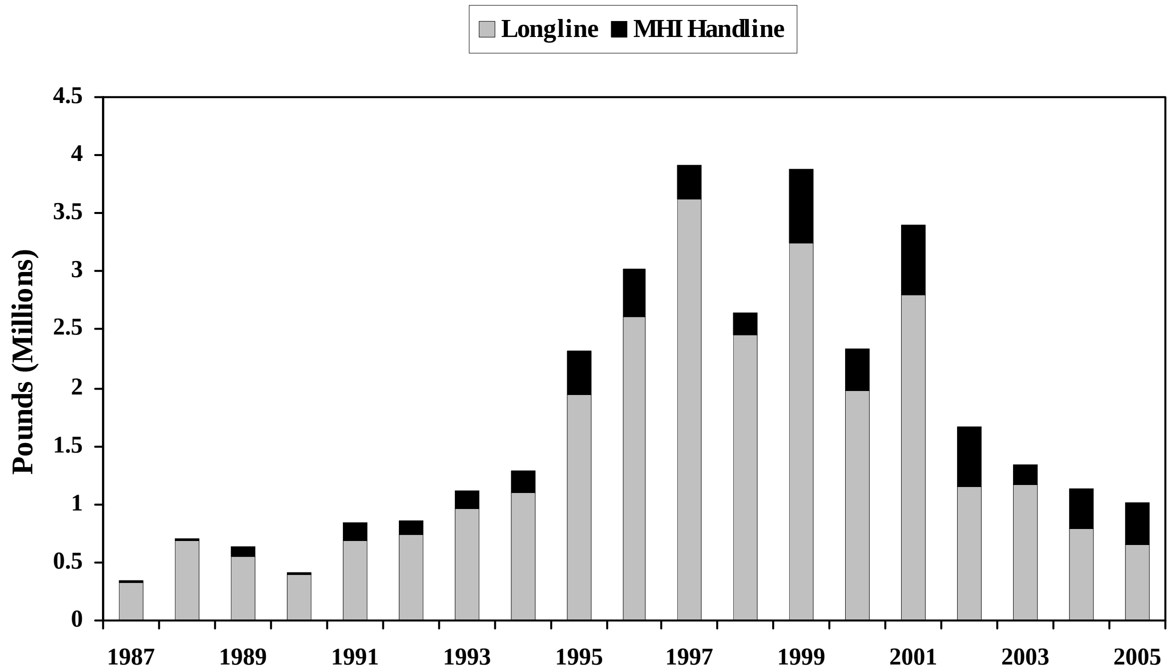


Interpretation: Skipjack tuna landings were on a declining trend. The decline was not apparent in all fisheries. The aku boat fishery accounted for most of the skipjack tuna landings. The main source of overall decline was the aku boat fishery. Skipjack tuna landings by the aku boat fishery were below the long-term average for the past 8 years. The longline and MHI troll fisheries were the next largest contributors to skipjack tuna landings.

	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	1,389
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	456	215	30	988	1,694
2002	282	203	20	925	1,441
2003	437	237	16	1,292	1,988
2004	293	245	23	615	1,179
2005	197	176	18	779	1,172
Average	**167**	**299**	**28**	**1,612**	**2,108**
Std. Dev.	**133**	**82**	**15**	**884**	**849**

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, 1987-2005.

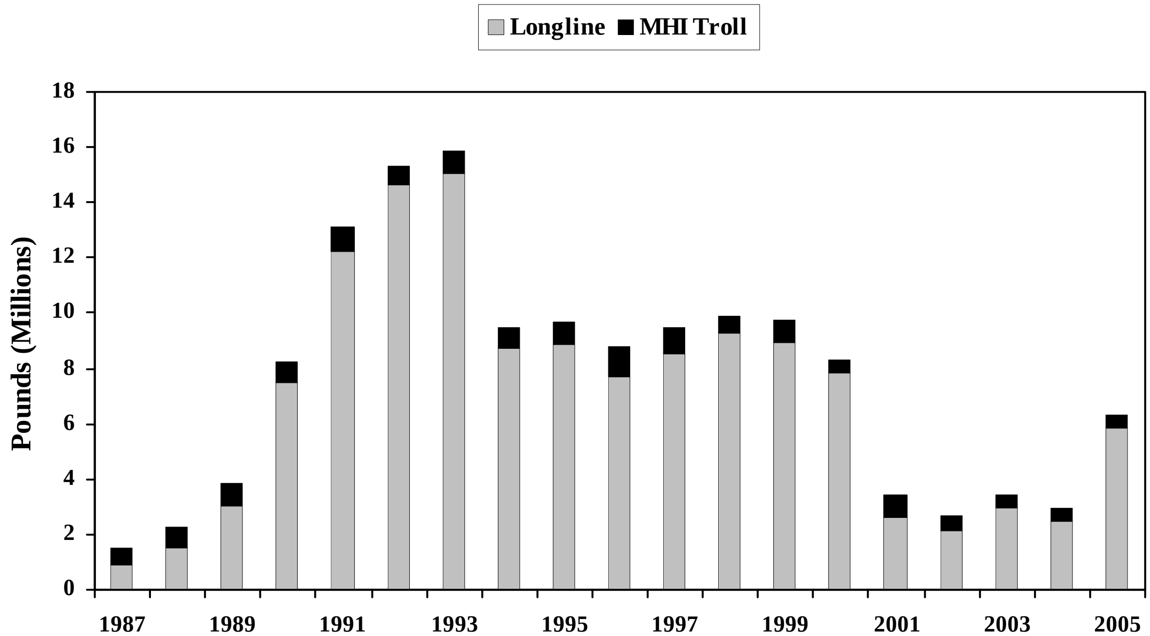


Interpretation: Albacore landings increased more than 11-fold from 1987 to 1999 and was on a declining trend thereafter with landings 40% below the long-term average in 2005. The longline and MHI handline fisheries, account for almost all of the albacore landings and were responsible for the overall 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 19-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	1,980	5	350	2,334
2001	2,803	13	602	3,419
2002	1,145	9	511	1,668
2003	1,160	10	176	1,348
2004	790	7	339	1,154
2005	663	15	360	1,039
Average	**1,465**	**11**	**263**	**1,740**
Std. Dev.	**1,003**	**19**	**186**	**1,145**

Figure 11. Hawaii commercial billfish landings by gear type, 1987-2005.

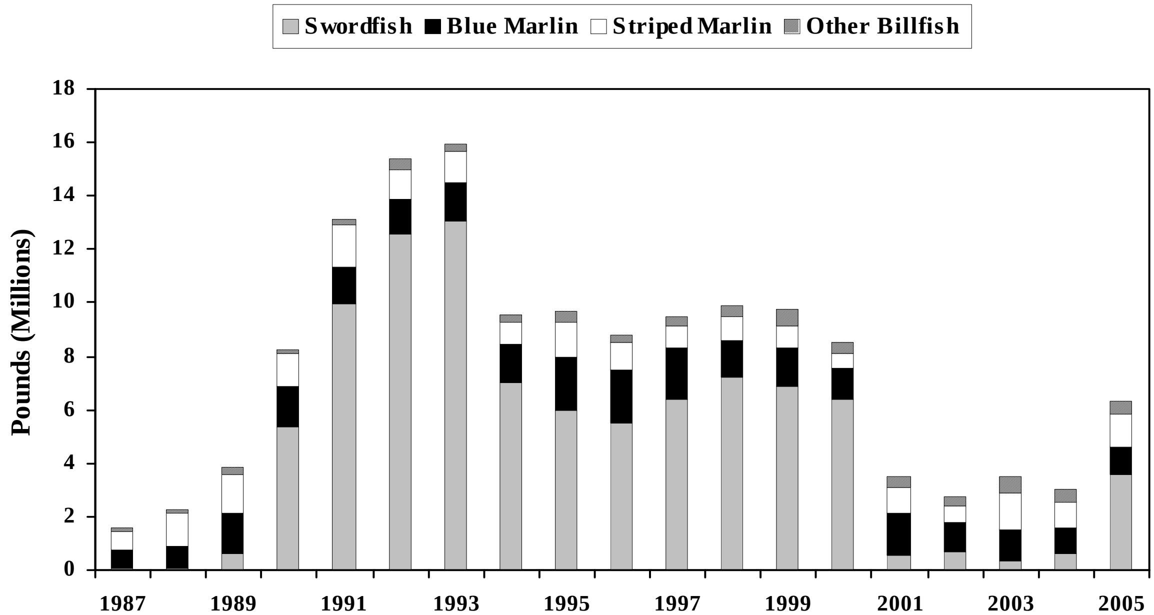


Interpretation: Two major factors affected billfish landings since 1987. The first was the growth of the longline fishery for swordfish in the early 1990s. The second was a series of management decisions that were intended to minimized longline interactions with sea turtles. These decisions strongly affected the amount of swordfish-targeted effort and the associated landings. In contrast, landings of marlins were relatively small and remained relatively constant from 1990s.

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.

	Hawaii Billfish Landings (1000 Pounds)			
Year	Longline	MHI Troll	MHI Handline	All Gear
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	7,815	507	213	8,546
2001	2,631	782	61	3,482
2002	2,162	536	33	2,738
2003	2,951	491	30	3,483
2004	2,468	475	23	3,010
2005	5,851	449	23	6,326
Average	**6,883**	**717**	**39**	**7,644**
Std. Dev.	**4,187**	**164**	**42**	**4,251**

Figure 12. Hawaii billfish landings by species, 1987-2005.

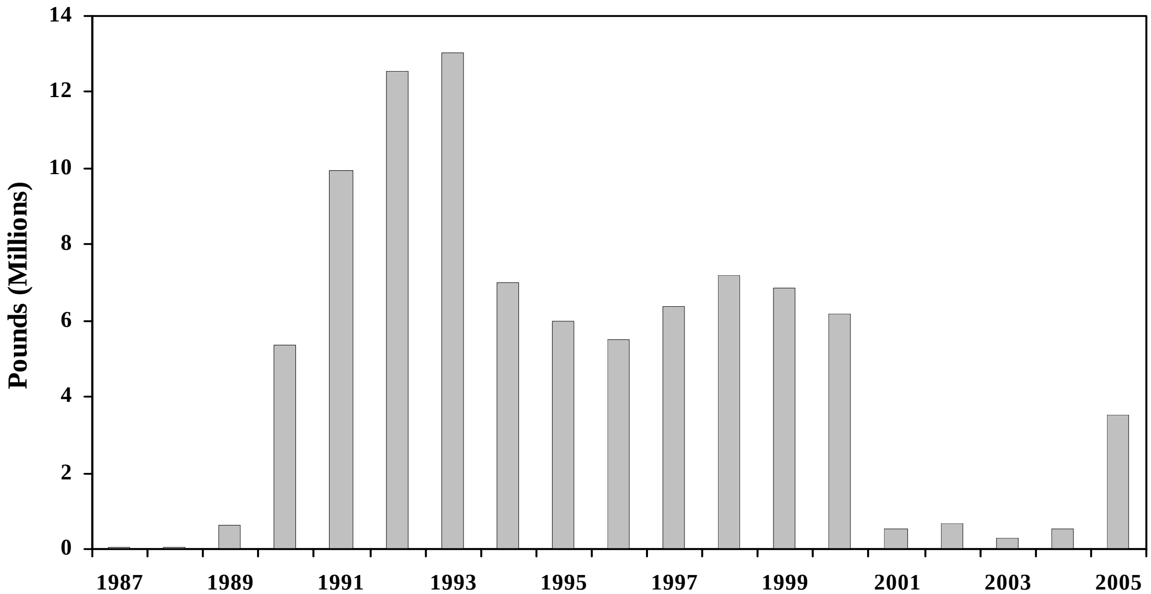


Interpretation: The billfish landings consisted mostly of marlins and small landings of swordfish from 1987 through 1989. However, in 1990 the billfish composition changed and total landings more than doubled as longline vessels began targeting swordfish. Swordfish landings continued to dominate billfish landings from 1990 through 2000 despite a 46% decrease in 1994. Swordfish landings dropped 92% in 2001 from regulatory actions and remained low through 2004. Billfish composition during 2001 through 2004 resembled the billfish composition of the late 1980s, with marlins as the largest component. Blue marlin composed 18% of the billfish landings with landings peaking in 1995-1997. Striped marlin landings peaked in 1991 and declined to a low in 2000 and recovered close to its long-term average in 2003-2005.

	Hawaii Billfish Landings (1000 Pounds)				
Year	**Swordfish**	**Blue Marlin**	**Striped Marlin**	**Other Billfish**	**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	6,414	1,146	548	438	8,546
2001	574	1,527	1,001	380	3,482
2002	711	1,051	616	361	2,738
2003	331	1,174	1,373	605	3,483
2004	598	987	935	490	3,010
2005	3,545	1,080	1,194	507	6,326
Average	**4,886**	**1,354**	**1,043**	**360**	**7,644**
Std. Dev.	**4,058**	**341**	**274**	**133**	**4,251**

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, 1987-2005.

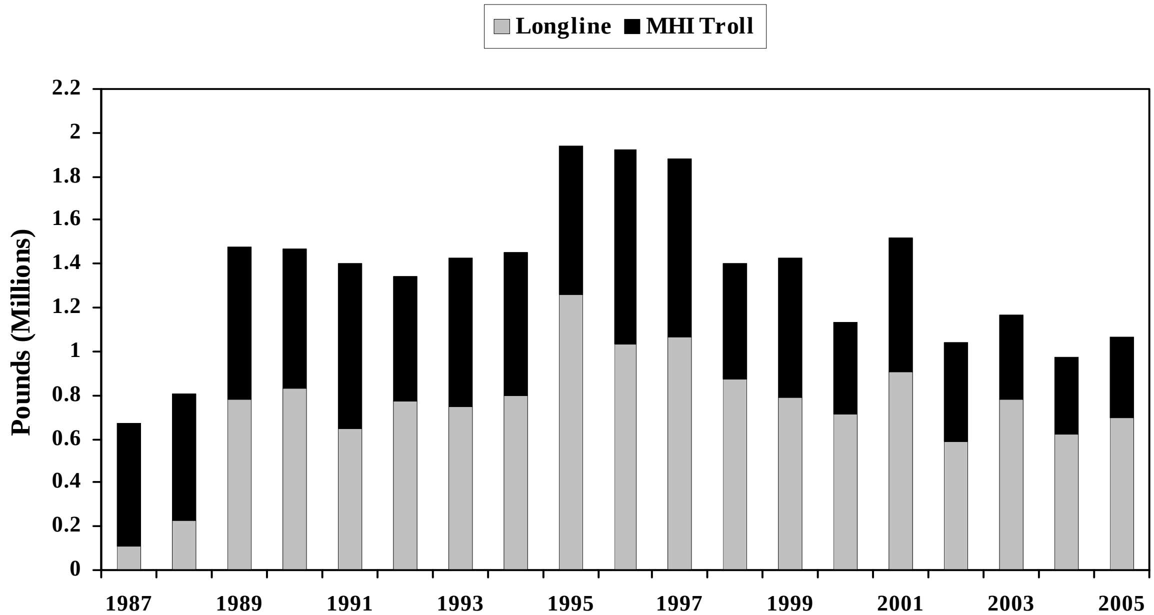


Interpretation: The trend in swordfish landings reflected both an increase in the number of vessels in the longline fishery and widespread targeting of swordfish by the fishery. Swordfish landings rose rapidly, peaking in 1993, and falling the following year. Landings remained relatively steady up to 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 more than six-fold the following year as longline fishers were allowed to fish early in the year when swordfish catches are typically high and became more proficient using techniques mandated under the new requirements. Swordfish landings by the MHI handline fishery were relatively low.

	Swordfish Landings (1000 Pounds)			
Year	**Longline**	**MHI Troll**	**MHI Handline**	**All Gear**
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	6,202	6	205	6,414
2001	519	6	49	574
2002	681	3	27	711
2003	300	2	24	331
2004	549	0	16	598
2005	3,527	1	17	3,545
Average	**4,857**	**2**	**25**	**4,886**
Std. Dev.	**4,062**	**2**	**43**	**4,058**

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.

Figure 14. Hawaii blue marlin landings, 1987-2005.



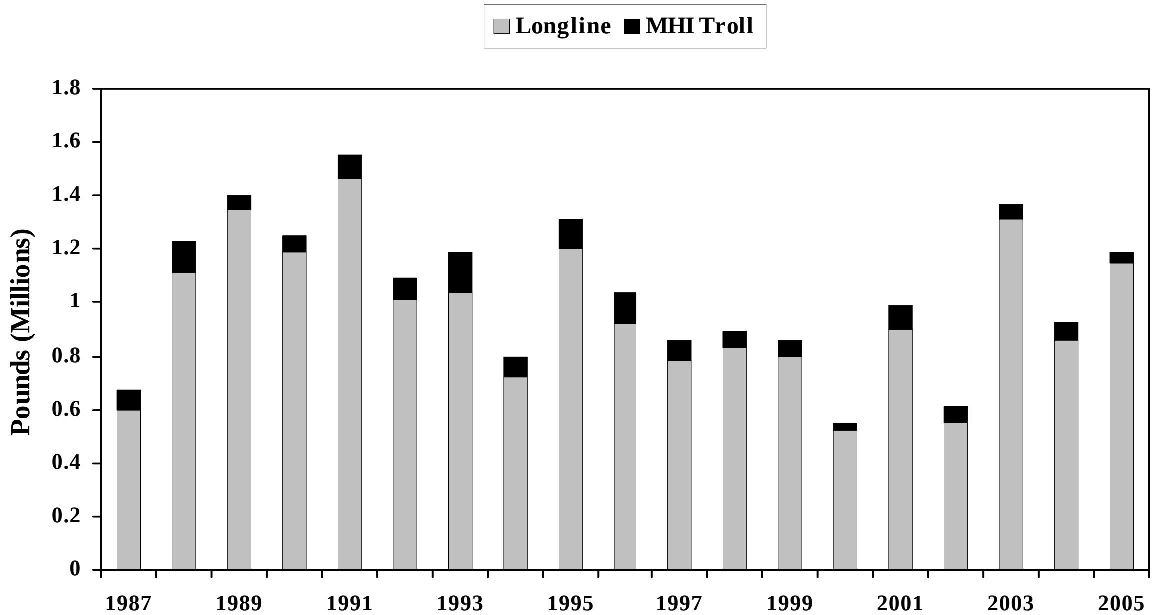
Interpretation: The two fisheries that landed the most blue marlin were the longline and MHI troll fisheries. Both fisheries were below their long-term averages in 2005. This has been true for three of the last four years with the longline fishery and six of the most recent eight years with the MHI troll fishery.

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 Landings (1000 Pounds)			
Year	**Longline**	**MHI Troll**	**MHI Handline**	**All Gear**
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	1,051
2003	775	389	5	1,174
2004	622	355	5	987
2005	698	374	5	1,080
Average	**750**	**592**	**10**	**1,354**
Std. Dev.	**254**	**145**	**5**	**341**

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.

Figure 15. Hawaii striped marlin landings, 1987-2005.



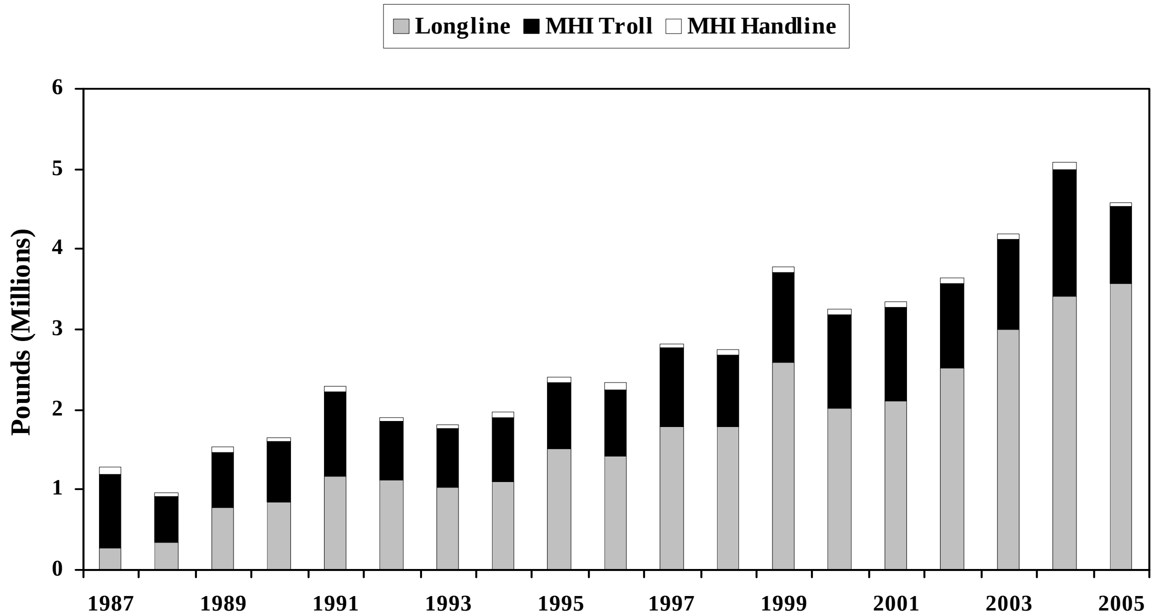
Interpretation: Striped marlin landings in 2005 exceeded the long-term average by 14%. Striped marlin was landed primarily by the longline fishery. The MHI troll fishery was the second largest producer of striped marlin in Hawaii. The MHI troll landings were about half the long-term average, but only 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 Pounds)			
Year	**Longline**	**MHI Troll**	**MHI Handline**	**All Gear**
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	903	93	5	1,001
2002	550	65	1	616
2003	1,309	63	1	1,373
2004	856	74	2	935
2005	1,153	41	0	1,194
Average	**963**	**79**	**1**	**1,043**
Std. Dev.	**266**	**29**	**1**	**274**

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 species by gear type, 1987-2005.

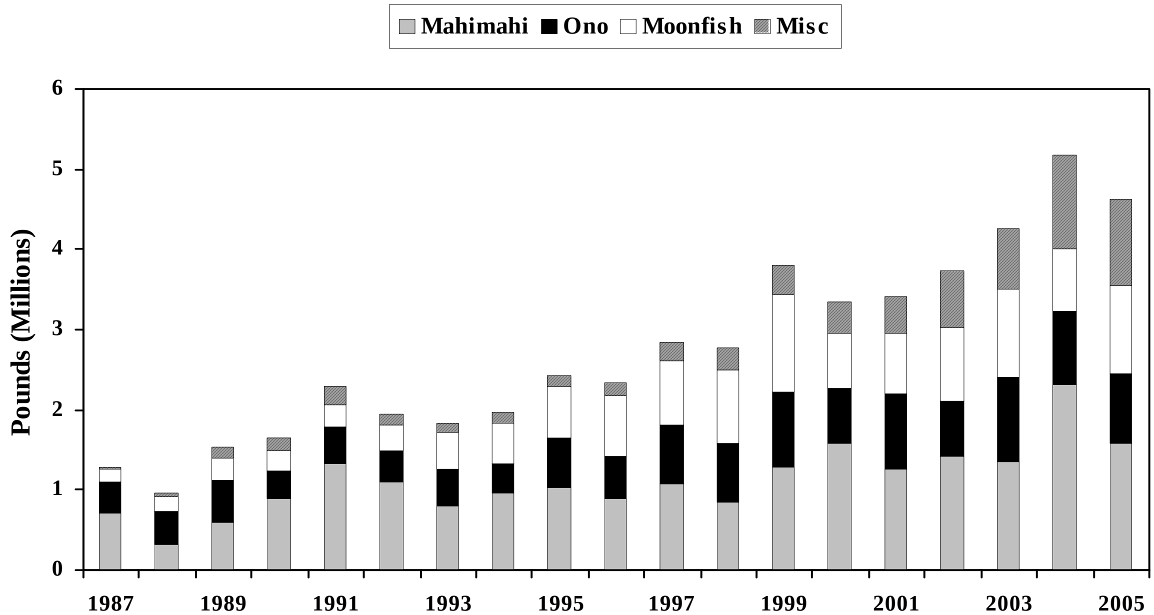


Interpretation: The landings of other pelagic PMUS were considerably greater than the long-term average. The increase was attributed primarily to the longline fishery given that the MHI troll and MHI handline landings were near their respective long-term averages in 2005. The other pelagic PMUS landings by the offshore handline fishery were very low in 2005.

	Total Other Pelagic PMUS Landings (1000 Pounds)					
Year	**Longline**	**MHI Troll**	**MHI Handline**	**Offshore Handline**	**Aku Boat**	**Total**
1987	281	907	102	-	2	1,292
1988	354	569	48	-	4	975
1989	775	691	62	-	1	1,529
1990	835	768	52	0	0	1,655
1991	1,155	1,067	66	5	0	2,293
1992	1,131	731	45	21	14	1,941
1993	1,030	744	50	23	3	1,850
1994	1,100	800	55	18	0	1,973
1995	1,520	815	61	20	0	2,416
1996	1,429	806	86	17	0	2,338
1997	1,792	974	55	9	5	2,835
1998	1,781	912	50	13	0	2,756
1999	2,589	1,109	81	20	0	3,799
2000	2,019	1,174	70	69	0	3,347
2001	2,115	1,155	72	41	0	3,412
2002	2,529	1,048	71	44	0	3,732
2003	3,009	1,119	50	18	2	4,265
2004	3,419	1,574	96	22	2	5,165
2005	3,578	962	52	6	0	4,633
Average	**1,707**	**943**	**64**	**18**	**2**	**2,748**
Std. Dev.	**944**	**225**	**16**	**17**	**3**	**1,149**

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).

Figure 17. Hawaii landings of other pelagic species, 1987-2005.

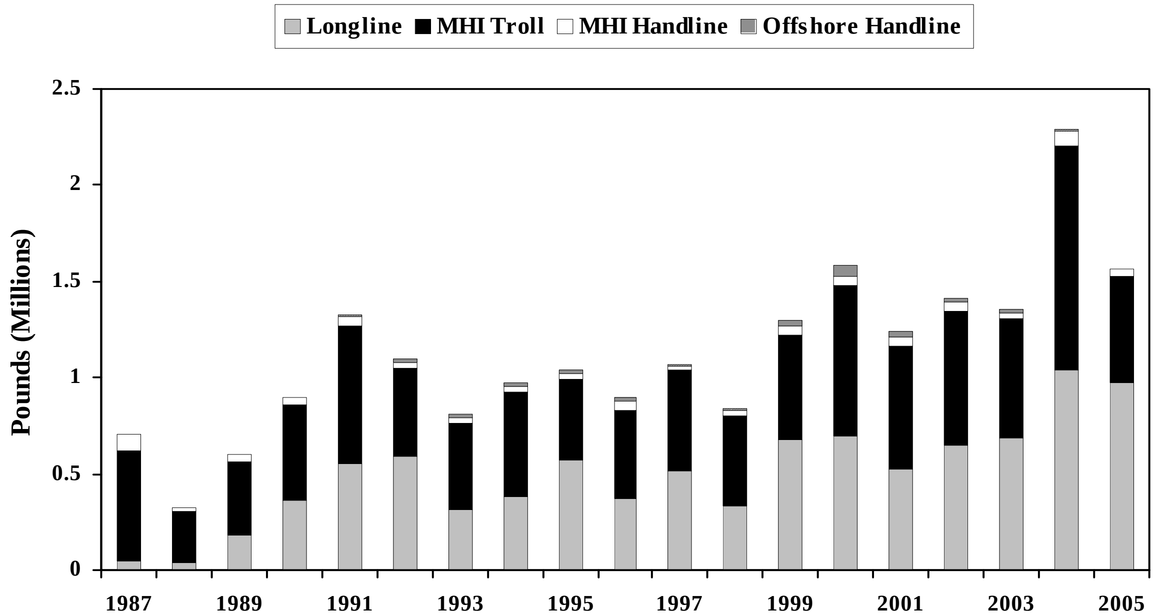


Year	Mahimahi	Ono	Moonfish	Misc	Total
	Landings of Other Pelagic PMUS (1000 Pounds)				
1987	704	400	152	35	1,292
1988	332	406	182	54	975
1989	597	522	274	136	1,529
1990	894	353	253	156	1,655
1991	1,322	456	270	245	2,293
1992	1,112	365	320	144	1,941
1993	814	450	454	132	1,850
1994	974	351	524	124	1,973
1995	1,044	606	629	137	2,416
1996	899	514	760	164	2,338
1997	1,077	715	823	220	2,835
1998	839	725	922	270	2,756
1999	1,293	929	1,210	367	3,799
2000	1,587	683	691	386	3,347
2001	1,253	944	768	447	3,412
2002	1,420	687	910	715	3,732
2003	1,361	1,052	1,092	759	4,265
2004	2,308	917	781	1,158	5,165
2005	1,574	879	1,094	1,086	4,633
Average	**1,127**	**629**	**637**	**355**	**2,748**
Std. Dev.	**426**	**223**	**324**	**327**	**1,149**

Interpretation: Mahimahi was the largest component of other pelagic landings. Mahimahi landings were above the long-term average for the past seven years. Ono landings increased at a gradual rate and consistently above its long-term average since 1997. Moonfish landings and landings of miscellaneous PMUS increased at the highest rates during the 19-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.

Figure 18. Hawaii mahimahi landings, 1987-2005.

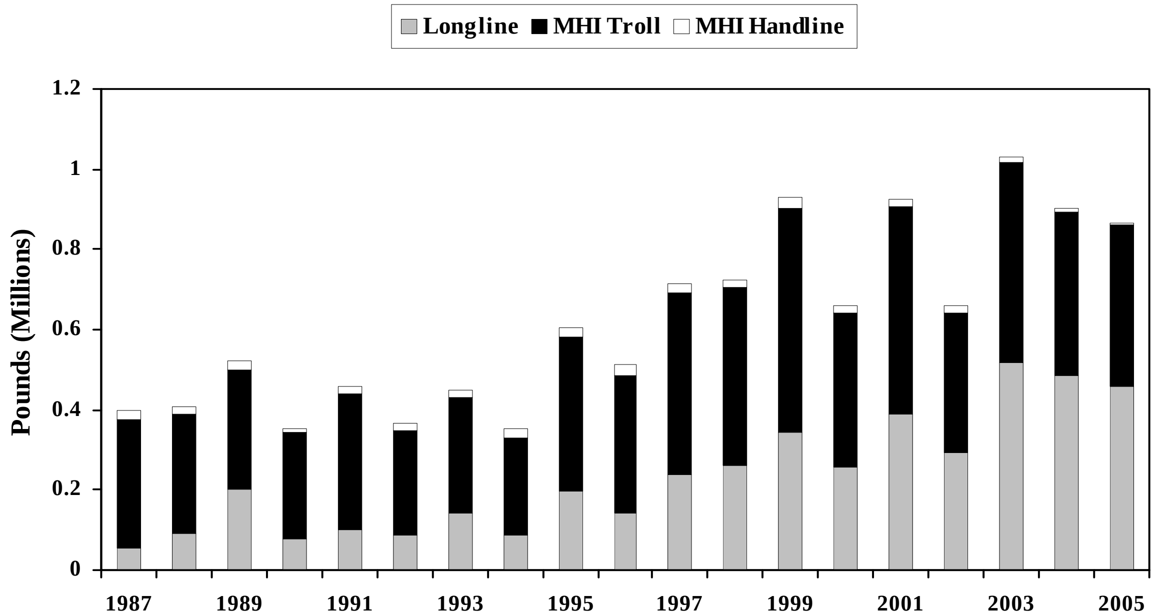


Interpretation: Mahimahi landings in 2005 were at the third highest level since 1987. The highest landing for this species was in 2004. The relatively high landings in 2005 were attributable to the longline fishery, in that both the MHI troll and MHI handline landings were slightly below their respective long-term averages. The offshore handline and aku boat landings of mahimahi in 2005 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 Pounds)					
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	0	1,587
2001	523	637	47	35	0	1,253
2002	646	696	48	26	0	1,420
2003	686	620	30	14	1	1,361
2004	1,041	1,163	73	14	2	2,308
2005	972	558	33	5	0	1,574
Average	**501**	**565**	**41**	**15**	**2**	**1,127**
Std. Dev.	**260**	**186**	**15**	**13**	**3**	**426**

Figure 19. Hawaii ono landings, 1987-2005.

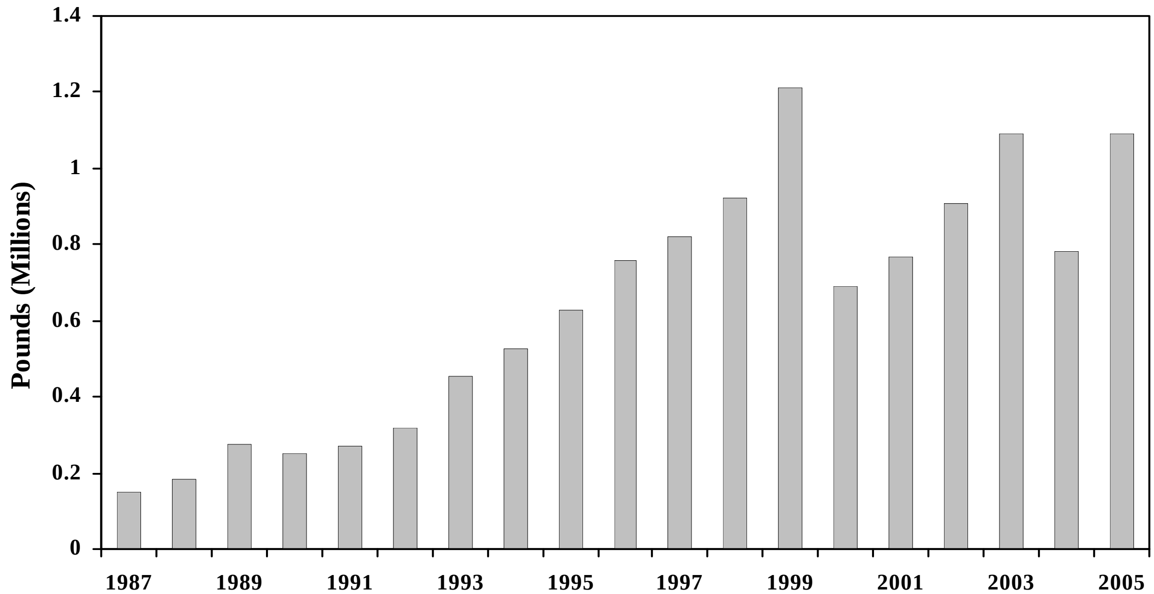


Interpretation: Ono landings were above the long-term average from 1997 with the five highest totals during the past seven years. The MHI troll fisery contributed the greatest fraction of these landings every year until 2003, at which time the longline fishery began to produce the greatest landings. Since 2003, the longline landings have ranged from 97-120% above the long-term average. In contrast, the MHI troll landings were 8% above the long-term average.

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 Pounds)			
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	515	18	944
2002	293	350	15	687
2003	518	498	13	1,052
2004	486	409	8	917
2005	459	401	8	879
Average	**233**	**371**	**19**	**629**
Std. Dev.	**144**	**88**	**6**	**223**

Figure 20. Hawaii moonfish landings, 1987-2005.

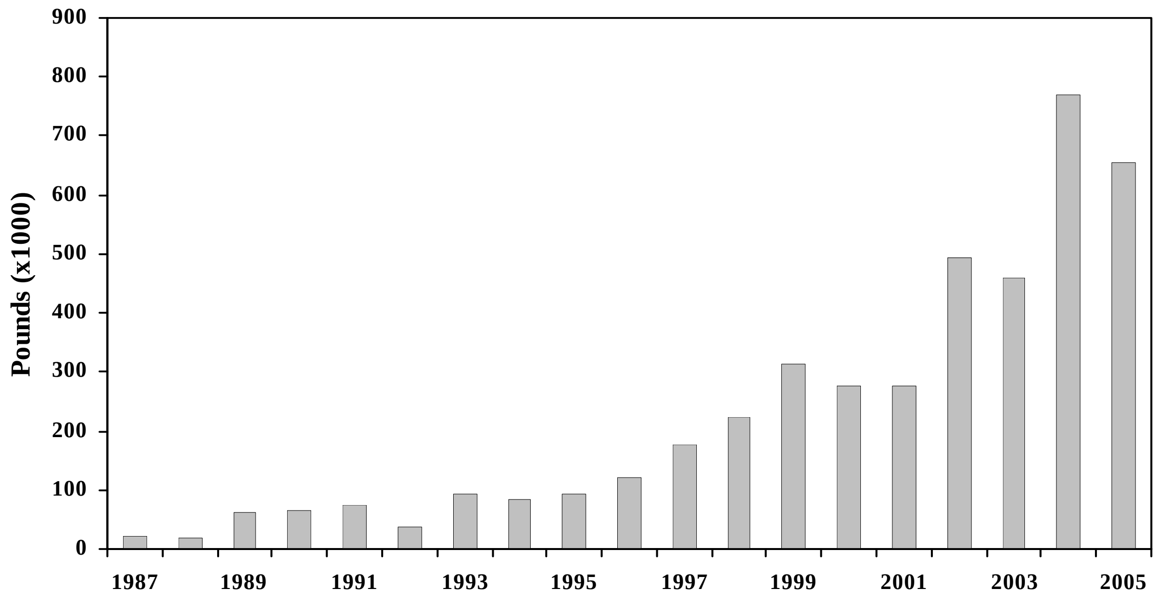


Interpretation: Moonfish are unique among the PMUS because they are caught exclusively by the longline fishery. The 2005 landings were the second highest since 1987 and exceeded the long-term average by 72%.

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 Pounds)	
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	1,092	1,092
2004	781	781
2005	1,093	1,094
Average	**637**	**637**
Std. Dev.	**324**	**324**

Figure 21. Hawaii pomfret landings, 1987-2005.

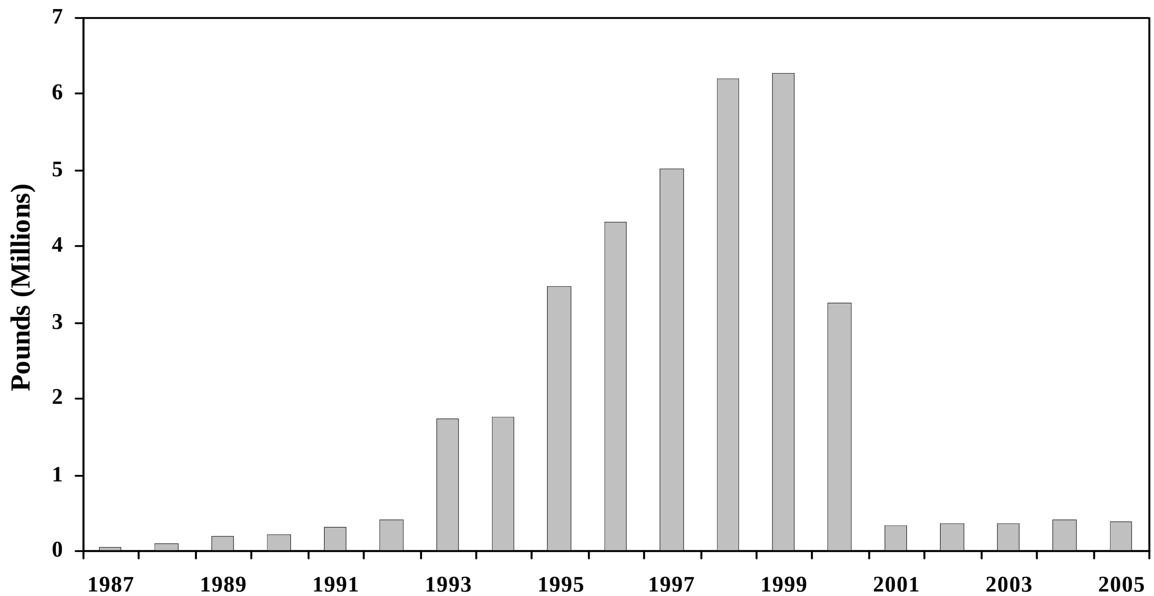


Interpretation: Landings of pomfrets came primarily from the longline fishery. The total was the second highest over the 19 year period with the record landing in 2004. rose gradually from 1987 to 1999 with substantially higher landings observed from 2002 peaking at 768,000 pounds in 2004.

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 Pounds)			
Year	**Longline**	**MHI Handline**	**Offshore Handline**	**Total**
1987	23	0	0	23
1988	18	0	0	18
1989	49	0	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	4	0	277
2001	267	6	0	275
2002	463	6	14	492
2003	416	5	0	459
2004	734	14	5	768
2005	632	9	1	655
Average	**219**	**2**	**1**	**227**
Std. Dev.	**204**	**4**	**3**	**215**

Figure 22. Hawaii shark landings, 1987-2005.

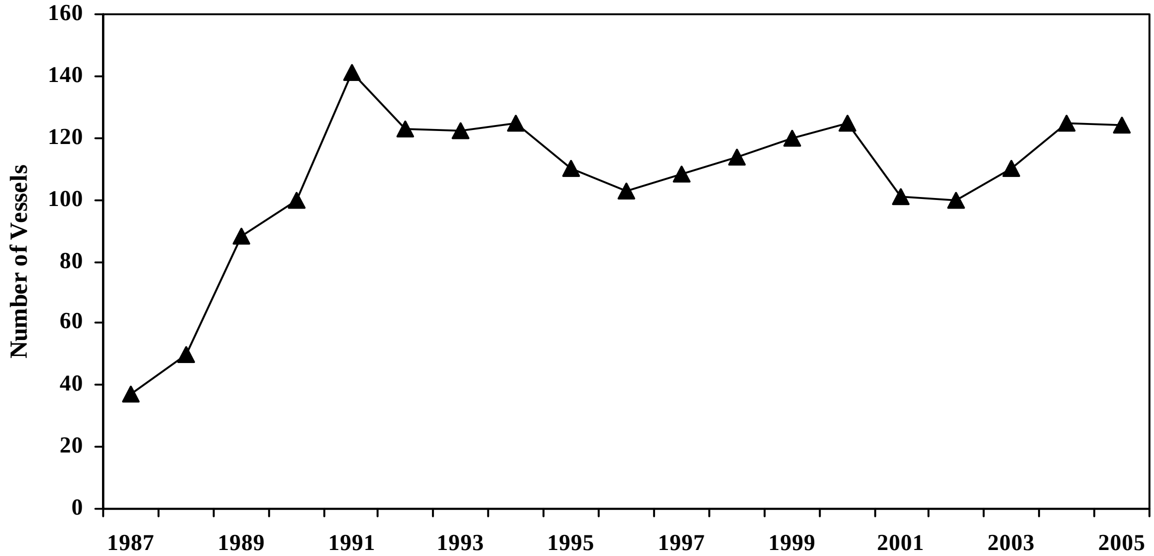


Interpretation: Sharks were landed almost exclusively by the longline fishery. Shark landings increased dramatically from 1987 to a peak of 6.3 million pounds in 1999. Sharks were landed headed and gutted in the late 1980's but a market for shark fins began in the early 1990's. Finning sharks then became 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 2005.

