Pelagic Fisheries of the Western Pacific Region

2009 Annual Report

Western Pacific Regional Fishery Management Council
Honolulu, Hawaii

Cover photo: *Longline fishing vessels docked in American Samoa (Photo by Fini Aitaoto, Council Island Coordinator)*

A report of the Western Pacific Regional Fishery Management Council

Pelagic Fisheries of the Western Pacific Region

2009 Annual Report

August 30, 2011

Prepared by the Pelagics Plan Team and Council Staff

for the

Western Pacific Regional Fishery Management Council
1164 Bishop Street, Suite 1400, Honolulu, Hawaii 96813

Table of Contents

List of Tables

CNMI

International

Recreational

U.S. West Coast Pelagic Fisheries

List of Figures

Hawaii

CNMI

International

Recreational

Pelagic Fisheries of the Western Pacific Region — 2009 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).

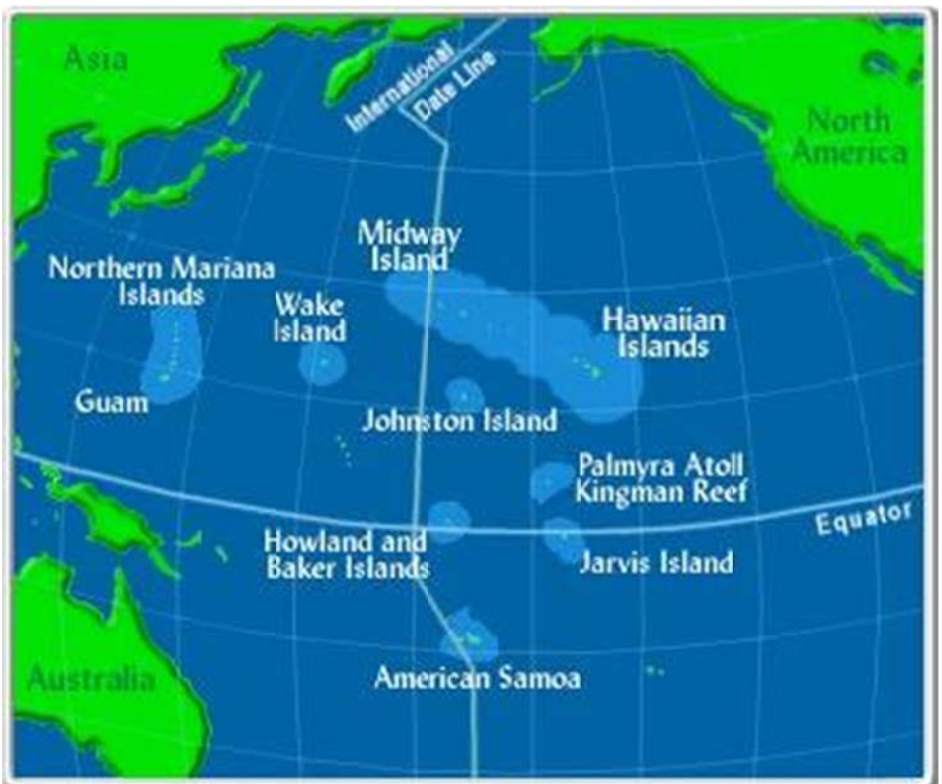


Figure 1. Map of the Western Pacific Region

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 2009, 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.

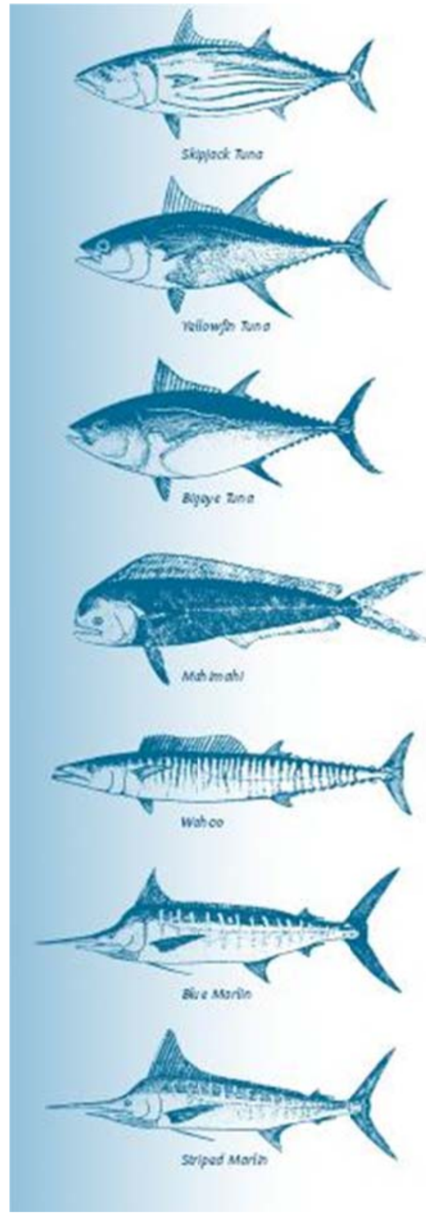
- Territory of American Samoa, Department of Marine and Wildlife Resources
- Territory of Guam, Division of Aquatic and Wildlife Resources
- Territory of Guam, Department of Commerce
- State of Hawaii, Division of Aquatic Resources
- Commonwealth of the Northern Mariana Islands, Division of Fish and 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 2009 and persons responsible for compilation of this report are included in Appendix 1.

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

B. The Pelagic Species of the Western Pacific Region

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



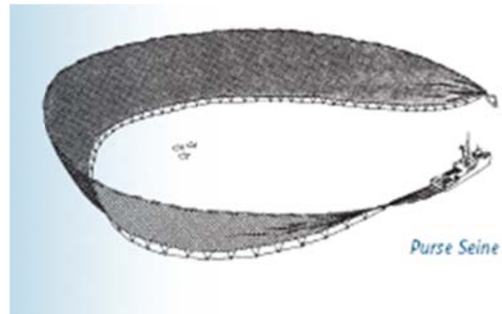
The previous MUS shark listing used to include oceanic species of the families *Alopiidae, Carcharinidae, Lamnidae, Sphynidae*. However, this could be construed to mean all members of these four shark families, which would also include nearshore and demersal sharks. The Pelagics Plan Team recommended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

Table 1. Names of Pacific Pelagic Management Unit Species

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

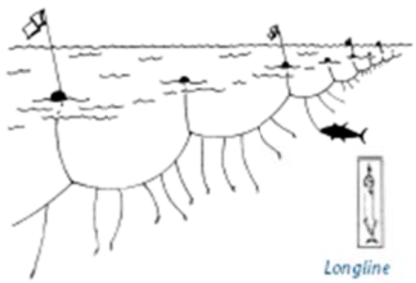
C. Pelagic Gear Types and Fisheries of the Western Pacific Region

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



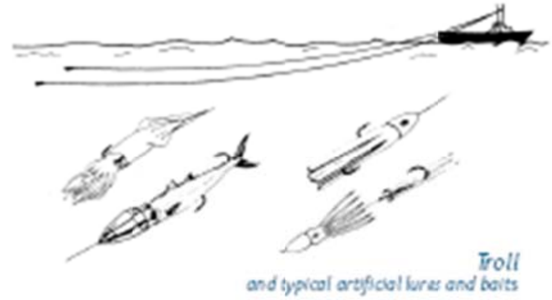
The largest fishery in terms of tonnage of fish landed is the U.S. purse-seine fishery, with catches of skipjack, yellowfin and bigeye tuna amounting to 148,514 mt in 2009. However, this fleet has been decreasing in size from a peak in 1984 of 61 vessels to 15 vessels in 2005 and 38 vessels in 2009.

The U.S. fleet of albacore trollers, based at West Coast ports, amounts to about 400 vessels, fishing primarily in the temperate waters of the North Pacific and landing in 2009 about 11,000 mt of fish. Some vessels from this fleet also fish seasonally for albacore in the South Pacific, catching on average between 250 and 1,000 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 127 vessels, targets a range of species, with vessels setting shallow longlines to catch swordfish or fishing deep to maximize catches of bigeye tuna.