	Shark Landings (1000 Pounds)	
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	3,256	3,267
2001	329	336
2002	359	366
2003	352	356
2004	413	418
2005	389	393
Average	**1,851**	**1,853**
Std. Dev.	**2,133**	**2,132**

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.

Figure 23. Number of Hawaii-based longline vessels, 1987-2005.



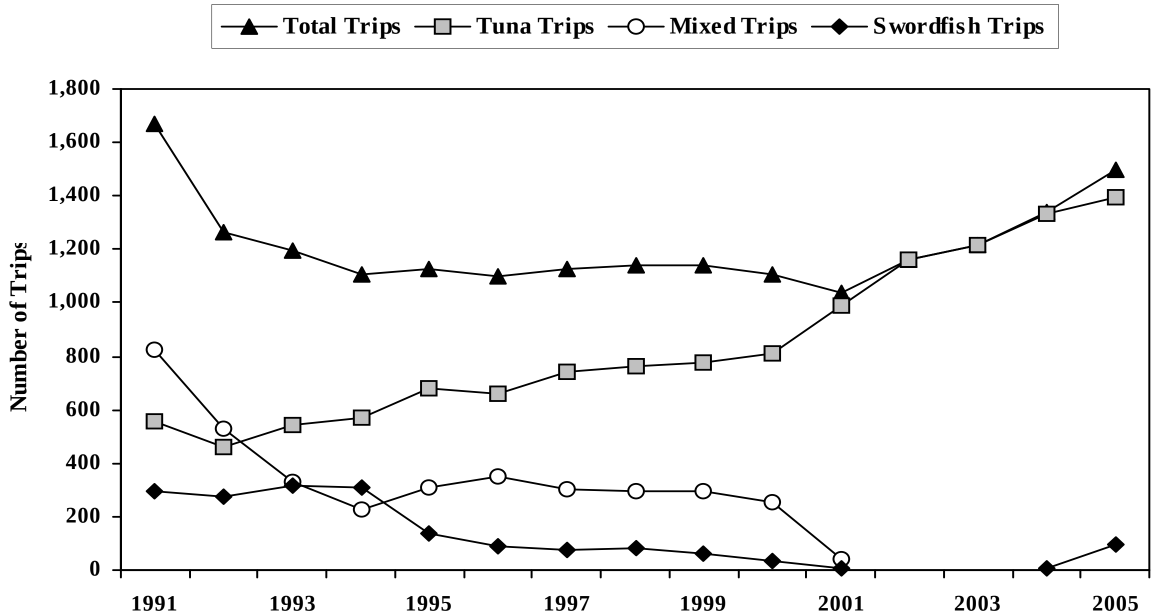
Interpretation: There were 124 active Hawaii-based longline vessels in 2005, down one vessel from 2004. Ninety-three vessels targeted tunas exclusively throughout the entire year while 31 vessels targeted both swordfish and tunas at some time during 2005.

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 1991-2005 based on date of landing.

Year	Vessels
1987	37
1988	50
1989	88
1990	100
1991	141
1992	123
1993	122
1994	125
1995	110
1996	103
1997	108
1998	114
1999	120
2000	125
2001	101
2002	100
2003	110
2004	125
2005	124
Average	**107**
Std. Dev.	**25**

Figure 24. Number of trips by the Hawaii-based longline fishery, 1991-2005.

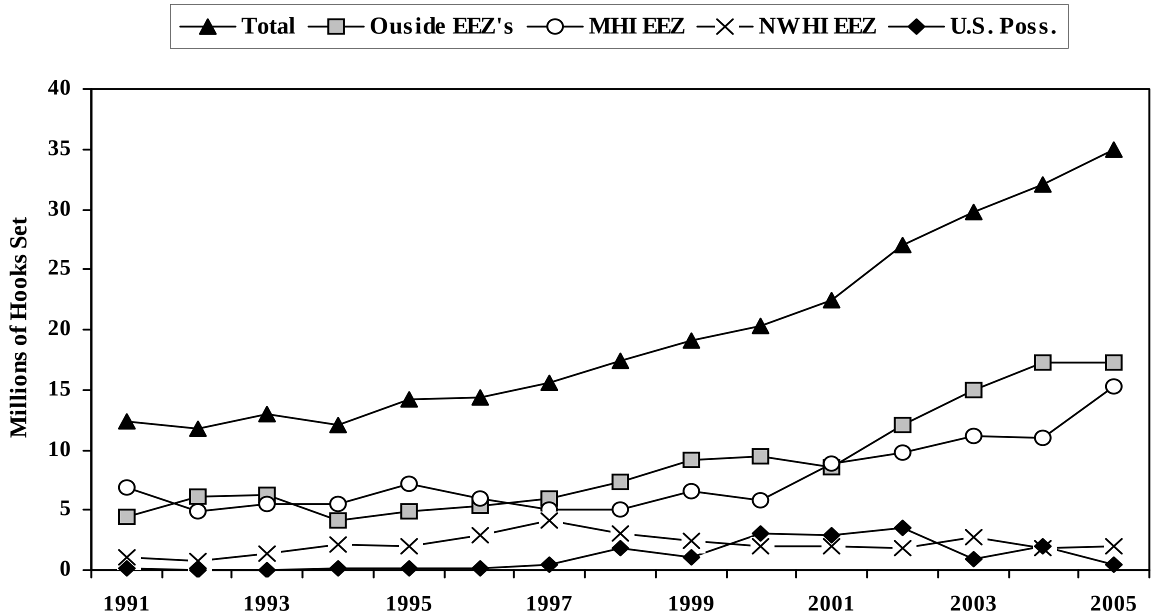


Interpretation: The Hawaii-based longline fleet made the second highest number of trips (1,496) in 2005. Total number of trips were above the long-term average in 2004 and 2005. A large majority (93%) of the trips targeted tunas, with the remainder targeting swordfish.

Source and Calculations: The number of trips was compiled from NMFS federal longline logbook data collected from 1991 to 2005. 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	1,101	658	352	91
1997	1,125	745	302	78
1998	1,140	760	296	84
1999	1,139	777	297	65
2000	1,104	814	253	37
2001	1,034	987	43	4
2002	1,161	1,161	--	--
2003	1,214	1,214	--	--
2004	1,338	1,332	--	6
2005	1,496	1,397	--	99
Average	**1,214**	**843**	**251**	**120**
Std. Dev.	**164**	**293**	**220**	**115**

Figure 25. Number of hooks set by the Hawaii-based longline fishery, 1991-2005.



Interpretation: The total number of hooks set by the Hawaii-based longline fishery increased steadily since 1994 to a record 35.0 million hooks in 2005. 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 (49%) and MHI EEZ (43%) in 2005. Effort in the NWHI EEZ (6%) increased slightly while effort in the EEZ of U.S. possessions (1%) decreased in 2005.

Source and Calculations: Number of hooks set was compiled from NMFS federal longline logbook data collected from 1991 to 2005. The summary of hooks set was based on date of haul.

	Millions of Hooks Set by Area				
Year	Outside EEZ's	MHI EEZ	NWHI EEZ	U.S. Poss.	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	5.5	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	5.8	2.0	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	29.8
2004	17.3	11.0	1.8	2.0	32.0
2005	17.3	15.2	2.0	0.5	35.0
Average	**8.9**	**7.6**	**2.1**	**1.1**	**19.7**
Std. Dev.	**4.4**	**2.9**	**0.8**	**1.2**	**7.5**

Table 3. Distance traveled to first set by the Hawaii-based longline fleet, 1991-2005.

	Miles to First Set							
	Average				Maximum			
Year	Tuna Trips	Mixed Trips	Sword Trips	Fleet Mean	Tuna Trips	Mixed Trips	Sword Trips	Fleet Mean
1991	240	276	585	318	1,508	1,408	1,792	1,792
1992	260	404	733	424	1,156	1,543	1,871	1,871
1993	222	522	820	465	1,432	1,616	2,122	2,122
1994	252	323	833	430	945	1,298	2,814	2,814
1995	273	397	884	441	945	1,609	2,097	2,097
1996	284	410	790	367	1,866	1,547	2,037	2,037
1997	288	365	623	332	1,002	1,323	1,973	1,973
1998	384	439	708	422	1,154	1,611	1,522	1,611
1999	313	490	821	388	1,160	1,723	1,791	1,791
2000	394	558	806	446	1,170	1,847	1,744	1,847
2001	358	431	1,357	365	1,352	1,393	1,648	1,648
2002	386	--	--	386	1,345	--	--	1,345
2003	336	--	--	336	1,704	--	--	1,704
2004	355	--	1,092	359	1,374	--	1,460	1,460
2005	323	--	613	343	1,240	--	1,296	1,296
Average	**311**	**308**	**711**	**388**	**1,290**	**1,128**	**1,611**	**1,827**
Std. Dev.	**54**	**198**	**336**	**45**	**255**	**694**	**718**	**360**

Interpretation: The average miles traveled to first set for the Hawaii-based longline fleet was 323 miles in 2005. This distance has remainded steady for about eight years. Tuna trips showed a general increase with longest average distance traveled to first set at 394 miles in 2000 then declining to 323 miles in 2005. Vessels that target swordfish travel farther because productive swordfish grounds occur in subtropical water temperatures north of the Hawaiian Islands.

The farthest maximum miles to first set for the Hawaii-based longline fleet was 1,296 miles made on a swordfish trip in 2005. The maximum distance traveled to first set was in excess of 2000 miles from 1993 to 1996 due to the long distances traveled by vessels making swordfish trips.

Source and Calculation: Distance traveled to first set was calculated from NMFS federal longline logbook data. The calculated was based on the difference between Honolulu (21 degrees 18 minutes North, 157 degrees 52 minutes West) and the begin set position of the first set on a longline trip. The average and maximum miles to first set must be interpreted with caution because they may include atypical trips such as those that departed from California and landed in Hawaii. This type of trip activity was included since these vessels were permitted to operate in the Hawaii-based longline fishery. In contrast, trips that vessels departed from Hawaii and landed in California were not included.

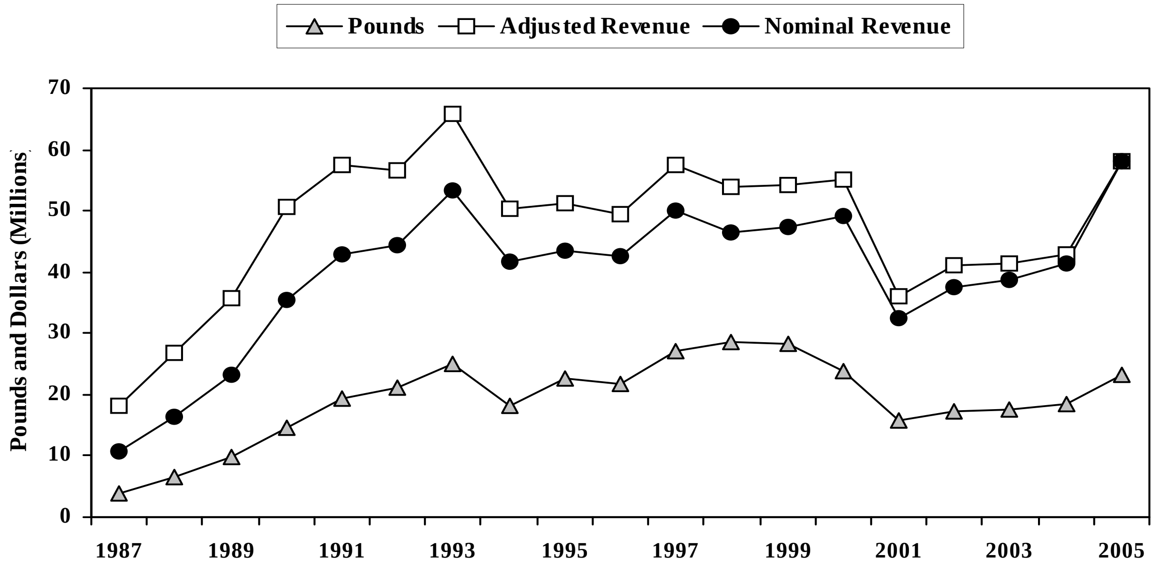
Table 4. Number of days fished per trip for the Hawaii-based longline fleet, 1991-2005.

	Days Fished Per Trip							
	Average				Maximum			
Year	Tuna Trips	Mixed Trips	Sword Trips	Fleet Mean	Tuna Trips	Mixed Trips	Sword Trips	Fleet Mean
1991	7.8	6.3	10.7	7.6	18.0	22.0	26.0	26.0
1992	8.4	7.7	12.7	9.1	14.0	21.0	26.0	26.0
1993	8.8	9.6	13.7	10.3	14.0	23.0	29.0	29.0
1994	8.9	8.0	13.4	10.0	16.0	19.0	26.0	26.0
1995	10.1	9.4	13.3	10.3	20.0	26.0	27.0	27.0
1996	10.3	10.3	12.7	10.5	22.0	30.0	26.0	30.0
1997	10.1	10.7	14.2	10.5	19.0	36.0	27.0	36.0
1998	10.4	11.4	14.6	11.0	17.0	24.0	24.0	24.0
1999	11.1	11.8	12.5	11.4	19.0	26.0	22.0	26.0
2000	11.0	13.3	15.5	11.7	21.0	29.0	28.0	29.0
2001	11.8	10.7	10.0	11.7	20.0	19.0	18.0	20.0
2002	12.1	--	--	12.1	26.0	--	--	26.0
2003	12.1	--	--	12.1	22.0	--	--	22.0
2004	11.9	--	14.7	11.9	32.0	--	19.0	32.0
2005	11.8	--	16.2	12.1	25.0	--	25.0	25.0
Average	**10.4**	**7.3**	**11.6**	**10.8**	**20.3**	**18.3**	**21.5**	**26.9**
Std. Dev.	**1.4**	**4.7**	**4.8**	**1.2**	**4.6**	**11.8**	**9.0**	**3.8**

Interpretation: The duration of tuna trips have been rather steady, averaging 11.1 to 12.1 days per trip from 1999 through 2005. The 2005 swordfish trips, however, were the longest in the 15-year time series.

Source and Calculation: Average and maximum number of days fished per trip were compiled from federal longline logbook data. The number of days fished per trip is a summary of number of hauls on an individual trip and does not include travel days or days not fishing.

Figure 26. Hawaii longline landings and revenue, 1987-2005.



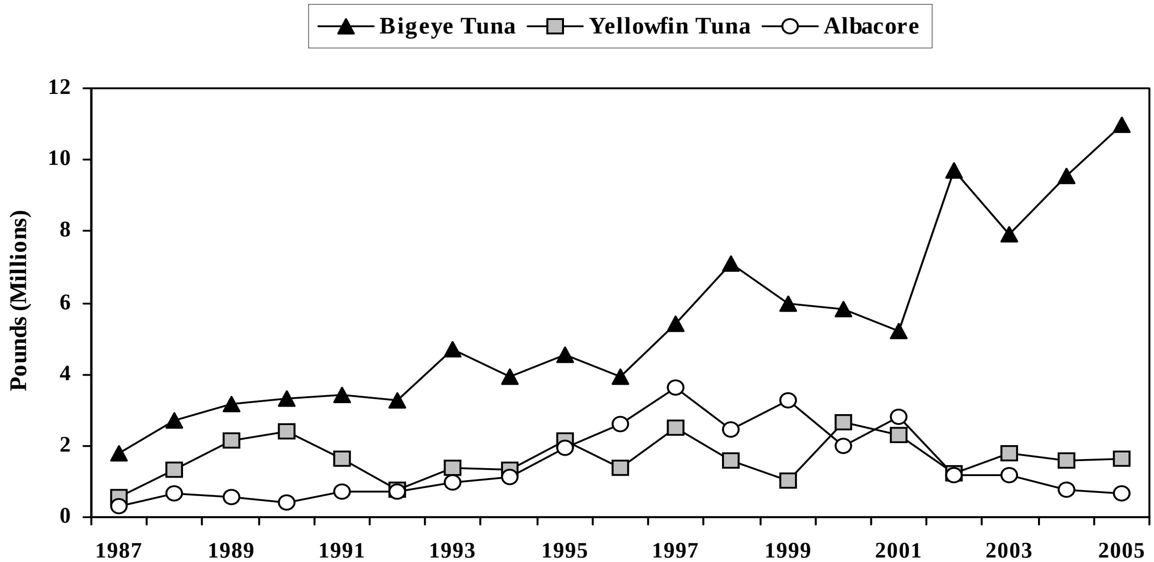
Interpretation: Total landings in 2005 was 22% higher than long-term average. Hawaii longline landings have increased in each of the past four years. Revenue in 2005 was also 22% higher than long-term average and have shown a steady increase in the past four years.

Year	Total Landings (1000lbs)	Nominal Revenue ($1000)	Adjusted Revenue ($1000)	Honolulu CPI
1987	3,891	$10,579	$18,211	114.9
1988	6,700	$16,470	$26,768	121.7
1989	9,942	$23,199	$35,655	128.7
1990	14,738	$35,309	$50,574	138.1
1991	19,478	$42,932	$57,378	148.0
1992	21,105	$44,387	$56,607	155.1
1993	25,005	$53,365	$65,932	160.1
1994	18,134	$41,788	$50,248	164.5
1995	22,723	$43,632	$51,341	168.1
1996	21,553	$42,700	$49,479	170.7
1997	27,145	$50,052	$57,594	171.9
1998	28,629	$46,609	$53,757	171.5
1999	28,348	$47,386	$54,085	173.3
2000	23,817	$49,174	$55,171	176.3
2001	15,804	$32,533	$36,071	178.4
2002	17,393	$37,469	$41,105	180.3
2003	17,645	$38,616	$41,400	184.5
2004	18,480	$41,374	$42,937	190.6
2005	23,275	$57,979	$57,979	197.8
Average	**19,148**	**39,766**	**47,489**	
Std. Dev.	**6,665**	**11,755**	**11,622**	

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 1992-2001, and the HDAR Dealer data from 2002 to 2004. 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.

Figure 27. Hawaii longline tuna landings, 1987-2005.



Interpretation: The three major tuna species landed by the Hawaii-based longline fishery are bigeye tuna, yellowfin tuna, and albacore. Landings of bigeye tuna reached a record 11 million pounds in 2005. It was also the largest component of the longline landings and made up 81% of the tuna landings. Yellowfin tuna was close to its long-term average in 2005. Albacore landings were 55% below its long-term average in 2005 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 Pounds)

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	5,830	2,656	1,980	221	7	10,694
2001	5,190	2,278	2,803	456	3	10,729
2002	9,676	1,235	1,145	282	2	12,344
2003	7,916	1,815	1,160	437	4	11,332
2004	9,532	1,559	790	293	1	12,179
2005	10,975	1,620	663	197	1	13,458
Average	**5,392**	**1,655**	**1,465**	**167**	**25**	**8,704**
Std. Dev.	**2,508**	**569**	**1,003**	**133**	**30**	**3,072**

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 (1992-2005).

Figure 28a. Hawaii longline billfish landings, 1987-2005.

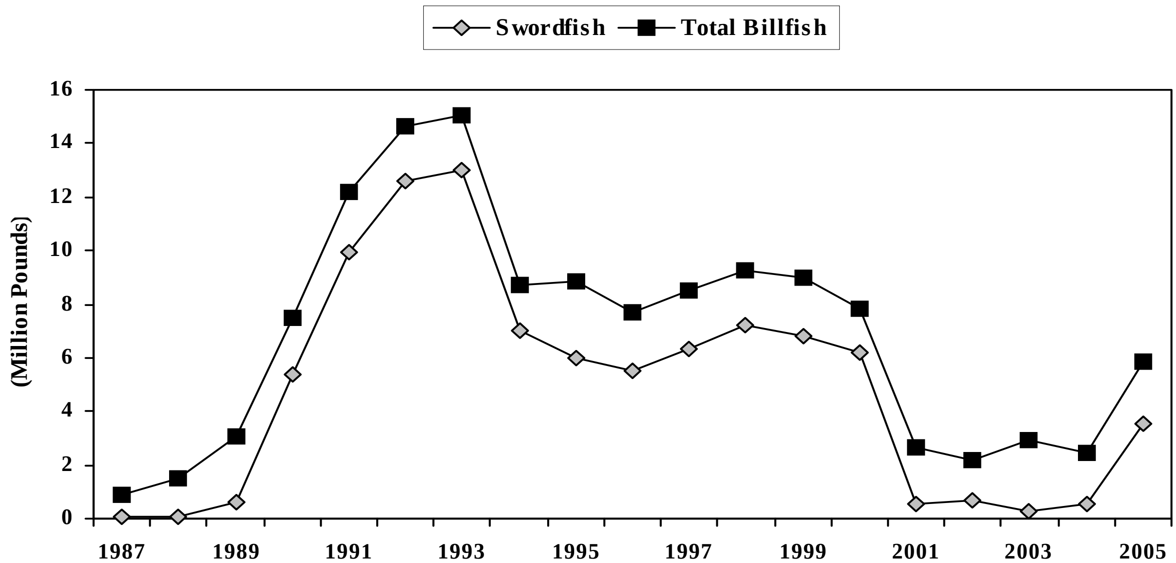
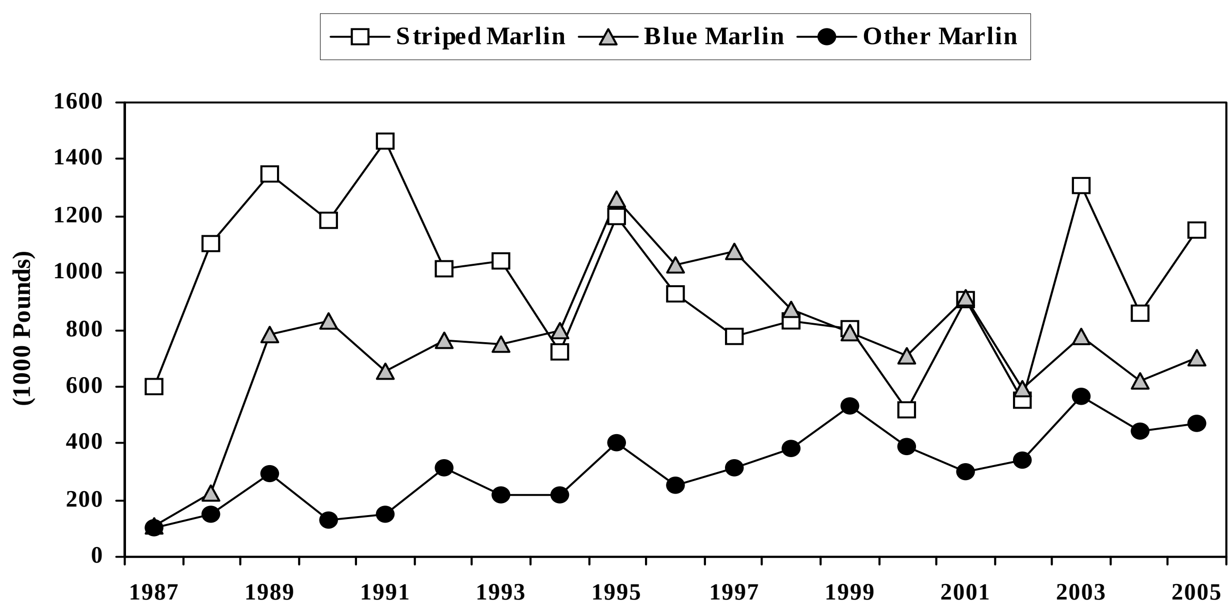


Figure 28b. Hawaii longline marlin landings, 1987-2005.



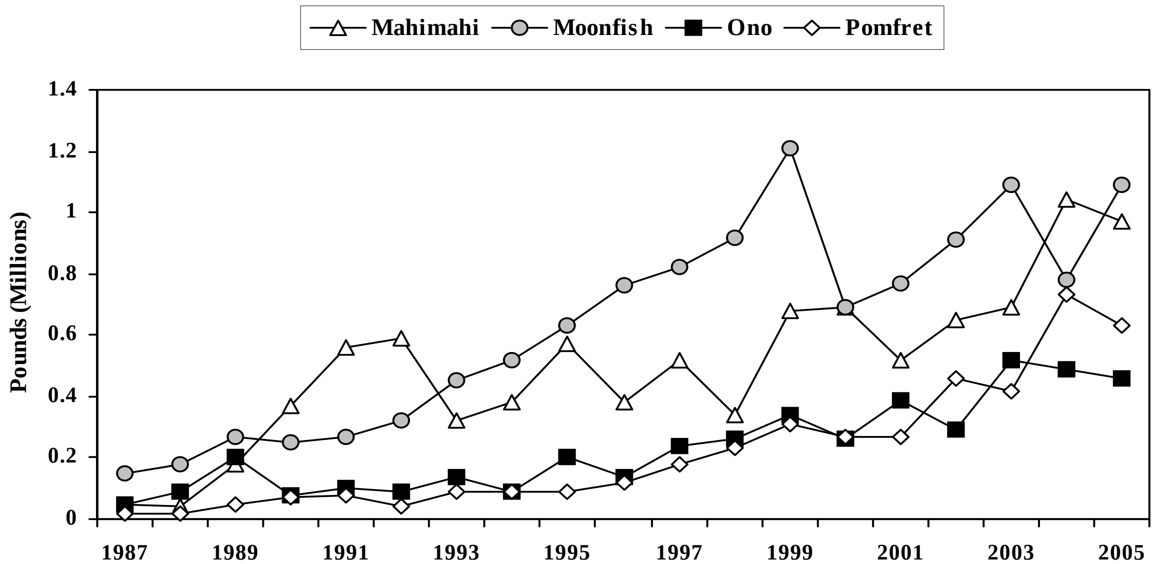
Interpretation: Billfish landings increased significantly in 2005 but were still 15% below the long-term average. The increase is directly attributable to swordfish. The swordfish-targeted longline fishery target was reopened under a new set of regulations intended to reduce sea turtle interactions in April 2004. 2005 was the first complete year the swordfish-target longine fishery was able to operate. As a result, swordfish landings by the longline fishery increased more than 6-fold the following year.

Hawaii Longline Billfish Landings (1000 lbs)					
Year	**Striped Marlin**	**Blue Marlin**	**Other Marlin**	**Swordfish**	**Total Billfish**
1987	599	112	99	52	862
1988	1,100	225	150	52	1,527
1989	1,350	784	290	619	3,043
1990	1,186	834	127	5,372	7,519
1991	1,462	654	153	9,939	12,208
1992	1,013	765	312	12,566	14,656
1993	1,039	748	220	13,027	15,034
1994	719	798	218	7,002	8,737
1995	1,198	1,257	401	5,981	8,837
1996	923	1,030	253	5,517	7,723
1997	775	1,074	316	6,352	8,517
1998	834	870	380	7,193	9,277
1999	803	787	533	6,835	8,958
2000	517	711	385	6,202	7,815
2001	903	909	299	519	2,631
2002	550	593	338	681	2,162
2003	1,309	775	567	300	2,951
2004	856	622	441	549	2,468
2005	1,153	698	473	3,527	5,851
Average	**963**	**750**	**313**	**4,857**	**6,883**
Std. Dev.	**266**	**254**	**131**	**4,062**	**4,188**

Marlins are landed incidentally by the longline fishery, but are retained because they sell for a moderate market price. Striped marlin and blue marlin are the largest component of the marlin landings. Striped marlin landings varied substantially while blue marlin landings were on a downward trend from its peak in 1995. Other marlin, primarily spearfish, was on a increasing trend.

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 (1992-2005).

Figure 29. Hawaii longline landings of other pelagic PMUS, 1987-2005.



Interpretation: Longline landings of other pelagic PMUS show a increasing trend for with record landings for this category in 2005. Moonfish was dominant component in this category at 1.1 million pounds in 2005, 72% above the long-term average. Mahimahi compose a large fraction of the landings with landings almost double its long-term average in 2005. Ono and pomfret landings increased substantially during the 19-year period with record landings in 2003 and 2004, respectively.

	Longline Landings of Other Pelagic fish (1000 lbs)				
Year	**Mahimahi**	**Moonfish**	**Ono**	**Pomfret**	**Total**
1987	45	152	53	23	281
1988	39	182	90	18	354
1989	183	274	202	49	775
1990	366	253	80	66	835
1991	555	270	101	75	1,155
1992	593	320	85	37	1,131
1993	316	454	142	92	1,030
1994	377	524	87	85	1,100
1995	570	629	195	93	1,520
1996	375	760	140	121	1,429
1997	518	823	239	178	1,792
1998	336	922	262	225	1,781
1999	679	1,210	343	313	2,589
2000	694	691	256	272	2,019
2001	523	768	390	267	2,115
2002	646	910	293	463	2,529
2003	686	1,092	518	416	3,009
2004	1,041	781	486	734	3,419
2005	972	1,093	459	632	3,578
Average	**501**	**637**	**233**	**219**	**1,707**
Std. Dev.	**260**	**324**	**144**	**204**	**944**

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 (1992-2005).

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Figure 30a. Hawaii longline blue and total shark landings, 1987-2005.

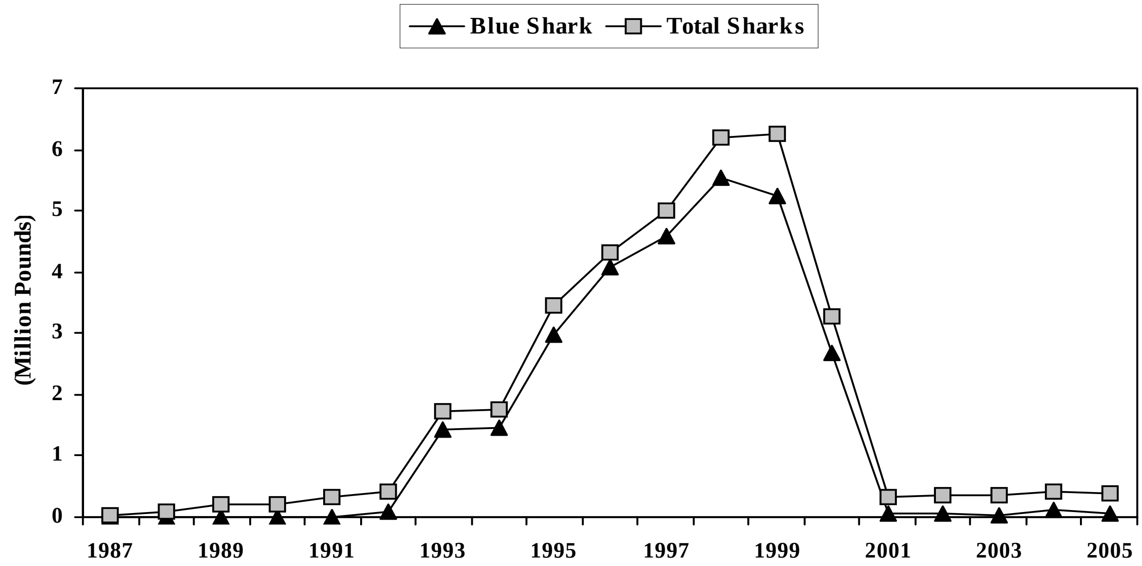
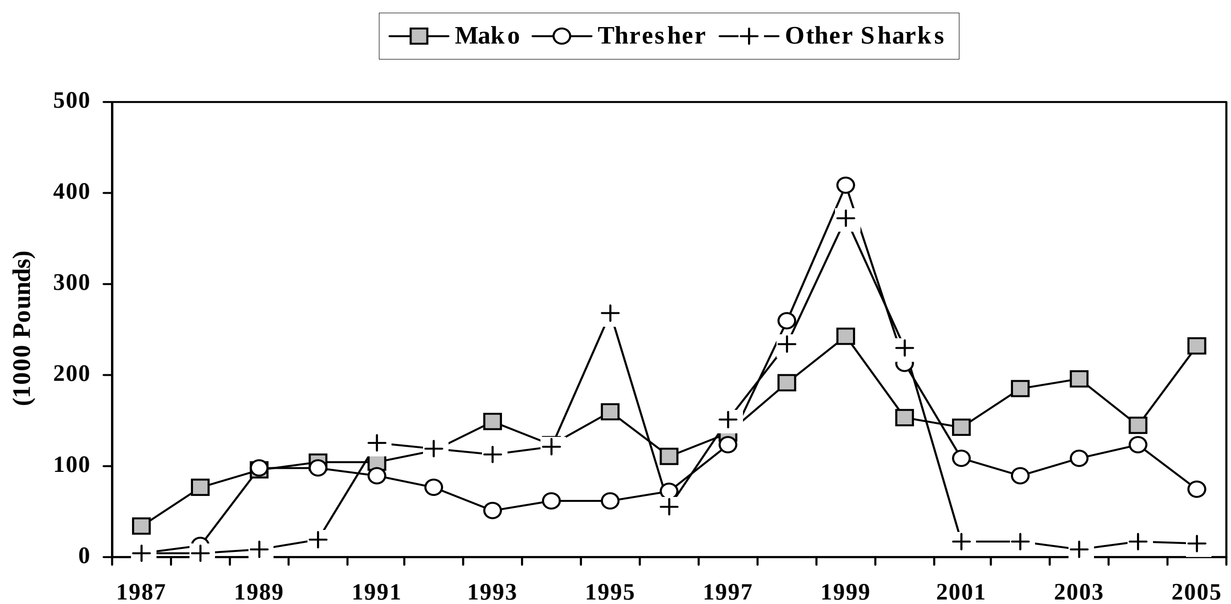


Figure 30b. Hawaii longline mako, thresher and other shark landings, 1987-2005.



Interpretation: Shark landings were almost 80% 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. Mako and thresher sharks were retained for their flesh and had landings substantially lower and less variable compared to blue shark. Blue shark and other sharks were retained for fins only so landings dropped significantly when laws prohibiting the practice took effect.

Year	Hawaii Longline Shark Landings (1000 lbs)				
	Mako	Thresher	Other Sharks	Blue Shark	Total
1987	33	5	5	0	43
1988	77	13	4	0	94
1989	95	98	8	2	203
1990	105	98	19	0	222
1991	104	89	125	0	318
1992	117	76	120	97	410
1993	150	51	112	1,423	1,736
1994	124	61	122	1,450	1,757
1995	160	62	268	2,978	3,468
1996	110	73	56	4,088	4,327
1997	137	123	152	4,598	5,010
1998	192	259	234	5,527	6,212
1999	242	409	372	5,249	6,272
2000	153	213	231	2,693	3,290
2001	142	109	16	63	329
2002	184	90	17	67	359
2003	195	109	9	39	352
2004	144	123	16	130	413
2005	233	75	15	66	389
Average	**142**	**112**	**100**	**1,498**	**1,853**
Std. Dev.	**51**	**91**	**106**	**1,968**	**2,134**

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 5. Hawaii-based longline catch (number of fish) by area, 1991-2005.

	Tunas			Billfish				Other PMUS			
Year	**Bigeye Tuna**	**Yellowfin Tuna**	**Albacore**	**Swordfish**	**Blue Marlin**	**Striped Marlin**	**Other Billfish**	**Mahimahi**	**Ono (Wahoo)**	**Moonfish**	**Sharks**
Main Hawaiian Islands EEZ											
1991	**22,517**	**7,150**	5,763	13,598	**6,086**	**11,520**	**5,973**	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	5,239	**4,168**	**12,472**	**6,900**	**30,417**	2,658	**4,022**	22,557
1996	**29,803**	**7,715**	19,259	4,634	**3,556**	**7,124**	**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	29,328	4,838	23,805	2,357	1,709	**5,617**	6,702	11,660	2,579	5,168	17,469
2000	21,654	5,247	5,964	2,510	1,557	2,446	**3,492**	17,628	1,202	2,772	16,590
2001	**36,928**	5,671	10,448	1,027	2,134	**7,651**	**4,018**	**21,608**	3,223	**3,404**	16,086
2002	51,177	2,465	2,707	752	873	**3,449**	3,761	21,374	1,345	3,373	14,828
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
Northwestern Hawaiian Islands EEZ											
1991	4,473	1,375	481	9,472	723	2,445	789	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	810	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	**2,877**	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	15,070
2000	7,615	1,380	2,663	6,676	415	2,294	1,082	6,413	224	699	11,233
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
U.S. Possessions EEZ's											
1991	374	439	30	25	36	38	33	84	21	0	237
1992	70	42	0	16	7	1	7	6	8	0	223
1993	4	1	0	0	0	3	1	6	3	0	7
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	17,742	6,330	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	766	733	910	1,202	1,916	448	8,307
2001	5,566	**20,778**	9,529	224	1,072	1,049	684	1,708	2,151	279	5,199
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

Table 5 (Cont.) Hawaii-based longline catch (number of fish) by area, 1991-2005.

	Tunas				Billfish			Other PMUS			
Year	Bigeye Tuna	Yellowfin Tuna	Albacore	Swordfish	Blue Marlin	Striped Marlin	Other Billfish	Mahimahi	Ono (Wahoo)	Moonfish	Sharks
Outside EEZ's											
1991	13,559	4,305	**7,777**	**43,194**	2,130	4,280	2,558	**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**	3,125	4,885	3,220	23,374	**2,801**	1,314	**58,154**
1996	17,597	6,236	**23,720**	**29,621**	1,929	4,250	2,624	9,591	**2,120**	1,776	**64,279**
1997	26,140	**10,992**	**30,887**	**29,568**	2,457	4,080	2,806	**30,747**	**3,640**	2,314	**49,938**
1998	**37,777**	**8,017**	**25,765**	**28,270**	**2,127**	3,427	3,885	**10,161**	**4,088**	3,479	**59,208**
1999	**36,960**	4,817	**35,752**	**29,574**	**1,859**	4,860	**7,401**	**27,862**	**5,438**	**5,628**	**51,797**
2000	**37,828**	9,933	**21,649**	**27,630**	**1,770**	**2,455**	3,485	**32,601**	**4,402**	**3,084**	**42,968**
2001	27,712	9,460	**27,841**	**2,545**	**2,440**	5,209	3,413	17,715	**7,117**	3,068	**20,152**
2002	**61,990**	4,278	**9,643**	**2,275**	**2,025**	3,076	**4,076**	**22,407**	**4,791**	**4,658**	**23,197**
2003	**56,211**	**12,952**	**13,783**	**1,777**	**2,437**	8,421	7,080	**25,708**	**10,965**	**6,945**	**29,093**
2004	**74,230**	**11,541**	**10,941**	**3,569**	**3,020**	6,585	**7,741**	**35,061**	**10,593**	**4,905**	**38,280**
2005	**68,361**	11,468	**6,901**	**15,793**	**2,072**	6,493	6,207	31,779	**9,505**	**8,193**	**35,906**

Interpretation: The bolded numbers in Table 5 show the area with the highest catch for a particular species. Catches of albacore, sharks, and swordfish 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 hghest catches for mahimahi were outside of the EEZ and the MHI EEZ.

Source and Calculations: Catches 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 6. Average weight (pounds) of the Hawaii-based longline landings by species, 1987-2005.

SPECIES	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average	SD
TUNAS																					
Albacore	63	60	62	61	52	45	44	41	51	53	55	55	52	55	55	56	56	46	50	53.2	6.1
Bigeye tuna	77	83	77	81	85	77	88	81	79	64	71	74	75	80	69	71	77	68	88	77.0	6.7
Bluefin tuna	---	---	---	638	185	192	203	190	271	223	239	177	202	165	169	151	273	207	238	232.6	113.8
Skipjack tuna	18	19	19	21	20	17	17	18	18	17	20	20	20	17	18	16	19	16	15	18.0	1.5
Yellowfin tuna	82	103	104	122	118	99	93	97	95	80	89	76	62	67	63	62	68	62	58	84.2	19.9
BILLFISH																					
Blue marlin	161	157	165	199	173	175	157	171	156	154	134	165	164	158	139	149	144	132	167	158.8	15.7
Striped marlin	66	57	62	62	58	66	64	64	58	58	66	60	55	59	48	55	49	53	71	59.4	5.9
Black marlin	208	151	191	204	184	155	136	167	72		190	167	131	136	633	222	154	182	185	192.7	115.3
Sailfish	52	51	55	55	51	45	49	55	47	40	46	43	45	56	45	59	56	39	40	48.8	6.2
Spearfish	34	31	31	35	32	34	34	33	33	31	31	32	29	35	31	33	31	30	31	32.0	1.5
Swordfish	129	119	130	152	153	178	171	163	171	157	163	176	188	185	133	146	141	138	164	155.6	20.1
OTHER PMUS																					
Mahimahi	21	20	23	19	15	11	13	12	10	17	13	16	16	14	12	14	13	16	13	15.1	3.5
Moonfish	111	108	104	98	97	98	101	103	101	105	103	101	98	100	99	98	93	92	83	99.6	6.1
Oilfish	20	22	23	22	23	22	21	13	23	---	---	---	---	18	16	17	16	16	17	19.3	3.3
Pomfrets	15	18	18	18	17	16	16	17	16	15	17	15	14	14	13	13	12	11	13	15.1	2.1
Wahoo (ono)	33	32	35	36	32	35	33	34	31	31	30	32	34	32	29	33	29	31	29	32.1	2.0
SHARKS																					
Mako shark	124	137	161	162	135	144	147	153	178	177	161	177	177	182	181	176	185	173	177	163.5	18.6
Thresher shark	97	122	158	167	180	176	199	164	172	156	160	171	202	162	171	176	197	169	202	168.5	25.8

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, albacore, bigeye tuna, and yellowfin tuna, exhibited changes throughout 1987-2005. The average weight of albacore was about 60 pounds until 1990 then declined to less than 50 pounds during 1992-94. This decline was related to increasing incidental landings of small albacore north of the Hawaiian Islands by longliners targeting swordfish. The average weight of albacore then increased as a greater proportion of longline effort shifted back to target tunas. The average weight of bigeye tuna showed small change over the 19 year period, ranging from 64 pounds to 88 pounds. Bigeye tuna average weight was 88 pounds in 2005. Yellowfin tuna average weight showed the most variation ranging from 62 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.