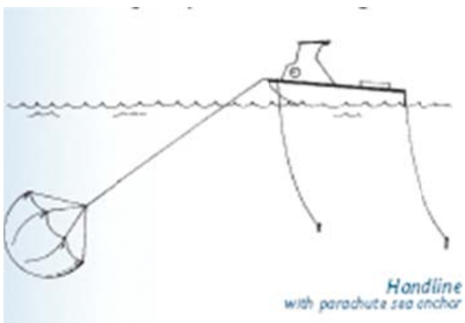
Catches by the Hawaii longline fleet also include yellowfin tuna, mahimahi (dorado), wahoo, blue and striped marlins, opah (moonfish) and monchong (pomfret). The Hawaii fishery does not freeze its catch, which is sold to the fresh fish and sashimi markets in Hawaii, Japan, and the U.S. mainland. The American Samoa longline fleet of about 26 vessels, down from a peak of 62 vessels in 2001, fishes almost exclusively for albacore tuna, which is landed to two tuna canneries in American Samoa. The combined landings from the two fisheries for all PPMUS in 2009 amounted to 12,875 mt, with about 60% of landings coming from the Hawaii fishery. In 2009, the combined landings of blue and striped marlins from the longline fishery amounted to 389 and 244 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 414 mt. Part of this catch is made by charter or for-hire fishing vessels. There are 1,667 troll vessels and 552 handline vessels in Hawaii, 44 troll vessels in the Commonwealth of the Northern Mariana Islands

(CNMI), 368 troll vessels in Guam, and 10 troll vessels in American Samoa. Troll and handline catches are dominated by yellowfin tuna in Hawaii, skipjack in Guam and CNMI, and skipjack and yellowfin tuna in American Samoa. Other commonly caught troll catches include mahimahi, wahoo and blue marlin. About 79% percent of the troll landings are made by Guam vessels. In 2009, the combined catches of blue and striped marlins by these fisheries amounted to 179 and 11 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. Recreational or non-commercial landings from boats in Guam, American Samoa and the Northern Mariana Islands amount to about 170-180 mt.



Tuna fisheries in the Pacific Ocean as a whole catch about 2.5 million mt of fish, with U.S. fisheries catching about 6% 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 five in 2000 to 31 in 2003. Lack of capital appears to be the primary constraint to substantial indigenous participation in the large-scale sector of the longline fishery (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. Until 2009, the canneries provided 8,118 jobs – 45.6 percent of total employment (in American Samoa) including both directly (5,538 jobs) and indirectly (2,580 jobs). As of 2006, there were 17,395 people employed, of which 5,894 worked for the government (in 2006, 4,757 worked directly for the canneries) (American Samoa Statistical Yearbook, 2006).

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.

On September 29, 2009, a submarine earthquake of magnitude 8.0 triggered a tsunami which made landfall in several Pacific island locations including American Samoa, with a population around 65,000. Four tsunami waves 15 to 20 feet (4 to 6 meters) high arrived ashore on American Samoa about 15 minutes after the quake, reaching up to a mile (1.5 kilometers) inland. In Pago Pago, streets and fields filled with debris, mud, overturned cars and boats. Several buildings situated a few feet above sea level were flattened. Power was out in some areas for about a month and roughly 2,200 people were in shelters across the island. All the American Samoa Department of Marine and Wildlife Resources (DMWR) floating docks were damaged and more than half destroyed. All ramps in Pago Pago were destroyed. Major boat docks were unusable because of the many derelict vessels around them and other boats sitting on the dock.

The Community Development Project Program-funded facility for the *Pago Pago Commercial Fishermen Association* project located in Pago Pago was destroyed and washed to sea, including some recently purchased equipment.

The shipyard dry-docking facilities were damaged; fortunately the last purse seiner was serviced and released the day before the tsunami. There were relatively minor damages to the cannery facilities. Longliners, DWF vessels supplying the canneries and purse seiners that were inside Pago Pago harbor may have sustained some damages. Inside Pago Pago bay area, huge amounts of trash and layers of oil pollution were observed.

3. Administrative or Management Actions to Date

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

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

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

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

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

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

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

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

AMENDMENT 15 (effective November 21, 2008) added three pelagic squid species to the FMP (*Ommastrephes bartramii, Thysanoteuthis rhombus*, and *Sthenoteuthis oualaniensis*). It also required owners of U.S. vessels greater than 50 feet in length overall that fish for pelagic squid to obtain Federal permits under the PFMP, to carry Federal observers if requested by NMFS, and to report any Pacific pelagic squid catch and effort either in Federal logbooks or via existing local reporting systems.

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

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

B. Guam

Generally, the major surface current affecting Guam is the North Equatorial Current, which flows westward through the islands. Sea surface temperatures off Guam vary between 80.9° – 84.9° F, depending on the season. The mixed layer extends to depths of 300 to 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 2009 total pelagic landings were approximately 719,892 lbs, an increase of 30% compared with 2008. Of this total, it is estimated that the total ex-vessel revenue was $286,514.

Landings in 2009 consisted primarily of three major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), and bonita or skipjack tuna (*Katsuwonus pelamis*). Other minor pelagic species caught include yellowfin tuna (*Thunnus albacares*), kawakawa (*Euthynnus affinis*), Pacific blue marlin (*Makaira mazara*), sailfish (*Istiophorus platypterus*), pomfrets (family Bramidae), oilfish (*Ruvettus pretiosus*), dogtooth tuna (*Gymnosarda unicolor*), rainbow runner (*Elagatis bipinnulatus*), and barracuda, as well as miscellaneous troll fishes and other tuna PMUS. Sharks were caught, but usually discarded as bycatch.

There are wide year-to-year fluctuations in the estimated landings of the five major species (yellowfin tuna and blue marlin are typically also considered major species, but catch was low in 2009). Mahimahi catch increased in 2009 more than 30,000 lbs from 2008, which is still significantly lower than the 2007 catch by more than 100,000 lbs. Wahoo catch totals also increased by more than 30,000 lbs from 2008, and were the third highest total during the 27 year recording period. Pacific blue marlin landings increased by almost 23,000 lbs from 2008, but were still the seventh lowest landings for the past 27 years.

Participation and effort experienced a 4% decrease in the number of participating vessels to 368 vessels in 2009, down from 385 vessels in 2008. 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.

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 fish to Europe 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 foreign fishing fleets reflect the volatility of the industry. The number of foreign 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 50 nmi longline exclusion zone around the island of Guam and the 25-75 nm exclusion zone around the MHI to foreign vessels.

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

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

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

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

AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

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 seafood industry to the Hawaii state economy indicated that in 2008, the industry contributed $273 million to the gross product, $184.4 million of household income, and employed 7,270 people (NMFS 2010). Total revenue in Hawaii's pelagic, bottomfish and lobster fisheries in 2009 was $71.1 million. The Hawaii longline fishery is by far the most important economically, accounting for more than 95 percent of the estimated ex-vessel value of the total commercial fish landings in the state in 2009. The shift from the 70% estimated contribution in 2003 by longlining to >95% is primarily due to the closure of the Northwestern Hawaiian Islands due to the implementation of the Papahanaumokuakea Marine National Monument, which prohibits bottomfishing and other fishing.

3. Administrative or Management Actions to Date

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

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

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

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

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

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

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

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

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

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

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

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

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

At the request of the Council NMFS issued a control date of March 16, 2007 to notify persons who entered the Hawaii-based pelagic charter fishery after that date that they would not necessarily be assured of continuing participation if a limited entry program was subsequently implemented for their fishery. The control date was issued in response to concerns regarding significant expansion of the charter vessel fleet and its potential to impact billfishes and other pelagic species.

AMENDMENTS 9, 12 and 13 were intended to address issues which have now become moot due to changing circumstances.

AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

AMENDMENT 18 (effective December 10, 2009) removed the 2,120-set limit for the Hawaii-based shallow-set longline fishery and implemented a new loggerhead sea turtle hard cap of 46 annual interactions.

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

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

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

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

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

At the request of the Council, NMFS published a temporary rule removing the delay in effectiveness for closing the Hawaii-based longline shallow-set swordfish fishery as a result of it having reached one of its turtle interaction limits (71 FR 14416). This rule was implemented as vessel communications had improved to the point that vessel operators could immediately be notified of a closure, thus removing the possibility of exceeding a turtle limit during the notification period. This rule was effective March 20, 2006 through September 18, 2006.

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

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

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

CONTROL DATE of June 19, 2008, set for Hawaii-based pelagic charter fishery. Anyone who enters this fishery after this control date is not guaranteed future participation in the fishery if the Western Pacific Regional Fishery Management Council recommends, and NMFS approves, management measures for this fishery (e.g. limited entry).

D. Commonwealth of the Northern Mariana Islands (CNMI)

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. Existing planning data for the CNMI are not suited to examining the direct and indirect contributions attributed to various inter-industry linkages in the economy. It is apparent, however, that fishing by the local small-boat fleet represents only a small fraction of the economic activity in the commonwealth.

3. Administrative or Management Actions to Date

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

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

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

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

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

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

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

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

CONTROL DATE of June 19, 2008 was set for the CNMI pelagic longline fishery. Anyone who enters this fishery after this control date is not guaranteed future participation in the fishery if the Western Pacific Regional Fishery Management Council recommends, and NMFS approves, management measures for this fishery (e.g. limited entry).

AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

E. Pacific Remote Island Areas (PRIA)

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

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

Due to its position below the equator, Jarvis Island lies within the South Equatorial Current, which runs in a westerly direction. Sea surface temperatures of pelagic EEZ waters around

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

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 visited 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 percent of their total annual harvest.

2. Pelagic Fisheries Development

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

3. Administrative or Management Actions to Date

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

---

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

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

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

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

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

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

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

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

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.

AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

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

A summary of the total pelagic landings during 2008 in the Western Pacific and the percentage change between 2007 and 2008 is shown in Table 2.

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

Table 2. Total Pelagic Landings (lbs) in the Western Pacific Region in 2009

	American Samoa		Guam		CNMI		Hawaii	
Species	**Lbs**	**%**	**Lbs**	**%**	**Lbs**	**%**	**Lbs**	**%**
Swordfish	27,361	83.8	-		-		3,975,000	-7.6
Blue marlin	91,753	20.3	32,605	236.0	47	-95.7	1,154,000	1.1
Striped marlin	7,981	404.5	-		-		644,000	-37.0
Other billfish	10,854	189.4	904	219.4	162		296,000	-47.8
Mahimahi (dolphinfish)	36,763	32.3	146,649	31.2	19,580	75.3	1,464,000	3.4
Wahoo	303,960	1.9	130,733	32.9	3,389	144.2	751,000	-22.1
Opah (moonfish)	6,322	18.5	-				1,896,000	42.0
Sharks (whole weight)	2,405	85.0	0				373,000	-10.3
Albacore tuna	8,604,024	10.2	-				678,000	-22.3
Bigeye tuna	351,509	28.3	-				1,0753,000	-20.4
Bluefin tuna	-		-				2,000	0.0
Skipjack tuna	341,829	-4.7	331,063	12.1	129,176	-18.1	1,098,000	-13.3
Yellowfin tuna	865,012	16.7	50,279	152.8	25,113	53.7	2,844,000	-18.2
Other pelagics	8,912	314.9	27,658	93.4	6,515	-30.0	1,218,000	2.0
Total	10,658,685	10.9	719,891	30.9	183,982	-6.6	27146000	-13.8

IV. 2009 International and Region-wide Pelagics Plan Team Recommendations

The Pelagics Plan Team met in Honolulu, Hawaii on April 29 – May 1, 2009. Area specific recommendations are reported under each island area sub-section.

American Samoa

- The Plan team recommends that the Department of Marine & Wildlife Resources (DMWR) consider establishing a recreational fisheries log book program for boat based recreational fishing.

Guam, CNMI & American Samoa

- The Plan Team recommends that the Guam, CNMI and American Samoa pelagic module include a new table to provide information on the magnitude of expansion factors for various effort and catch estimates. The table will incorporate the following columns:
    - Expansion factor for expanding catch from the voluntary commercial receipt program (Guam and CNMI)
    - The number of interviews for pelagic troll fishing (Guam & Am Samoa)
    - Number of boats out fishing on a sample day(Guam & Am Samoa)
    - Total expanded number of pelagic troll trips (Guam & Am Samoa)

- The Pelagic Plan Team recommends that NMFS Pacific Islands Fisheries Science Center (NMFS PIFSC) assist Department of Agriculture & Wildlife Resources (DAWR) with planning the location of additional FAD sites with respect to bathymetry, currents and proximity to boat ramps and small boat harbors.

Hawaii

- The Pelagic Plan Team recommends that the Hawaii module incorporate catch rate (lbs/hr), for trolling and handline in addition to lbs/trip for years 2003 and thereafter.

- The Pelagic Plan Team made no recommendation on management measures for the Cross Seamount mixed gear pelagic fishery, other than to note that it had previously questioned the need for management in a fishery which participation was and still is clearly in decline. The Pelagic Plan Team did, however, recommend that the seamount monchong, *Eumigistes illustris*, be maintained in the Pelagics Fishery Ecosystem Plan Management Unit.

International Recommendations

- The Pelagic Plan Team recommends that the International Module include a table showing the annual catches by weight for species caught by the US longline fishery as submitted to the Inter-American Tropical Tuna Commission (IATTC) and Western & Central Pacific Fisheries Commission (WCPFC).

- The Plan Team recommends that the Council, in its consideration of approaches to implement the WCPFC bigeye tuna (BET) catch limit, consider the implications if the Hawaii-based longline fleet is allowed to continue to fish in the Western and Central Pacific Ocean (WCPO) once the WCPFC bigeye tuna (BET) catch limit has been reached. Vessels may target other tuna species which may have implications on current WCPFC Conservation and Management Measures (CMMs) for WCPO yellowfin and North Pacific albacore. Further, if vessels continue to fish, BET will be caught and discarded. Although many BET discards may survive, additional mortality would occur, contrary to the intent of the WCPFC limit to reduce mortality. The Pelagic Plan Team recommends research on the post-release mortality of longline caught BET.

Region-wide Recommendations

The Plan Team heard with interest the potential for accessing NOAA Cooperative Research Funds and recommended that the projects be identified that would build on existing or planned research for Council pelagic fishery management needs. An example would be to provide further support for an existing PFRP pilot project to tag seamount monchong on the Cross Seamount. The Pelagic Plan Team also made the following suggestions for potential Cooperative Research Projects:

American Samoa

1. Pilot study to quantify catches from the sport fish /recreational fishing vessels through setting up a voluntary logbook system and training fishers to record data.

2. Study to determine what American Samoa's FADs are producing in terms of catches, size structure, and investigate stock structure by tagging fish at FADs.

3. Study assessing the feasibility of rebuilding of the alia fleet to characterize the new fleet in terms of: where they fish, what they catch, amount of effort, duration of trips, etc.

4. Gear testing (large circle hooks, large bait) with regards to reducing sea turtle bycatch in the longline fleet and determining the effectiveness of the proposed gear changes.

CNMI

1. Study to determine the stock structure of the pelagic monchong targeted and caught by both Guam and CNMI fishers.

2. Pilot study to characterize the fledging longline fishery through onboard sampling (size frequency data, etc.).

3. Pilot study to characterize the bottomfish fishery (near and offshore) through onboard sampling (size frequency data, etc.).

4. A fishery development project to determine the feasibility of a swordfish fishery in northern waters through an exploratory fishing survey.

Hawaii

1. Study to determine post-hooking mortality of bigeye tuna when targeted by the longline fleet.

2. A pilot voluntary recreational fishers reporting system.

3. Monchong tagging at Cross and possibly other seamounts to characterize the *Eumegistus illustris* resource in Hawaii.

V. Data Modules

A. American Samoa

Introduction

The pelagic fishery in American Samoa is and has been an important component of the American Samoan domestic economy. Prior to 1995, the pelagic fishery was largely a troll fishery. Horizontal longlining was introduced to the Territory by Western Samoan fishermen in 1995. Local fishers have found longlining worthwhile because they land more pounds with less effort and use less gasoline for trips. Initially the vessels used in longlining were "alias," locally built, twin-hulled (wood with fiberglass or aluminum) vessels about 30 feet long that are powered by 40HP gasoline outboard engines. Larger monohull vessels capable of longer multi-day trips began joining the longline fleet soon after the alias. Monohull vessels now dominate the fleet and landings. The number of alias participating in the fishery has dropped to near zero at present. Commercial troll vessels have also declined. Federal longline logbooks were required during 1996. Two 50-mile area closures for vessels longer than 50 feet were implemented by the

Council and NMFS during 2002; one surrounds Swains Island and one surrounds Tutuila and Anu'u Islands. Federal longline limited entry permits were issued during December of 2005. Albacore is the primary species caught longlining. The bulk of the longline catch is sold to the Pago Pago canneries, but some of the catch is sold to stores, restaurants and local residents. Catch is also donated for family functions.