Swordfish landed on tuna target trips are biased towards small swordfish in comparison to swordfish target trips. Average weight for swordfish was lowest in the late 1980s when the longline fishery 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 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 164 pounds when swordfish-directed effort increased substantially in 2005.

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 19-year period ranging from 48 pounds in 2001 to a record 71 pounds in 2005.

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 2005. 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.

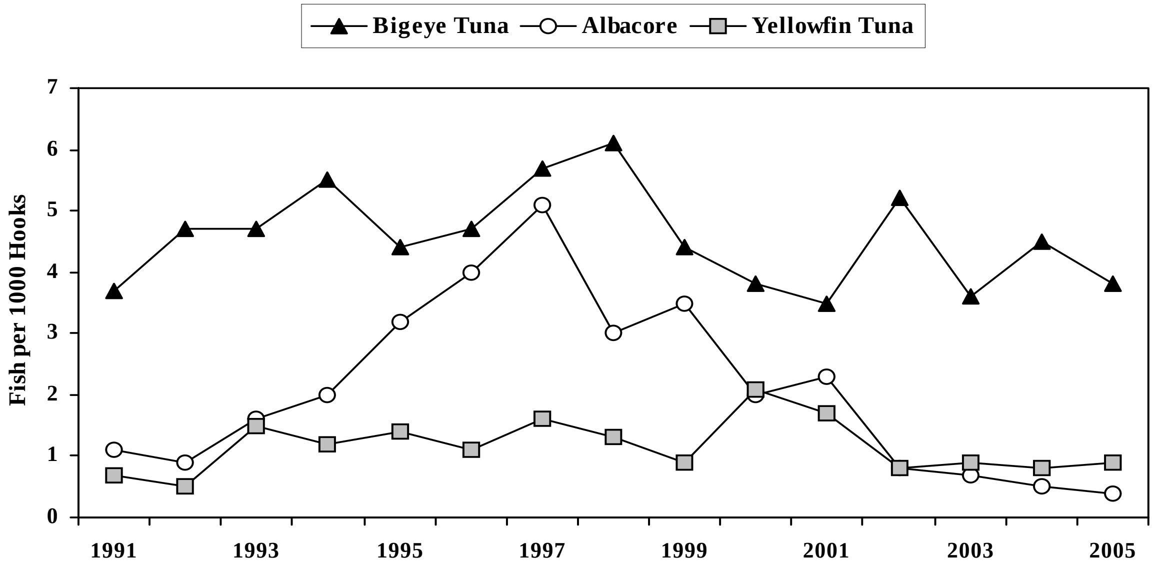
Table 7. Bycatch, retained catch, and total catch for the Hawaii-based longline fishery, 2005.

	Number Released	Percent Released	Kept	Caught
Tuna				
Albacore	454	3.3	13,183	13,637
Bigeye Tuna	3,754	2.9	125,588	129,342
Bluefin Tuna	0	0.0	6	6
Skipjack Tuna	1,753	12.4	12,415	14,168
Yellowfin Tuna	2,324	8.0	26,649	28,973
Other Tunas	3	6.3	45	48
Billfish				
Blue Marlin	86	2.0	4,235	4,321
Spearfish	359	2.4	14,456	14,815
Striped Marlin	439	2.8	15,353	15,792
Other Billfish	7	1.8	388	395
Swordfish	2,685	11.0	21,665	24,350
Other Pelagic Fish				
Mahimahi	2,439	3.1	75,521	77,960
Moonfish	102	0.8	13,230	13,332
Oilfish	805	3.6	21,633	22,438
Pomfret	379	0.8	46,891	47,270
Wahoo	125	0.8	16,041	16,166
Misc. Pelagic Fish	2,211	54.8	1,821	4,032
Total (Non-Shark)	**17,925**	**4.2**	**409,120**	**427,045**
Sharks				
Blue Shark	66,279	99.0	657	66,936
Mako Shark	1,797	57.5	1,328	3,125
Thresher Shark	3,229	89.4	382	3,611
Other sharks	1,852	92.9	142	1,994
Total Sharks	**73,157**	**96.7**	**2,509**	**75,666**

Interpretation: Bycatch of the Hawaii-based longline fishery was measured in number of fish released. The total bycatch for all species combined was 18% in 2005. Tunas, which are the primary target species of the longline fleet, had a low bycatch rate (5%). The number of bigeye tuna released was highest for all tuna species although the bycatch rate was relatively low (3%). Although billfish and other miscellaneous pelagic catch are not targeted, these species are highly marketable and also have low rates of discards (6% and 3%, respectively). Most of the sharks landed 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 by tuna-targeted trips, 1991-2005.



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 and was 3.8 in 2005. Bigeye tuna CPUE was usually highest in the MHI EEZ.

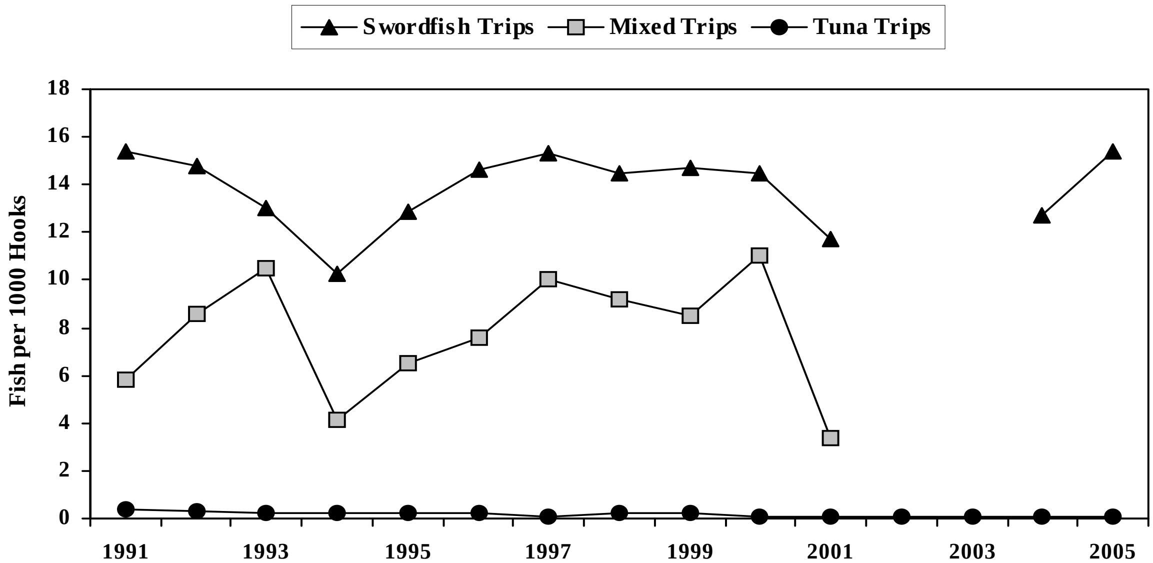
Albacore generally sells for a substantially lower price than bigeye tuna, so it is seldom targeted or is caught incidentally. Albacore CPUE rose rapidly in the early 1990s, peaked in 1997, then declined to a record low of 0.4 fish per 1000 hooks in 2005. Albacore CPUE is usually higher outside of the U.S. EEZ.

CPUE for yellowfin tuna was usually the lowest of the three major tuna species. Yellowfin tuna CPUE was lowest in 1992, increased to a CPUE of about 1 to 2 fish the following nine years, declined just below 1 fish 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
Average	**4.6**	**2.1**	**1.1**
Std. Dev.	**0.8**	**1.4**	**0.4**

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, 1991-2005.



Interpretation: Swordfish CPUE varies considerably depending upon the target species, and for this reason average swordfish CPUE for the longline fleet was not an meaningful measure of fishery performance. Effort with "shallow" longline gear, which is the typical method of fishing for swordfish, was drastically reduced in 2001 and prohibited beginning in 2002 due to sea turtle conservation measures. Therefore, swordfish CPUE for these trips types was unavailable for 2002 and 2003.

	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	10.5	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	3.4	0.1
2002	--	--	0.1
2003	--	--	0.1
2004	12.7	--	0.1
2005	15.4	--	0.1
Average	**12.0**	**5.7**	**0.2**
Std. Dev.	**4.9**	**4.0**	**0.1**

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 through 2000. Swordfish target effort was curtailed substantially in 2000 and 2001. The swordfish fishery was 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.

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, 1992-2005.

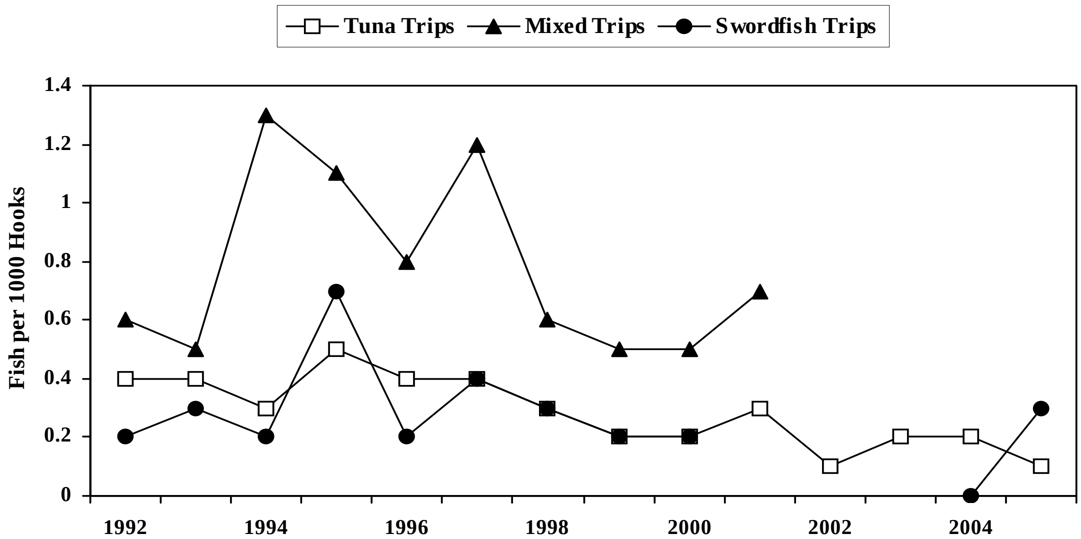
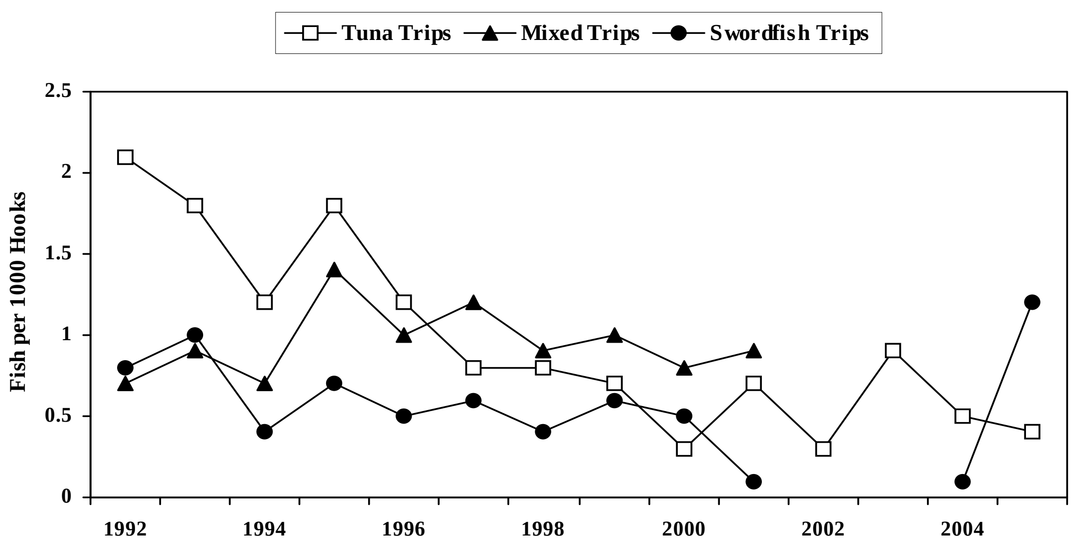


Figure 33b. Longline striped marlin CPUE by trip type, 1992-2005



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 thereafter.

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.

Longline Marlin CPUE (Fish per 1000 Hooks) By Trip Type

	Blue Marlin			Striped Marlin		
Year	**Tuna Trips**	**Mixed Trips**	**Swordfish Trips**	**Tuna Trips**	**Mixed Trips**	**Swordfish Trips**
1991	No entry due to poor species identification					
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	1.1	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	--	0.7	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
Average	**0.3**	**0.6**	**0.2**	**1.0**	**0.7**	**0.5**
Std. Dev.	**0.1**	**0.4**	**0.2**	**0.6**	**0.5**	**0.4**

Figure 34a. Hawaii longline mahimahi CPUE by trip type, 1991-2005.

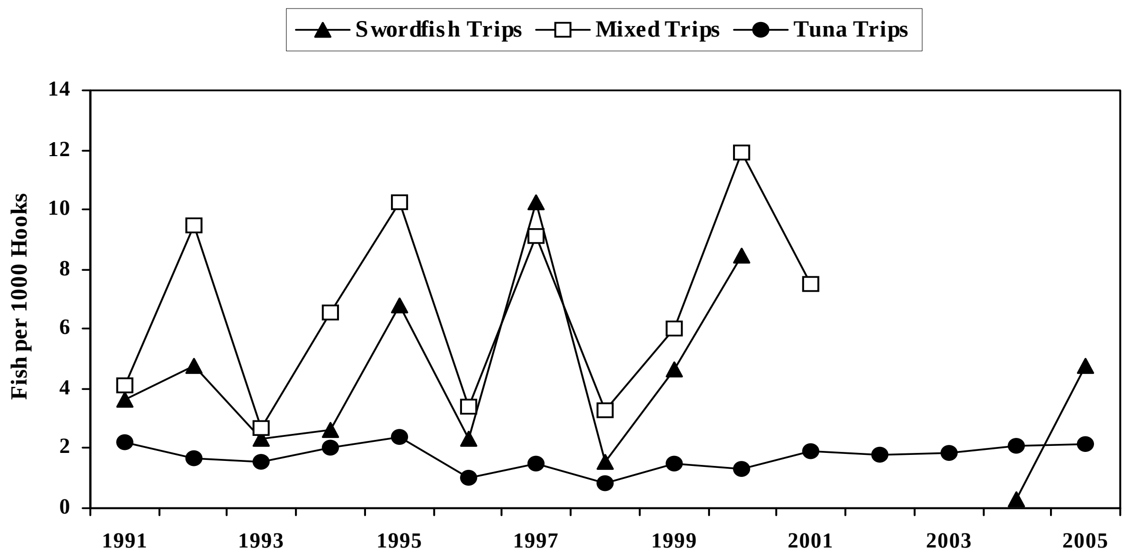
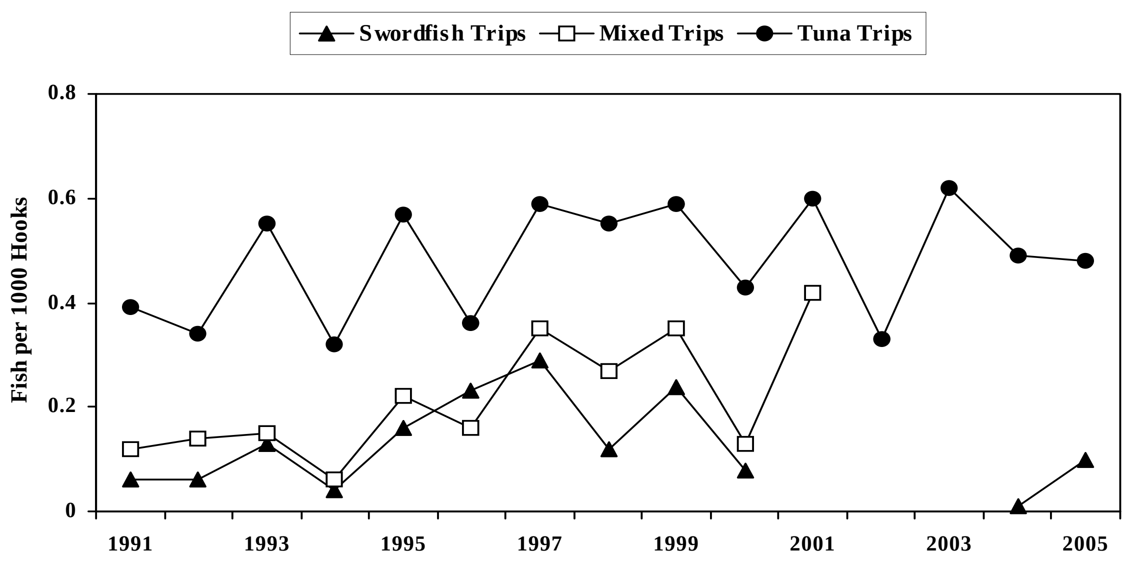


Figure 34b. Hawaii longline ono (wahoo) CPUE by trip type, 1991-2005.



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 on swordfish and mixed-target trips. The highest mahimahi CPUE was by mixed trips at 12.0 in 2000. Ono CPUE was consistently higher on tuna trips (Fig. 34b). Ono CPUE was equal to the long-term average from both triptypes in 2005.

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.

	Longline CPUE (Fish per 1000 Hooks) By Trip Type					
	Mahimahi			**Ono**		
Year	**Tuna Trips**	**Mixed Trips**	**Swordfish Trips**	**Tuna Trips**	**Mixed Trips**	**Swordfish Trips**
1991	2.18	4.13	3.62	0.39	0.12	0.06
1992	1.68	9.47	4.78	0.34	0.14	0.06
1993	1.52	2.69	2.33	0.55	0.15	0.13
1994	2.03	6.56	2.62	0.32	0.06	0.04
1995	2.39	10.26	6.78	0.57	0.22	0.16
1996	1.03	3.42	2.32	0.36	0.16	0.23
1997	1.46	9.11	10.24	0.59	0.35	0.29
1998	0.84	3.25	1.53	0.55	0.27	0.12
1999	1.48	6.03	4.65	0.59	0.35	0.24
2000	1.32	11.89	8.45	0.43	0.13	0.08
2001	1.89	7.53	--	0.60	0.42	--
2002	1.79	--	--	0.33	--	--
2003	1.85	--	--	0.62	--	--
2004	2.09	--	0.30	0.49	--	0.01
2005	2.12	--	4.75	0.48	--	0.10
Average	**1.71**	**4.96**	**3.49**	**0.48**	**0.16**	**0.10**
Std. Dev.	**0.42**	**3.95**	**3.05**	**0.11**	**0.13**	**0.09**

Figure 35a. Hawaii longline moonfish CPUE by trip type, 1991-2005.

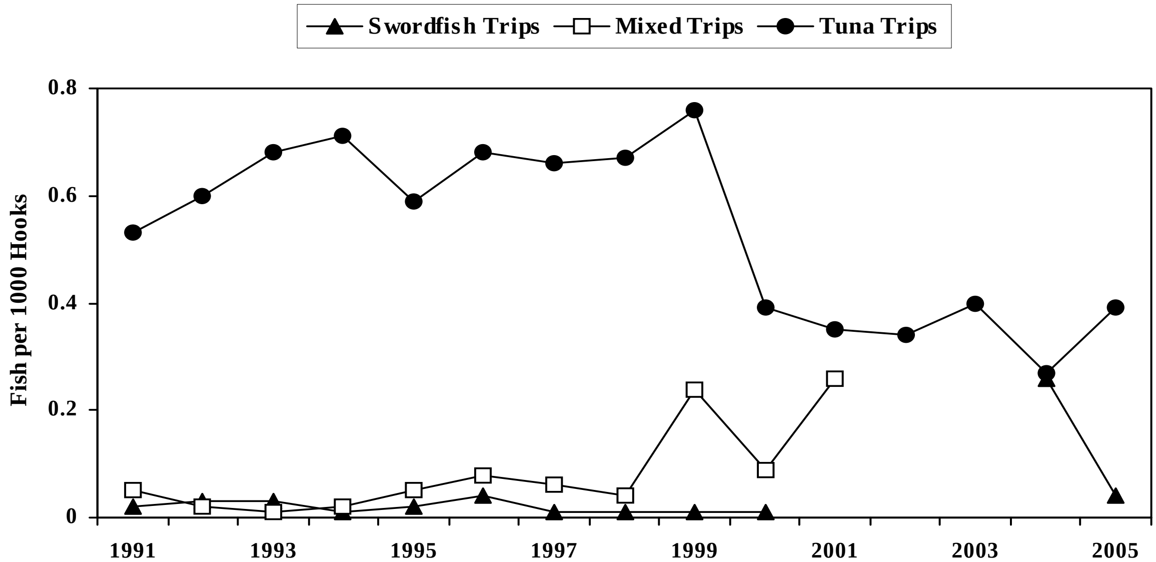
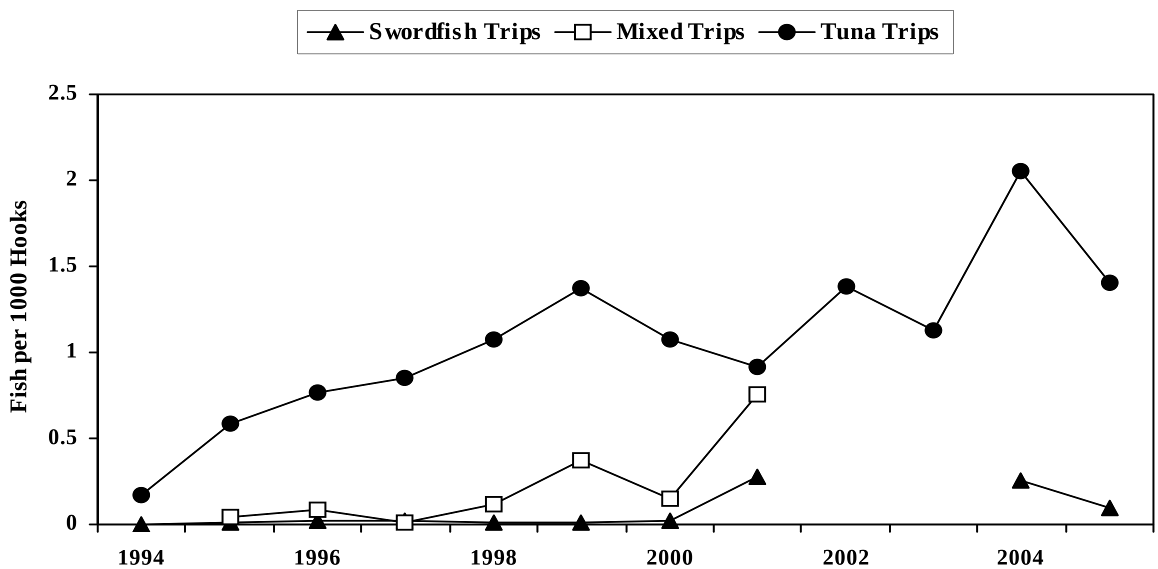


Figure 35b. Hawaii longline pomfret CPUE by trip type, 1994-2005.

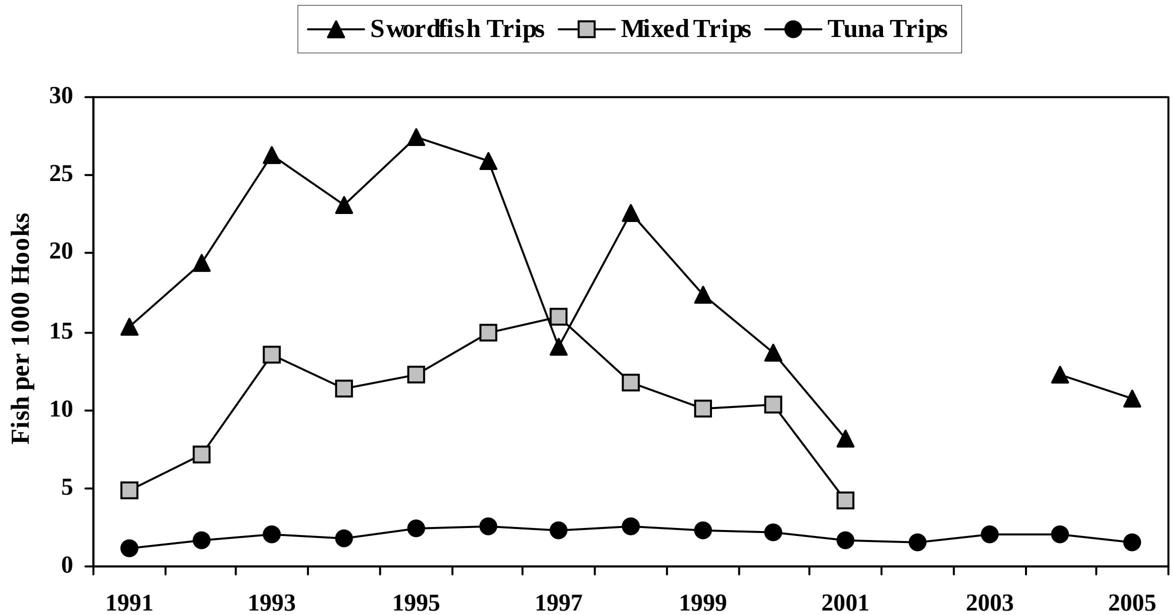


Interpretation: Moonfish and pomfrets were caught incidentally by the longline fishery. There were substantial differences in moonfish and pomfret CPUE among the different trip types. CPUE for both moonfish and pomfret was higher on tuna-target trips. Moonfish CPUE during 2000-2005 appear to be about half of what it was during 1993-1999. Pomfret CPUE showed a relatively steady increase over the past 12 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.

	Longline CPUE (Fish per 1000 Hooks) By Trip Type					
	Moonfish			Pomfret		
Year	Tuna Trips	Mixed Trips	Swordfish Trips	Tuna Trips	Mixed Trips	Swordfish Trips
1991	0.53	0.05	0.02	--	--	--
1992	0.60	0.02	0.03	--	--	--
1993	0.68	0.01	0.03	--	--	--
1994	0.71	0.02	0.01	0.17	--	0.00
1995	0.59	0.05	0.02	0.59	0.04	0.01
1996	0.68	0.08	0.04	0.77	0.09	0.02
1997	0.66	0.06	0.01	0.85	0.01	0.02
1998	0.67	0.04	0.01	1.07	0.12	0.01
1999	0.76	0.24	0.01	1.37	0.37	0.01
2000	0.39	0.09	0.01	1.07	0.15	0.02
2001	0.35	0.26	--	0.91	0.76	0.28
2002	0.34	--	--	1.38	--	--
2003	0.40	--	--	1.13	--	--
2004	0.27	--	0.26	2.05	--	0.26
2005	0.39	--	0.04	1.40	--	0.10
Average	**0.54**	**0.06**	**0.03**	**0.85**	**0.10**	**0.05**
Std. Dev.	**0.16**	**0.08**	**0.06**	**0.59**	**0.20**	**0.09**

Figure 36. Hawaii longline blue shark CPUE by trip type, 1991-2005.

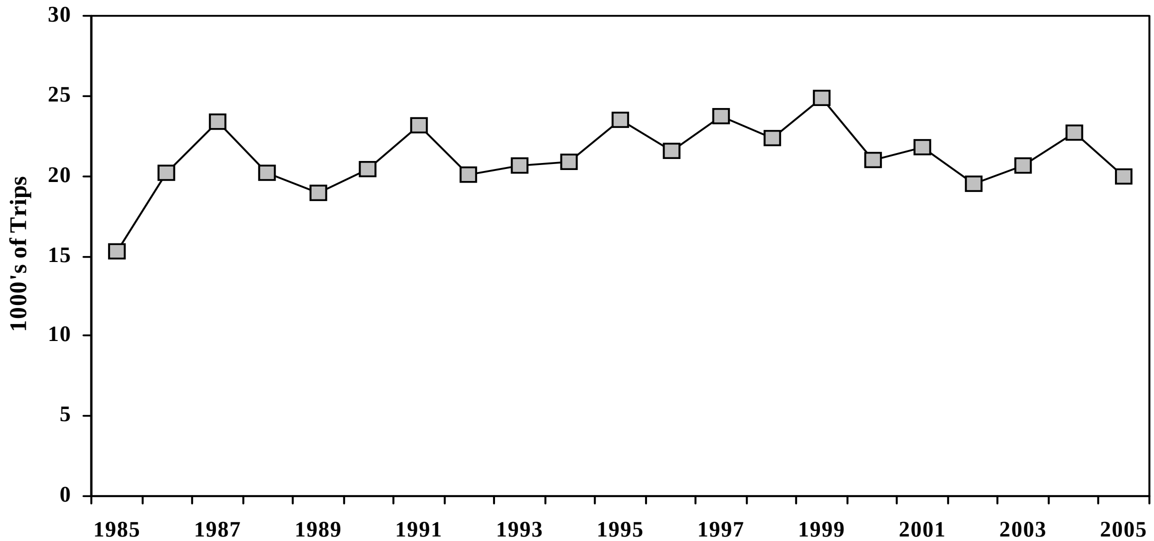


Interpretation: Blue sharks are caught incidentally by the longline fishery. The blue shark CPUE on swordfish-targeted trips is always considerably greater (by about 8-fold) than on tuna-targeted trips. Blue shark CPUE on swordfish targeted trip in 2004 and 2005 was lower than in the 1990s One factor 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	13.5	2.1
1994	23.1	11.3	1.8
1995	27.5	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	--	1.5
Average	**15.8**	**7.8**	**2.0**
Std. Dev.	**8.4**	**5.6**	**0.4**

Figure 37. Number of Main Hawaiian Islands troll trips, 1985-2005.

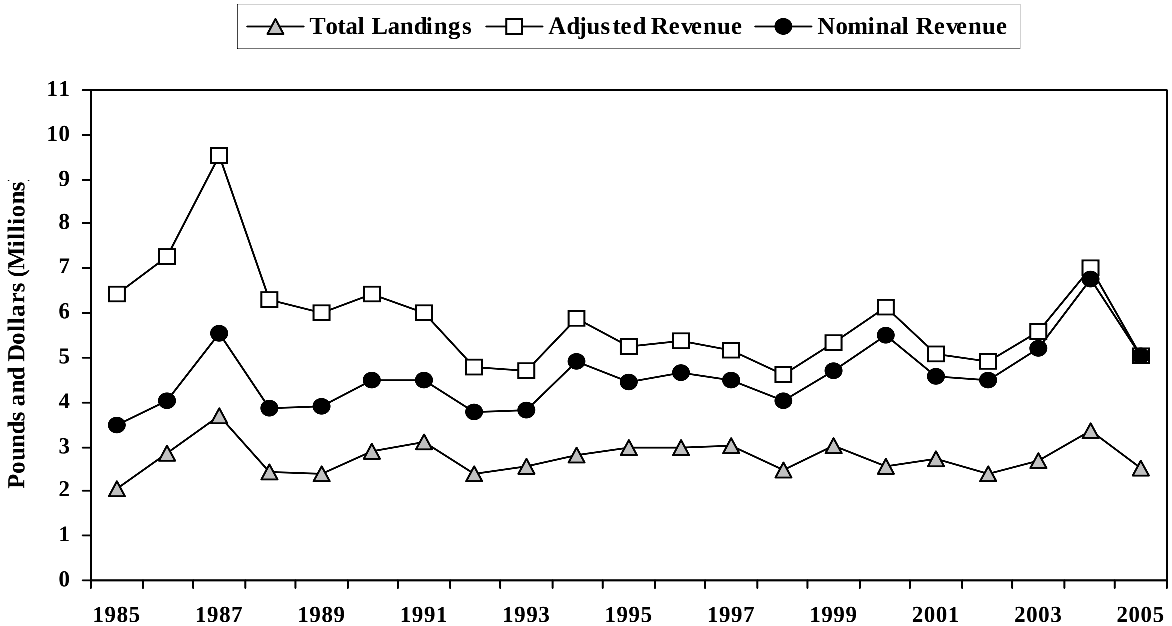


Interpretation: The number of MHI troll trips in 2005 was 19,905, 6% below the long-term average. The MHI troll trip activity remained relatively stable since 1986 around 20,000 trips per year.

Source and Calculations: The number of MHI troll trips was counted from HDAR Commercial Fish Catch data. A MHI troll trip was defined as a unique HDAR Commercial Marine License number returning on a particular day using the gear and fishing areas defined for the MHI troll fishery at the beginning of this module. There was no way to distinguish a zero Commercial Fish Catch report that represented no fishing effort from one that represented no catch (unsuccessful fishing operation(s)), the trip count did not include Fish Catch reports with zero catch.

Year	MHI Troll Trips
1985	15,291
1986	20,139
1987	23,391
1988	20,202
1989	18,924
1990	20,468
1991	23,184
1992	20,109
1993	20,647
1994	20,905
1995	23,527
1996	21,611
1997	23,674
1998	22,403
1999	24,884
2000	20,950
2001	21,839
2002	19,520
2003	20,598
2004	22,658
2005	19,905
Average	**21,182**
Std. Dev.	**2,038**

Figure 38. Main Hawaiian Islands troll landings and revenue, 1985-2005.

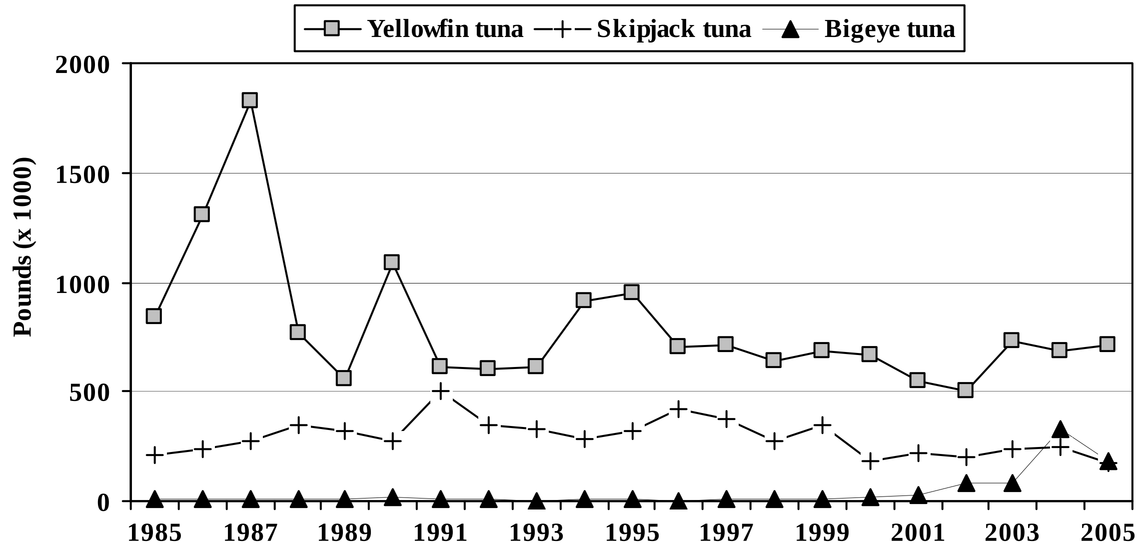


Interpretation: The total landings by the MHI troll fishery in 2005 were 2.5 million pounds worth an estimated $5.0 million. Total landings and revenue this year were 9% and 14% below their respective long-term averages.

Source and Calculations: Total catch and nominal revenue for the MHI troll fishery were derived from HDAR Commercial Fish Catch and HDAR Dealer data. The total catch and nominal revenue values were obtained by adding the catch 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 Honolulu CPI.

Year	Total Landings (1000 lbs)	Nominal Revenue ($1000)	Adjusted Revenue ($1000)	Honolulu CPI
1985	2,049	$3,479	$6,443	106.8
1986	2,842	$4,009	$7,248	109.4
1987	3,709	$5,536	$9,530	114.9
1988	2,445	$3,875	$6,298	121.7
1989	2,401	$3,899	$5,992	128.7
1990	2,901	$4,494	$6,437	138.1
1991	3,102	$4,497	$6,010	148.0
1992	2,394	$3,762	$4,798	155.1
1993	2,578	$3,816	$4,715	160.1
1994	2,810	$4,897	$5,888	164.5
1995	2,966	$4,471	$5,261	168.1
1996	2,994	$4,650	$5,388	170.7
1997	3,016	$4,487	$5,163	171.9
1998	2,471	$4,011	$4,626	171.5
1999	3,013	$4,685	$5,347	173.3
2000	2,564	$5,477	$6,144	176.3
2001	2,742	$4,585	$5,084	178.4
2002	2,390	$4,494	$4,931	180.3
2003	2,693	$5,192	$5,566	184.5
2004	3,354	$6,767	$7,022	190.6
2005	2,517	$5,028	$5,028	197.8
Average	**2,760**	**$4,577**	**$5,853**	
Std. Dev.	**368**	**$734**	**$1,097**	

Figure 39. Main Hawaiian Islands troll tuna landings, 1985-2005.

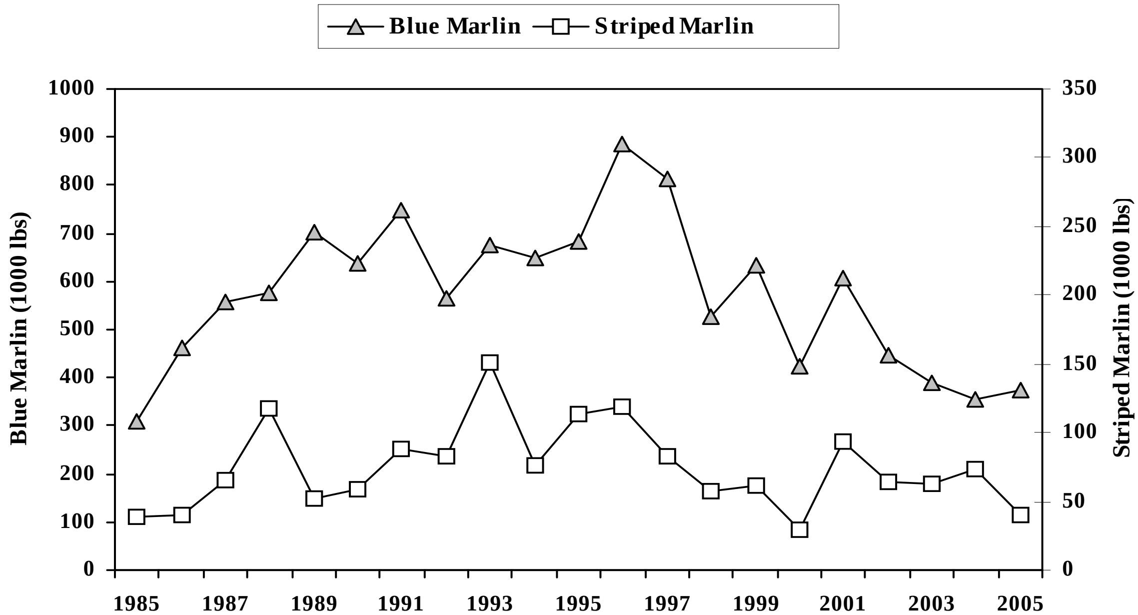


Interpretation: The MHI troll tuna landings in 2005 were 1.1 million pounds, close to the long-term average. The largest component of tuna landings by the MHI troll fishery was yellowfin tuna. These were relatively stable for the past three years but 11% below the long-term average. Skipjack tuna was the second largest component of the MHI troll landings. Skipjack tuna landings in 2005 were 40% below the long-term average, and the lowest throughout 1985-2005. Increasing catches of bigeye tuna and small catches of albacore were also landed by this fishery. The greatest bigeye tuna landings by this fishery were in 2004 and 2005.

	MHI Troll Tuna Landings (1000 Pounds)					
Year	Yellowfin Tuna	Skipjack Tuna	Bigeye Tuna	Albacore	Other Tunas	Total Tuna
1985	844	207	6	1	4	1,062
1986	1,308	241	10	0	8	1,567
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	878
2001	545	215	23	13	5	801
2002	499	203	86	9	6	804
2003	727	237	80	10	27	1,081
2004	681	245	328	7	43	1,304
2005	708	176	187	15	19	1,105
Average	**794**	**292**	**40**	**10**	**13**	**1,149**
Std. Dev.	**297**	**81**	**77**	**18**	**9**	**290**

Source and Calculations: The tuna catch statistics for the MHI troll fishery were derived from HDAR Commercial Fish Catch and Marine Dealer data. The MHI troll fishery tuna catch was calculated by totaling tuna catch by species and includes bluefin tuna, kawakawa and unclassified tunas in the other tunas category.

Figure 40. Main Hawaiian Islands troll billfish landings, 1985-2005.