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

Fishery Data History

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

In the 2008 Pelagics Annual Report, changes to the algorithms for expansion of the boat-based creel survey data were described. Changes to the algorithms were necessary due to peculiarities in historical data as well as the emergence of multi-day trips. Data from 1982-1985 were left unchanged; data from 1986-2006 were re-expanded. This accounts from changes in graph and data presentations between subsequent annual reports and annual reports prepared for 2008 onward. Additionally of importance, starting in 2000, lengths were often recorded of the larger fish rather than weights; thus, the creel survey system was modified to calculate length-weight conversions. Cannery sampling forms were initiated in 2001, which allowed determination of catch of each species sold locally, sold to the canneries, and not sold. Lastly, the method for determining price per pound was revised in 2001.

2009 Summary - American Samoan Pelagic Fishery

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

Landings (pounds): A little over 10.6 million pounds of pelagic species is estimated to have landed by American Samoa vessels during 2009. This is a decrease of about 1 million pounds from the 2008 total landings. Tuna species account for about 94% of the total landings; albacore dominated (85%) tuna landings, accounting for 80% of the total pelagic landings. Non-tuna and other pelagic species total about 500,000 lbs, of which wahoo dominated (61%) the non-tuna landings and barracudas dominated the other pelagic. Of the total landings, about 10.5 million pounds account for commercial landings. Longline vessels equal to or greater than 50 feet dominate the American Samoa pelagic landings

Effort: About 15.0 million hooks with 4,869 sets were deployed during 177 trips by 26 American Samoan longline vessels during 2009. Longline effort indicators – sets, hooks, trips – decreased this year compared to 2008; the number of Longline vessels decreased by two. The number of fishing trips decreased by 55% in 2009, but hours fished increased at the same rate from both creel and logbook data from 99,000 in 2008 to about 103,000 fishing hours in 2009. The number of local alias participating in the longline fisheries remains at one boat as of the last three years.

Pounds-Per-Hour Trolling: Average pound-per-hour (PPH) trolling in 2009 is 25.64. Average trolling hours are 407. The pound per hour decreased 59% from 62.38 PPH in 2008. The 62.38 PPH recorded in 2008 is the highest ever in the 28 year history. Pounds per troll hour have generally increased since 2001.

Longline CPUE: The 2009 Longline CPUE (Catch / 1000 hooks) for tuna species showed a slight increase of 0.8 fish from 18.2 CPUE recorded for 2008. The albacore catch rate dominated in 2009 and it also showed a small increase to 14.9 from 14.2 fish per 1000 hooks recorded for 2008. For the non-tuna catch, wahoo showed the highest rate and an increase of 0.3 fish per thousand hooks from the 2008 catch rate. Total non tuna species catch rate also increased to 2.5 in 2009 from 2.0 in 2008.

Fish Size: The average weight-per-fish (Table 6C) for albacore tuna showed a slight increase in fish weight of 0.8 lb from 2008 fish weight from the cannery samples. Yellowfin tuna average weight also increased by 1.4 lbs from the cannery samples. The creel surveys showed a slight increase for albacore tuna in 2009, but yellowfin tuna showed a huge weight increase of 31.9 lbs from the 2008 average of 35.4 lbs. Skipjack and bigeye tuna showed no weights in the creel samples, but in the cannery samples they both showed slight decreases in weights in 2009. In the non tuna table, only wahoo species have weight data; the data showed a weight decrease from 33.2 lbs in 2008 to 28.9 lbs in 2009.

Revenues: Inflation-adjusted revenue for 2009 showed an increase for both tuna and non tuna. About $10.36 million was recorded for 2009 from all pelagic species, an increase of 5% from 2008.Tuna sales was estimated at $10.1 million, which is 96% of total value of $10.5 million. Albacore revenue amounted to $8.6 million, with an average price of $1/ lb; it accounted for 82% of the total commercial value. The CPI for 2009 was 238.9 and 231.5 for 2008.

Bycatch: Trolling recorded no bycatch and longline logbooks showed that about 12% of the fishes were released (or 36,000 fish). Of the total tuna caught, 3.6% of the tuna species were released. Skipjack tuna topped the number of released fish of tuna species. Sharks dominated non tuna PMUS percentages of bycatch at 99.3%, or 5,479 sharks (37 were kept). Other pelagic species show that 100% of dogtooth tuna were released. A total of about 268,900 fishes were kept and 35,900 fishes were released by longline vessels in 2009.

Conclusion: Longline fishing by large monohull vessels (>50ft and >70ft) continued to dominate American Samoa's pelagic fishery. The alia longline fleet remains at one boat as of the last three years. In September 2009, one of the two canneries shut down; however, data showed that the 2009 landings increased compared to 2008. Fishing efforts and number of fishing boats decreased, but the total landings were still higher than 2008. The closure of the Chicken of the Sea cannery showed no negative impact on the total pelagic landings. The increase may have demonstrated that the American Samoa longline fleet still was still unloading their catch at the Starkist Cannery, or that they caught more or discarded fewer fish. The 2010 landings report may elucidate whether the closure of Samoa Packing posed any impact on American Samoa pelagic total landings.

The local alia that previously participated in the trolling fishery was sold out before the tsunami and it has participated in bottom fishing since then, leaving no local alia to participate 100% in troll fishing. The number of alias that participated in any pelagic fisheries declined after the tsunami; 99% of the alia fleet sustained damages to the boats, engines and loss of fishing gear. It remains to be seen whether the alia longline fleet will increase. The new fish market poised to open soon may attract more fishing boats and may draw interest from local fishermen to participate again in the fisheries.

Plan Team Recommendations

2009 Recommendations

1. That DMWR be included in any pelagic fisheries tagging project so they can learn tagging techniques and documentation of findings, and get involved in the investigation of migratory pelagic species in the region.

2. That the Council provide funds to build a separate dock for the American Samoa longline fleet.

Table 3. American Samoa 2009 Estimated Total Landings by Pelagic Species by Gear Type

Species	LongLine Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack tuna	341,829	2,582	0	344,410
Albacore tuna	8,604,024	0	0	8,604,024
Yellowfin tuna	865,012	2,560	0	867,571
Kawakawa	0	5	0	5
Bigeye tuna	351,509	0	0	351,509
Tunas (unknown)	198	0	0	198
TUNAS SUBTOTALS	10,162,572	5,146	0	10,167,717
Mahimahi	36,763	113	57	36,933
Black marlin	225	0	0	225
Blue marlin	91,753	0	0	91,753
Striped marlin	7,981	0	0	7,981
Wahoo	303,960	0	0	303,960
Sharks (all)	2,405	0	68	2,473
Swordfish	27,361	0	0	27,361
Sailfish	4,184	0	0	4,184
Spearfish	6,670	0	0	6,670
Moonfish	6,322	0	80	6,402
Oilfish	6,171	0	0	6,171
Pomfret	1,241	0	0	1,241
NON-TUNA PMUS SUBTOTALS	495,035	113	205	495,353
Barracudas	500	41	3,927	4,467
Rainbow runner	48	14	304	366
Dogtooth tuna	0	14	626	641
Pelagic fishes (unknown)	529	0	0	529
OTHER PELAGICS SUBTOTALS	1,077	69	4,857	6,003
TOTAL PELAGICS	**10,658,683**	**5,328**	**5,062**	**10,669,073**

Interpretation: About 10.7 million pounds of pelagic species were landed in American Samoa during 2009. Tuna species dominated (94%) pelagic landings. Albacore tuna dominated (80%) the tuna species landings during 2009, followed by yellowfin (8%), bigeye (3.4%) and skipjack (3.3%) tunas. Wahoo dominated (61%) the non-tuna Pelagic Management Unit Species (PMUS) landings.

Calculations: "Longline Pounds" total landing estimates were from the boat-creel survey for the alia longliners. These boat-creel survey landing estimates were augmented with longline logbook data from the larger longliners. The "Troll Pounds" category included the pelagic landings of combined troll/bottomfishing trips, as well as the landings of purely troll trips. The "Other Pounds" category included pelagic species caught with bottomfishing or spearfishing methods (not by longlining or trolling) such as barracuda, rainbow runner, and dogtooth tuna. Lastly, the "Sharks (all)" category included all species of sharks that could and could not be identified by the fishermen.

Table 4. American Samoa 2009 Estimated Commercial Landings, Value and Average Price by Pelagic Species

Species	Longline			Troll/Non-Longline		
	Pounds	Value($)	Price/ LB	Pounds	Value($)	Price/ LB
Skipjack tuna	341,829	$206,410	$0.60	2,379	$4,219	$1.77
Albacore tuna	8,604,024	$8,616,157	$1.00	0	$0	
Yellowfin tuna	853,036	$796,992	$0.93	2,560	$7,304	$2.85
Bigeye tuna	320,576	$378,821	$1.18	0	$0	
TUNAS SUBTOTALS	10,119,465	$9,998,380	$0.99	4,939	$11,523	$2.33
Mahimahi	24,417	$57,271	$2.35	171	$445	$2.61
Black marlin	187	$168	$0.90	0	$0	
Blue marlin	55,556	$52,778	$0.95	0	$0	
Striped marlin	1,785	$1,964	$1.10	0	$0	
Wahoo	299,404	$181,105	$0.60	0	$0	
Sharks (all)	0	$0		68	$34	$0.50
Swordfish	18,843	$40,996	$2.18	0	$0	
Sailfish	1,751	$4,359	$2.49	0	$0	
Spearfish	953	$1,096	$1.15	0	$0	
Moonfish	4,863	$7,294	$1.50	80	$120	$1.50
Oilfish	4,549	$4,549	$1.00	0	$0	
Pomfret	1,019	$2,293	$2.25	0	$0	
NON-TUNA PMUS SUBTOTALS	413,328	$353,875	$0.86	318	$599	$1.88
Barracudas	192	$516	$2.68	3,750	$10,012	$2.67
Rainbow runner	48	$128	$2.65	219	$581	$2.65
Dogtooth tuna	0	$0		641	$1,700	$2.65
OTHER PELAGICS SUBTOTALS	241	$644	$2.68	4,609	$12,293	$2.67
TOTAL PELAGICS	**10,533,034**	**$10,352,899**	**$0.98**	**9,867**	**$24,415**	**$2.47**

Interpretation: More than 9.6 million pounds of pelagic species were estimated to have been sold in 2008, which was 99.5 % of the estimated total pelagic landings. It earned an estimated revenue of over $9.5 million. Longline fishing dominated the sales revenues at about $9.3 million. Albacore tuna topped the sales at $7.8 million, which is 83% of the total revenue; albacore was followed by yellowfin, bigeye and skipjack tuna. Longline-caught tunas averaged $0.98 per pound and non-tuna averaged $2.30 per pound.

Calculation: Estimated commercial landings, value and price/pound calculations were the same as those described for Table 1 and in greater detail in the Fishery Data History section above.

Table 5. Longline Effort by American Samoan Vessels during 2009

	All Vessels
Boats	26
Trips	177
Sets	4,869
1000 Hooks	14,999
Lightsticks	714

Table 6. Number of fish kept, released and percent released for all American Samoa longline vessels during 2009

Species	Number Kept	Number Released	Percent Released
Skipjack tuna	26,866	7,517	21.9
Albacore tuna	221,315	673	0.3
Yellowfin tuna	15,585	911	5.5
Bigeye tuna	8,118	570	6.6
Tunas (unknown)	11	15	57.7
TUNAS SUBTOTALS	271,895	9,686	3.4
Mahimahi	1,629	1,602	49.6
Black marlin	2	26	92.9
Blue marlin	675	2,691	79.9
Striped marlin	116	224	65.9
Wahoo	10,776	3,670	25.4
Sharks (all)	37	5,926	99.4
Swordfish	215	90	29.5
Sailfish	64	612	90.5
Spearfish	145	1,210	89.3
Moonfish	128	584	82.0
Oilfish	326	7,014	95.6
Pomfret	141	1,249	89.9
NON-TUNA PMUS SUBTOTALS	14,254	24,898	63.6
Barracudas	48	360	88.2
Rainbow runner	8	1	11.1
Dogtooth tuna	0	10	100
Pelagic fishes (unknown)	11	2,909	99.6
OTHER PELAGICS SUBTOTALS	67	3,280	98.0
TOTAL PELAGICS	286,216	37,864	11.7

Interpretation: Table 5Table 2 lists 26 vessels that landed pelagic species in American Samoa during 2009, which is 2 less than last year. The vessels participated in a total of 177 fishing trips during 2009 that deployed 4869 longline sets, while using about 15 million hooks and 714 lightsticks. Table 5 values were used to calculate an average for longline vessels landing in American Samoa during 2009:

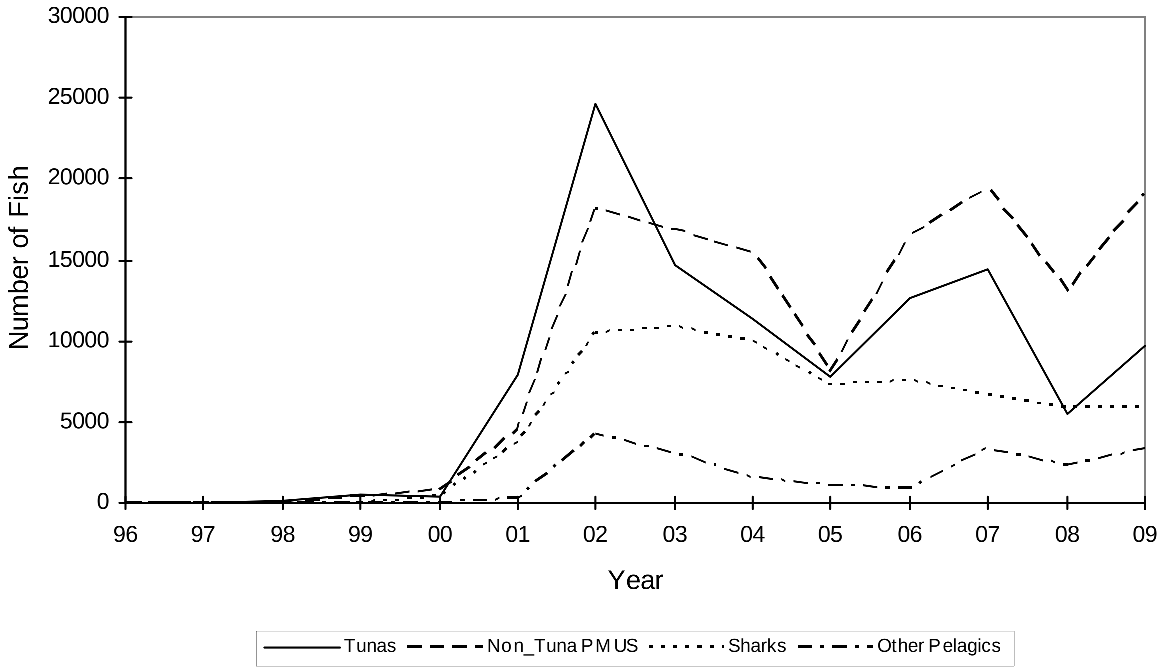
- Average of 6.8 trips and 187 sets were made per boat
- 513,286 hooks and 6 lightsticks were used per boat
- 27.5 sets were made, 8475 hooks were set, and 4.0 lightsticks were used per trip
- 3038 hooks and .03 lightsticks were used per set

More than 221,000 individual albacore (Table 6) were kept by longline fishermen landing in American Samoa during 2009, which calculates to 76 percent of the fish kept. Over 26,800 skipjack, about 15,500 yellowfin, and 8,100 bigeye tunas were kept. Over 10,700 wahoo, 1629 mahimahi, 675 blue marlin, and 215 swordfish were also kept. Eleven fish of unknown tuna species were kept and 98% of the other pelagic-species were released.

Skipjack tuna had the highest number released of the tuna species. All sharks and about 96% of the oilfish were released. About the same number of mahimahi were kept and released. The non-tuna Pelagic Management Unit Species (PMUS) (63%) and other unknown pelagic species (98%) were released. Fish can be released for various reasons including quality, handling and storage difficulties, and marketing problems. Investigation into the reasons for releasing of pelagic species are recommended because of the high release rate for many non-tuna PMUS and releases of some tuna.

Calculation: These values are sums of the number of fish kept and the number of fish released from longline logbook data for all of the longline vessels in American Samoa. The percent released is calculated as the number released divided by the sum of the number released and the number kept. The percentages for subtotals and totals are the sum of released species for the subtotal or total divided by the sum of kept plus the sum of released for the subtotal or total. The kept values for sharks include those that were finned. All species of sharks entered in the longline logbooks are combined in the All Sharks species. Rays and sunfish are included in the Misc Pelagic Fish species. A trip is a unique combination of vessels and return dates where the return date is in the current year.