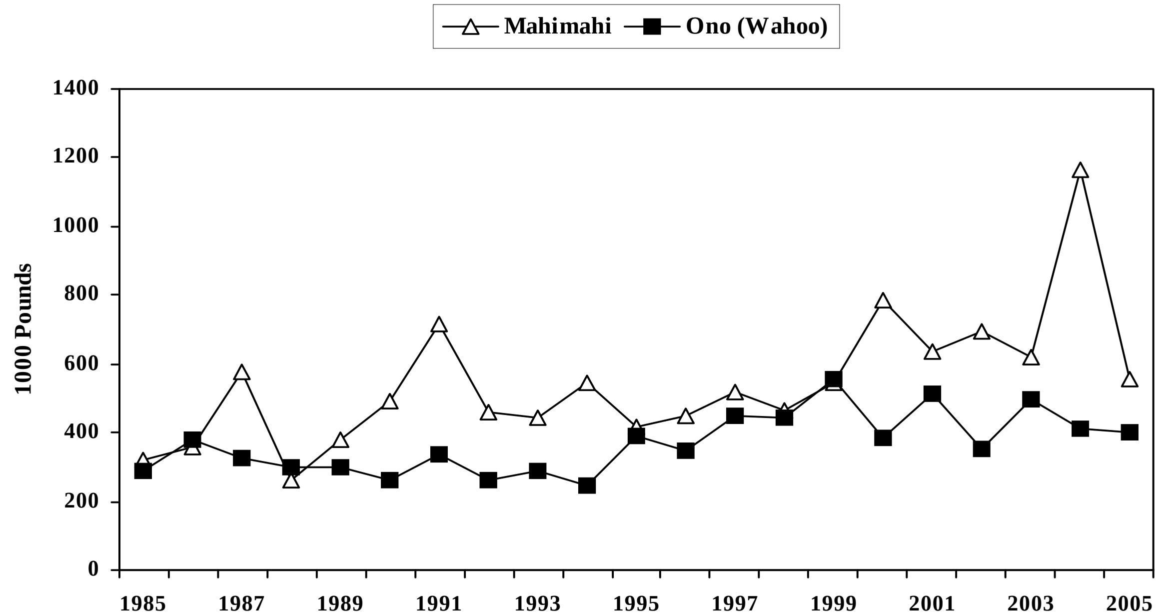


Interpretation: Billfish landings by the MHI troll fishery in 2005 were 449,000 pounds, 35% below the long-term average. Landings of billfish by the MHI troll fishery consisted primarily of blue marlin. Blue marlin landings increased from about 300 thousand pounds in the mid 1980s to approximately 900 thousand pounds in 1996 and gradually declined thereafter. In contrast to the longline fishery, the striped marlin landings in this fishery were quite low. The MHI troll fishery also had small landings of other billfish, e.g., including spearfish and sailfish.

	MHI Troll Billfish Landings (1000 Pounds)				
Year	Blue Marlin	Striped Marlin	Other Billfish	Swordfish	Total Billfish
1985	311	39	24	1	375
1986	463	40	29	0	533
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	6	507
2001	608	93	75	6	782
2002	446	65	22	3	536
2003	389	63	37	2	491
2004	355	74	46	0	475
2005	374	41	34	1	449
Average	**573**	**75**	**43**	**2**	**692**
Std. Dev.	**152**	**30**	**13**	**2**	**176**

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

Figure 41. Main Hawaiian Islands troll landings of other pelagic PMUS, 1985-2005.

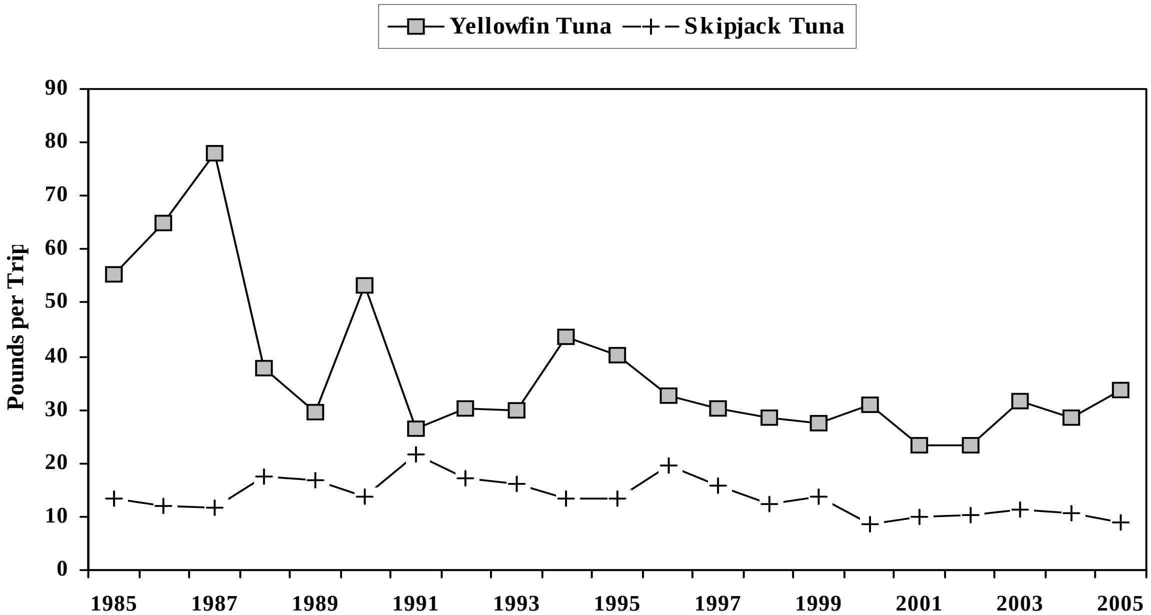


Interpretation: Landings of "other pelagic" species by the MHI troll fishery in 2005 was 963,000 pounds, 5% above the long-term average. Mahimahi and ono comprised most of these landings. Mahimahi landings have exceeded the long-term average since 1999; ono landings were above its long-term average in eight of the last nine years.

Source and Calculations: The other pelagic catch statistics for the MHI troll fishery were derived from HDAR Commercial Fish Catch and Dealer data. Other pelagic catch by the MHI troll fishery was calculated by totaling other pelagic catch 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 Pelagics Landings (1000 Pounds)			
Year	**Mahimahi**	**Ono (Wahoo)**	**Misc Pelagics**	**Total Other Pelagic**
1985	323	287	2	612
1986	358	381	3	742
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	1,179
2001	637	515	6	1,159
2002	696	350	4	1,050
2003	620	498	3	1,121
2004	1,163	409	3	1,575
2005	558	401	4	963
Average	**544**	**368**	**7**	**919**
Std. Dev.	**189**	**86**	**4**	**229**

Figure 42. Main Hawaiian Islands troll tuna CPUE (landings per trip), 1985-2005.



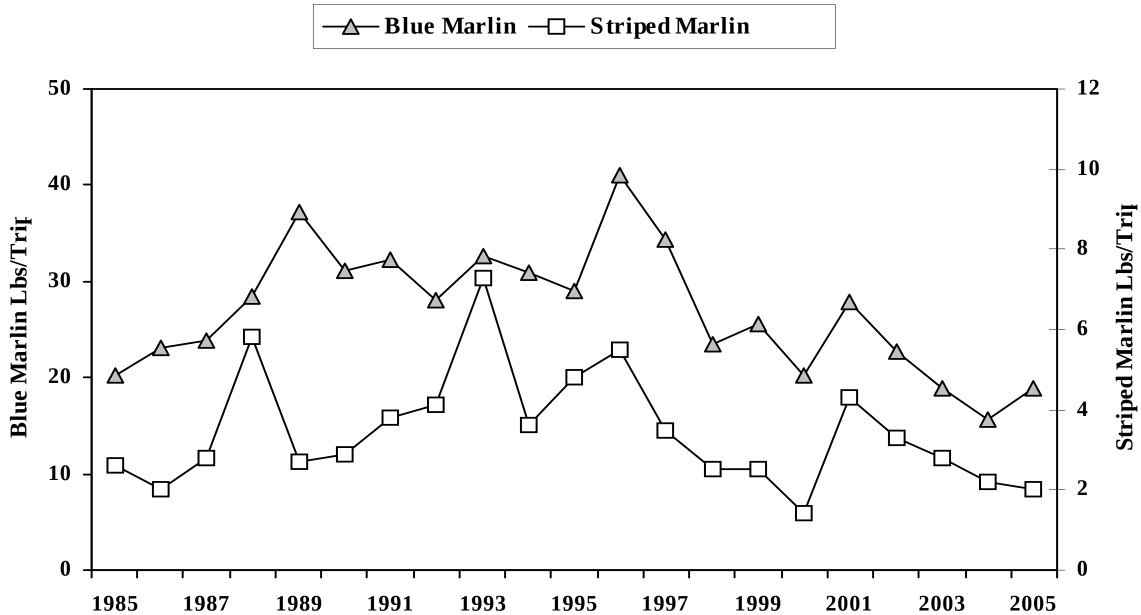
Interpretation: MHI troll yellowfin tuna CPUE was consistently higher than skipjack tuna CPUE. Yellowfin tuna CPUE has remained below the long-term average for the past ten years. Yellowfin tuna peaked near 80 pounds in 1987 and trended downward to a low of 23.2 pounds per trip in 2002. Skipjack tuna CPUE was close to a record low in 2005 and below its long-term average for the past six years.

Source and Calculations: The MHI troll tuna CPUE was defined as landings per successful day fished and complied from HDAR Commercial Fish Catch data. MHI troll CPUE was measured as pounds per trip. MHI troll catch and effort were calculated using the specific gear and area codes described in the introduction. Since there was no way to determine if a zero Commercial Fish Catch report represented no fishing effort at all or no catch (unsuccessful fishing operation(s)), the CPUE calculation did not include Fish Catch reports with zero catch. Yellowfin tuna and skipjack tuna catches were divided by the number of MHI troll trips.

MHI Troll Tuna CPUE (Pounds per trip)

Year	Yellowfin Tuna	Skipjack Tuna
1985	55.2	13.5
1986	64.9	12.0
1987	78.1	11.8
1988	37.8	17.4
1989	29.6	16.8
1990	53.2	13.6
1991	26.5	21.7
1992	30.1	17.3
1993	29.8	16.1
1994	43.7	13.5
1995	40.3	13.5
1996	32.7	19.6
1997	30.1	15.9
1998	28.4	12.4
1999	27.6	13.9
2000	31.0	8.7
2001	23.4	9.9
2002	23.2	10.4
2003	31.7	11.5
2004	28.4	10.8
2005	33.7	8.9
Average	**37.1**	**13.8**
Std. Dev.	**14.0**	**3.4**

Figure 43. Main Hawaiian Island troll marlin CPUE (landings per trip), 1985-2005.



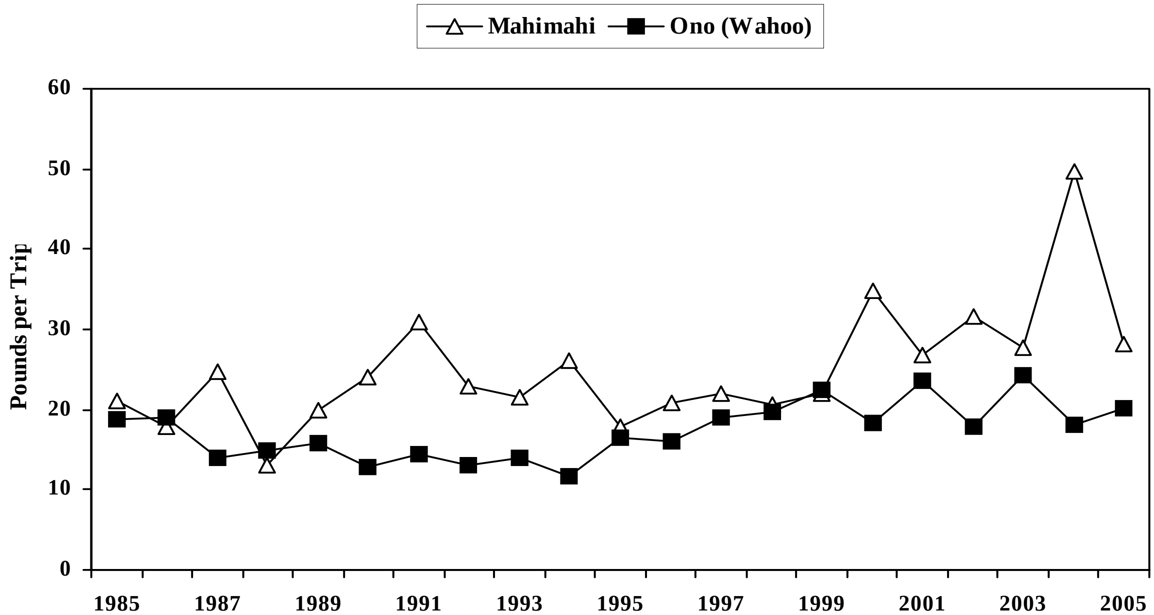
Interpretation: CPUE for blue marlin was higher compared to the CPUE for striped marlin. Blue marlin and striped marlin CPUE were both below their long-term average for the past four years. The CPUE for both species appeared to have been on a downward trend from the mid 1990s.

Source and Calculations: The MHI troll tuna CPUE was defined as landings per successful day fished and complied from HDAR Commercial Fish Catch data. MHI troll CPUE was measured as pounds per trip. MHI troll catch and effort were calculated using the specific gear and area codes described in the introduction. Since there was no way to determine if a zero Commercial Fish Catch report represented no fishing effort at all or no catch (unsuccessful fishing operation(s)), the CPUE calculation did not include Fish Catch reports with zero catch. Blue marlin and striped marlin catches were divided by the number of MHI troll trips.

MHI Troll Marlin CPUE (Pounds per Trip)

Year	Blue Marlin	Striped Marlin
1985	20.3	2.6
1986	23.0	2.0
1987	23.8	2.8
1988	28.5	5.8
1989	37.2	2.7
1990	31.2	2.9
1991	32.3	3.8
1992	28.1	4.1
1993	32.7	7.3
1994	31.0	3.6
1995	29.1	4.8
1996	41.0	5.5
1997	34.4	3.5
1998	23.5	2.5
1999	25.5	2.5
2000	20.2	1.4
2001	27.9	4.3
2002	22.8	3.3
2003	18.8	2.8
2004	15.7	2.2
2005	18.8	2.0
Average	**26.9**	**3.5**
Std. Dev.	**6.4**	**1.4**

Figure 44. Main Hawaiian Island troll mahimahi and ono CPUE (landings per trip), 1985-2005.



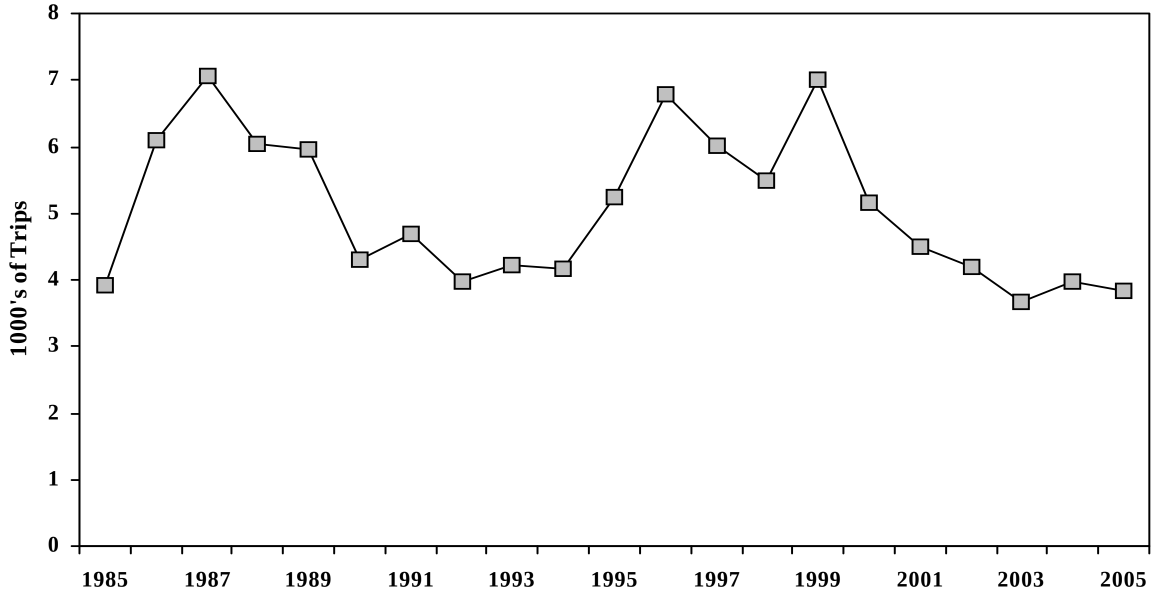
Interpretation: Mahimahi CPUE for the MHI troll fishery was slightly higher and more variable than that for ono. CPUE for both mahimahi and ono in 2005 exceeded their long-term average by 12% and 16%, respectively. CPUE for both species have been on an upward trend since the mid-1990s.

Source and Calculations: The MHI troll tuna CPUE was defined as landings per successful day fished and complied from HDAR Commercial Fish Catch data. MHI troll CPUE was measured as pounds per trip. MHI troll catch and effort were calculated using the specific gear and area codes described in the introduction. Since there was no way to determine if a zero Commercial Fish Catch report represented no fishing effort at all or no catch (unsuccessful fishing operation(s)), the CPUE calculation did not include Fish Catch reports with zero catch. Mahimahi and ono catches were divided by the number of MHI troll trips.

MHI Troll Mahimahi and Ono Landings per Trip (Pounds)

Year	Mahimahi	Ono (Wahoo)
1985	21.1	18.8
1986	17.8	18.9
1987	24.8	13.9
1988	13.1	14.8
1989	20.0	15.7
1990	24.0	12.8
1991	31.0	14.5
1992	22.9	13.0
1993	21.5	13.9
1994	26.1	11.7
1995	17.8	16.5
1996	20.9	16.1
1997	21.9	19.1
1998	20.7	19.7
1999	21.9	22.4
2000	34.9	18.4
2001	26.7	23.6
2002	31.6	17.9
2003	27.6	24.2
2004	49.7	18.0
2005	28.1	20.1
Average	**25.0**	**17.3**
Std. Dev.	**7.4**	**3.4**

Figure 45. Number of Main Hawaiian Islands handline trips, 1985-2005.

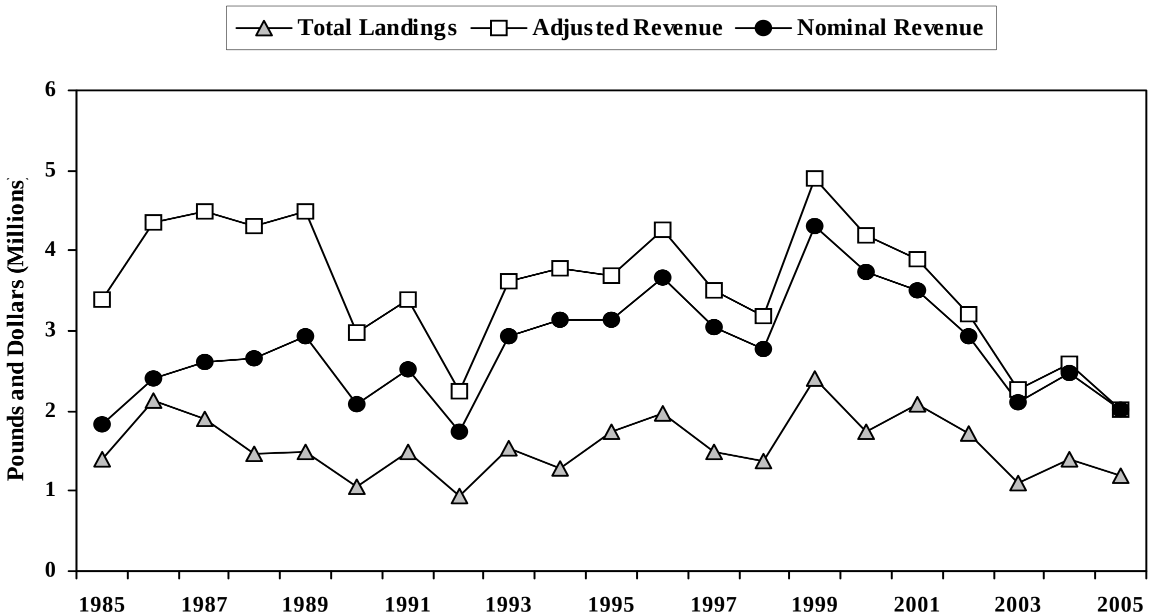


Interpretation: There were 3,837 MHI handline trips in 2005, 24% below the long-term average. MHI handline trip activity appeared to have two periods of high effort (1986-1989 and 1995-1999) and more recently, a downward thereafter.

Source and Calculations: The number of MHI handline trips was counted from HDAR Commercial Fish Catch data. A MHI troll trip was defined as a unique HDAR Commercial Marine License number returning on a particular day using the gear and fishing areas defined for the MHI handline fishery at the beginning of this module. There was no way to distinguish a zero Commercial Fish Catch report that represented no fishing effort from one that represented no catch (unsuccessful fishing operation(s)), the trip count did not include Fish Catch reports with zero catch.

Year	MHI Handline Trips
1985	3,929
1986	6,087
1987	7,069
1988	6,032
1989	5,947
1990	4,300
1991	4,688
1992	3,981
1993	4,209
1994	4,157
1995	5,230
1996	6,801
1997	6,010
1998	5,481
1999	7,004
2000	5,149
2001	4,496
2002	4,180
2003	3,660
2004	3,982
2005	3,837
Average	**5,059**
Std. Dev.	**1,095**

Figure 46. Main Hawaiian Island handline landings and revenue, 1985-2005.

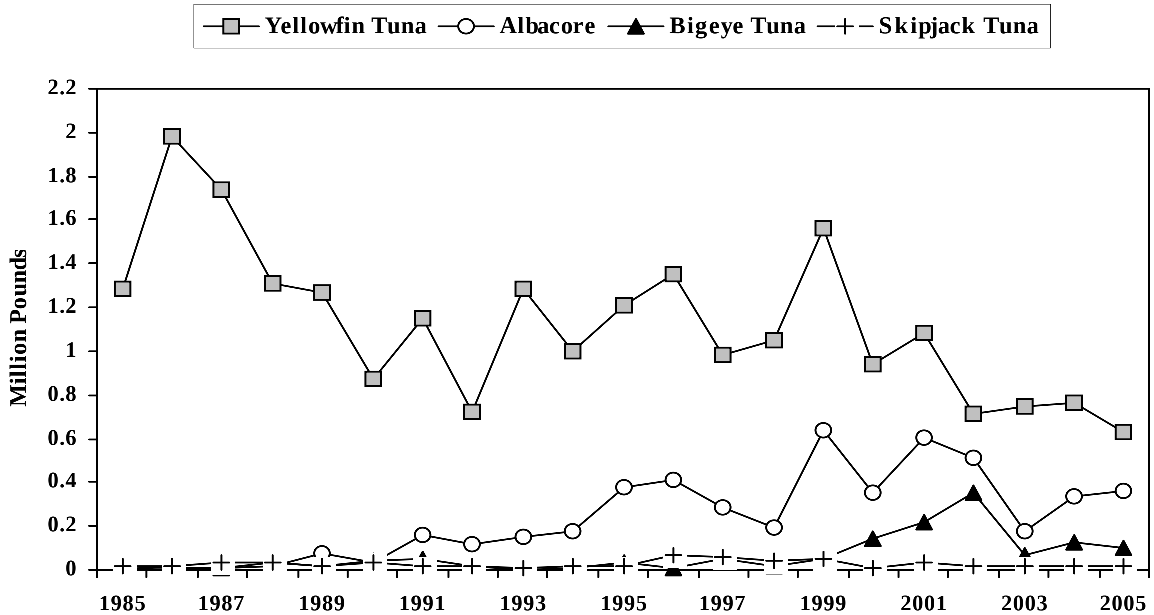


Interpretation: Total landings by the MHI handline fishery in 2005 were 1.2 million pounds, worth an estimated $2.0 million. Total landings and revenue by this fishery was below the long-term values by 24% and 43%, respectively. The recent pattern for MHI handline fishery landings and revenue was similar to the trip activity, which consisted of a decreasing trend from 1999.

Source and Calculations: Total catch and nominal revenue for the MHI handline fishery were derived from HDAR Commercial Fish Catch and Marine Dealer data. The total catch and nominal revenue values were obtained by adding the catch and revenue values for all species caught by the MHI handline fishery. The adjusted revenue is calculated by dividing the nominal revenue by the Honolulu CPI and then multiplying the result by the current Honolulu CPI.

Year	Total Landings (1000 lbs)	Nominal Revenue ($1000)	Adjusted Revenue ($1000)	Honolulu CPI
1985	1,391	$1,836	$3,400	106.8
1986	2,136	$2,399	$4,337	109.4
1987	1,914	$2,606	$4,486	114.9
1988	1,471	$2,654	$4,314	121.7
1989	1,487	$2,922	$4,491	128.7
1990	1,060	$2,084	$2,985	138.1
1991	1,477	$2,532	$3,384	148.0
1992	946	$1,754	$2,237	155.1
1993	1,532	$2,924	$3,613	160.1
1994	1,287	$3,135	$3,770	164.5
1995	1,733	$3,139	$3,694	168.1
1996	1,962	$3,669	$4,251	170.7
1997	1,479	$3,044	$3,503	171.9
1998	1,368	$2,759	$3,182	171.5
1999	2,414	$4,301	$4,909	173.3
2000	1,732	$3,727	$4,181	176.3
2001	2,077	$3,513	$3,895	178.4
2002	1,707	$2,916	$3,199	180.3
2003	1,097	$2,106	$2,258	184.5
2004	1,387	$2,482	$2,576	190.6
2005	1,193	$2,020	$2,020	197.8
Average	**1,564**	**$2,787**	**$3,556**	
Std. Dev.	**370**	**$645**	**$793**	

Figure 47. Main Hawaiian Island handline tuna landings, 1985-2005.

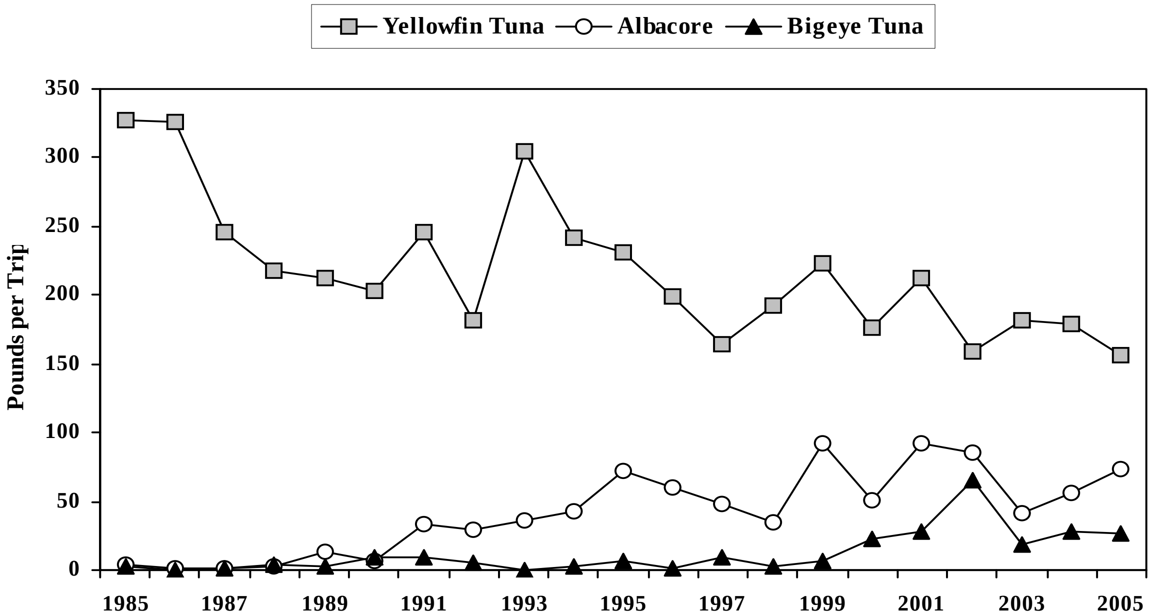


Year	Yellowfin Tuna	Albacore	Bigeye Tuna	Skipjack Tuna	Other Tunas	Total Tuna
	MHI Handline Tuna Landings (1000 lbs)					
1985	1,287	15	11	16	1	1,330
1986	1,984	11	2	24	1	2,023
1987	1,734	12	6	25	5	1,782
1988	1,310	18	28	29	9	1,395
1989	1,266	78	19	20	11	1,393
1990	876	31	41	26	7	981
1991	1,154	157	45	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	350	141	14	3	1,444
2001	1,082	602	222	30	4	1,940
2002	711	511	354	20	3	1,598
2003	746	176	74	16	4	1,016
2004	762	339	125	23	18	1,266
2005	632	360	100	18	6	1,116
Average	**1,126**	**239**	**65**	**27**	**5**	**1,462**
Std. Dev.	**342**	**191**	**84**	**14**	**4**	**352**

Interpretation: The MHI handline tuna landings in 2005 were 1.1 million pounds, 24% 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 44% below the long-term average, whereas albacore and bigeye tuna exceeded their long-term averages by 51% and 54%, respectively.

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

Figure 48. Main Hawaiian Island handline tuna CPUE (landings per trip), 1985-2005.

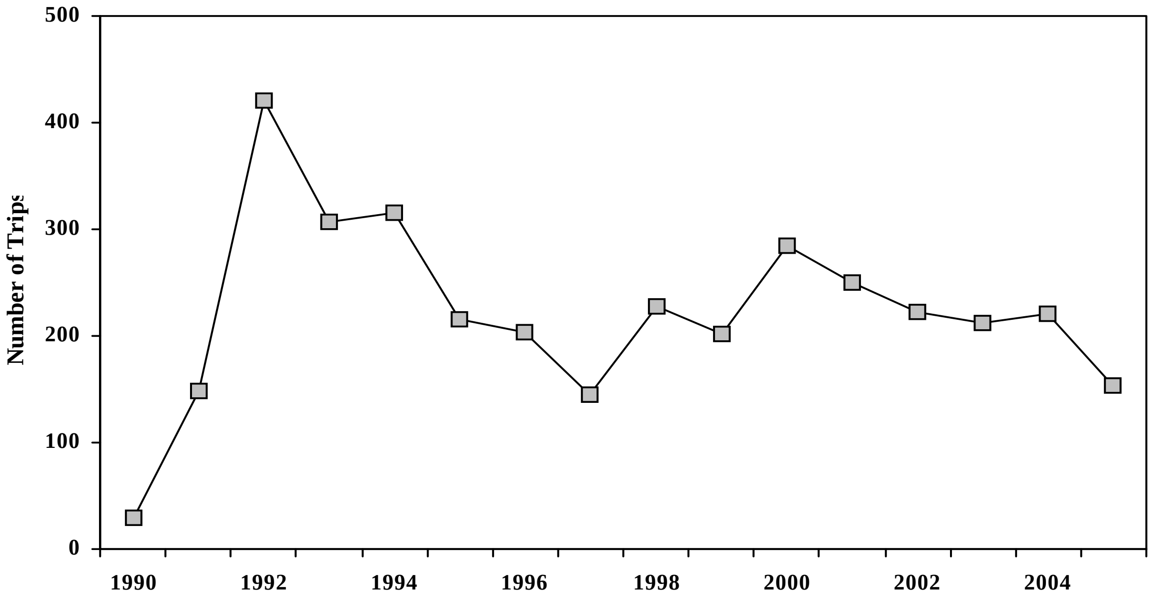


Interpretation: MHI handline yellowfin tuna CPUE was 154 pounds per trip in 2005, more than double that for albacore and six times that of bigeye tuna. Nonetheless, the yellowfin tuna MHI handline CPUE was the lowest throughout 1985-2005. In contrast, albacore and bigeye tuna CPUE were fourth highest in the times series

Source and Calculations: The MHI handline tuna CPUE was defined as landings per successful day fished and complied from HDAR Commercial Fish Catch data. MHI handline CPUE was measured as pounds per trip. MHI handline catch and effort were calculated using the specific gear and area codes described in the introduction. Since there was no way to determine if a zero Commercial Fish Catch report represented no fishing effort at all or no catch (unsuccessful fishing operation(s)), the CPUE calculation did not include Fish Catch reports with zero catch. Tuna landings for each species were divided by the number of MHI handline trips.

	MHI Handline Landings per Trip (Pounds)			
Year	**Yellowfin Tuna**	**Albacore**	**Bigeye Tuna**	**All Species**
1985	327.6	3.8	2.8	354.0
1986	326.0	1.9	0.3	350.9
1987	245.3	1.7	0.8	270.8
1988	217.2	3.1	4.6	243.8
1989	212.8	13.0	3.2	250.1
1990	203.7	7.2	9.5	246.5
1991	246.1	33.4	9.6	315.1
1992	181.4	29.1	4.8	237.6
1993	304.8	36.6	0.5	364.0
1994	241.3	42.3	2.4	309.6
1995	230.7	72.7	6.2	331.4
1996	198.8	60.1	1.6	288.5
1997	164.1	47.8	8.7	246.1
1998	191.9	34.8	2.7	249.6
1999	222.6	91.7	6.6	344.6
2000	176.5	50.5	23.1	336.4
2001	211.8	92.8	28.7	462.0
2002	158.8	85.4	66.1	408.3
2003	181.4	41.1	19.2	299.9
2004	179.6	56.3	27.6	348.4
2005	156.0	73.4	26.1	310.9
Average	**218.0**	**41.8**	**12.2**	**312.8**
Std. Dev.	**49.2**	**29.3**	**15.2**	**57.8**

Figure 49. Number of offshore tuna handline trips, 1990-2005.

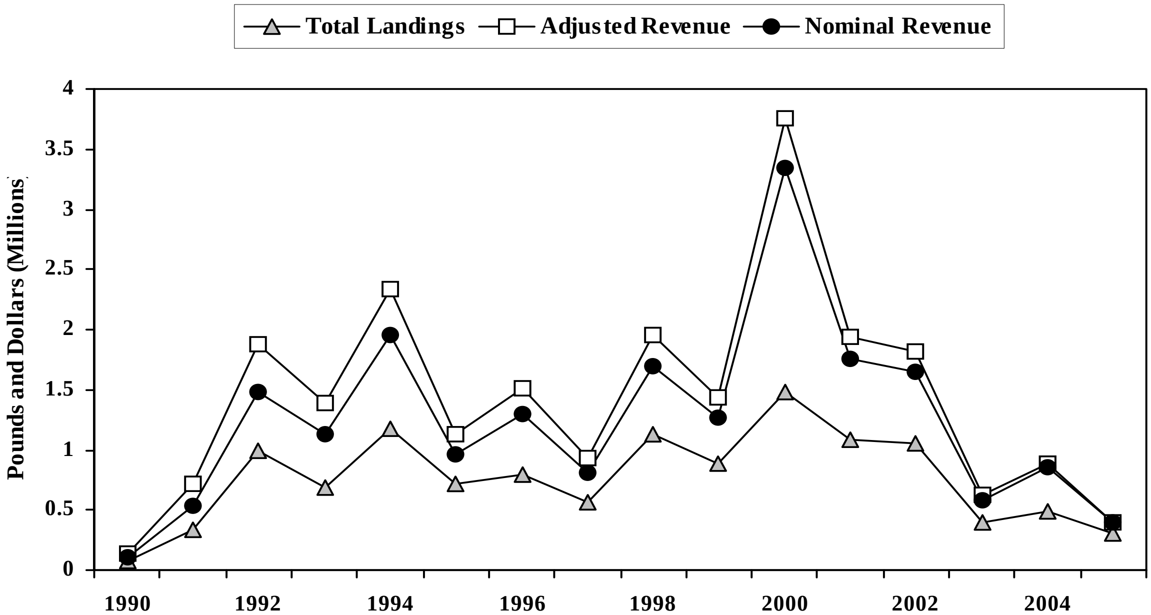


<u>Interpretation:</u> The number of offshore handline trips was 154 in 2005, 30% below the long-term average. Prior to 2005, the offshore handline trip activity had remained approximately stable from 1998 through 2004.

<u>Source and Calculations:</u> The number of offshore handline trips was counted from HDAR Commercial Fish Catch data. An offshore troll trip was defined as a unique HDAR Commercial Marine License number returning on a particular day using the gear and fishing areas defined for the offshore handline fishery at the beginning of this module. There was no way to distinguish a zero Commercial Fish Catch report that represented no fishing effort from one that represented no catch (unsuccessful fishing operation(s)), the trip count did not include Fish Catch reports with zero catch.

Year	Offshore Handline Trips
1990	29
1991	148
1992	420
1993	307
1994	316
1995	216
1996	204
1997	145
1998	228
1999	202
2000	284
2001	250
2002	223
2003	212
2004	220
2005	154
Average	**222**
Std. Dev.	**84**

Figure 50. Offshore tuna handline landings and revenue, 1990-2005.

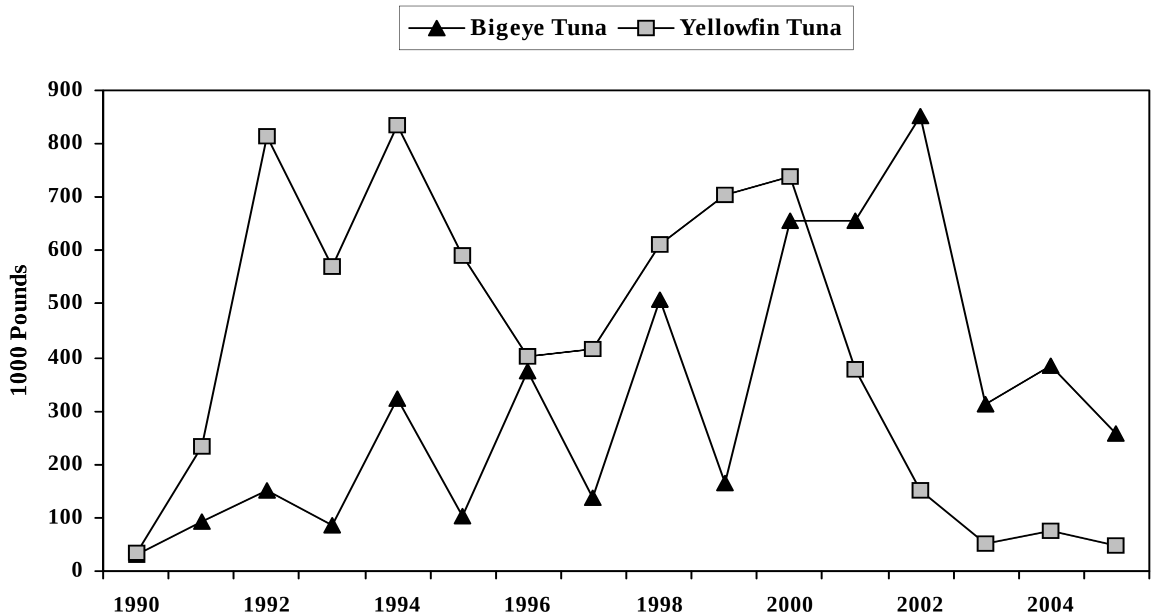


Interpretation: Total landings and revenue by the offshore handline fishery were 313,000 pounds worth an estimated $387,000 in 2005. Total landings and revenue by this fishery were below the long-term values by 59% and 73%, respectively in 2005. The recent trend for offshore handline fishery landings and revenue was one of a steep decline since 2000.

Source and Calculations: Total catch and nominal revenue for the offshore handline fishery were derived from HDAR Commercial Fish Catch and Dealer data. The total catch and nominal revenue values were obtained by adding the catch and revenue values for all species caught by the offshore handline 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 Honolulu CPI.

Year	Total Landings (1000 lbs)	Nominal Revenue ($1000)	Adjusted Revenue ($1000)	Honolulu CPI
1990	66	$97	$139	138.1
1991	331	$533	$712	148.0
1992	987	$1,477	$1,884	155.1
1993	679	$1,125	$1,390	160.1
1994	1,175	$1,947	$2,341	164.5
1995	714	$964	$1,134	168.1
1996	793	$1,302	$1,509	170.7
1997	563	$811	$933	171.9
1998	1,134	$1,696	$1,956	171.5
1999	888	$1,256	$1,434	173.3
2000	1,482	$3,355	$3,764	176.3
2001	1,087	$1,748	$1,938	178.4
2002	1,059	$1,647	$1,807	180.3
2003	400	$579	$621	184.5
2004	485	$860	$892	190.6
2005	313	$387	$387	197.8
Average	**760**	**$1,237**	**$1,428**	
Std. Dev.	**384**	**$777**	**$884**	

Figure 51. Offshore tuna handline landings, 1990-2005.



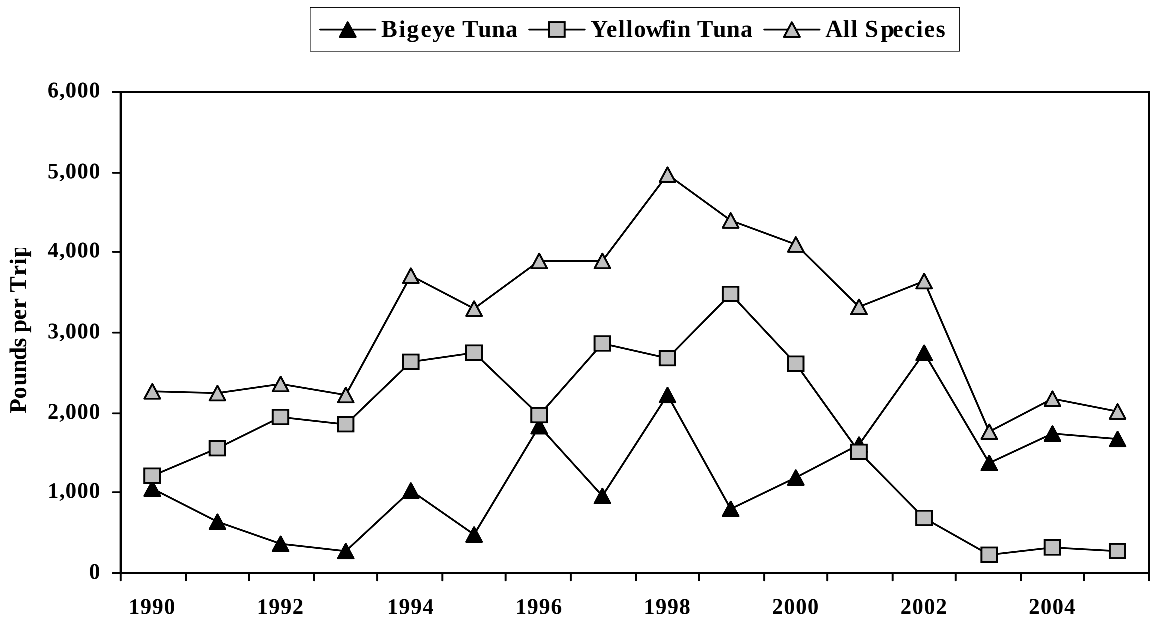
Interpretation: The offshore handline landings in 2005 were 330,000 pounds, 59% below the long-term average. The largest component of tuna landings by the offshore fishery was bigeye tuna followed by yellowfin tuna. Offshore handline landings of bigeye tuna and yellowfin tuna were low for the past three and four years, respectively. The offshore handline landings of mahimahi were relatively small.