Figure 2. Number of Fish Released by American Samoa Longline Vessels



Interpretation: The number of fish released by American Samoan longline vessels increased in 2009 for all categories. Tuna species released in 2008 almost doubled in 2009. Almost all categories increased the amount released, but sharks species released about the same number in 2009 as in 2008. The number of non-tuna Pelagic Management Unit Species (PMUS) released by American Samoan longline vessels increased 31% in 2009 to 18,972 fish. The number of other pelagic fish released in 2009 totaled 3280, an increase of 31% from 2008.

Calculation: These values are sums of Longline Logbook number released data for each year. They are summed according to the species groups in Tables 1 and 2 with sharks separated out of the "Non-Tuna PMUS" species group.

	Number of Fish Released			
Year	Tunas	Non-Tuna PMUS	Sharks	Other Pelagics
1996	0	0	37	0
1997	50	36	19	1
1998	71	29	28	0
1999	492	438	37	43
2000	371	815	386	0
2001	7,888	4,457	3,648	239
2002	24,601	18,100	10,459	4,183
2003	14,679	16,826	10,831	3,125
2004	11,323	15,481	9,918	1,521
2005	7,830	8,039	7,318	1,057
2006	12,609	16,498	7,487	842
2007	14,418	19,350	6,667	3,308
2008	5,542	13,039	5,833	2,274
2009	9,686	18,972	5,926	3,280

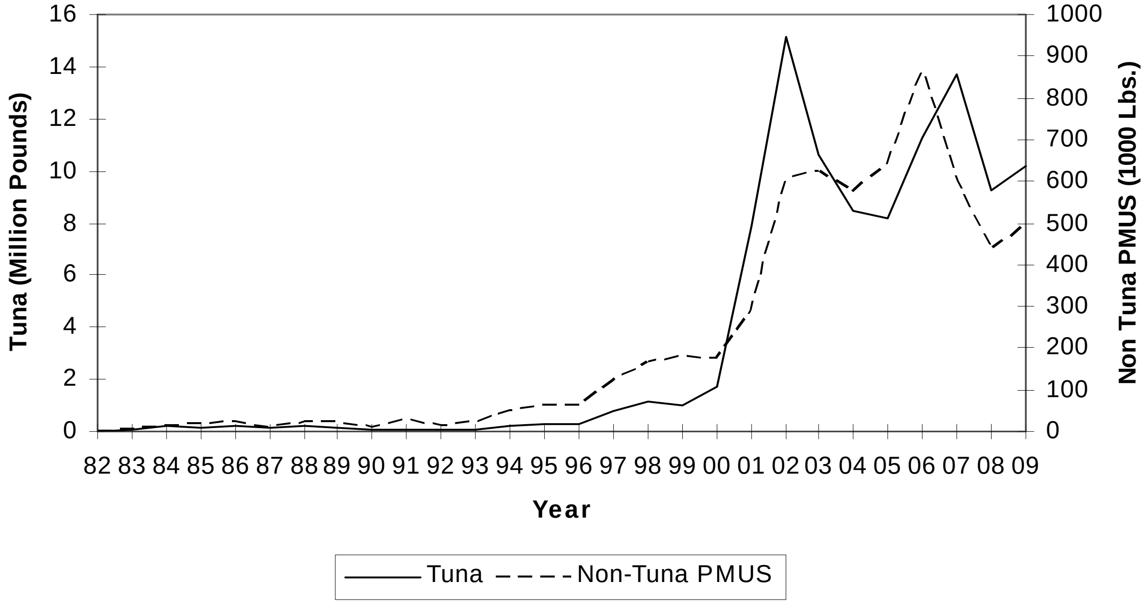
Table 7. American Samoa 2009 Trolling Bycatch

	Bycatch						Interviews		
Species	Alive	Dead Inj	Unk	Total	Catch	%BC	With BC	All	%BC
All Species (Comparison)					532	0.000	0	40	0.00

Interpretation: There was no bycatch recorded from 2009 for trolling only; 40 interviews were conducted with 532 pelagic fish landed and no fish returned at sea. Using fishermen's reports at the dock may not accurately reflect the number of fish returned at sea.

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

Figure 3. American Samoa Annual Estimated Total Landings of Tuna and Non-Tuna PMUS

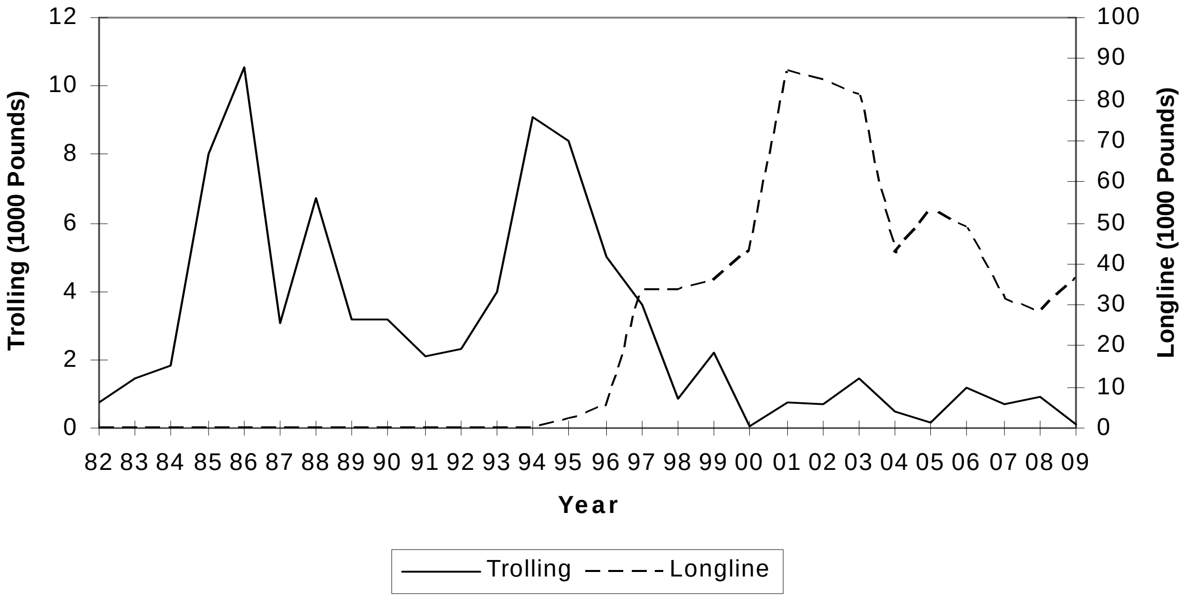


Interpretation: Total landing estimates exceeded 10 million pounds for tuna, about 0.8 million pounds increase for 2009; and it also shows an increase of 13% to 495,353 pounds for non-tuna Pelagic Management Unit Species (PMUS) during 2009. 2002 is the peak year of the fisheries.

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

Year	Pounds Landed	
	Tuna	Non Tuna PMUS
1982	23,042	2,106
1983	90,057	4,806
1984	198,961	15,121
1985	107,659	19,686
1986	190,967	23,899
1987	144,037	10,894
1988	207,095	23,462
1989	171,809	20,534
1990	81,736	10,494
1991	72,645	28,092
1992	94,060	12,328
1993	47,815	21,736
1994	190,262	48,146
1995	288,667	64,329
1996	317,601	64,473
1997	802,077	119,961
1998	1,160,724	163,726
1999	1,004,615	178,648
2000	1,685,591	175,061
2001	7,870,925	292,699
2002	15,169,356	606,670
2003	10,617,519	621,523
2004	8,489,580	575,669
2005	8,204,994	639,043
2006	11,242,553	865,217
2007	13,731,224	601,292
2008	9,252,262	433,255
2009	10,167,717	495,353
Average	**3,629,484**	**219,222**
Std. Dev.	**4,948,093**	**260,191**

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

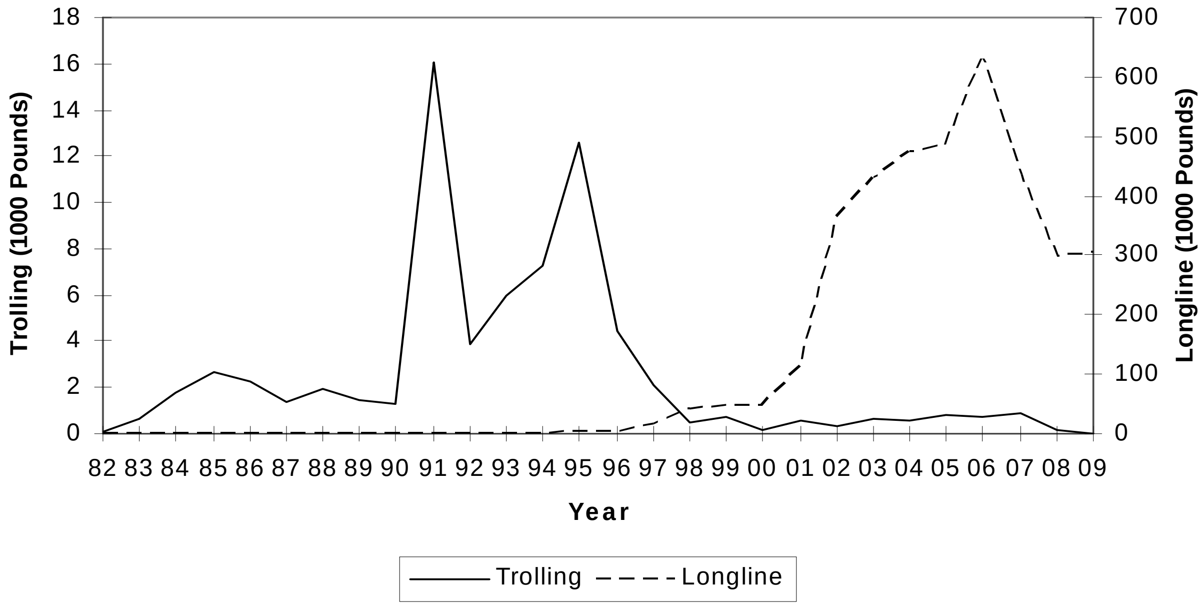


Interpretation: Estimated landings of mahimahi by longline gear increased by 24% to 36,763 pounds during 2009, while trolling gear shows a decrease of 88% from the 2008 landings. Longline gear dominates the mahimahi estimated landings. Mahi landings peaked during 2001 at 87,187 pounds.

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	777
1983	0	1,443
1984	0	1,844
1985	0	8,011
1986	0	10,542
1987	0	3,049
1988	0	6,736
1989	0	3,170
1990	0	3,169
1991	61	2,090
1992	0	2,325
1993	212	4,000
1994	101	9,086
1995	2,373	8,393
1996	5,395	5,022
1997	33,412	3,623
1998	33,484	843
1999	35,779	2,193
2000	42,857	66
2001	87,037	782
2002	84,603	720
2003	81,022	1,434
2004	42,718	469
2005	53,078	161
2006	48,705	1,164
2007	31,415	684
2008	28,027	931
2009	36,763	113
Average	**34,055**	**2,959**
Std. Dev.	**27,900**	**2,927**

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



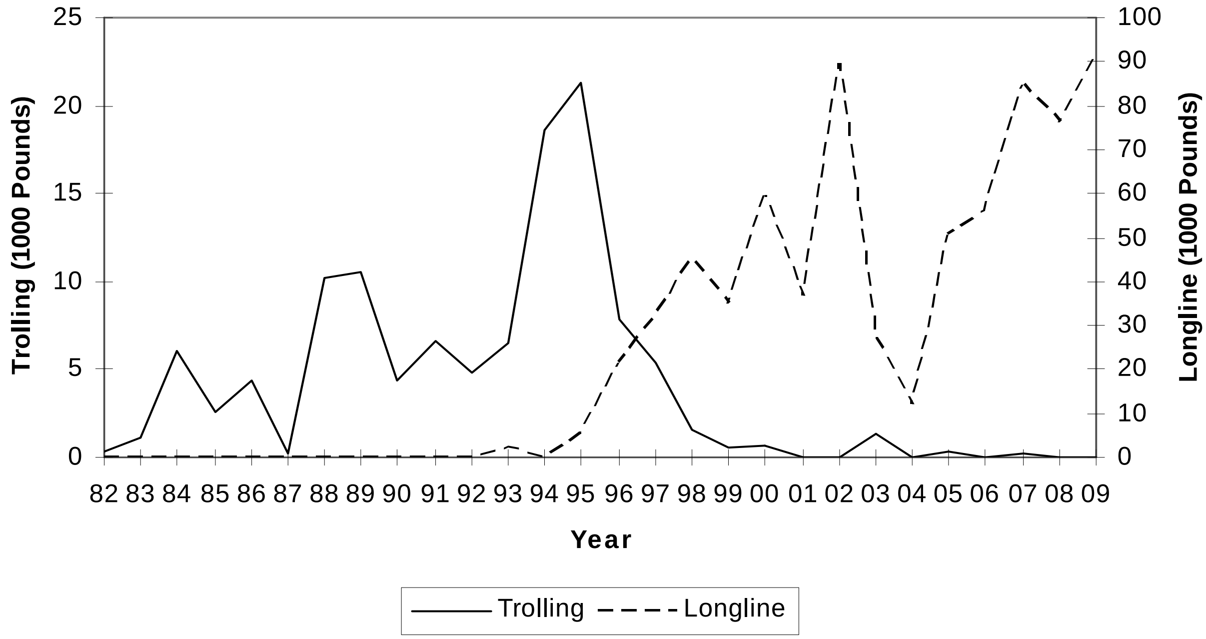
Interpretation: Estimated landings of wahoo increased by only 4,400 lbs (2%) between 2008 and 2009. Trolling gear decreased to zero landings in 2009 from 165lbs in 2008. Estimated wahoo landings peaked in 2006

Estimated troll landings of wahoo peaked in 1991 at 14,600 pounds. 2009 is the only year that recorded zero landing since 1982.

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	114
1983	0	632
1984	0	1,777
1985	0	2,678
1986	0	2,282
1987	0	1,395
1988	84	1,962
1989	0	1,476
1990	0	1,333
1991	0	16,081
1992	0	3,904
1993	1,227	5,977
1994	0	7,261
1995	1,642	12,625
1996	3,570	4,399
1997	15,807	2,074
1998	40,439	487
1999	48,181	685
2000	47,330	140
2001	114,219	587
2002	362,689	351
2003	431,531	612
2004	475,032	537
2005	487,394	828
2006	630,329	696
2007	436,921	889
2008	299,481	165
2009	303,960	0
Average	**168,174**	**2,570**
Std. Dev.	**207,645**	**3,732**

Figure 6. American Samoa Annual Estimated Total Landings of Blue Marlin by Gear

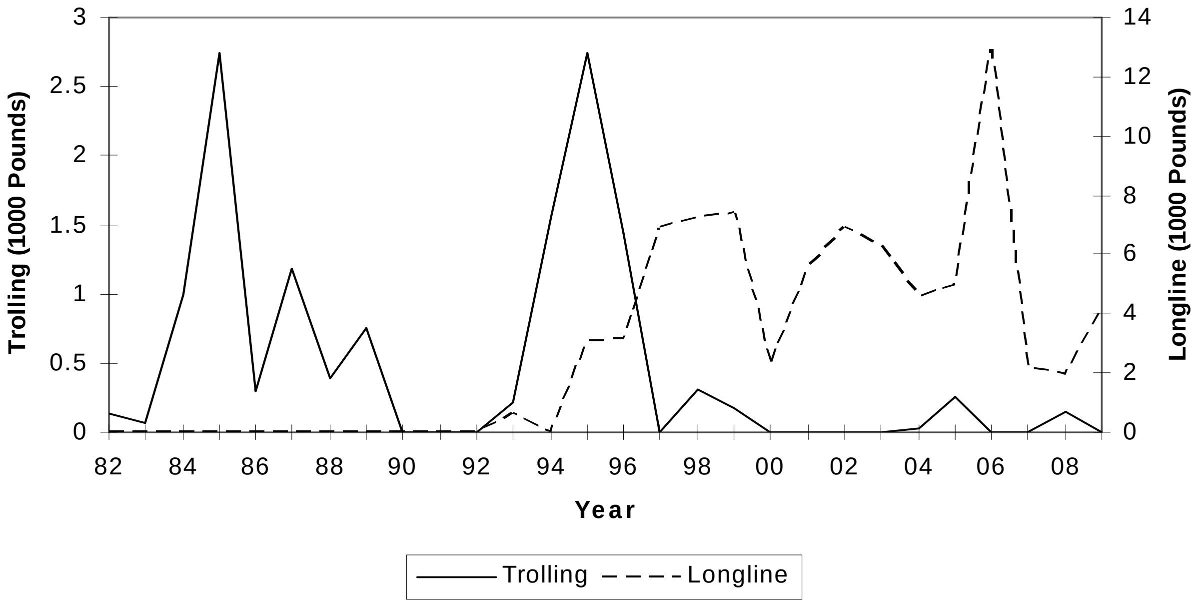


Interpretation: Estimated blue marlin landings for both longline and trolling gears total 91,753 pounds. The 2009 longline landings show an increase (17%) from 2008. Trolling gear recorded zero landings, the same as 2008. 2009 landings are the highest in the 28 years history.