Year	Offshore Handline Landings (1000 Pounds) Bigeye Tuna	Yellowfin Tuna	Mahimahi	All Species
1990	31	35	0	66
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	656	739	54	1,482
2001	655	379	35	1,087
2002	851	151	26	1,059
2003	314	53	14	400
2004	385	75	14	485
2005	258	47	5	313
Average	**318**	**416**	**18**	**760**
Std. Dev.	**234**	**279**	**13**	**372**

Most of the tunas caught by the offshore handline fishery are smaller than those taken by the MHI handline fishery. The yellowfin tuna catch reported in the HDAR Commercial Fish Catch data may actually be bigeye tuna; knowledgeable observers have reported that the small tunas caught by this fishery (up to 70%) are predominantly bigeye tuna (David Itano, pers. comm.). As standard practice, tuna catch reported by fishermen as "ahi" are coded by the HDAR Fisheries Statistics Unit as yellowfin tuna. Therefore, the total tuna catch by the offshore handline fishery is almost certainly more accurate than the catch for individual species. HDAR is making an effort to help educate fishermen and fish dealers to identify small tunas correctly.

Source and Calculations: The catch statistics for the offshore tuna handline fishery were derived from HDAR Commercial Fish Catch and Dealer data. The offshore tuna handline fishery catch was calculated by totaling catch by species.

Figure 52. Offshore tuna handline CPUE (landings per trip), 1990-2005.



Interpretation: Offshore handline CPUE was 2,014 pounds in 2005, 36% less than the long-term average. Bigeye tuna CPUE in 2005 was 34% higher than the long-term average. In contrast, yellowfin tuna and mahimahi CPUE down this year by 84% and 59%, respectively. In general, the trend for bigeye tuna CPUE was that of an increase while yellowfin tuna CPUE was that of 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.

	Offshore Handline Landings per Trip (Pounds)			
Year	Bigeye Tuna	Yellowfin Tuna	Mahimahi	All Species
1990	1,052	1,217	2	2,271
1991	635	1,568	31	2,234
1992	359	1,942	49	2,349
1993	277	1,860	76	2,213
1994	1,024	2,638	56	3,718
1995	474	2,738	94	3,306
1996	1,838	1,966	82	3,886
1997	954	2,865	65	3,884
1998	2,228	2,689	57	4,974
1999	812	3,480	101	4,397
2000	1,200	2,601	173	4,088
2001	1,610	1,514	131	3,327
2002	2,741	676	100	3,650
2003	1,380	233	62	1,761
2004	1,750	330	62	2,185
2005	1,673	286	30	2,014
Average	**1,250**	**1,788**	**73**	**3,141**
Std. Dev.	**671**	**989**	**40**	**960**

Source and Calculations: The offshore handline tuna CPUE was defined as landings per successful day fished and complied from HDAR Commercial Fish Catch data. Offshore handline CPUE was measured as pounds per trip. Offshore handline catch and effort were calculated using the specific gear and area codes described in the introduction. Since there was no way to determine if a zero Commercial Fish Catch report represented no fishing effort at all or no catch (unsuccessful fishing operation(s)), the CPUE calculation did not include Fish Catch reports with zero catch. Total landings by the offshore handline fishery were divided by the number of offshore tuna handline trips.

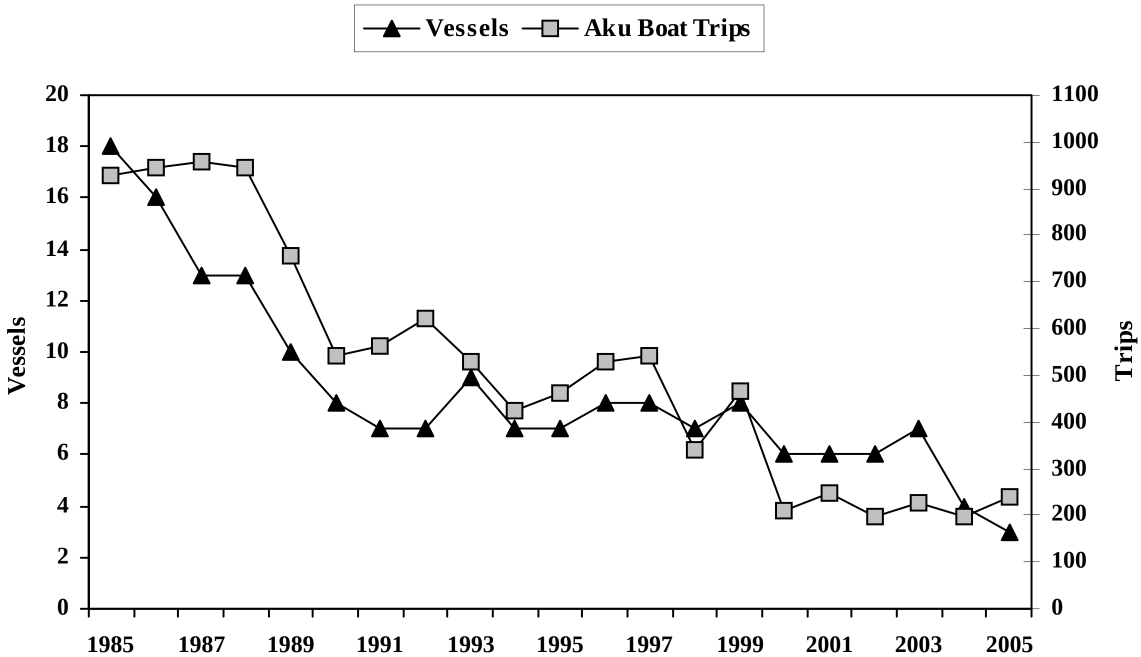
Table 8. Average weight by species for the troll and handline landings, 1987-2005.

	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	83	18	25
1999	48	24	7	31	210	55	88	18	27
2000	48	28	11	48	238	61	178	15	25
2001	42	20	11	39	181	50	158	15	24
2002	38	30	10	41	224	42	139	16	26
2003	46	20	6	30	185	49	146	16	22
2004	43	36	6	27	192	59	143	18	23
2005	48	30	5	23	139	73	121	15	23
Average	**43.1**	**23.5**	**7.4**	**32.6**	**199.2**	**61.7**	**115.2**	**15.7**	**23.6**
Std. Dev.	**9.9**	**5.7**	**2.1**	**6.8**	**25.4**	**7.9**	**27.7**	**1.9**	**1.5**

Interpretation: Except for blue marlin, the average weights for fish landed by troll and handline gear in 2005 were with two standard deviations of the long-term average. Mean weight for blue marlin, in contrast, was 30% less than the long-term average.

Source and Calculations: The average weights were calculated from HDAR Commercial Fish Catch data. Total weight landed was divided by the total number landed. Landings by the troll and handline fishery were usually landed whole. However, if the catch that was processed, i.e., headed and gutted, gilled and gutted, a raising factor was applied to approximate whole weight of the fish.

Figure 53. Hawaii aku boat (pole and line) vessel and trip activity, 1985-2005.

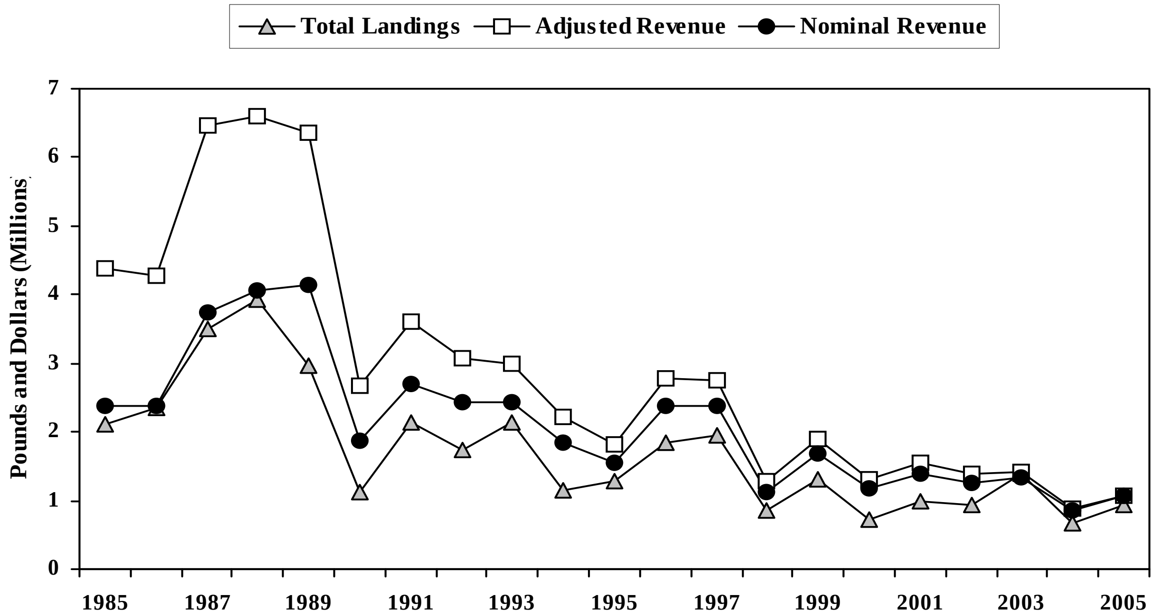


Interpretation: The vessel and trip activity of the aku boat fishery has been in decline over the 20-year period with only three aku boat vessels fishing in 2005. The steep decline that occurred in the 1980s was primarily attributable to the closure of the tuna cannery. Attrition of vessels, many which were built in the 1940s, and poor skipjack tuna landings also contributed to the long-term decline in this fishery. The aku boat fishery made 238 trips in 2005, 54% below the long-term average.

Source and Calculations: The number of aku boat vessels and trips were counted from HDAR Commercial Aku Boat Fish Catch 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 define a aku boat trip. The calculation for aku boat trips included zero landing trips.

Year	Vessels	Aku Boat Trips
1985	18	927
1986	16	943
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	210
2001	6	248
2002	6	197
2003	7	225
2004	4	199
2005	3	238
Average	**8.5**	**517**
Std. Dev.	**3.6**	**256**

Figure 54. Hawaii aku boat (pole and line) landings and revenue, 1985-2005.

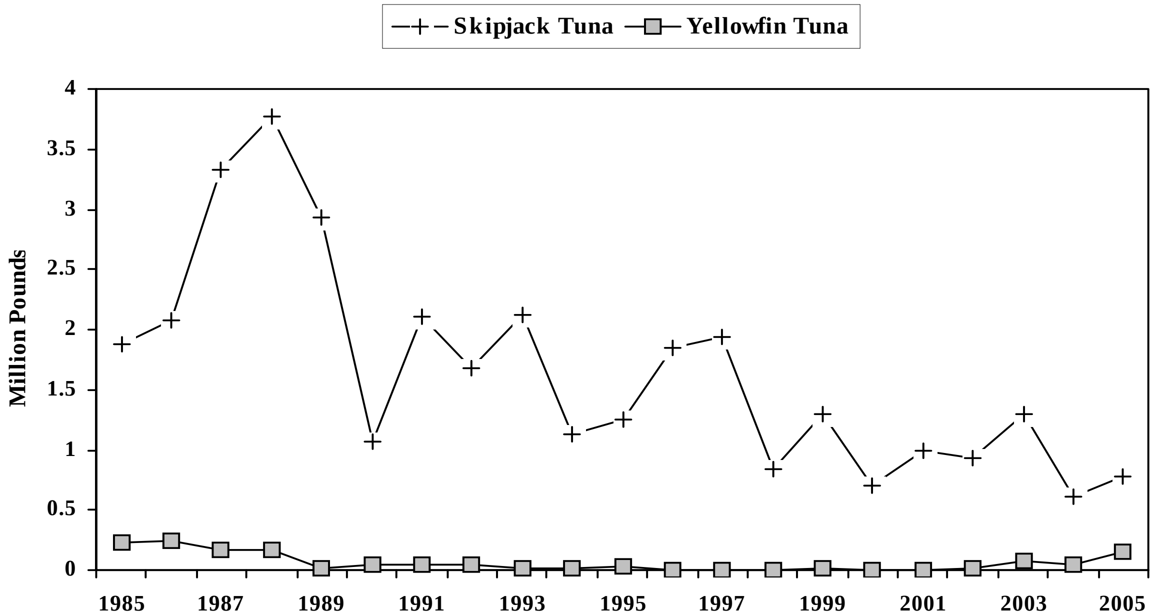


Interpretation: Aku boat landings were 931,000 pounds, worth an estimated $1.1 million in 2005, down 46% and 63% from their respective long-term averages. The trends for total landings and revenue were similar to the number of aku boat vessels and trip activity. Aku boat landings and revenue peaked in 1988, then decreased sharply in 1990, and have continued to decline slowly since.

Source and Calculations: Total catch and nominal revenue for the aku boat fishery were derived from HDAR Commercial Marine Dealer data. The total catch and nominal revenue values were obtained by adding the catch 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)	Nominal Revenue ($1000)	Adjusted Revenue ($1000)	Honolulu CPI
1985	2,114	$2,367	$4,384	106.8
1986	2,351	$2,366	$4,278	109.4
1987	3,503	$3,751	$6,457	114.9
1988	3,940	$4,063	$6,604	121.7
1989	2,962	$4,146	$6,372	128.7
1990	1,116	$1,873	$2,683	138.1
1991	2,146	$2,706	$3,617	148.0
1992	1,735	$2,415	$3,080	155.1
1993	2,137	$2,415	$2,984	160.1
1994	1,159	$1,835	$2,206	164.5
1995	1,291	$1,550	$1,824	168.1
1996	1,844	$2,389	$2,768	170.7
1997	1,947	$2,393	$2,754	171.9
1998	845	$1,106	$1,276	171.5
1999	1,312	$1,674	$1,911	173.3
2000	708	$1,167	$1,310	176.3
2001	994	$1,399	$1,551	178.4
2002	932	$1,256	$1,378	180.3
2003	1,375	$1,327	$1,423	184.5
2004	656	$861	$894	190.6
2005	931	$1,074	$1,074	197.8
Average	**1,714**	**$2,102**	**$2,896**	
Std. Dev.	**886**	**$938**	**$1,754**	

Figure 55. Hawaii aku boat (pole and line) fishery landings by species, 1985-2005.

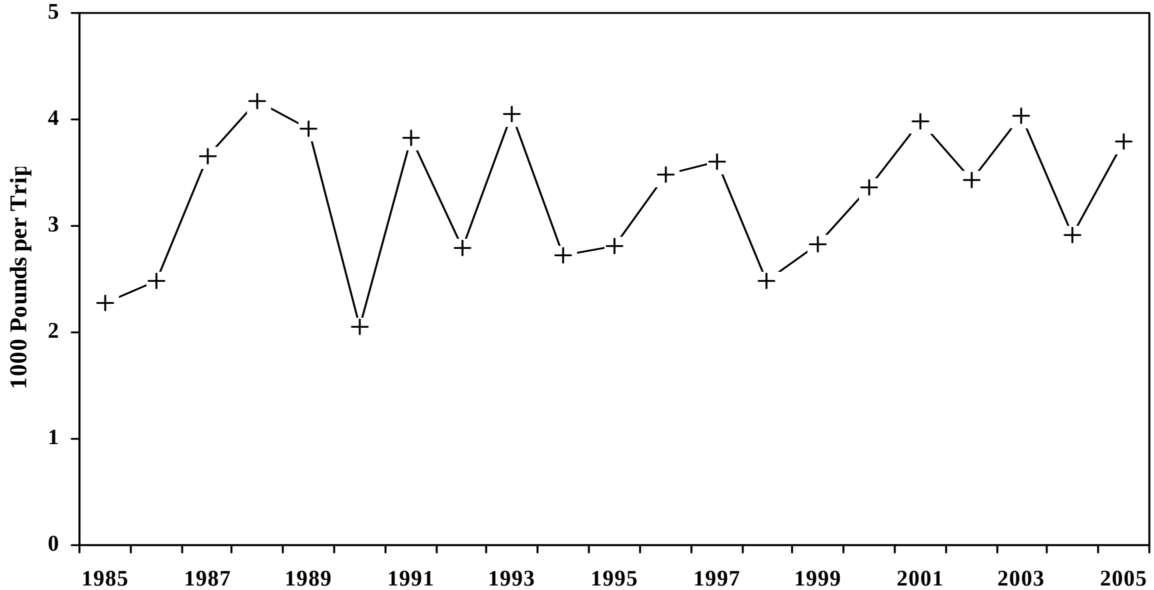


<u>Interpretation:</u> Total aku boat landings in 2005 were 931,000 pounds, 46% below the long-term average. The aku boat fishery lands consisted primarily of skipjack tuna. There were small landings of yellowfin tuna also. Skipjack tuna landings varied annually with an overall downward trend. Part of 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.

<u>Source and Calculations:</u> The tuna catch statistics for the aku boat fishery were derived from HDAR Commercial Aku Boat Fish Catch and Marine Dealer data. The aku boat catch was calculated by totaling catch by species.

	Aku Boat Landings (1000 Pounds)				
Year	**Skipjack Tuna**	**Yellowfin Tuna**	**Other Tunas**	**Mahimahi**	**Total**
1985	1,881	227	6.0	0.0	2,114
1986	2,075	251	17.0	7.0	2,351
1987	3,328	173	0.0	2.0	3,503
1988	3,768	168	0.0	4.0	3,940
1989	2,938	21	2.0	1.0	2,962
1990	1,073	39	4.0	0.0	1,116
1991	2,102	44	1.0	0.0	2,146
1992	1,682	36	3.6	13.6	1,735
1993	2,121	10	3.0	3.0	2,137
1994	1,133	19	6.0	0.0	1,159
1995	1,256	34	0.0	0.0	1,291
1996	1,842	2	0.0	0.0	1,844
1997	1,942	0	0.0	5.0	1,947
1998	842	3	0.0	0.0	845
1999	1,291	21	0.0	0.0	1,312
2000	704	2	1.1	0.5	708
2001	988	4	0.7	0.3	994
2002	925	5	1.9	0.2	932
2003	1,292	72	9.9	1.1	1,375
2004	615	38	1.1	1.8	656
2005	779	149	2.7	0.1	931
Average	**1,647**	**63**	**2.9**	**1.9**	**1,714**
Std. Dev.	**848**	**78**	**4.1**	**3.2**	**886**

Figure 56. Hawaii aku boat (pole and line) fishery CPUE (landings per trip), 1985-2005.



Interpretation: The CPUE for skipjack tuna in the aku boat fishery was 3,157 pounds per trip, equal to the long-term average. The aku boat skipjack tuna landings per trip varied substantially between 1985 and 2005, but there has been no clear trend. The total by this fishery in 2005 were 16% greater than the long-term average.

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 Fish Catch data and measured as catch (in pounds) per trip. Catch 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**
1985	2,029	2,280
1986	2,201	2,493
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	3,354	3,364
2001	3,974	3,994
2002	3,411	3,430
2003	3,911	4,026
2004	2,747	2,905
2005	3,157	3,788
Average	**3,157**	**3,270**
Std. Dev.	**655**	**639**

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

Not much has changed for the year 2005 in the Pelagic Fishery of the CNMI. Trolling is still 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.

Charter vessels generally retain their catches. Data used to in this report for all pelagics, tuna and Non-Tuna PMUS landings were summed from the Commercial Purchase Data Base.

The primary target and most marketable species for the pelagic fleet are skipjack tuna. Record landings of Skipjack were recorded comprising 70% of all pelagic sold. This is the highest recorded landings since the 1980's. 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. This has kept market demand fairly high due to the continuing immigrant population growth on Saipan (over half of the population on Saipan is nonnative).

Table 1.—CNMI Consumer Price Indices (CPIs)

Year	CPI	CPI Adjuste Factor
1983	140.90	1.93
1984	153.20	1.77
1985	159.30	1.71
1986	163.50	1.66
1987	170.70	1.59
1988	179.60	1.51
1989	190.20	1.43
1990	199.33	1.36
1991	214.93	1.27
1992	232.90	1.17
1993	243.18	1.12
1994	250.00	1.09
1995	254.48	1.07
1996	261.98	1.04
1997	264.95	1.03
1998	264.18	1.03
1999	267.80	1.02
2000	273.23	1.00
2001	271.01	1.00
2002	271.55	1.00
2003	268.92	1.01
2004	271.28	1.00
2005	**271.90**	**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 2005 Commercial Pelagic Landings, Revenues and Price

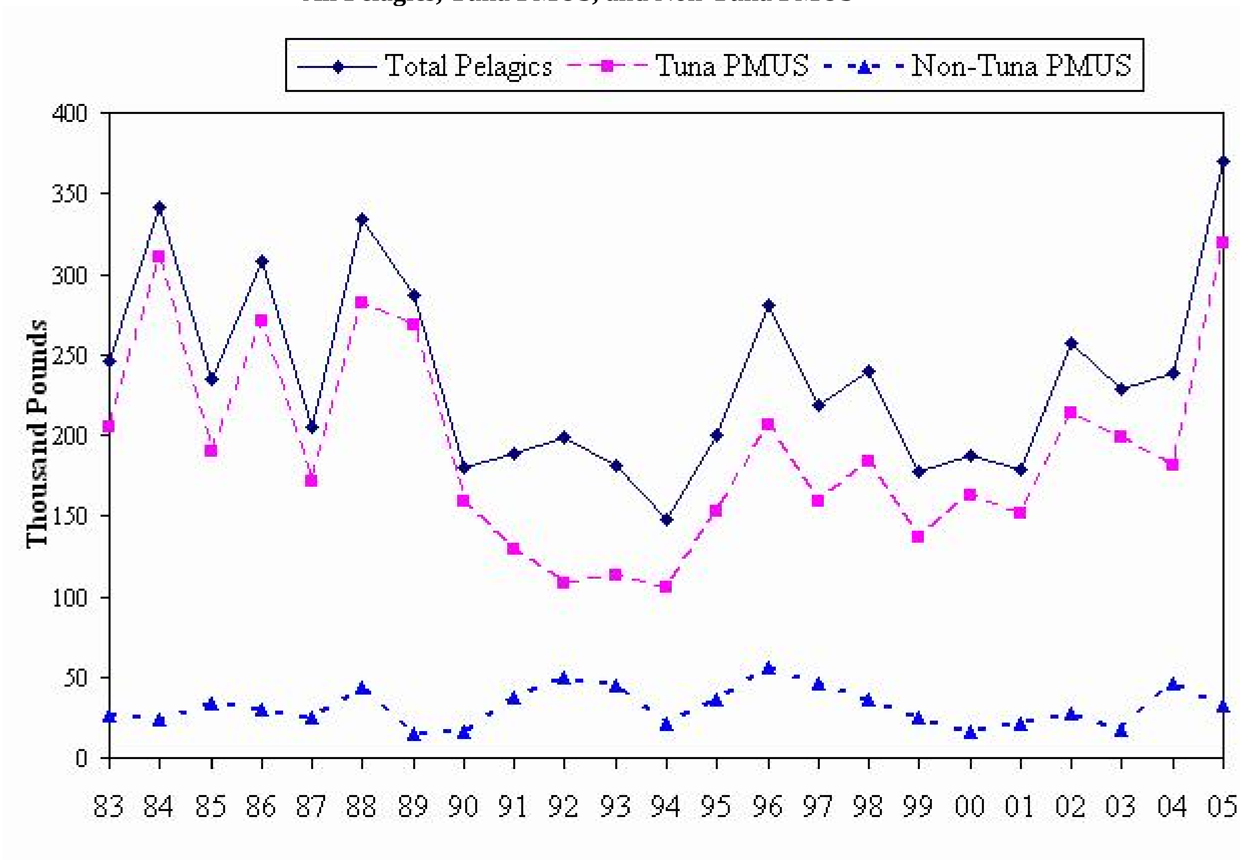
Species	Landing (Lbs)	Value ($)	Avg Price ($/Lb)
Skipjack Tuna	258,911	456,514	1.76
Yellowfin Tuna	52,014	102,228	1.97
Saba (kawakawa)	8,461	16,048	1.90
Tuna PMUS	**319,386**	**574,790**	**1.80**
Mahimahi	26,891	52,883	1.97
Wahoo	3,349	6,962	2.08
Blue Marlin	1,595	2,201	1.38
Sailfish	38	57	1.50
Sickle Pomfret (w/woman)	265	655	2.48
Non-tuna PMUS	**32,136**	**62,759**	**1.95**
Dogtooth Tuna	7,802	15,394	1.97
Rainbow Runner	11,272	21,556	1.91
Barracuda	13	32	2.50
Troll Fish (misc.)	63	119	1.89
Non-PMUS Pelagics	**19,150**	**37,100**	**1.94**
Total Pelagics	**370,672**	**674,649**	**1.82**

Interpretation: Skipjack landings increased 75% or more than 110,000 pounds in 2005. Skipjack tuna continues to dominate the pelagic landings, comprising around 70 % of the (commercially receipted) industry's pelagic catch. Yellowfin tuna and mahimahi ranked second and third in total landings. Mahi landings decreased 25% for 2004. However Yellowfin landings increased 89%. Increase in yellowfin landings in 2002 is partly due to landings from the Northern Islands and by a longline experiment conducted by a fishing company. Skipjack tunas are easily caught in near shore waters throughout the year. Mahimahi is seasonal with peak catch usually from February through April. Yellowfin season usually runs from April to September. The overall pelagic catch increased by 55% in 2005.

The highest average price of identified pelagic species was $2.48/lb for Sickle Pomfret. The lowest priced species is blue marlin. The average price per pound for Skipjack tuna, the species with the greatest landings, decreased 10% from $1.95/lb in 2004 to $1.76/lb in 2005.

2005 Recorded Blue Marlin landings was 1,595 pounds. The low ex-vessel price may be partially related to the manner in which the fish is kept prior to sale. Blue Marlin is rarely a target by commercial fishermen except during fishing tournaments and by Charter boats.

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.

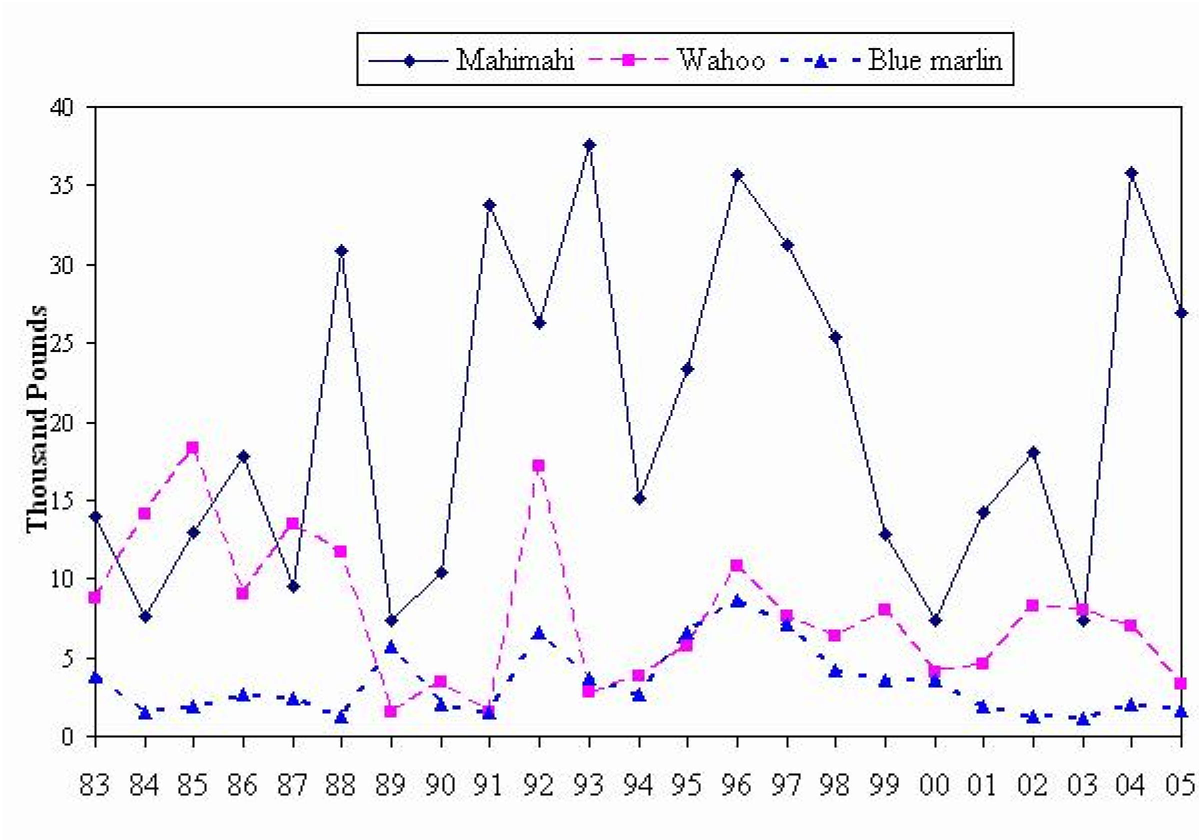
Interpretation: Total weight of pelagics landed in 2005 increased 55% from 2004 level which is also above the 23 year mean. This is partly due to tuna landings increasing by 86% and the landings recorded in the "Non-Tuna PMUS" category decreased 30% from 2004 figures.

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	**370,672**	**319,386**	**32,136**
Average	236,139	190,460	31,468
Standard Deviation	59,700	62,363	11,905

Figure 2. NMI Annual Commercial Landings: Mahimahi, Wahoo, and Blue Marlin.



Interpretation: Mahimahi landings increased 376% in 2004, which is the highest recording in 22 years. However 2005 landings decreased 25% which is still above the 23 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%, the lowest recording in 12 years.

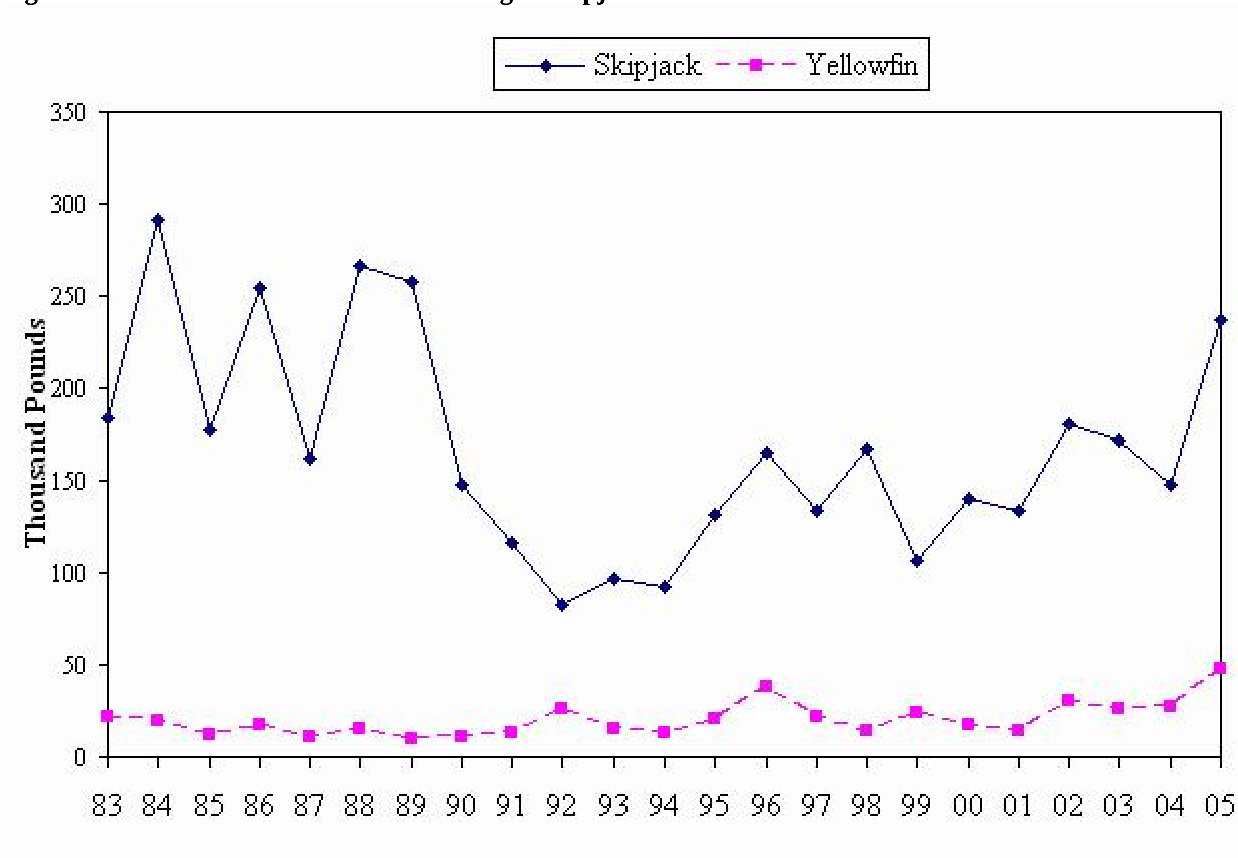
2004 Blue Marlin landing increased 77% from the 2003 figures. 2005 landings decreased 20%. Blue marlin is rarely a target by the commercial fishermen except for charter boats and during fishing tournaments. If blue marlins are landed, they are often kept by the fishermen and therefore rarely ever recorded 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**
Average	20,050	7,790	3,365
Standard Deviation	10,449	4,691	2,151

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. For 2005 skipjack landings showed a significant increase of 75 over 2004 landings and well above the 23 year mean. Skipjack landings made up 70% of the total pelagic landings. The highest landings in 15 years.

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.

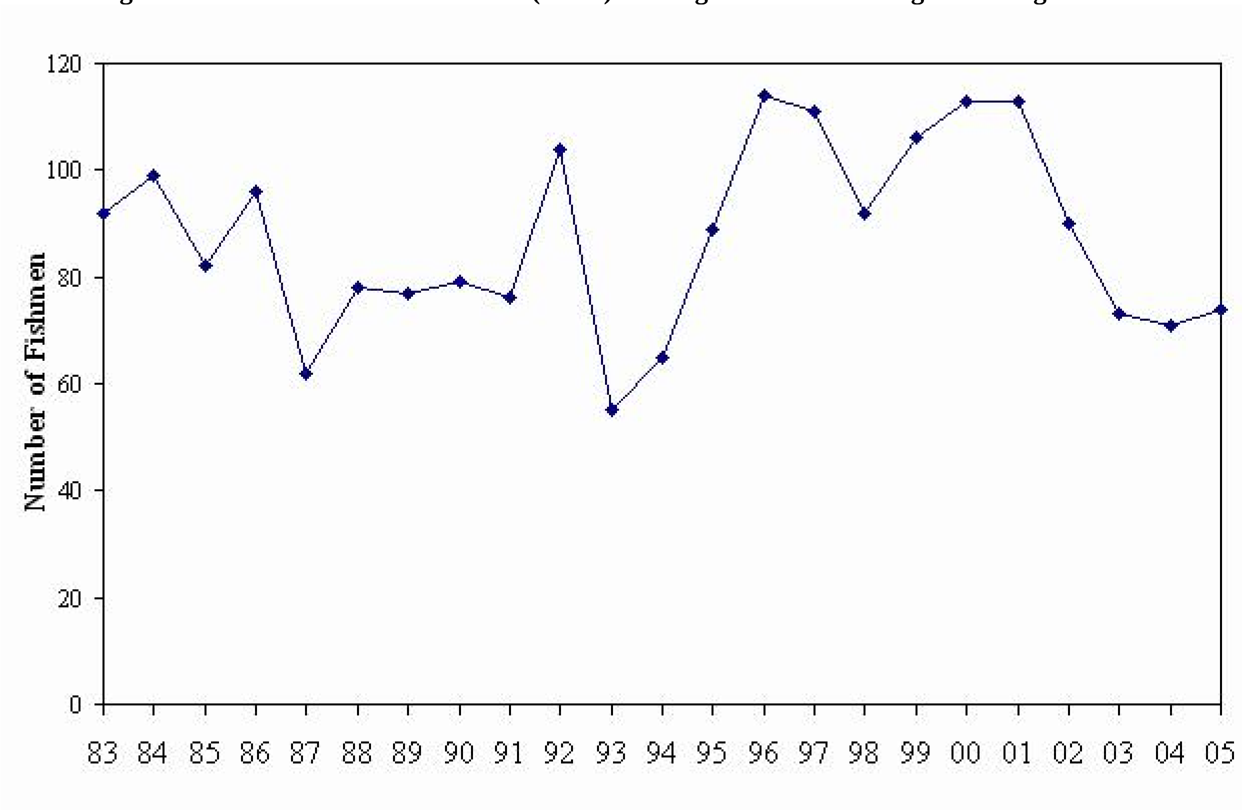
Although more highly prized than skipjack, yellowfin tuna are not as common, and therefore not landed as often. The average fish size tends to be smaller when compared with yellowfin tuna from other geographic areas. The total landings for yellowfin tuna increased in 2002 by 51% from the 2001 figures. 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 lonlining, 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 fiqures.

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	**258,911**	**52,014**
Average	167,974	20,472
Standard Deviation	59,916	9,874

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.

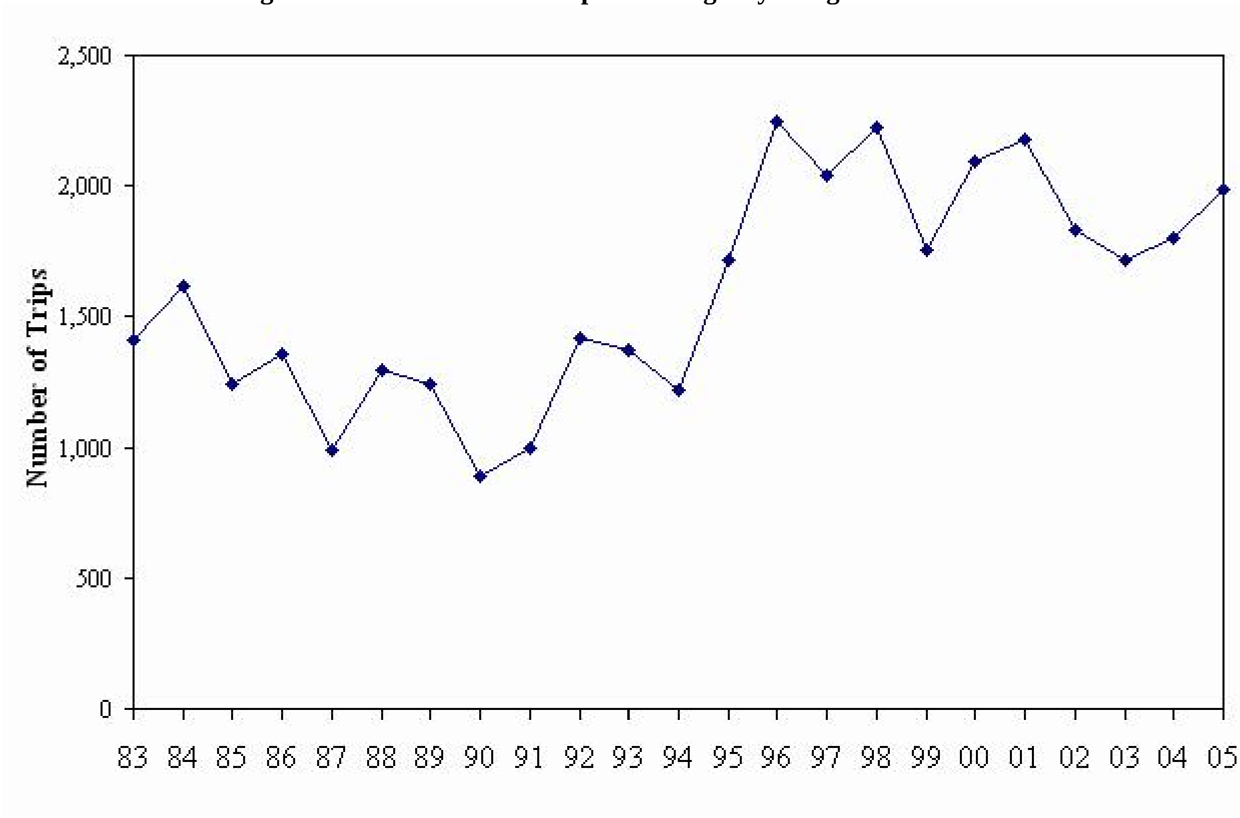
The number of fishermen making pelagic landings decreased 20% from 113 in 2001 to 90 in 2002. Data indicates a continued decline of 23% in 2003 and a 7% drop in 2004. The decrease is partly due to vendors whom own multiple fishing boats entering all their landings on a single receipt and at times combining 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.

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	**74**
Average	87
Standard Deviation	17

Figure 5. NMI Number of Trips Catching Any Pelagic Fish.



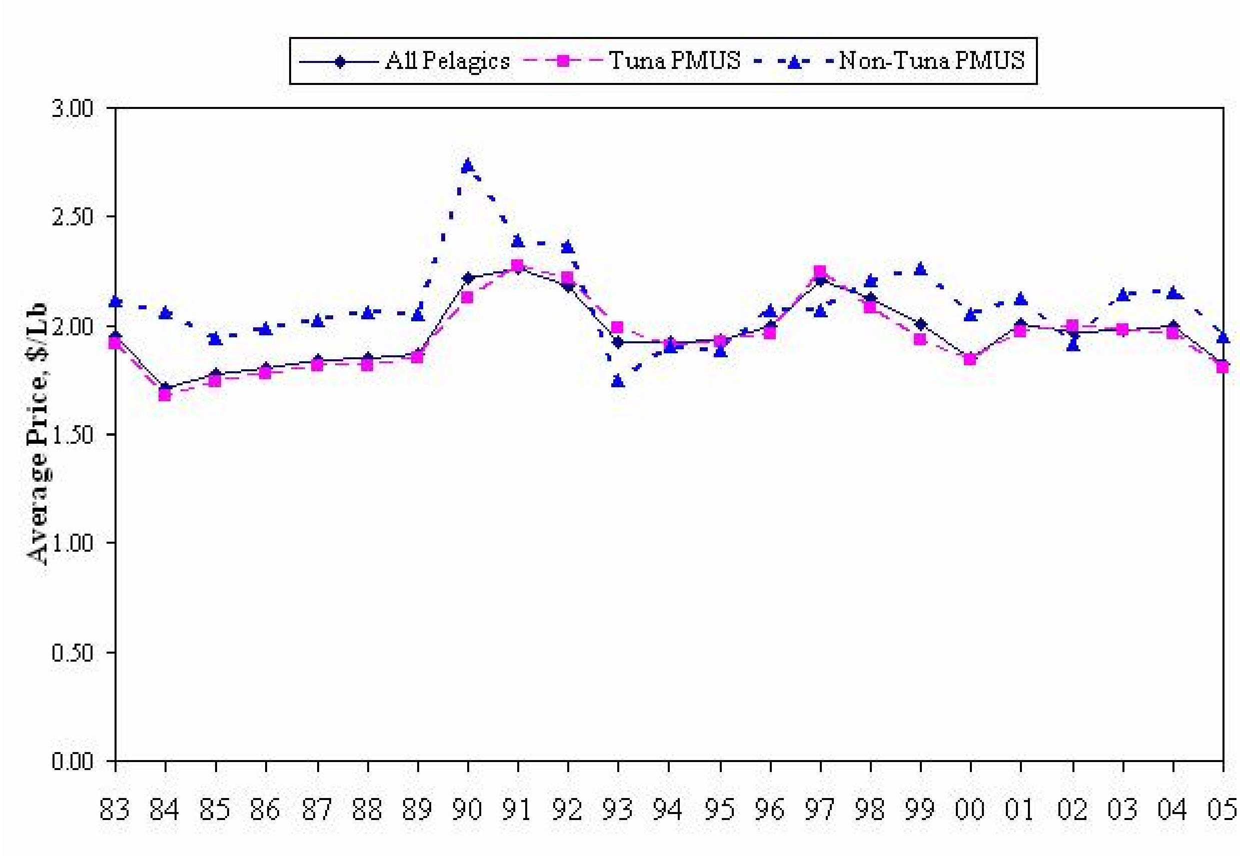
Interpretation: The number of pelagic trips rose in 1998, the decrease in 1999 figures may be caused by the refusal of vendors to participate in the Ticket System. The number of pelagic trips decreased in 2002 by 16% from 2,179 to 1835 and continued to decline in 2003 by 6% and remained near that level for 2004. There was a 10% increase in 2005. Typhoons hit the Marianas region frequently, this may attributed to some decline in fishing trips from the chart above.

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	**1,983**
Average	1,594
Standard Deviation	415

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 increase 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 decrease of 4% in 2003, 2% in 2004 and 8% in 2005 and below the 23 year mean.

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 20% decrease.

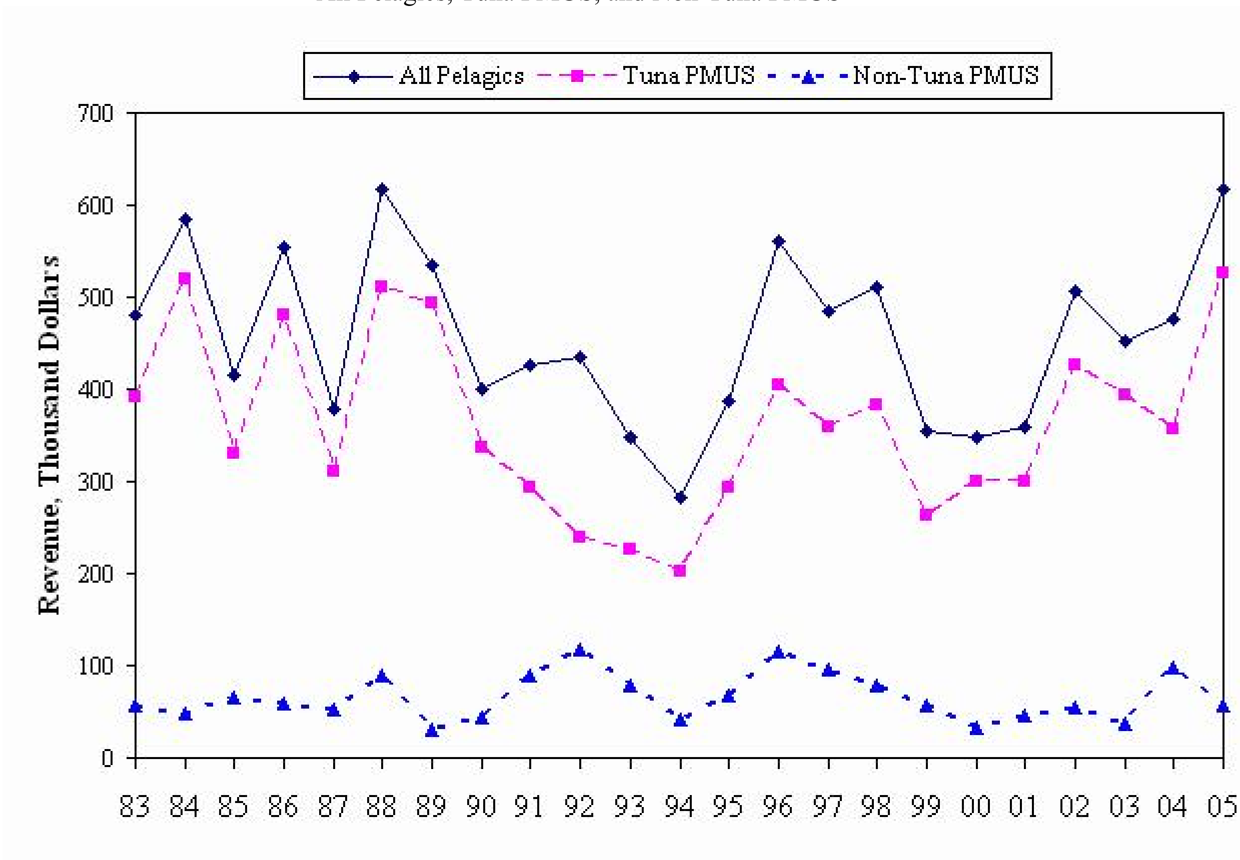
Although in 2001 there was a loss of the large Korean tourist market in the CNMI, there appears to be no substantial loss to revenue. This may be attributed to a redirection of the market toward the local community.

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

Inflation-Adjusted Average Price ($/Lb)

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	1.01	1.95	0.99	1.91	1.09	2.11
1984	0.97	1.71	0.95	1.68	1.16	2.06
1985	1.04	1.78	1.02	1.75	1.14	1.95
1986	1.09	1.80	1.07	1.77	1.20	1.99
1987	1.16	1.84	1.14	1.81	1.27	2.02
1988	1.22	1.85	1.20	1.81	1.36	2.06
1989	1.30	1.86	1.29	1.85	1.43	2.05
1990	1.63	2.22	1.57	2.13	2.01	2.74
1991	1.80	2.28	1.80	2.29	1.90	2.41
1992	1.88	2.20	1.91	2.24	2.04	2.38
1993	1.72	1.92	1.78	1.99	1.56	1.75
1994	1.76	1.92	1.75	1.91	1.75	1.90
1995	1.81	1.93	1.80	1.93	1.76	1.88
1996	1.92	2.00	1.88	1.96	1.99	2.07
1997	2.17	2.23	2.20	2.27	2.03	2.09
1998	2.07	2.13	2.02	2.08	2.14	2.20
1999	1.98	2.02	1.91	1.95	2.24	2.28
2000	1.87	1.87	1.86	1.86	2.07	2.07
2001	2.00	2.00	1.97	1.97	2.12	2.12
2002	1.97	1.97	1.99	1.99	1.92	1.92
2003	1.96	1.98	1.96	1.98	2.12	2.14
2004	1.99	1.99	1.96	1.96	2.15	2.15
2005	**1.82**	**1.82**	**1.80**	**1.80**	**1.95**	**1.95**
Average	1.66	1.97	1.64	1.95	1.76	2.10
Standard Deviation	0.39	0.15	0.40	0.16	0.39	0.21

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 Pelagic" category.

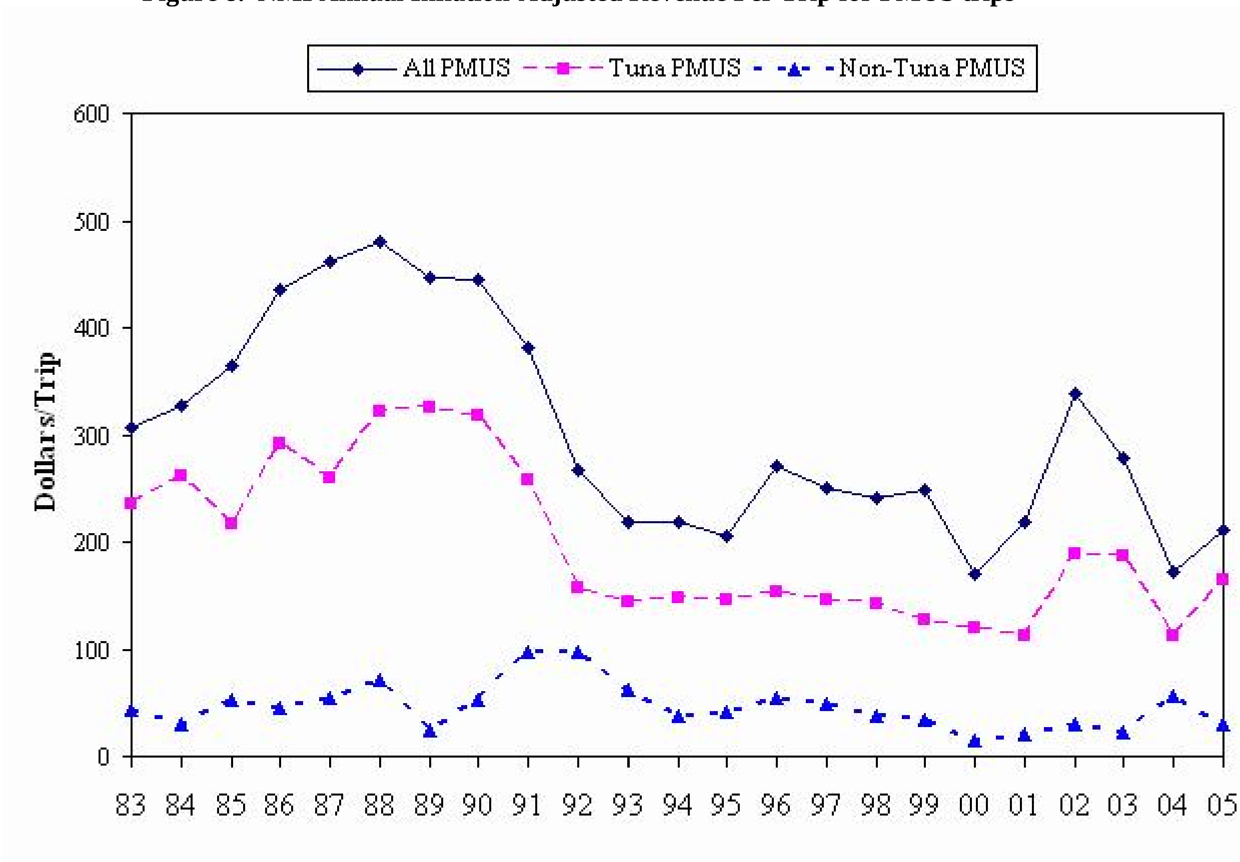
In 2003 the tunas' inflation-adjusted revenues decreased 8% from the 2002 figures and continued to decline to 11% for 2004. This is due to the decrease in landings of Skipjack tuna, which in 2004 comprised only of 67% of the total pelagic landings compared to 2003 where it comprised 87% of the total pelagic landings. 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%. 2005 "Non-Tuna PMUS" inflation-adjusted revenues decreased 36%, while the Tuna PMUS increased 61%, and all Pelagics increased 42%.(Skipjack tuna comprised 70% of all pelagic landings and 81% of all Tuna PMUS species).

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	479,387	202,800	391,404	29,059	56,084
1984	330,254	584,550	294,077	520,516	27,044	47,868
1985	244,171	417,532	193,920	331,603	37,882	64,778
1986	333,766	554,052	289,681	480,870	35,488	58,910
1987	237,687	377,922	195,793	311,311	32,344	51,427
1988	409,075	617,703	338,348	510,905	59,701	90,149
1989	373,927	534,716	345,839	494,550	20,917	29,911
1990	293,993	399,830	248,144	337,476	32,102	43,659
1991	338,643	430,077	232,077	294,738	70,235	89,198
1992	374,977	438,723	206,950	242,132	102,133	119,496
1993	311,342	348,703	201,350	225,512	69,592	77,943
1994	259,470	282,822	185,381	202,065	37,818	41,222
1995	361,511	386,817	275,080	294,336	62,920	67,324
1996	539,628	561,213	388,691	404,239	110,939	115,377
1997	474,509	488,744	351,492	362,037	93,306	96,105
1998	496,652	511,552	372,142	383,306	77,011	79,321
1999	351,062	358,083	261,394	266,622	55,404	56,512
2000	350,468	350,468	302,473	302,473	32,186	32,186
2001	358,656	358,656	300,154	300,154	44,987	44,987
2002	506,302	506,302	425,961	425,961	53,468	53,468
2003	447,647	452,123	390,100	394,001	36,764	37,132
2004	476,543	476,543	356,110	356,110	98,417	98,417
2005	**674,649**	**674,649**	**574,790**	**574,790**	**62,759**	**62,759**
Average	382,318	460,486	301,424	365,527	55,760	65,836
Standard Deviation	108,075	98,341	94,035	100,110	26,408	25,657

Figure 8. NMI Annual Inflation-Adjusted Revenue Per Trip for PMUS trips



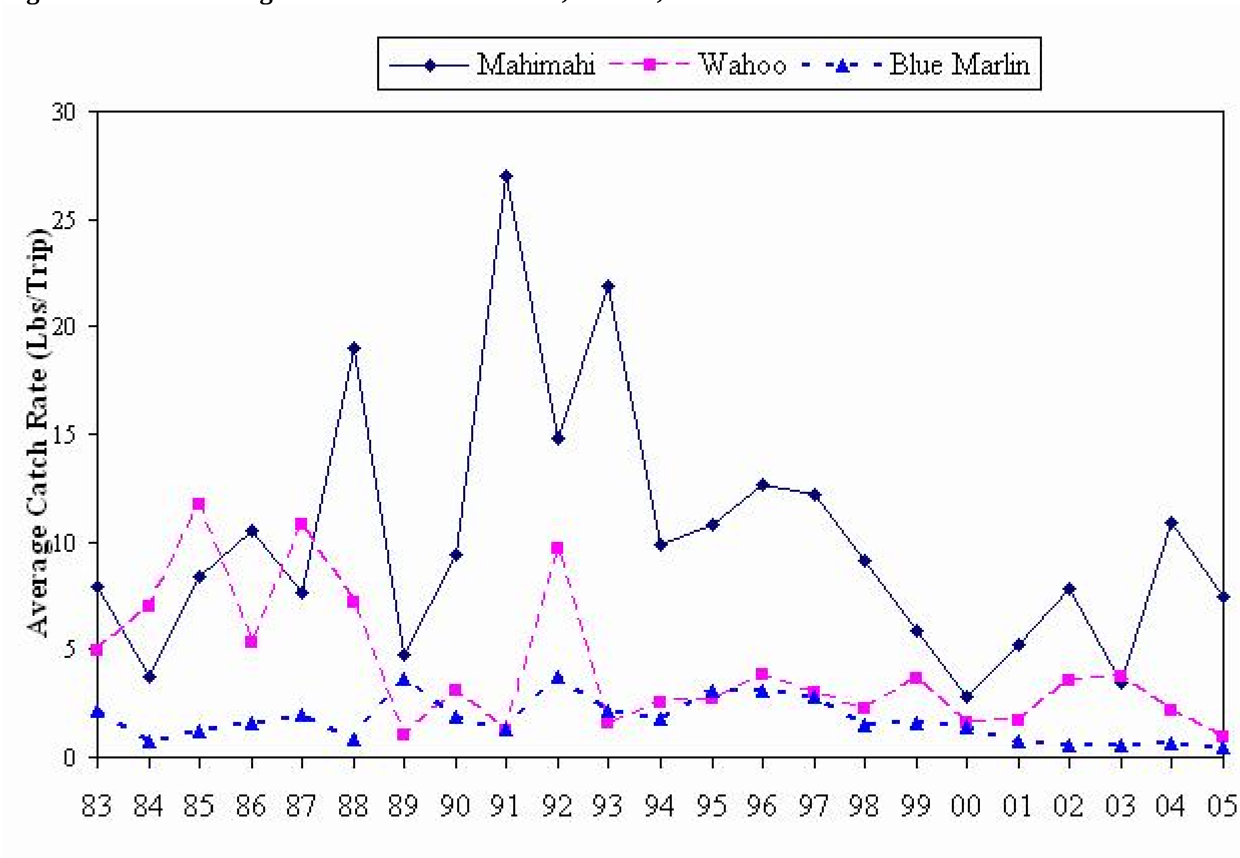
Interpretation: The inflation-adjusted revenue per trip for "All PMUS Species" decreased 18% in 2003, 38% for 2004, however 2005 revenues recorded a 23% increase over 2004.. "Non-Tuna PMUS" decreased 26% in 2003 however 2004 revenue increased significantly to 152% or 56$/per trip. This is the highest it has been for the past 10 years which is above the 22 year mean. 2005 "Non-Tuna" revenues decreased 41%.This decrease in revenue coincides with the decrease in "Non Tuna" landings "Tunas PMUS" remained relatively stable in 2003 at 186 $/Trip but dropped significantly to 112 $/Trip in 2004. In 2005 "Tunas PMUS" revenues per trip increased 41% ($164/trip) but still below the 23 year mean.

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	306.87	122.00	235.46	22.00	42.46
1984	185.00	327.45	148.00	261.96	17.00	30.09
1985	214.00	365.94	128.00	218.88	31.00	53.01
1986	262.00	434.92	176.00	292.16	27.00	44.82
1987	290.00	461.10	163.00	259.17	34.00	54.06
1988	318.00	480.18	213.00	321.63	47.00	70.97
1989	312.00	446.16	228.00	326.04	17.00	24.31
1990	327.00	444.72	233.00	316.88	38.00	51.68
1991	302.00	383.54	204.00	259.08	77.00	97.79
1992	231.00	270.27	135.00	157.95	83.00	97.11
1993	195.00	218.40	128.00	143.36	55.00	61.60
1994	200.00	218.00	135.00	147.15	35.00	38.15
1995	193.00	206.51	136.00	145.52	39.00	41.73
1996	261.00	271.44	148.00	153.92	53.00	55.12
1997	245.00	252.35	143.00	147.29	47.00	48.41
1998	234.00	241.02	138.00	142.14	36.00	37.08
1999	246.00	250.92	125.00	127.50	33.00	33.66
2000	172.00	172.00	121.00	121.00	16.00	16.00
2001	219.00	219.00	113.00	113.00	21.00	21.00
2002	339.00	339.00	189.00	189.00	30.00	30.00
2003	275.00	277.75	185.00	186.85	22.00	22.22
2004	172.00	172.00	112.00	112.00	56.00	56.00
2005	**212.00**	**212.00**	**164.00**	**164.00**	**33.00**	**33.00**
Average	241.87	303.11	155.96	197.48	37.78	46.10
Standard Deviation	53.85	98.14	36.75	71.52	17.87	21.39

Figure 9. NMI Trolling Catch Rate of Mahimahi, Wahoo, and Blue Marlin



Interpretation: The mahimahi catch rate in 2003 drop significantly 56% from 2002. This decrease may be biological because it appears that the trolling catch rates of Guam and the NMI have fluctuated similarly over the last twenty-two years. In 2004, mahimahi catch rate rebounded a surprising 219% or near 11 lbs./trip. 2003 catch rate was 3.43lbs/trip. 2005 mahimahi catch rates decreased 32% or 7.46lbs./trip.

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 declined to 2.19 lbs/trip or 41% and 2005 declined further to 56% or .93 lbs/trip.

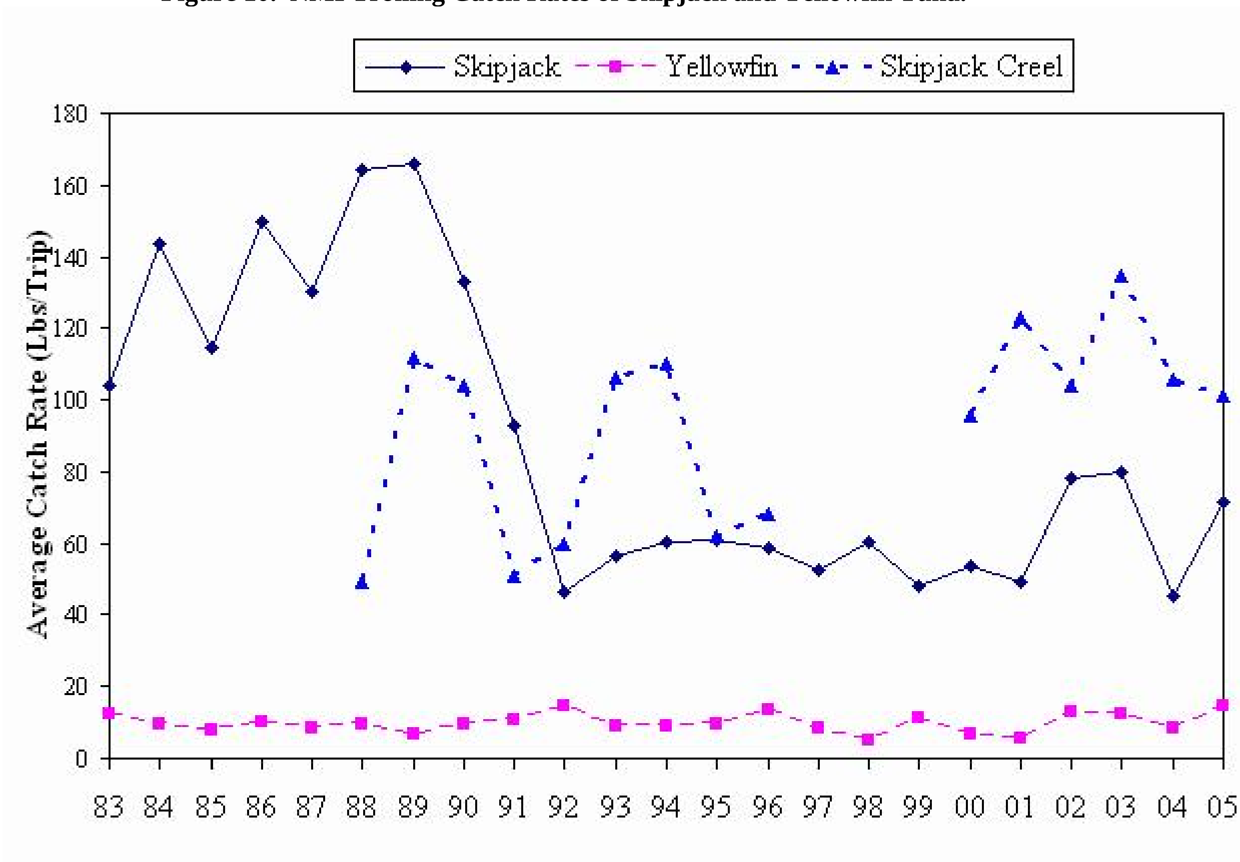
2005 Blue Marlin catch rates decreased 28% from 2004 level. Blue marlins are not a marketable species and are rarely a target by fishermen except during fishing tournaments. When landed, it is rarely sold to vendors participating in the Commercial Purchase Data Collection Program; therefore it would 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.

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	**7.46**	**0.93**	**0.44**
Average	10.15	4.14	1.70
Standard Deviation	5.94	3.13	1.00

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 is an increase of 3% in comparison with the 2002 catch rate of 78. 2004 catch rates declined 44% or 45 lbs/trip. 2005 catch rates increased 60%. Skipjack tuna is the preferred species in the troll fishery of the NMI because of their relative ease of capture and local popularity. Previous discussions have suggested that non-tuna 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 conducted by a fishing company whom recently applied and received a federal longline permit. 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 or 33%. 2005 yellowfin catch rates increased 75% over the previous year (14lbs/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 sampled from all non-charter boat trolling trip interviews by the number of these trolling trips interviewed. Charter boats were not included because they typically never see their catch and their fishing activity is not similar to the commercial fishery therefore the comparison would not be as valid if charter boats were included.

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**
Average	88	10	92
Standard Deviation	41	3	27

Offshore Daytime Creel Survey Bycatch Summary
Based on the Interview Catch Data in Year 2000-2005
Method: Trolling

		Number Caught					Trip		
	Species	Released	Dead/Injd	Both	All	BC%	With BC	All	BC%
Non Charter							2	797	0.25
	Mahimahi	3		3	1172	0.18			
	Yellowfin Tuna		1	1	1048	0.10			
	Total			4	2220	0.28			
	Compared With All Species			4	26,275	0.02			
Charter							0	112	0.00
	Compared With All Species			0	543	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 2005 by both non-charter and charter boats indicate less than 1% or 4 out of 20,435 of the total pelagic species landed is released. The only two species reported as bycatch was Mahimahi and Yellowfin Tuna. 3 out of 1172 Mahimahi or .18% landed was released. And 1 out of 1048 Yellowfin Tuna or .10% landed was 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 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 Daytime 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 from 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 2005 for the purse seine fishery and 2004 for longline and pole-and-line fisheries. Fishery trends in the Pacific Ocean are illustrated for the purse seine, longline and pole-and-line fisheries.

Vessels

The majority of the 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 112 vessels in 2005. In contrast, there has been a steady increase in the number of vessels from Pacific Islands fleets, which totaled 66 vessels in 2005. The remainder comes from a large number of smaller vessels in the Indonesian and Philippines domestic fisheries, and a variety of other domestic and foreign fleets, including several recent distant-water entrants into the tropical fishery (e.g. China, New Zealand and Spain).

Catch

The purse seine fishery has accounted for around 55–60% of the WCP–CA total catch by volume since the early 1990s, with annual catches in the range 790,000–1,260,000 mt. The provisional 2005 purse-seine catch of 1,523,373 mt was the highest on record and around 10% higher than the previous record in 2004 (1,390,764 mt), with the purse seine catch being in excess of 1,300,000 mt for the past four years. The purse seine skipjack catch for 2005 (1,249,711 mt – 82%) was the highest on record and the yellowfin catch for 2005 (231,241 mt – 15%) was a significant improvement (~28%) on the low 2004 catch (180,253 mt). The estimated purse seine bigeye catch2 for 2005 (41,502 mt – 3%) was also a record, against the trend of reduced catches since the previous record in 1999 (38,327 mt).

The Chinese-Taipei fleet had been the highest producer in the tropical purse seine fishery until 2004, when it was surpassed by the combined Pacific Islands purse seine fleets fishing under the FSM Arrangement. The 2005 provisional catch estimate (195,039 mt) for the Chinese-Taipei fleet was similar to the level taken in 2004, but less than 60,000 mt compared to 2002, mainly due to several vessels changing flag at the end of 2002 (i.e. a reduction in vessel numbers).

Catches, fleet sizes and effort by the Japanese and Korean purse seine fleets have been stable for most of this time series. The increase in annual catch by the FSM Arrangement fleet since 2000 corresponds to an increase in vessel numbers, and coincidently, mirrors the decline in US purse seine catch, vessel numbers and effort over this period.

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 WCP–CA experienced no significant evolution towards either a strong El Nino- or La Nina-state during 2005, fishing activity remained concentrated in the PNG, FSM and Solomon Islands area, as it had during 2004, although with slightly more activity in Nauru and Kiribati waters during 2005.

The 2005 purse-seine fishery in the WCPFC Convention Area (WCP-CA). Source: WCPFC-SC2-2006/GN WP-1

Table 1. Total reported purse seine catch (metric tonnes) of skipjack, yellowfin and bigeye tuna in the Pacific Ocean. Source: WCPFC Yearbook 2005.

Year	Skipjack	Yellowfin	Bigeye	Total
1967	115,859	68,869	1,757	186,485
1968	67,229	93,647	4,801	165,677
1969	51,076	117,521	1,141	169,738
1970	55,001	147,197	2,970	205,168
1971	108,271	114,013	5,049	227,333
1972	47,883	174,299	4,644	226,826
1973	58,519	208,998	4,189	271,706
1974	90,552	208,755	2,675	301,982
1975	133,937	195,922	7,628	337,487
1976	148,562	230,082	18,295	396,939
1977	119,966	200,453	12,422	332,841
1978	207,891	172,150	19,590	399,631
1979	193,084	198,822	13,777	405,683
1980	210,147	174,891	23,676	408,714
1981	209,371	227,698	18,810	455,879
1982	270,243	188,492	12,053	470,788
1983	375,951	189,711	13,684	579,346
1984	382,651	247,271	17,481	647,403
1985	344,573	311,885	12,385	668,843
1986	415,430	366,413	9,907	791,750
1987	427,225	417,407	12,103	856,735
1988	575,159	372,829	9,356	957,344
1989	567,311	437,345	14,225	1,018,881
1990	658,672	438,686	17,918	1,115,276
1991	824,967	445,753	18,133	1,288,853
1992	790,696	480,288	27,118	1,298,102
1993	673,382	457,956	23,648	1,154,986
1994	812,551	422,515	45,460	1,280,526
1995	861,386	399,547	57,168	1,318,101
1996	856,527	351,765	83,307	1,291,599
1997	839,909	493,374	99,830	1,433,113
1998	1,133,309	520,405	65,340	1,719,054
1999	1,120,106	495,715	87,799	1,703,620
2000	1,140,045	451,429	125,906	1,717,380
2001	1,048,481	597,784	89,388	1,735,653
2002	1,238,769	593,792	83,688	1,916,249
2003	1,324,329	594,415	75,759	1,994,503
2004	1,365,152	433,411	95,713	1,894,276
2005	1,478,905	500,003	112,625	2,091,533
Average	522,741	322,145	32,600	877,486
STD Deviation	419,137	155,633	34,872	593,741

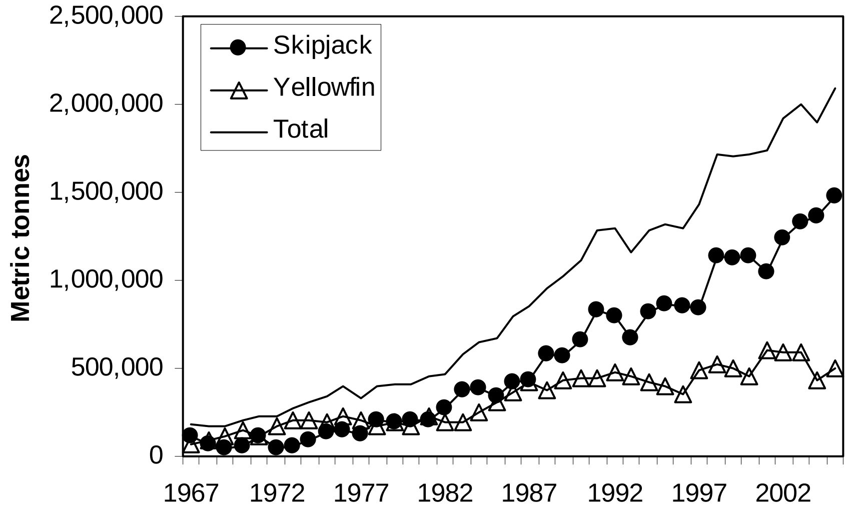


Figure 1. Total purse seine catch of skipjack and yellowfin tuna in the Pacific Ocean, 1967–2005. Source: WCPFC Yearbook 2005.

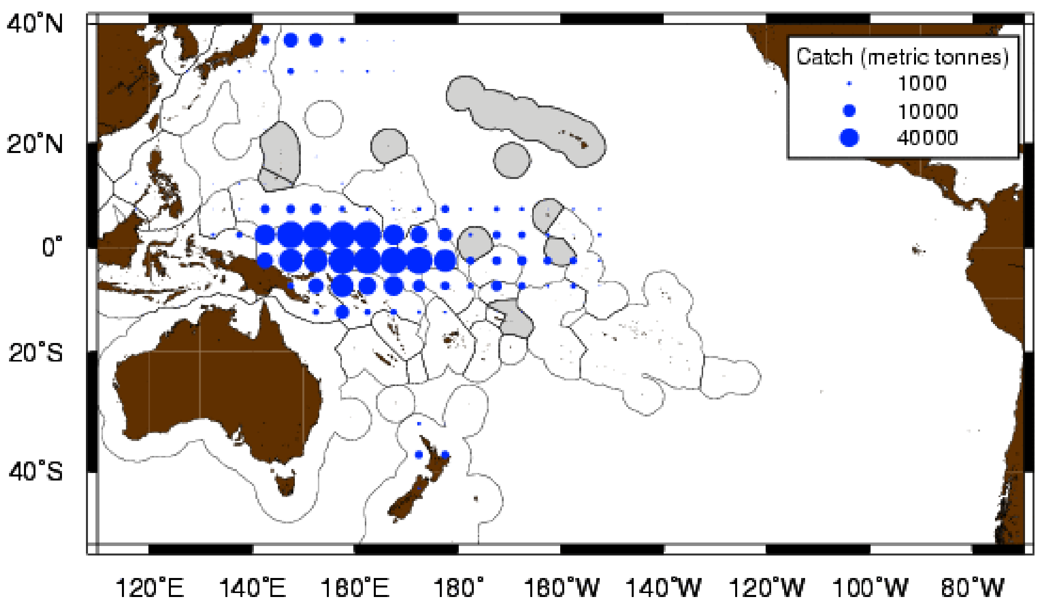


Figure 2. Distribution of total purse seine WCP-CA skipjack catch in 2005. Source: SPC public domain data.

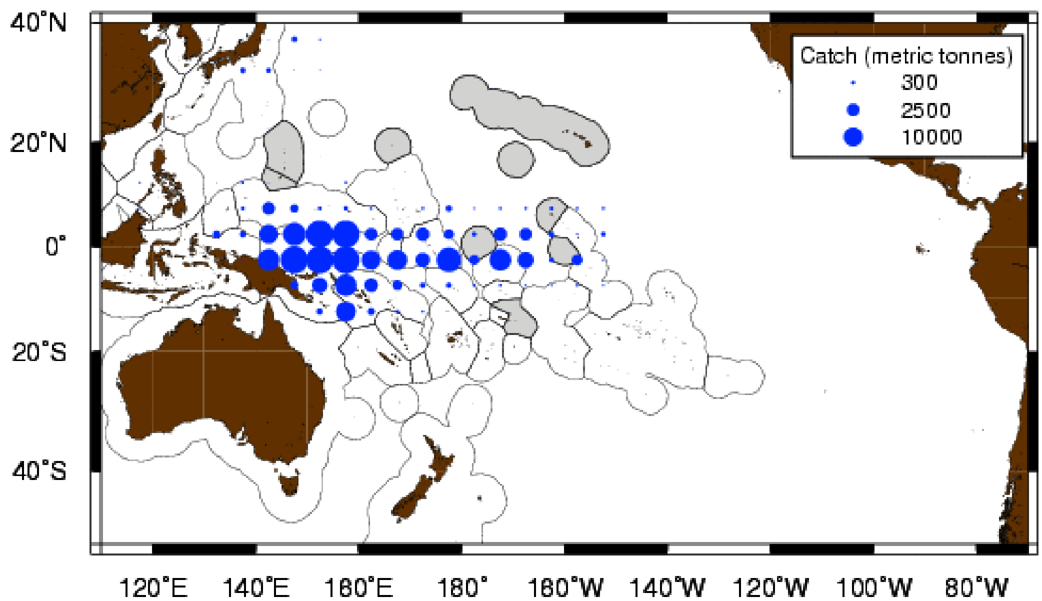


Figure 3. Distribution of total purse seine WCP-CA yellowfin catch in 2005. Source: SPC public domain data.

Vessels

The diverse longline fleet in the WCP-CA was composed of roughly 5,000 vessels in 2005. The fishery involves two main types of operation –

- large **distant-water** freezer vessels (typically >250 GRT) which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical species (e.g. yellowfin, bigeye tuna) or subtropical species (e.g. albacore , swordfish). Some voluntary reduction by one major fleet (Japan distant-water) has occurred in recent years;
- smaller **offshore** vessels (typically <100 GRT) which are usually **domestically-based**, with ice or chill capacity, and serving fresh or air-freight sashimi markets. These vessels operate mostly in tropical areas.

Additionally, small vessels in Indonesia, Philippines and more recently in Papua New Guinea target yellowfin and bigeye by handlining and small vertical longlines, usually around the numerous arrays of anchored FADs in home waters.

Catch

The provisional WCP–CA longline catch (242,059 mt) for 2005 was only 3,000 mt lower than the highest on record which was attained in 2002 (245,335 mt). The WCP–CA albacore longline catch (73,400 mt – 30%) for 2005 was similar to catch levels of in recent years, although catches have declined slightly since 2001, primarily due to a drop in catches by key fleets that continue to move away from albacore as a target species. The provisional bigeye catch (87,159 mt – 36%) for 2005 was the third highest on record, and the yellowfin catch (76,521 mt – 32%) was at a similar level to catches in recent years, but notably, the highest since 2000.

A significant change in the WCP–CA longline fishery over the past 5 years has been the growth of Pacific-Islands domestic albacore fisheries, which have gone from taking 32% of the total south Pacific albacore longline catch in 1998, to accounting for over 53% of the catch in 2005. 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 has resulted in a reduced contribution to the overall 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.

Domestic fleet sizes continue to increase at the expense of foreign-offshore and distant-water fleets, although the Chinese-Taipei distant-water longline fleet increased by ~80%

over the period 2000–2003 (from 78 in 2000 to 142 vessels in 2003, but has stabilized at 133 vessels in 2005).

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, 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, targeting 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. There has been growth in domestic fleets in the South Pacific over recent years with the most significant examples in the American Samoan, Fijian and French Polynesian fleets and the recent establishment of the Cook Islands fleet.

The 2005 longline fishery in the WCP-CA. Source: WCPFC-SC2-2006/GN WP-1

2005 Pelagic Plan Team Recommendations

1. The Pelagic Plan Team recommends that the Council ask both the chair of the International Scientific Committee and the chair of the North Pacific Albacore Working Group about North Pacific albacore stock assessment results in the context of the Western Pacific Council's reference points for stock status determination. The Council's annual SAFE report requires outputs from stock assessments on the ratios of current biomass and biomass at MSY ($B_{current}/B_{msy}$) and current fishing mortality and fishing mortality at MSY ($F_{current}/F_{msy}$).

2. The Pelagic Plan Team supports the previous SSC recommendation that the Council have formal standing in the US delegations to Regional Fishery Management Organizations (RFMOs) such as the Western and Central Pacific Fishery Commission and the Inter-American Tropical Tuna Commission (IATTC).

3. The Pelagic Plan Team recommends that the Council's Pelagics FMP be amended to include the following protocol for how the Council will address the problem of overfishing on Pacific highly migratory fish stocks:
    a. Council receives notice with appropriate documentation from NMFS, including stock assessment, area of consideration, fishery and stock data supporting the NMFS notice, and time frame for Council action.
    b. Council refers NMFS report to its Pelagics Plan Team, advisors and SSC for review and advice with focus on
        i. The condition of the stock involved
        ii. The possible reasons for the stock condition including fishery and environmental conditions that may be relevant to the stock condition
        iii. The relative role of U.S. fisheries in overall stock harvests

iv. Existing conservation and management measures of the Regional fishery Management Organization (RFMO) with jurisdiction over the stock involved
v. Possible measures to end overfishing or rebuild the stock involved

c. Possible domestic fishery conservation measures
d. Possible international fishery conservation measures
e. Comparison and evaluation of alternative measures including distinction between Pacific wide and regional measures effects and effectiveness
f. Reports to Council from advisory bodies
g. Initial decision by Council for corrective action to address problem
h. Draft decision document distributed for public review and advice
i. Council action
    i. Recommendations for domestic regulations
    ii. Recommendations for international actions
    iii. The Council ensures representation on any US delegation to Regional Fishery Management Organizations
j. Council drafts a position paper on how it believes overfishing may be ended and/or stock(s) rebuilt for Pacific HMS Council staff should also scrutinize these RFMO meeting agendas to identify issues of importance to the Council, not simply those that pertain to overfishing. The position paper should clearly and forcefully state the Council's considered position on EVERY substantial issue.).
k. Regional fishery management organization meets and acts on fishery conservation and management needs
l. Council is advised on RFMO actions, US. government positions, and requirements under applicable treaties
m. Council determines appropriate regulatory response for domestic fisheries consistent with international agreements and M-SA.
n. Council submits recommendations (if any) to NMFS for implementation
o. NMFS implements approved recommendations as necessary

Table 2. Total reported longline catch (metric tonnes) of PMUS in the Pacific Ocean. Source: WCPFC Yearbook 2005 and SPC public domain data.

Year	Albacore	Yellowfin	Bigeye	Striped Marlin	Black Marlin	Blue Marlin	Swordfish	Total
1962	37,413	65,758	80,945	26,639	2,229	18,169	11,216	242,369
1963	26,613	72,158	109,157	29,733	2,342	18,341	11,414	269,759
1964	26,283	62,222	77,268	41,462	1,876	13,055	8,615	230,781
1965	28,625	61,113	59,012	34,712	2,375	10,068	9,665	205,570
1966	51,664	70,751	66,784	29,485	2,172	9,462	11,615	241,933
1967	58,462	45,369	69,510	32,841	1,825	8,804	12,041	228,851
1968	46,594	61,056	62,990	40,280	1,883	8,026	11,477	232,306
1969	38,995	66,956	84,642	26,463	2,073	9,118	14,358	242,604
1970	49,460	68,449	68,306	37,376	1,605	11,301	10,329	246,825
1971	46,351	65,779	68,163	33,168	2,127	6,727	9,410	231,724
1972	48,254	78,034	87,168	22,663	1,884	8,129	9,102	255,234
1973	60,545	73,988	93,189	20,333	1,935	8,313	9,604	267,907
1974	39,501	65,306	82,614	19,930	1,620	7,634	8,693	225,299
1975	31,398	80,102	103,221	16,308	1,845	5,797	9,434	248,105
1976	45,249	93,202	127,615	16,903	1,056	7,244	11,259	302,527
1977	49,758	106,769	146,169	9,623	936	7,244	10,892	331,391
1978	43,055	120,517	126,896	10,309	1,624	8,196	10,887	321,485
1979	37,716	120,516	119,139	16,658	1,950	8,658	11,162	315,798
1980	43,604	136,352	126,192	18,449	1,652	9,722	17,675	353,646
1981	49,824	102,664	99,239	21,430	2,067	10,875	22,507	308,606
1982	46,204	95,949	101,251	22,641	2,277	10,943	19,151	298,416
1983	38,394	97,081	105,313	14,917	1,916	8,615	20,666	286,902
1984	33,922	83,381	98,283	12,530	1,524	11,252	16,323	257,214
1985	39,357	89,463	123,826	13,164	1,234	9,744	18,698	295,485
1986	42,466	87,826	158,229	17,411	1,250	11,335	20,542	339,059
1987	34,508	95,723	168,163	20,728	1,814	12,580	25,285	358,800
1988	42,572	104,059	140,008	19,071	2,726	12,845	24,294	345,574
1989	31,111	85,940	134,279	13,763	1,510	10,437	16,527	293,568
1990	33,310	110,082	174,143	9,661	1,806	9,845	14,941	353,788
1991	36,976	91,844	163,596	10,553	2,047	10,601	17,413	333,030
1992	47,047	91,664	158,719	8,948	2,045	10,296	18,962	337,681
1993	57,839	90,519	137,057	10,715	1,646	11,377	18,923	328,076
1994	62,383	105,114	148,272	10,807	1,786	14,048	15,580	357,989
1995	62,642	101,178	123,928	11,934	1,332	13,675	13,956	328,645
1996	64,712	94,764	100,991	8,352	818	8,511	15,180	293,329
1997	76,953	93,332	118,284	9,956	1,510	9,808	15,850	325,694
1998	83,416	82,694	127,512	6,752	1,838	9,318	15,071	326,601
1999	73,305	70,536	107,660	5,600	1,597	8,876	14,404	281,977
2000	79,040	101,399	118,171	4,703	2,170	9,837	17,949	333,269
2001	99,555	104,160	141,129	4,599	1,583	11,180	18,007	380,214
2002	94,300	100,057	162,014	4,092	1,439	10,235	16,907	389,044
2003	103,516	97,377	136,239	6,345	944	14,510	19,574	378,505
2004	93,443	103,935	137,852	4,998	1,211	20,306	21,843	383,588
Average	52,008	88,259	114,957	17,605	1,746	10,583	15,056	300,213
STD deviation	20,285	18,914	31,742	10,341	417	3,031	4,529	50,607

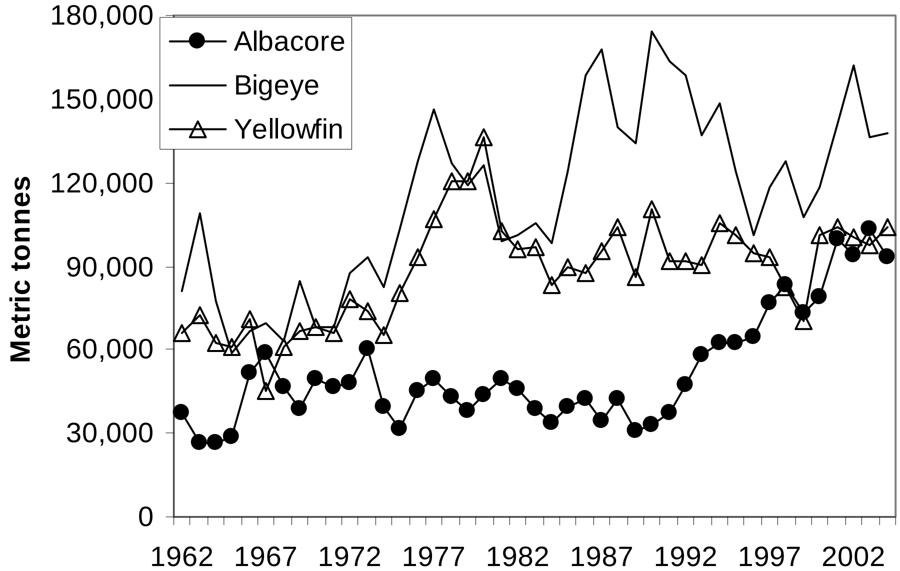


Figure 4. Reported longline tuna catches in the Pacific Ocean. Source: SPC public domain data.

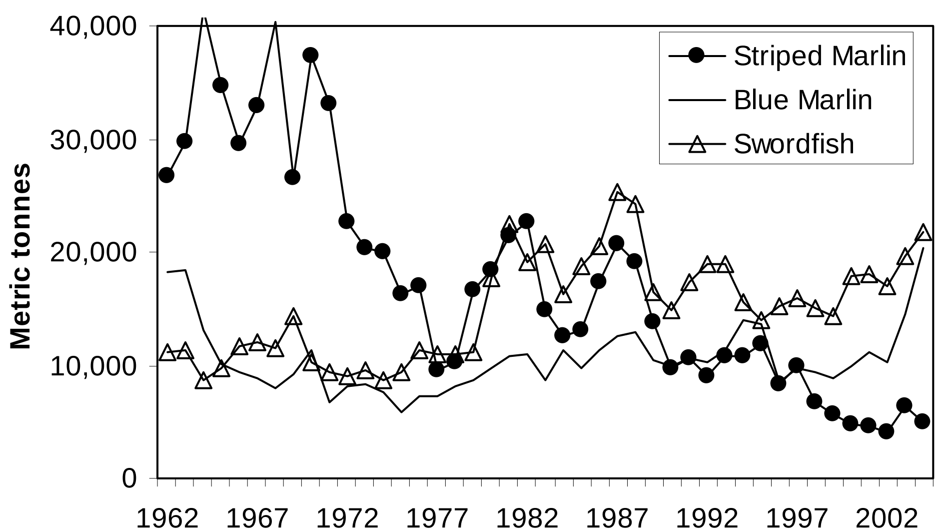


Figure 5. Reported longline billfish catches in the Pacific Ocean. Source: SPC public domain data.

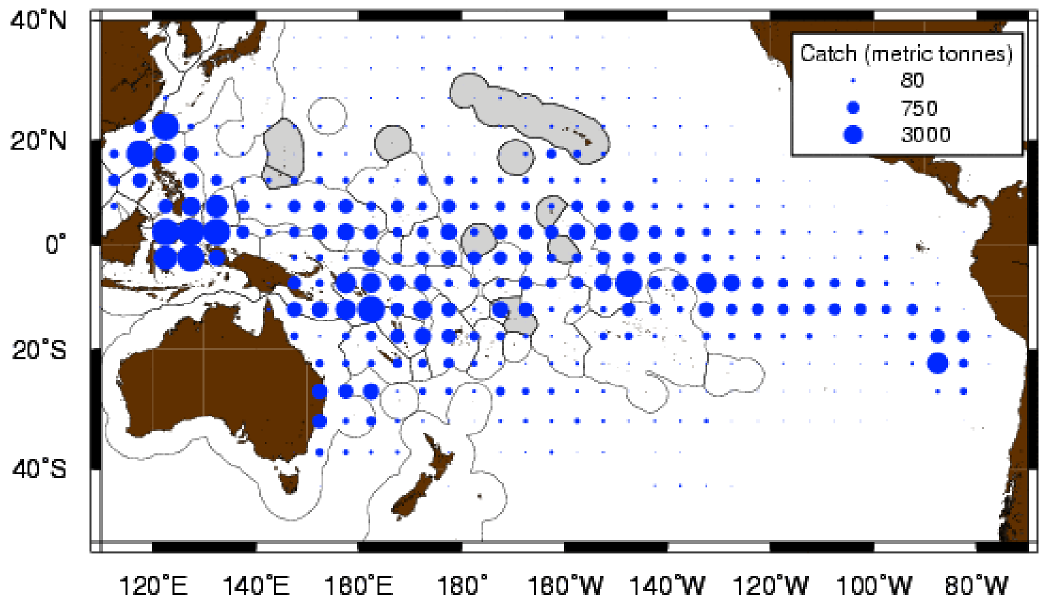


Figure 6. Distribution of longline catches of yellowfin tuna reported in 2004. Source: SPC public domain data.

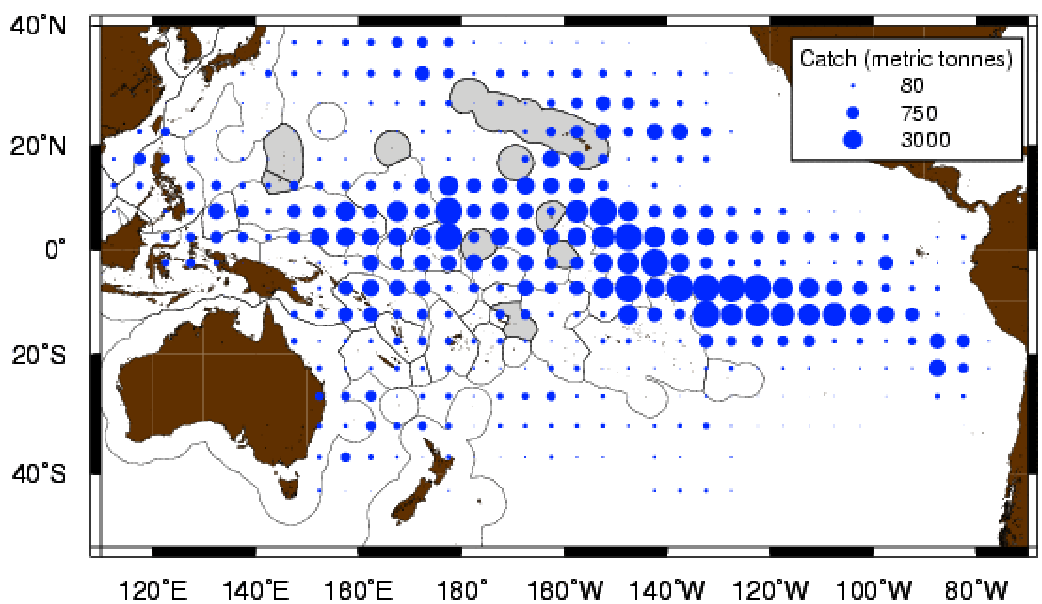


Figure 7. Distribution of longline catches of bigeye tuna reported in 2004. Source: SPC public domain data.

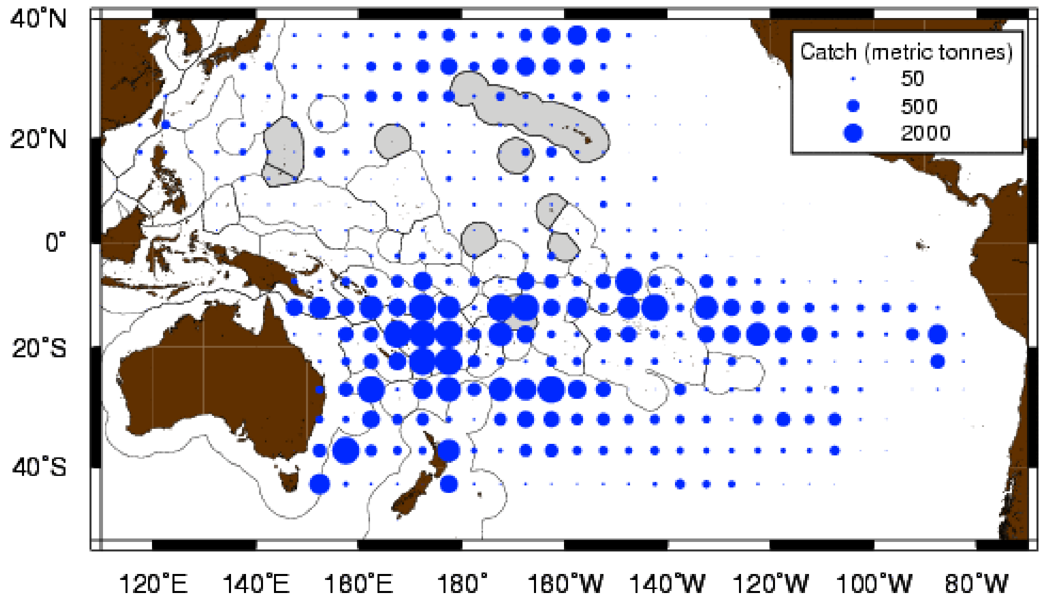


Figure 8. Distribution of longline catches of albacore tuna reported in 2004. Source: SPC public domain data.

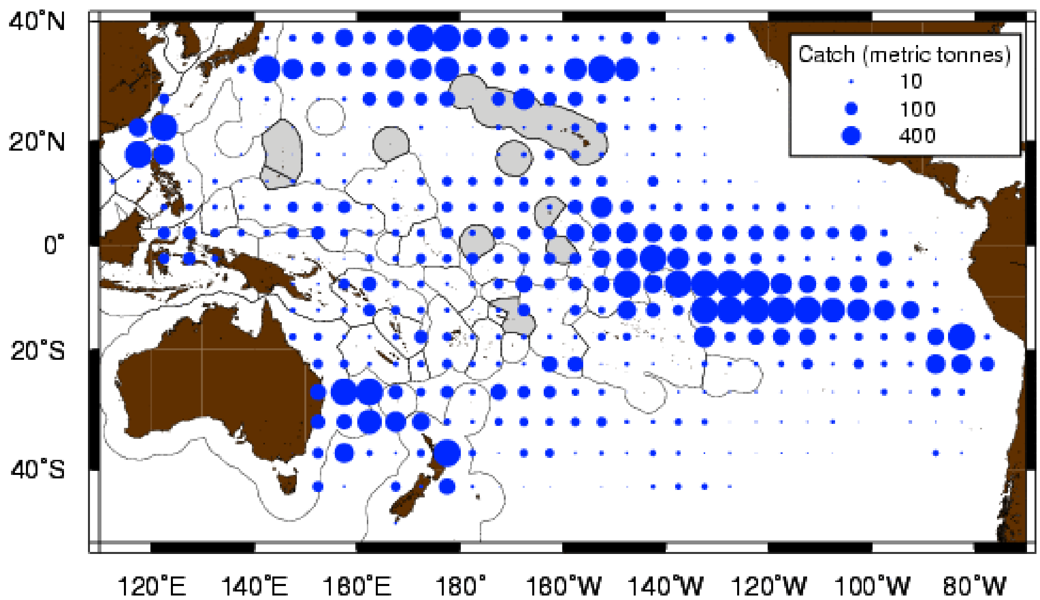


Figure 9. Distribution of longline catches of swordfish reported in 2004. Source: SPC public domain data.

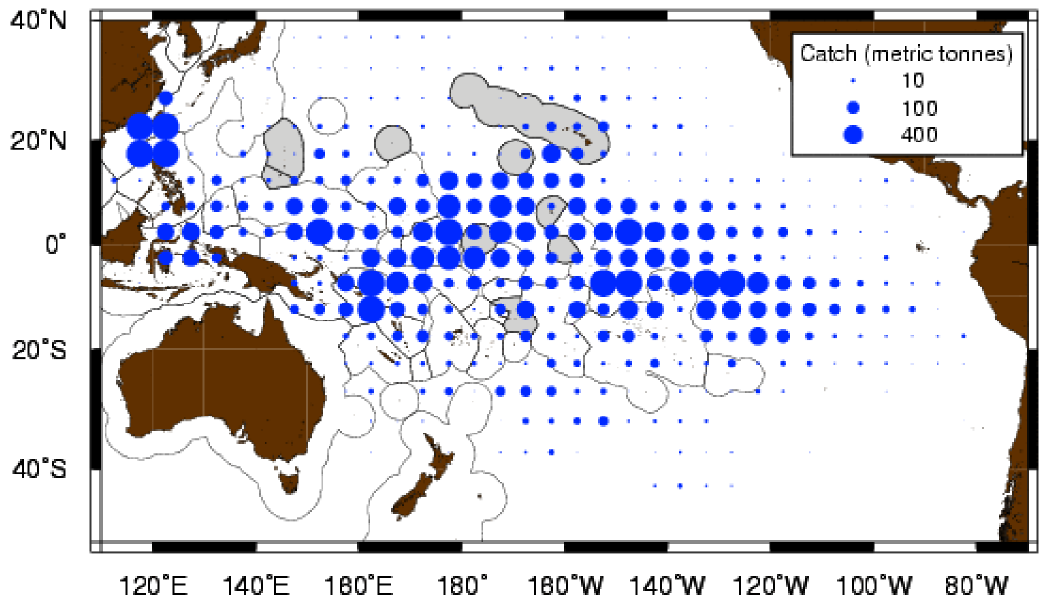


Figure 10. Distribution of longline catches of blue marlin reported in 2004. Source: SPC public domain data.

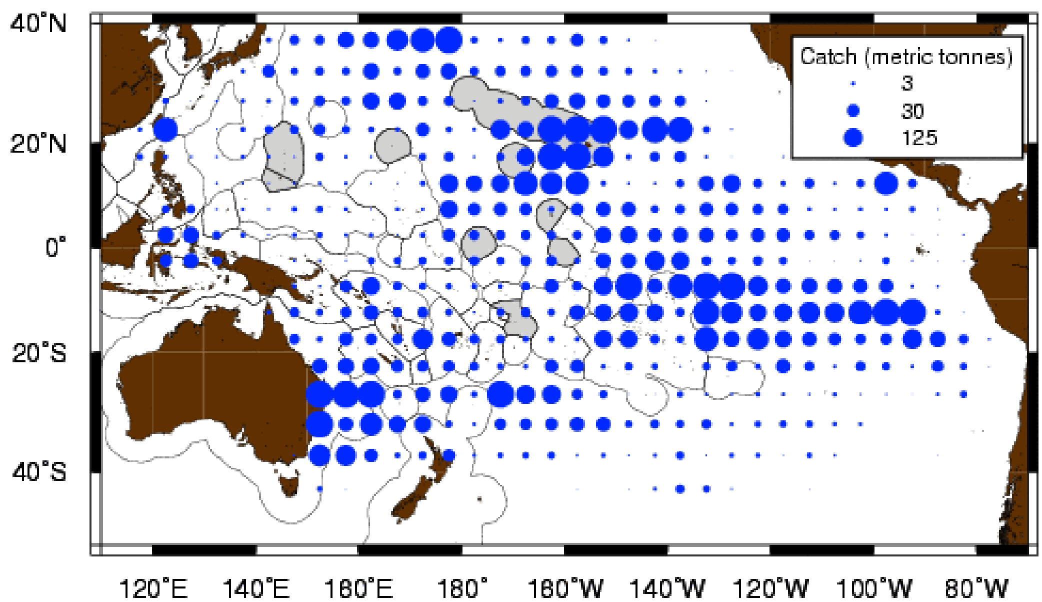


Figure 11. Distribution of longline catches of striped marlin reported in 2004. Source: SPC public domain data.

The 2005 pole-and-line fishery in the WCP-CA. Source: WCPFC-SC2-2006/GN WP-1

Vessels The pole-and-line fleet was composed of approximately ~500 vessels in the 2005 fishery which excludes vessels in the Indonesia domestic fishery.

Catch The 2005 catch estimates for most 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. 200,000–230,000 mt). Skipjack tends to account for the vast majority of the catch (typically around 70-80% of the total catch), while albacore, taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific (typically around 15-20% of the total catch), yellowfin (5–7%) and a small component of bigeye (~1%) make up the remainder of the catch. The Japanese distant-water and offshore (138,281 mt in 2004) and the Indonesian fleets (41,049 mt in 2005) account for most of the WCP–CA pole-and-line catch. The Solomon Islands fleet (6,882 mt in 2004) continues to recover from low catch levels experienced in recent years (only 2,778 mt in 2000), but is still far from 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).

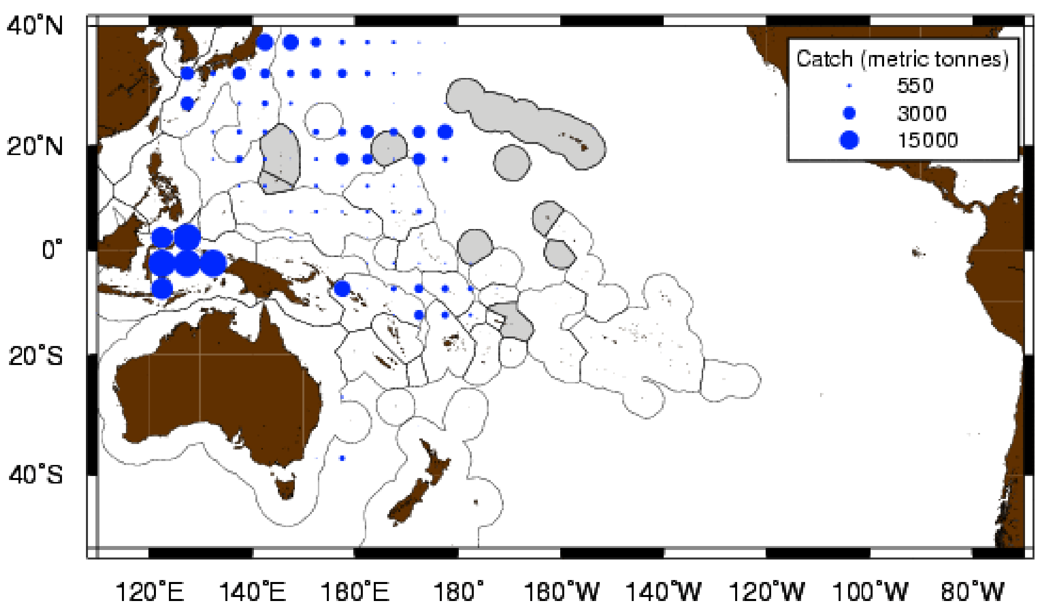


Figure 12. Distribution of pole-and-line catch of skipjack reported in 2004. Source: SPC public domain data.

Table 3. Total reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: WCPFC Yearbook 2005.

Year	Skipjack
1970	212,813
1971	204,305
1972	185,937
1973	271,487
1974	304,460
1975	245,967
1976	299,094
1977	309,683
1978	343,497
1979	298,549
1980	343,909
1981	306,104
1982	269,764
1983	308,536
1984	385,242
1985	251,902
1986	340,53
1987	266,93
1988	309,68
1989	295,58
1990	226,24
1991	296,38
1992	255,62
1993	287,61
1994	234,40
1995	266,96
1996	217,20
1997	232,13
1998	247,81
1999	239,82.
2000	224,014
2001	164,224
2002	153,719
2003	172,765
2004	148,223
2005	149,120
Average	257,507
STD deviation	59,585

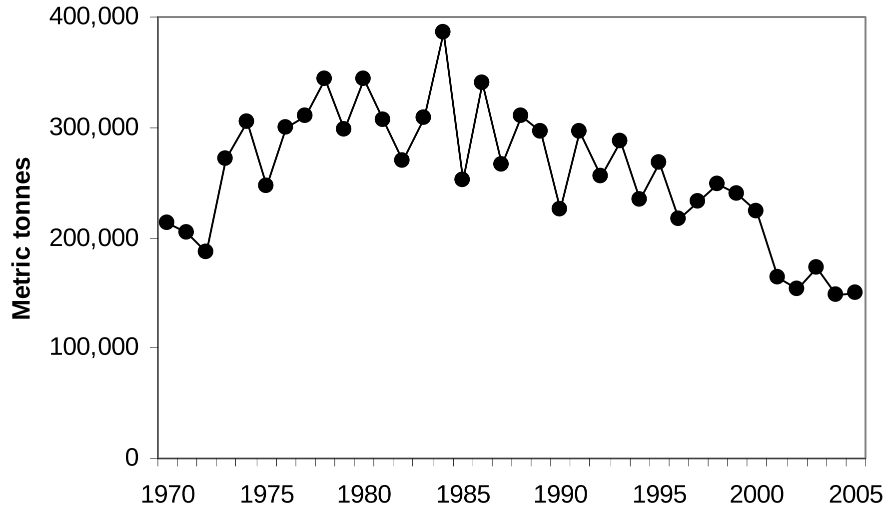


Figure 13. Reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: WCPFC Yearbook 2005.

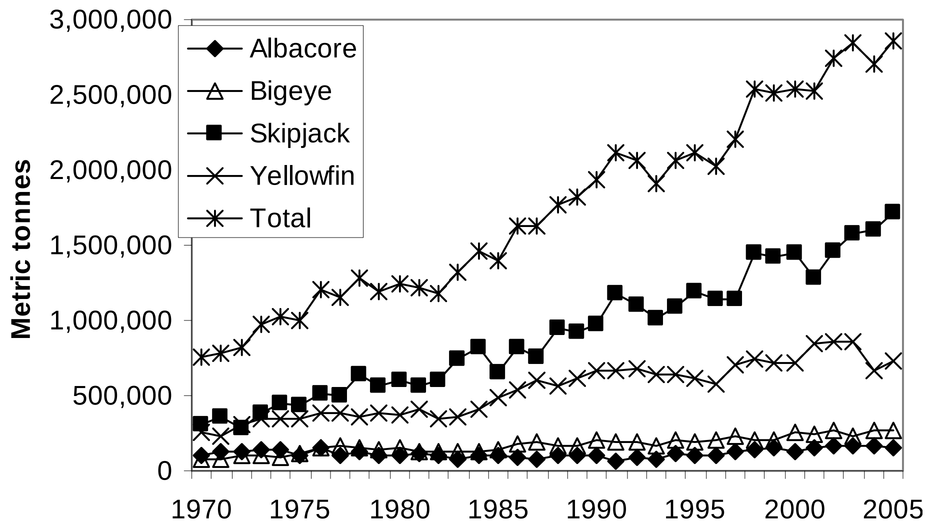


Figure 14. Estimated total annual catch of tuna species in the Pacific Ocean. Source: WCPFC Yearbook 2005.

Table 4. Estimated annual catch (metric tonnes) of tuna species in the Pacific Ocean. Source: WCPFC Yearbook 2005.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	101,121	75,844	311,894	262,629	751,488
1971	126,104	77,523	353,183	228,650	785,460
1972	127,571	97,516	281,876	310,482	817,445
1973	141,978	103,557	386,940	342,797	975,272
1974	136,561	91,315	451,668	347,690	1,027,234
1975	103,637	117,467	437,369	346,682	1,005,155
1976	148,188	153,844	506,572	390,149	1,198,753
1977	100,607	167,874	506,000	384,494	1,158,975
1978	132,082	154,154	637,184	353,729	1,277,149
1979	96,496	140,423	561,417	390,346	1,188,682
1980	102,371	156,841	602,829	375,978	1,238,019
1981	112,787	125,945	570,071	407,471	1,216,274
1982	108,454	122,371	598,598	351,112	1,180,535
1983	81,782	128,547	748,631	363,126	1,322,086
1984	103,758	124,843	822,449	408,086	1,459,136
1985	100,155	147,287	655,669	488,636	1,391,747
1986	85,770	177,959	825,076	541,814	1,630,619
1987	78,923	189,268	756,401	597,581	1,622,173
1988	96,429	160,343	945,613	568,062	1,770,447
1989	108,786	160,374	925,345	621,132	1,815,637
1990	102,487	205,258	968,094	662,943	1,938,782
1991	70,456	195,073	1,185,461	668,654	2,119,644
1992	93,379	196,068	1,103,884	677,069	2,070,400
1993	82,635	170,292	1,009,656	645,865	1,908,448
1994	113,571	207,122	1,092,429	645,560	2,058,682
1995	105,169	195,920	1,196,106	617,086	2,114,281
1996	106,520	199,910	1,138,041	576,825	2,021,296
1997	130,154	232,047	1,137,156	710,275	2,209,632
1998	135,457	208,339	1,449,311	748,877	2,541,984
1999	155,954	211,361	1,425,594	716,477	2,509,386
2000	125,167	261,517	1,443,606	714,388	2,544,678
2001	154,805	245,951	1,277,749	849,727	2,528,232
2002	172,455	263,491	1,457,771	854,501	2,748,218
2003	170,123	229,260	1,579,531	861,780	2,840,694
2004	164,827	263,458	1,601,624	670,452	2,700,361
2005	154,218	265,898	1,716,134	725,606	2,861,856
Average	117,526	172,896	907,415	539,631	1,737,468
STD deviation	27,206	54,316	411,523	181,251	644,597

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 2006, the SC reviewed assessments for bigeye and yellowfin 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/sc2/pdf/SC2_ExecSummary.pdf and http://www.wcpfc.int/sc2/pdf/SC2_GN_WP1.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 March 2006, the fifth meeting of the ISC reviewed assessments for North Pacific albacore and summary statements from the meeting are available (http://isc.ac.affrc.go.jp/).

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 15). 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 and anticipated stock assessments for WPRFMC PMUS

Albacore Tuna (S. Pacific)	2006	Swordfish (N. Pacific)	2004
Albacore Tuna (N. Pacific)	2004	Wahoo	
Other tuna relatives (*Auxis* sp.)		Yellowfin Tuna (WCPO)	2006
(*allothunnus* sp., *Scomber* sp.)		Kawakawa	
Bigeye Tuna (WCPO)	2006	Bluefin Tuna (Pacific)	2004
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)	2005	Salmon Shark	
Striped Marlin			

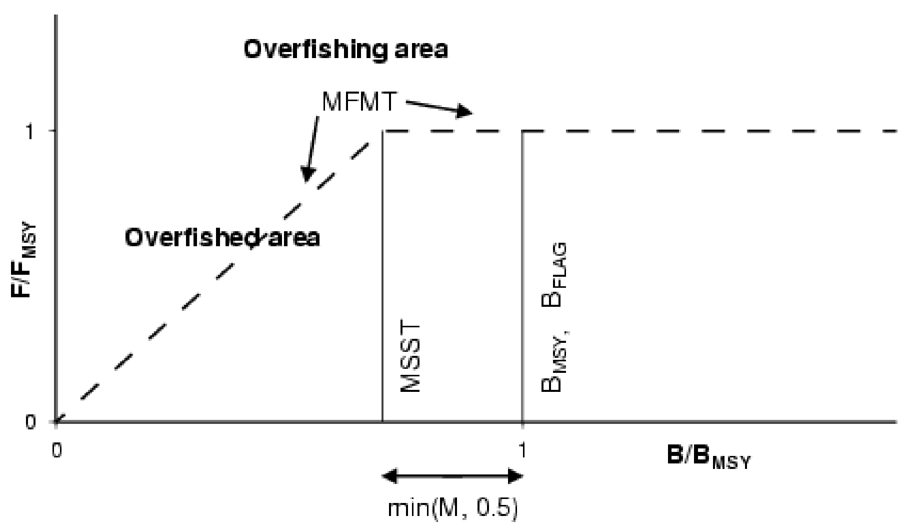


Figure 15. Specification of reference points MFMT and MSST in the WPRFMC Pelagic FMP.

Skipjack tuna in the WCP-CA

Stock status: A stock assessment was undertaken for skipjack during 2005 and is the first since 2003. The 2005 stock assessment indicates that for the skipjack stock in the WCP-CA overfishing is not occurring ($F_{current}$ / F_{MSY} < 1), that the stock is not in an overfished state ($B_{current}$ / B_{MSY} > 1), and that exploitation is modest relative to the stock's biological potential (Figure 16, Table 6).

Management implications: Catches increased in 2005 from their previous historical high in 2004. These high catches are 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 yellowfin and bigeye tunas.

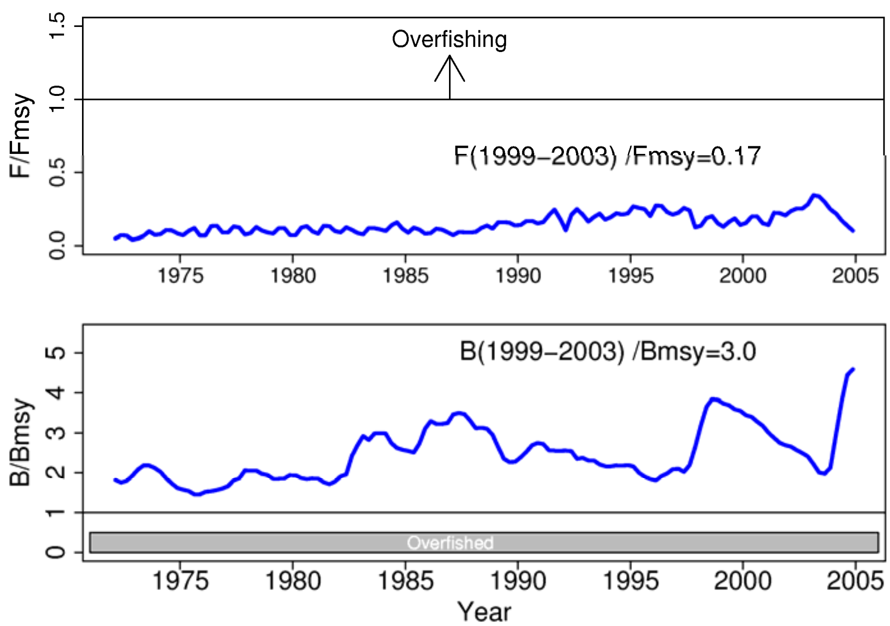


Figure 16. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for skipjack tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

Yellowfin tuna in the WCP-CA

Stock status: The 2006 assessment results were reviewed and confirmed as consistent with the 2005 assessment, although the point estimate for $F_{current}/F_{MSY}$ was slightly more optimistic in this assessment. The assessment using the 6 region model indicates that over-fishing is occurring in the WCPO ($F_{current}/F_{MSY} \geq 1$, with 73% probability), but the stock is not yet in an overfished state ($B_{current}/B_{MSY} > 1$, with 95% probability). The trajectory of these stock status reference points indicates that the stock has been declining rapidly in recent years, and fishing mortality at current levels will probably move the yellowfin stock into an overfished state. The greatest impact from the fishery is in the equatorial region, while the temperate regions are estimated to be only lightly exploited. Furthermore, the attribution of depletion to various fisheries or groups of fisheries indicates that the Indonesian and Philippines domestic fisheries probably have the greatest impact, particularly in the western equatorial region, and is also estimated to impact the other regions, to some extent, through fish movement, although the movement rates out of this region are not estimated to be very large. The purse seine fishery has a lesser, but still substantial effect, particularly in the equatorial regions. Unlike the case for bigeye, the impact of the longline fishery on yellowfin is relatively small.

Management implications: In order to maintain the yellowfin stock at a level capable of producing the maximum sustainable yield the Scientific Committee recommends a 10% reduction in fishing mortality from the average levels for 2001-2004. If the WCPF Commission wishes to maintain equilibrium average biomass at levels above BMSY, further reductions would be required. For example, a 26% reduction in fishing mortality would be required to maintain biomass at a level 20% above that which will produce the maximum sustainable yield. As noted in 2005, fishing impacts in the western equatorial WCPO have been increasing over recent years and more urgent management actions may be required for this area.

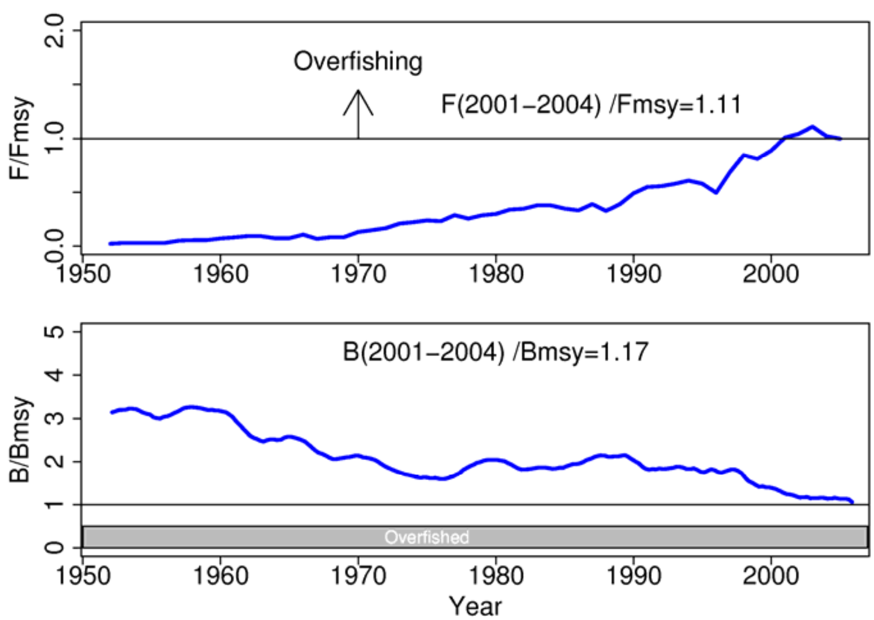


Figure 17. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for yellowfin tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point (MSST).

Bigeye tuna in the WCP-CA

Stock status: The 2006 assessment results were reviewed and confirmed as consistent with the 2005 assessment, although the point estimate for $F_{current}/F_{MSY}$ was slightly more pessimistic in this assessment. The assessment using the 6 region model indicates that there is a high probability that overfishing of bigeye has been occurring in the WCPO ($F_{current}/F_{MSY} \geq 1$, with >99% probability) since 1997. While the stock is not yet in an overfished state ($B_{current}/B_{MSY} > 1$, with >99% probability) further biomass decline is likely to occur at 2001-2004 levels of fishing mortality at long-term average levels of recruitment, moving the stock into an overfished state. The greatest impact from the fishery is in the equatorial region, while the temperate regions are estimated to be moderately exploited. Furthermore, the attribution of depletion to various fisheries or groups of fisheries indicates that the longline fishery has the greatest impact; the purse seine fishery operating on associated sets has a lesser, but still substantial effect, particularly in the equatorial regions.

Management implications: In order to maintain the bigeye stock at a level capable of producing the maximum sustainable yield the Scientific Committee recommends a 25% reduction in fishing mortality from the average levels for 2001-2004. If the WCPF Commission wishes to maintain average biomass at levels above BMSY, further reductions would be required. The various levels of fishing mortality reduction required to maintain the biomass at specified levels above BMSY (relative to the average levels for 2001-2004). For example, a 39% reduction in fishing mortality would be required to maintain biomass at a level 20% above that which will produce the maximum sustainable yield. Fishing impacts in the equatorial WCPO have been increasing over recent years and more urgent management actions may be required for this area.

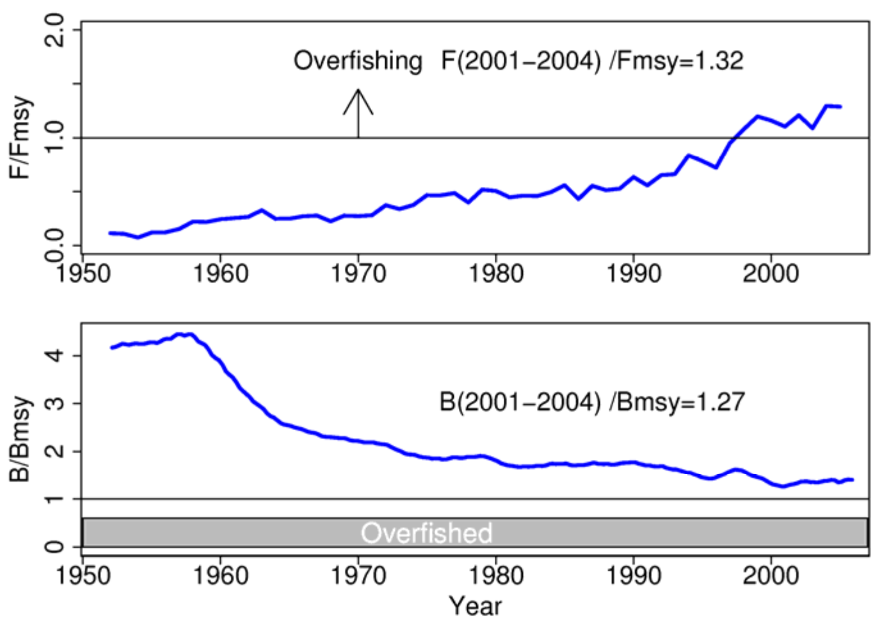


Figure 18. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for bigeye tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

South Pacific albacore (SPALB)

Stock status: A full stock assessment was not undertaken for south Pacific albacore in 2006, but the 2005 assessment was updated using new data for 2004 and 2005. The key conclusions were similar to those of the 2003 and 2005 assessments, i.e. that overfishing is not occurring ($F_{current}$ /F_{MSY} <1) and the stock is not in an over-fished state ($B_{current}$ / B_{MSY} >1). Overall, fishery impacts on the total biomass are low (10%), although considerably higher impacts occur for the portion of the population vulnerable to longline. The model estimates that recent recruitment is below average and, consequently, the portion of the population vulnerable to longline is predicted to decline further in the next 2−3 years. The assessment conclusions were relatively insensitive to a range of different assumptions regarding the key biological parameters included in the model, although the analysis highlighted the need to refine some of these key parameters.

Management implications: The key management implications are unchanged from the 2005 assessment. Current catch levels from the South Pacific albacore stock appear to be sustainable and yield analyses suggest that increases in fishing mortality and yields are possible. However, given the age specific mortality of the longline fleets, any significant increase in effort would reduce CPUE to low levels with only moderate increases in yields. CPUE reductions may be more severe in areas of locally concentrated fishing effort.

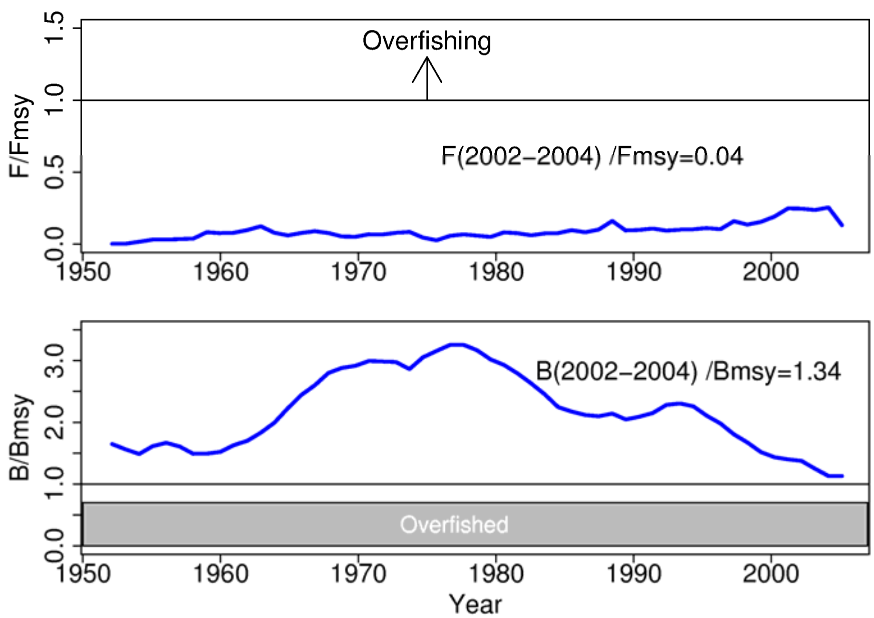


Figure 19. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for South Pacific albacore. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

Stock status – North Pacific albacore (NPALB)

A primary focus of the 2004 North Pacific Albacore (NPALB) Workshop was assessing the albacore stock using the age-structured model, VPA-2BOX. Stock assessment results indicated that the point estimate of the 2004 stock biomass is roughly 429,000 mt with 80% confidence limits ranging from roughly 329,000 to 563,000 mt. The 2004 level of spawning stock biomass of 165,000 t (24% less than SSB_{MSY} relative to $F_{30\%}$) is largely reflective of a very strong 1999 year-class that eventually became a major contributor in 2004 as part of 'mature' (spawning) biomass. However, subsequent recruitment declined to levels more typical of the extended historical time series, which translated to reduced levels of forecasted SSB, particularly, assuming 'high F' scenarios within the overall uncertainty analysis. This, coupled with a current fishing mortality rate (F_{2003}) that is high relative to commonly used reference points, may be cause for concern regarding the stock status of North Pacific albacore. Future conditions are less well-known, but if F continues at assumed levels, it is unlikely that SSB will rebuild to SSB_{MSY} levels within a 5-year time horizon.

Stock status – Pacific bluefin tuna

A complicating factor in a 2004 Pacific bluefin stock assessment was that some of the fishery statistics are substandard. MULTIFAN-CL and ADAPT VPA assessments show similar biomass trends, though some combinations of various size weightings of the MULTIFAN-CL analysis result in different long-term trends. Biomass was high in the mid 1950s, 1979, and mid-1990s. Recruitment has fluctuated with a large pulse in 1994 and very low recruitment in 1992. Changes in biomass and spawning stock biomass have been driven by recruitment. Yield per recruit estimates from the ADAPT modeling showed recent fishing mortality (F) exceeding Fmax. The status of the stock may be characterized as: 1) biomass appears to have recovered from a record low level in the late 1980s to a more intermediate level in recent years, largely due to better than average recruitment during the 1990s; 2) the SSB has generally declined since 1995 despite good recruitment and will likely continue to decline if recent fishing mortality rates continue; 3) recent fishing mortality is greater than Fmax, which has both economic implications and is an indicator of biological concern; and 4) the high fishing mortality on young fish (ages 0–2) and older fish (ages 6+) may be cause for concern with respect to maintaining a sustainable fishery in future years. Implications of the stock status include: 1) no further increases in fishing mortality (F) for any of the fisheries taking PBF; and 2) reduce the uncertainty associated with the assessment results by undertaking improvement in the data collection, data analyses, and assessment models used.

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.

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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}=0.17	No	No	B/B_{MSY}=3.0	No	No	Langley et al. 2005	>0.5 yr^{-1}	0.5 B_{MSY}
Yellowfin Tuna (WCPO)	F/F_{MSY}=1.11	Yes	Not applicable	B/B_{MSY}=1.17	No	No	Hampton et al. 2006a	0.8-1.6 yr^{-1}	0.5 B_{MSY}
Albacore Tuna (S. Pacific)	F/F_{MSY}=0.04	No	No	B/B_{MSY}=1.34	No	No	Langley & Hampton 2004	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}=1.32	Yes	Not applicable	B/B_{MSY}=1.27	No	No	Hampton et al. 2006b	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] Assssment results based on natural mortality fixed at 0.2 yr^{-1}

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).

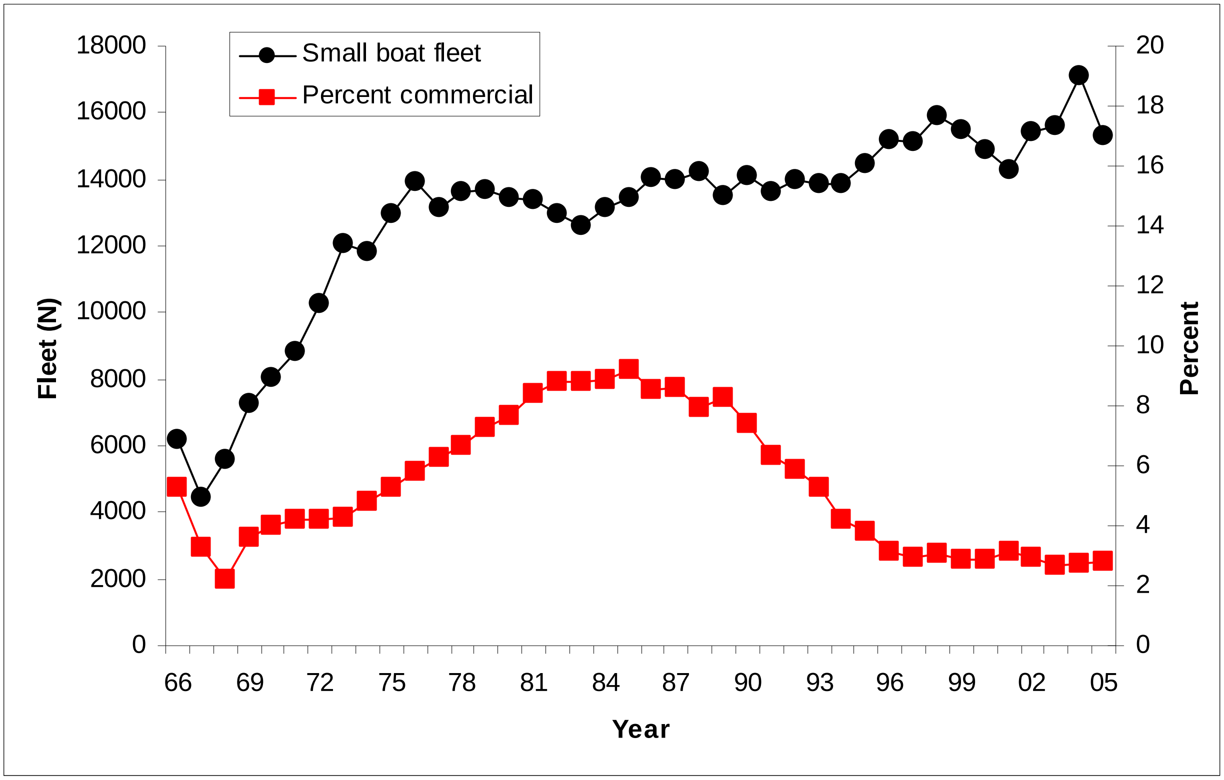

Figure 1 Annual number of small vessel registrations in Hawaii. Figure shows total fleet size, and percentage of vessels being registered for commercial fishing (Source: Hawaii Division of Boating and Ocean Resources)

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 were 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 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 2005

Location	Year	Total catch (lbs)	Unsold catch (lb)	Nominal recreational catch (lb)	Recr. catch as % of total catch	Recr. fishing trips
American Samoa	2005	8,884,860	34,346	32,949	0.37	97
Guam	2005	765,110	407,146	361,445	47.2	4,846
Hawaii	2005	51,526,512		20,907,914	40.6	590,304
NMI	2005	530,033	97,243	88,702	48.3	7,131

Charter vessel sportsfishing

Tables 2-6 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 2005

Location	Catch (lb)	Effort (trips)	Species
Guam	56,692	1,748	mahimahi, skipjack, wahoo, blue marlin
Hawaii	478,650	11,318	blue marlin, mahimahi, yellowfin, wahoo
Northern Mariana Islands	21,824	572	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 patrons fee, but are also able to dispose of fish on local markets, as is the case in Hawaii. The catch composition of charter vessel catch versus conventional commercial trolling 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 cath 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, 2005

Species	Charter vessels		Commercial trollers	
	Landings	Percent	Landings	Percent
Blue marlin	154,724	32.33%	221,708	11.37%
Mahimahi	116,388	24.32%	436,265	22.37%
Yellowfin tuna	104,404	21.81%	552,962	28.36%
Wahoo	48,215	10.07%	352,748	18.09%
Striped marlin	15,891	3.32%	24,343	1.25%
Shortnose spearfish	13,145	2.75%	11,224	0.58%
Skipjack	12,698	2.65%	151,176	7.75%
Others	13,187	2.76%	199,697	10.24%
Total	478,650	100.00%	1,950,123	100.00%

Table 4. Comparison of species composition of landings made by Guam pelagic charter vessels versus commercial troll vessels, 2005

Species	Charter vessels		Commercial trollers	
	Landings (lb)	Percent	Landings (lb)	Percent
Mahimahi	27,189	47.96%	79,990	34.79%
Skipjack Tuna	14,349	25.31%	85,008	36.97%
Wahoo	11,405	20.12%	32,521	14.14%
Blue Marlin	1,950	3.44%	7,258	3.16%
Yellowfin Tuna	1,733	3.06%	23,177	10.08%
Others	66	0.12%	1,965	0.85%
Total	56,692	100.00%	229,919	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 2004, charter vessel catches on the island of Hawaii accounted for nearly half of the total charter vessel landings within the state, with Oahu and Maui County charter vessels forming most of the remaining charter vessel catch.

Table 5. Charter vessel catches in Hawaii by island, 2005

Island	Catch	Percent	Trips	Percent	CPUE (lb/trip)
Hawaii	237,244	49.57%	5,547	49.01%	42.76
Kauai	31,726	6.63%	621	5.49%	51.08
Maui County*	87,071	18.19%	3,504	30.96%	24.84
Oahu	122,609	25.62%	1,646	14.54%	74.48
Total	478,650	100.00%	11,318	100.00%	42.29

* DAR confidentiality protocols prevent reporting 2004 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 two thirds of the charter vessel catch comprises blue marlin (Table 6). Elsewhere, mahimahi dominate 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, 2005

Hawaii			Kauai		
Species	Landings (lb)	Percent	Species	Landings (lb)	Percent
Blue marlin	96,805	40.80%	Yellowfin tuna	9,900	31.20%
Yellowfin tuna	64,067	27.00%	Mahimahi	8,031	25.31%
Mahimahi	30,728	12.95%	Skipjack	4,508	14.21%
Wahoo	22,512	9.49%	Blue marlin	4,238	13.36%
Shortnose spearfish	8,775	3.70%	Wahoo	2,629	8.29%
Striped marlin	5,423	2.29%	Striped marlin	1,040	3.28%
Others	8,935	3.77%	Others	1,381	4.35%
Total	237,244	100.00%	Total	31,726	100.00%

Oahu			Maui		
Species	Landings (lb)	Percent	Species	Landings (lb)	Percent
Mahimahi	46,647	38.04%	Mahimahi	30,982	35.58%
Blue marlin	30,058	24.51%	Blue marlin	23,624	27.13%
Yellowfin tuna	27,471	22.41%	Wahoo	14,483	16.63%
Wahoo	8,591	7.01%	Striped marlin	5,578	6.41%
Striped marlin	3,850	3.14%	Yellowfin tuna	2,967	3.41%
Skipjack	3,382	2.76%	Shortnose spearfish	2,898	3.33%
Others	2,611	2.13%	Others	6540	7.51%
Total	122,609	100.00%	Total	87,071	100.00%

Recreational Fishing Data Collection in Hawaii

The Hawaii Marine Recreational Fishing Survey Project

Recreational fish catches in Hawaii are monitored through the Hawaii Marine Recreational Fishing Survey (HMRFS), a collaborative project of the NMFS Office of Science and Technology and the Hawaii Division of Aquatic Resources. This project is a segment of the nationwide Marine Recreational Fisheries Statistical Survey (MRFSS), which has been used by NMFS to estimate recreational catches in most of the coastal states of the US.

The MRFSS program uses a triple survey approach that has been developed over the 20+ years of its history. For each two-month survey period (wave) a random sample of households is called by telephone to determine how many have done any fishing in the ocean, their mode of fishing (private boat, rental boat, charter boat, or shoreline), what methods were used, and how much effort (number of trips and hours) was expended. Concurrently, surveyors are sent out to boat launch ramps, small boat harbors, and shoreline fishing sites to interview fishermen to fill out intercept survey forms. The intercept survey collects data on fishing area, fishing methods, trip/effort, species caught, and lengths and weights of fish. The sites are randomly selected, but stratified by fishing pressure so that the sites with the highest pressures are likely to be surveyed more often. In addition the charter boat operators are surveyed by a separate survey. This additional survey of the charter fleet serves the same function as the random digit dialing household survey and is necessary because out of town fishers that charter vessels wouldn't be covered by randomly calling the Hawaiian populace. The telephone and charter survey data are used to estimate total statewide fishing effort and the intercept surveys provide detailed catch and trip information. Data from the three surveys are combined and expanded by computer to yield statewide estimates of total effort and catch by species, mode, and county[9].

NMFS and HDAR contributed joint funding for intercept surveys and charter boat surveys on the islands of Oahu, Hawaii, and Maui. NMFS also funded the Random Digit Dialing household telephone survey via a national contractor beginning in January 2001. The HMRFS project commenced in July 2001. Four surveyors were hired in the first year (July 2001 - June 2002) and began surveys of private boat and charter boat fishermen in late 2001. The HMRFS has continued to expand its efforts now consists of 11 surveyors (3 on Oahu, 2 on Maui, and 3 on Hawaii, 2 on Kauai, and 1 on Molokai) and 1 data worker. The HMRFS expanded in 2004 to surveying Kauai and Molokai. Over the subsequent years the project has expanded to cover most of the main Hawaiian Islands

In 2006, the MRFSS survey was reviewed by the National Research Council of the National Academy of Sciences (NRC 2006). The reviewers were critical of the statistical methods employed to generate expansions of the survey data to annual recreational catch estimates for each state. Consequently, NMFS is conducting an overhaul of the MRFSS survey to respond to the NRC criticisms. As such, readers of this report should understand that there is uncertainty surrounding the various expansions from the HMRFS survey and figures reported here may change as new methods are developed to conduct the expansions from survey data. However, Table 7 provides summaries of the recreational boat and shoreline fish catch between 2003 and 2005 for pelagic and other species of fish.

Recreational pelagic fish catches ranged from about 15.4 and 18.7 million pounds over this period. As would be expected, most of this catch came from boat-based fishing, although some pelagic fish can be caught from shore. However, the volume of shoreline-caught pelagic fish is unlikely to be as high as shown in Table 7. This is illustrative of some of the weaknesses identified by the NRC review of the MRFSS methodology, where rare or uncommon events can be expanded disproportionately.

Table 7. Recreational fish catches in Hawaii between 2003 and 2005. Source: HMFRS

Fish type	Catch (lb) Boat fishing	Shoreline fishing	Total
		2003	
Pelagic	18,185,500	515,376	18,700,876
Others	630,895	1,744,178	2,375,073
Total	**18,816,395**	**2,259,554**	**21,075,949**
		2004	
Pelagic	15,233,923	148,908	15,382,831
Others	1,521,458	1,385,932	2,906,850
Total	**16,755,381**	**1,534,840**	**18,289,681**
		2005	
Pelagic	17,451,519	1,109,008	18,560,527
Others	989,359	1,358,028	2,347,387
Total	**18,440,878**	**2,467,036**	**20,907,914**

[9] For more information on the MRFSS program and survey methods, please go to the MRFSS web site (http://www.st.nmfs.gov/st1/recreational/).

Figures 2-5 summarize aspects of the boat-based recreational fishery landings for six major pelagic fish species in Hawaii (blue marlin, striped marlin, mahimahi, skipjack, yellowfin and wahoo) between 2003 and 2005, while Figure 6 shows the bimonthly distribution of boat-based fishing effort over the same time period. Skipjack tuna are the most commonly recreationally caught pelagic fish (Figure 2) followed by yellowfin tuna, mahimahi and wahoo. In terms of weight, however, yellowfin tuna dominates recreational pelagic fish catches (Figure 3). Although blue marlin numbers in the catch are small compared to other species, the much greater average weight (Figure 4) means that it comprises a significant fraction of the recreational catch by weight, compared to the catch by numbers. Average weights for most species tended to be relatively similar between years except for yellowfin tuna, where a high average weight in 2003 meant that the estimated catch in that year was about double that of subsequent years. This is also reflected in the nominal catch rate (lbs/trip) in Figure 5, where yellowfin catch rate was much higher in 2003 than in 2004 and 2005. The distribution of fishing recreational fishing effort shows that boat based activity is highest in the summer and fall when the weather is at its most clement in Hawaii.

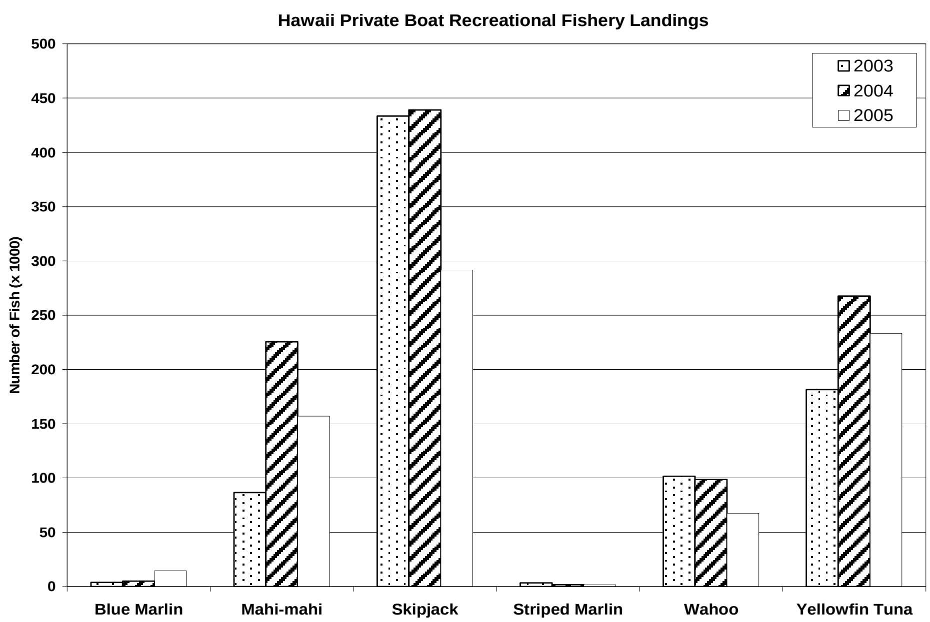

Figure 2. Annual recreational fishery landings by number of six major pelagic fish species in Hawaii between 2003 and 2006

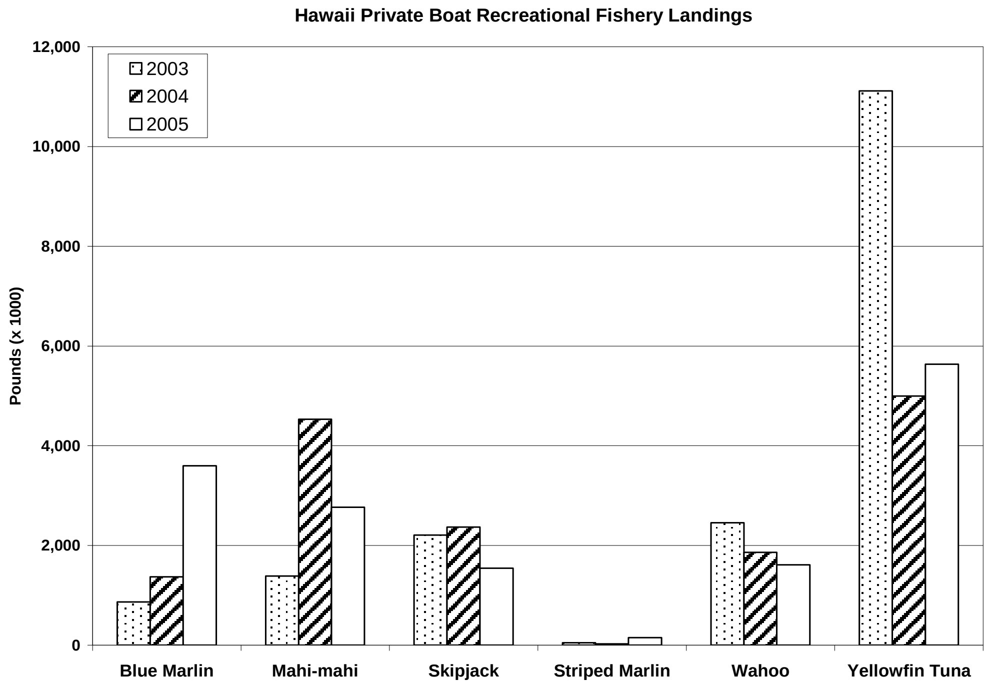

Figure 3. Annual recreational fishery landings by weight of six major pelagic fish species in Hawaii between 2003 and 2006

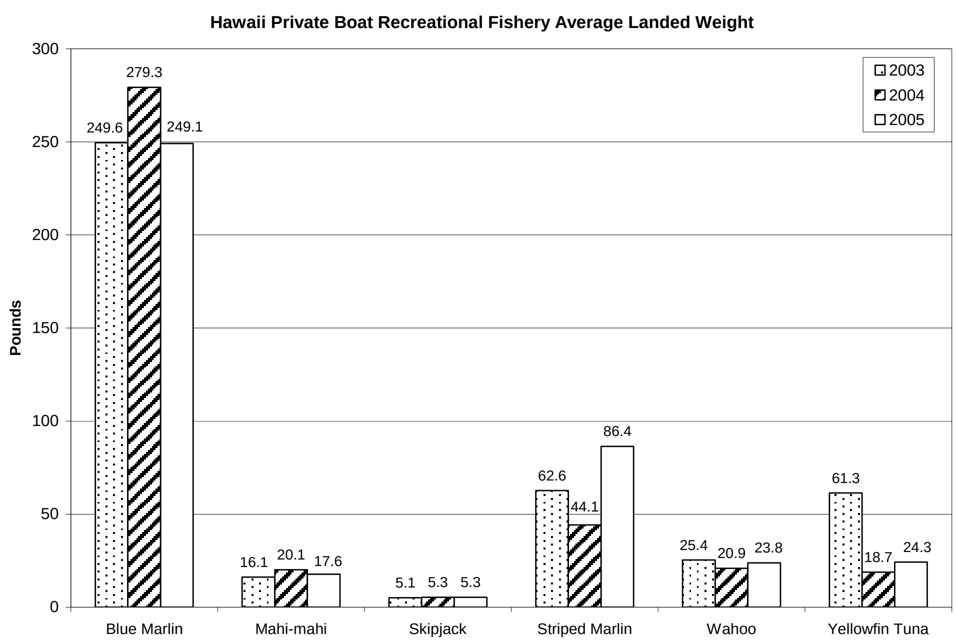

Figure 4. Average weight of six major pelagic fish species caught by recreational fishing in Hawaii between 2003 and 2005

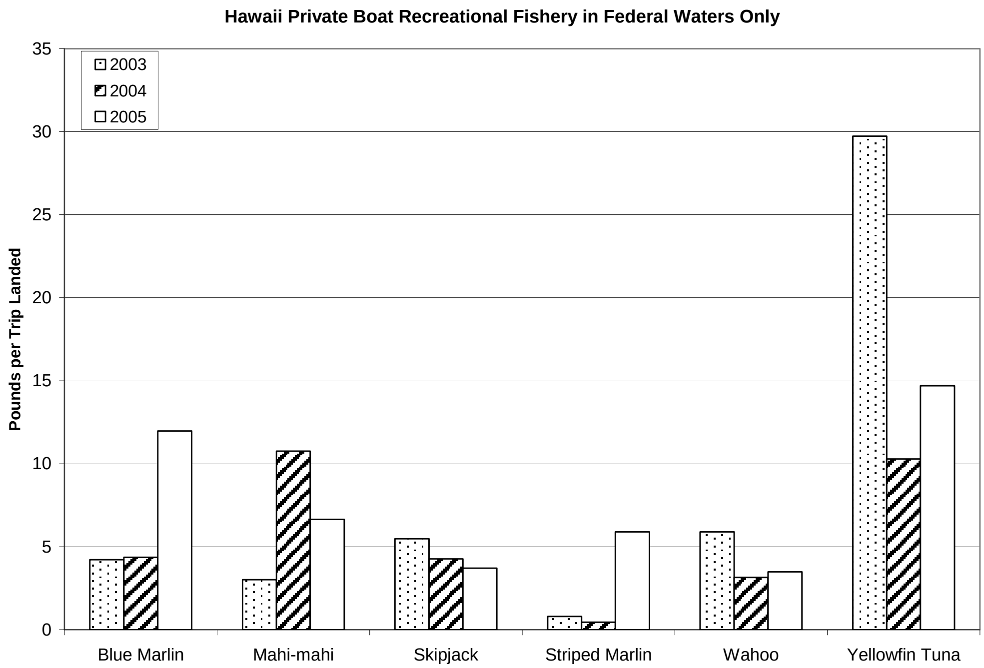

Figure 5. Annual recreational catch per unit effort (lbs per trip) for six major pelagic species in Hawaii between 2003 and 2005

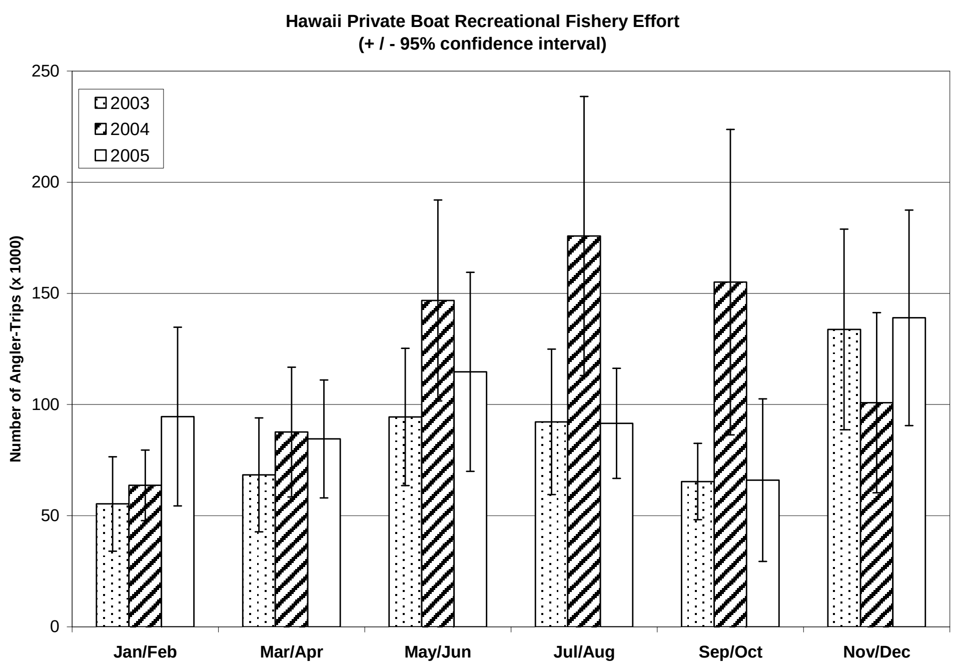

Figure 6. Annual private vessel recreational fishing effort in Hawaii between 2003 and 2005

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G. Pelagic fisheries production from the Pacific West Coast States

Introduction

The following tables include time series for pelagic fisheries production along the US West Coast between 1985 and 2005. 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
1985	7,301	15,025	2,977	7	3,254	3,418	1,190	<.05	95	149	1
1986	5,243	21,517	1,361	29	4,731	2,530	974	<.05	48	312	2
1987	3,160	23,201	5,724	50	823	1,803	562	2	20	403	2
1988	4,908	19,520	8,863	6	804	1,636	500	1	9	322	3
1989	2,214	17,615	4,505	1	1,019	1,357	504	<.05	17	255	6
1990	3,030	8,509	2,256	2	925	1,236	357	1	31	373	20
1991	1,676	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	4,885	3,350	2,586	7	1,087	1,546	292	<.05	22	142	1
1993	6,151	3,795	4,539	26	559	1,771	275	1	44	122	0
1994	10,686	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	6,528	3,038	7,037	49	714	1,161	270	5	31	95	5
1996	14,173	3,347	5,455	62	4,688	1,191	319	1	20	96	1
1997	11,292	4,774	6,070	82	2,251	1,448	319	35	32	132	1
1998	13,785	5,799	5,846	53	1,949	1,378	326	2	11	98	3
1999	9,629	1,353	3,759	105	179	1,992	320	10	5	6	0
2000	9041	1148	780	87	312	2652	295	5	3	80	1
2001	11,183	655	58	53	196	2195	373	2	2	46	2
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

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
1985	12,214,354	18,206,638	2,826,414	25,900	4,127,982	19,538,942	2,660,903	843	140,433	283,043	3,319
1986	8,895,672	25,475,289	1,367,387	129,108	6,618,473	18,256,026	2,412,160	277	95,181	611,399	1,886
1987	7,085,992	33,183,108	5,982,568	244,701	2,902,340	15,405,478	1,638,772	2,560	30,721	989,632	2,566
1988	12,280,116	34,161,742	12,618,821	33,772	4,445,064	13,007,930	1,310,935	1,097	13,328	868,676	2,923
1989	4,873,362	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,202,991	191	31,313	707,408	4,631
1990	6,911,021	10,485,225	2,361,619	10,928	1,433,788	8,811,042	786,534	2,067	42,599	909,368	15,834
1991	3,349,988	4,721,908	3,130,649	50,650	137,612	7,497,271	1,145,001	0	28,944	491,477	892
1992	13,214,373	4,412,452	1,606,563	51,444	1,360,230	8,709,765	521,922	693	17,108	266,344	2,056
1993	13,001,721	6,440,417	3,498,178	238,527	841,129	10,062,551	520,120	509	32,498	248,651	681
1994	22,293,343	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,555	46	37,579	270,088	17,572
1995	12,377,227	3,260,929	5,125,387	268,465	1,129,006	7,013,279	510,733	9,389	26,730	177,076	2,994
1996	28,583,043	3,388,536	4,185,411	273,321	4,238,678	6,363,798	634,493	1,635	18,591	174,621	616
1997	20,529,493	5,254,042	5,639,463	370,331	2,896,450	6,297,358	609,285	64,543	35,781	232,737	287
1998	19,068,271	5,976,102	5,322,183	277,238	3,058,769	6,052,792	574,795	2,635	9,513	173,349	6,094
1999	17,515,551	1,468,743	2,748,208	639,668	961,423	8,309,539	616,407	18,424	5,876	109,767	83
2000	17,154,639	1,294,388	483,242	579,384	577,095	11,772,245	587,702	2,738	4,636	132,970	909
2001	20,687,195	465,558	33,633	320,855	473,821	8,696,689	595,542	2,767	8,428	75,780	1,501
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

[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, 1985-2005

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
	Landings (mt)										
Washington											
1985	172	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<.05
1986	845	N.A.	0	N.A.	0	0	82	N.A.	N.A.	N.A.	<.05
1987	529	N.A.	0	N.A.	0	0	65	N.A.	N.A.	N.A.	<.05
1988	1,900	N.A.	0	N.A.	0	2	6	N.A.	N.A.	N.A.	<.05
1989	855	N.A.	0	N.A.	0	0	3	N.A.	N.A.	N.A.	0
1990	1,225	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1991	428	N.A.	<.05	N.A.	0	0	<.05	N.A.	N.A.	N.A.	<.05
1992	1,864	N.A.	<.05	N.A.	0	0	1	N.A.	N.A.	N.A.	<.05
1993	2,167	N.A.	0	N.A.	0	1	<.05	N.A.	N.A.	N.A.	<.05
1994	5,377	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1995	3,413	N.A.	0	N.A.	0	<.05	5	N.A.	N.A.	N.A.	<.05
1996	4,969	N.A.	0	N.A.	0	0	4	N.A.	N.A.	N.A.	<.05
1997	3,775	N.A.	0	N.A.	0	0	2	N.A.	N.A.	N.A.	<.05
1998	6,517	N.A.	0	N.A.	0	0	6	N.A.	N.A.	N.A.	<.05
1999	2,074	N.A.	0	N.A.	12	4	65	N.A.	N.A.	N.A.	0
2000	3,185	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<0.5
2001	4,152	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
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
Oregon											
1985	692	0	0	N.A.	0	0	2	N.A.	N.A.	0	0
1986	1,116	<.05	<.05	N.A.	0	0	424	N.A.	N.A.	0	0
1987	1,038	0	0	N.A.	<.05	0	92	N.A.	N.A.	0	0
1988	1,799	0	0	N.A.	0	0	81	N.A.	N.A.	0	0
1989	490	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	0
1990	943	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1991	571	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1992	1,764	0	0	N.A.	0	0	1	N.A.	N.A.	0	<.05
1993	2,157	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1994	2,131	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1995	2,283	<.05	<.05	N.A.	<.05	3	1	N.A.	N.A.	0	<.05
1996	4,059	<.05	0	N.A.	<.05	16	<.05	N.A.	N.A.	0	1
1997	4,158	<.05	<.05	N.A.	1	6	<.05	N.A.	N.A.	0	<.05
1998	4,808	0	0	N.A.	3	35	<.05	N.A.	N.A.	1	2
1999	2,064	<.05	0	N.A.	6	6	1	N.A.	N.A.	<.05	<.05
2000	3,972	0	0	N.A.	0	0	0	N.A.	N.A.	0	1
2001	4,058	0	0	N.A.	0	0	0	N.A.	N.A.	0	2
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
California											
1985	6,437	15,025	2,977	7	3,254	3,418	1,188	<.05	95	149	1
1986	3,282	21,517	1,361	29	4,731	2,530	468	<.05	48	312	2
1987	1,592	23,201	5,724	50	823	1,803	405	2	20	403	2
1988	1,209	19,520	8,863	6	804	1,634	414	1	9	322	3
1989	870	17,615	4,505	1	1,019	1,357	501	<.05	17	255	6
1990	862	8,509	2,256	2	925	1,236	356	1	31	373	20
1991	677	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	1,257	3,350	2,586	7	1,087	1,546	291	<.05	22	142	1
1993	1,827	3,795	4,539	26	559	1,770	275	1	44	122	<.05
1994	3,177	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	832	3,038	7,037	49	714	1,159	264	5	31	95	5
1996	5,146	3,347	5,455	62	4,687	1,175	316	1	20	96	<.05
1997	3,358	4,774	6,070	82	2,250	1,442	317	35	32	132	<.05
1998	2,459	5,799	5,846	53	1,946	1,343	319	2	11	97	1
1999	5,491	1,353	3,759	105	161	1,982	253	10	5	62	<.05
2000	1,884	1,148	780	87	312	2,612	250	3	5	80	<0.5
2001	2,972	642	57	53	196	2,194	360	2	2	46	0
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

Table 4. Pacific coast real commercial ex-vessel revenues (1999)[1] from highly migratory species by state, 1985-2005

	Revenues ($)										
Year	**Albacore**	**Yellowfin**	**Skipjack**	**Bigeye**	**Bluefin**	**Swordfish**	**Common Thresher**	**Pelagic Thresher**	**Bigeye Thresher**	**Shortfin Mako**	**Blue Shark**
Washington											
1985	292,000	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	183
1986	1,348,513	N.A.	0	N.A.	0	0	303,270	N.A.	N.A.	N.A.	170
1987	1,160,514	N.A.	0	N.A.	0	0	298,466	N.A.	N.A.	N.A.	580
1988	4,666,429	N.A.	0	N.A.	0	13,526	31,385	N.A.	N.A.	N.A.	65
1989	1,730,680	N.A.	0	N.A.	0	0	10,541	N.A.	N.A.	N.A.	0
1990	2,693,806	N.A.	0	N.A.	0	0	33	N.A.	N.A.	N.A.	0
1991	818,179	N.A.	17	N.A.	0	0	287	N.A.	N.A.	N.A.	52
1992	5,014,569	N.A.	82	N.A.	0	0	655	N.A.	N.A.	N.A.	39
1993	4,603,209	N.A.	0	N.A.	0	5,907	953	N.A.	N.A.	N.A.	34
1994	10,609,267	N.A.	0	N.A.	0	0	102	N.A.	N.A.	N.A.	0
1995	6,429,656	N.A.	0	N.A.	0	328	16,541	N.A.	N.A.	N.A.	16
1996	9,515,982	N.A.	0	N.A.	0	0	11,619	N.A.	N.A.	N.A.	44
1997	7,000,641	N.A.	0	N.A.	0	0	10,922	N.A.	N.A.	N.A.	10
1998	8,962,842	N.A.	0	N.A.	0	0	19,243	N.A.	N.A.	N.A.	71
1999	3,637,282	N.A.	0	N.A.	27,772	9,445	144,232	N.A.	N.A.	N.A.	0
2000	5,837,871	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	9
2001	7,951,774	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
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
Oregon											
1985	1,204,367	0	0	N.A.	0	0	3,064	N.A.	N.A.	0	0
1986	1,891,052	173	4	N.A.	0	0	874,406	N.A.	N.A.	0	0
1987	2,319,249	0	0	N.A.	9	0	214,998	N.A.	N.A.	0	0
1988	4,444,898	0	0	N.A.	0	0	180,477	N.A.	N.A.	0	0
1989	1,142,060	0	0	N.A.	0	0	19	N.A.	N.A.	0	0
1990	2,167,028	0	0	N.A.	0	0	664	N.A.	N.A.	0	69
1991	1,166,314	0	0	N.A.	0	0	0	N.A.	N.A.	0	73
1992	4,554,091	0	0	N.A.	0	0	1,228	N.A.	N.A.	0	99
1993	4,350,334	0	0	N.A.	0	0	498	N.A.	N.A.	0	130
1994	4,103,617	0	0	N.A.	0	0	0	N.A.	N.A.	0	93
1995	4,332,302	336	9	N.A.	454	25,141	1,681	N.A.	N.A.	0	192
1996	7,801,152	9	0	N.A.	1,203	125,422	234	N.A.	N.A.	0	438
1997	7,567,729	536	424	N.A.	3,332	51,790	199	N.A.	N.A.	0	209
1998	6,665,217	0	0	N.A.	15,783	263,820	114	N.A.	N.A.	2,726	5,628
1999	3,782,057	198	0	N.A.	38,117	46,955	2,588	N.A.	N.A.	787	48
2000	7,487,569	0	0	N.A.	0	0	1,190	N.A.	N.A.	0	529
2001	7,544,089	0	0	N.A.	0	0	0	N.A.	N.A.	0	1,211
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
California											
1985	10,717,987	18,206,638	2,826,414	25,900	4,127,982	19,538,942	2,657,839	843	140,433	283,043	3,136
1986	5,656,107	25,475,116	1,367,383	129,108	6,618,473	18,256,026	1,234,483	277	95,181	611,399	1,716
1987	3,606,229	33,183,108	5,982,568	244,701	2,902,331	15,405,478	1,125,308	2,560	30,721	989,632	1,986
1988	3,168,789	34,161,742	12,618,821	33,772	4,445,064	12,994,405	1,099,073	1,097	13,328	868,676	2,858
1989	2,000,622	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,192,430	191	31,313	707,408	4,631
1990	2,050,187	10,485,225	2,361,619	10,928	1,433,788	8,811,042	785,836	2,067	42,599	909,368	15,765
1991	1,365,494	4,721,908	3,130,632	50,650	137,612	7,497,271	1,144,714	0	28,944	491,477	767
1992	3,645,713	4,412,452	1,606,481	51,444	1,360,230	8,709,765	520,038	693	17,108	266,344	1,918
1993	4,048,179	6,440,417	3,498,178	238,527	841,129	10,056,643	518,669	509	32,498	248,651	517
1994	7,580,459	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,452	46	37,579	270,088	17,479
1995	1,615,269	3,260,593	5,125,378	268,465	1,128,552	6,987,810	492,511	9,389	26,730	177,076	2,785
1996	11,265,909	3,388,527	4,185,411	273,321	4,237,475	6,238,375	622,640	1,635	18,591	174,621	135
1997	5,961,123	5,253,506	5,639,039	370,331	2,893,118	6,245,568	598,164	64,543	35,781	232,737	67
1998	3,440,213	5,976,102	5,322,183	277,238	3,042,986	5,788,972	555,437	2,635	9,513	170,623	395
1999	10,102,663	1,468,544	2,748,208	639,668	895,534	8,253,140	469,587	18,424	5,876	108,980	35
2000	3,829,200	1,294,388	483,242	579,384	576,439	11,770,080	485,073	2,736	4,636	136,698	294
2001	5,191,333	445,861	32,878	320,753	472,785	8,695,855	584,636	2,767	8,428	75,572	0
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