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	315
1983	0	1,083
1984	0	6,097
1985	0	2,574
1986	0	4,327
1987	0	265
1988	0	10,217
1989	0	10,590
1990	0	4,339
1991	0	6,669
1992	0	4,807
1993	2,168	6,545
1994	0	18,661
1995	5,338	21,272
1996	21,576	7,867
1997	32,434	5,379
1998	45,475	1,592
1999	34,883	590
2000	59,505	623
2001	36,792	0
2002	89,825	0
2003	26,994	1,344
2004	12,314	0
2005	50,584	300
2006	56,047	0
2007	84,970	204
2008	76,297	0
2009	91,753	0
Average	**42,762**	**4,131**
Std. Dev.	**29,458**	**5,440**

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

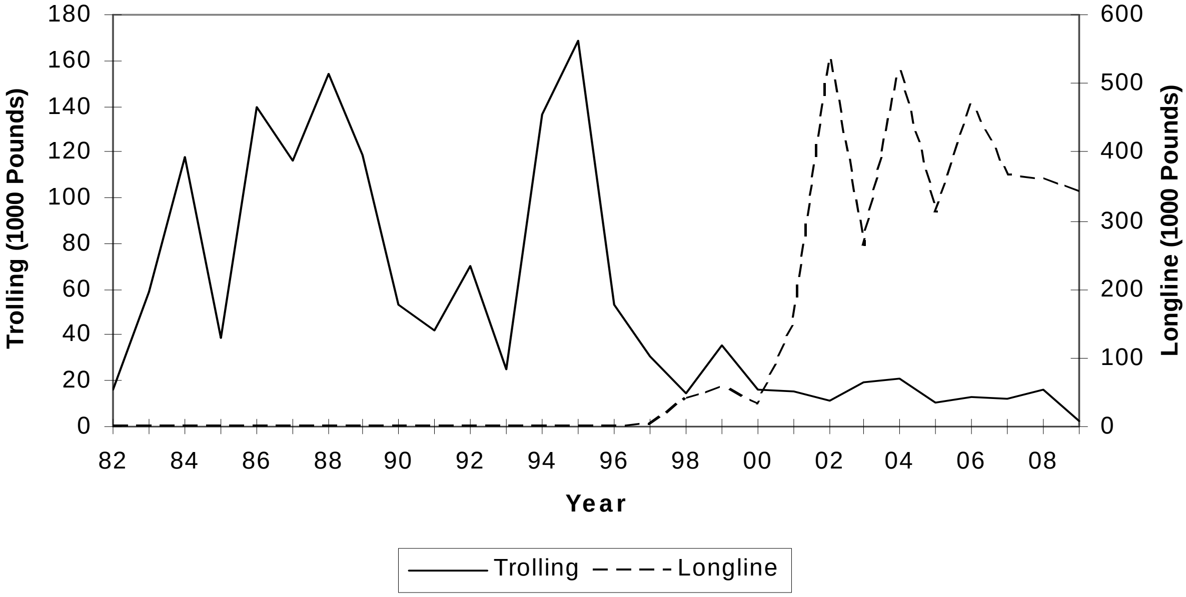


Interpretation: Estimated landings of sailfish by longline gear in 2009 shows an increase of 54%. However trolling gear shows a zero landing. 2006 landing is recorded as the highest ever in 28 years caught only by the longline gear.

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	127
1983	0	74
1984	0	989
1985	0	2,744
1986	0	294
1987	0	1,187
1988	0	394
1989	0	757
1990	0	0
1991	0	0
1992	0	0
1993	618	218
1994	0	1,561
1995	3,078	2,751
1996	3,130	1,444
1997	6,921	0
1998	7,191	314
1999	7,391	184
2000	2,257	0
2001	5,498	0
2002	6,932	0
2003	6,268	0
2004	4,598	32
2005	4,959	248
2006	12,933	0
2007	2,167	0
2008	1,931	148
2009	4,184	0
Average	**4,709**	**481**
Std. Dev.	**3,053**	**771**

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



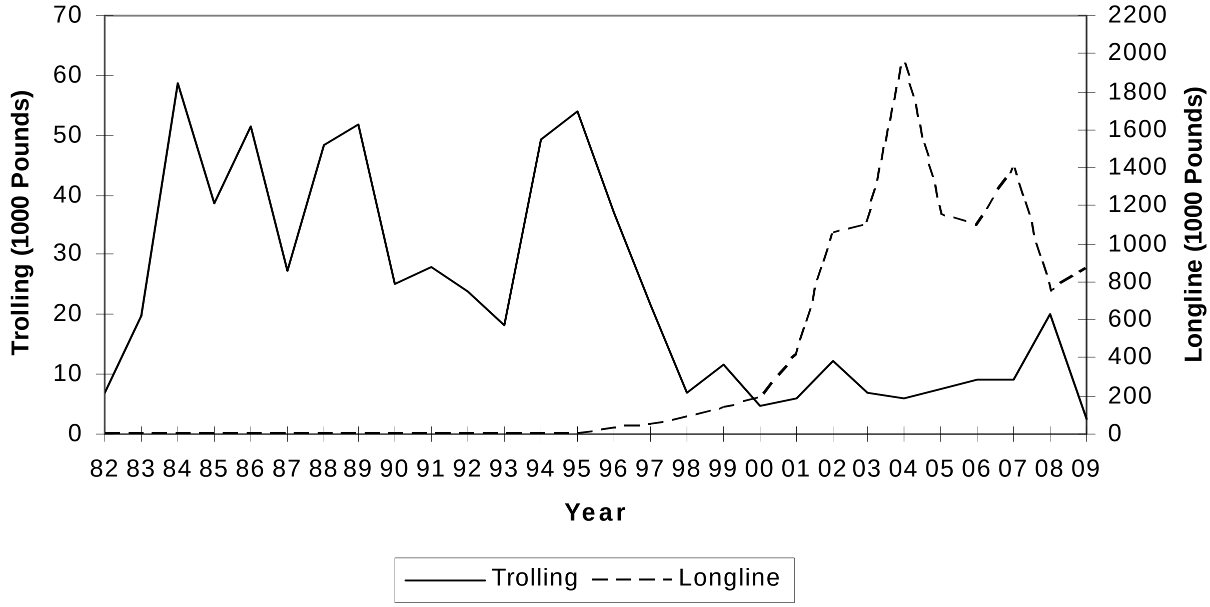
Interpretation: Estimated 2009 total landings of skipjack tuna for both gears decreased by 9%. Estimated longline landings of skipjack tuna decreased by 5%, to 341,829 lbs from 359,568 lbs. Estimated skipjack trolling landings showed a large decrease by more than 80% from 16,294 lbs in 2008 to 2,582 in 2009. The highest landing ever recorded was in 2002.

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

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

	Pounds Landed	
Year	Longline	Trolling
1982	0	15,877
1983	0	58,997
1984	0	117,693
1985	0	38,902
1986	0	139,421
1987	0	116,436
1988	0	153,903
1989	0	118,948
1990	0	53,423
1991	345	42,137
1992	0	69,901
1993	533	25,356
1994	103	136,762
1995	160	168,389
1996	438	53,149
1997	2,546	30,430
1998	40,625	14,822
1999	56,014	35,171
2000	32,153	16,211
2001	149,565	15,086
2002	538,700	11,376
2003	264,414	19,464
2004	519,129	20,728
2005	312,055	10,845
2006	470,166	13,040
2007	365,220	12,255
2008	359,568	16,294
2009	341,829	2,582
Average	**181,766**	**54,557**
Std. Dev.	**195,747**	**50,409**

Figure 9. American Samoa Annual Estimated Total Landings of Yellowfin Tuna by Gear



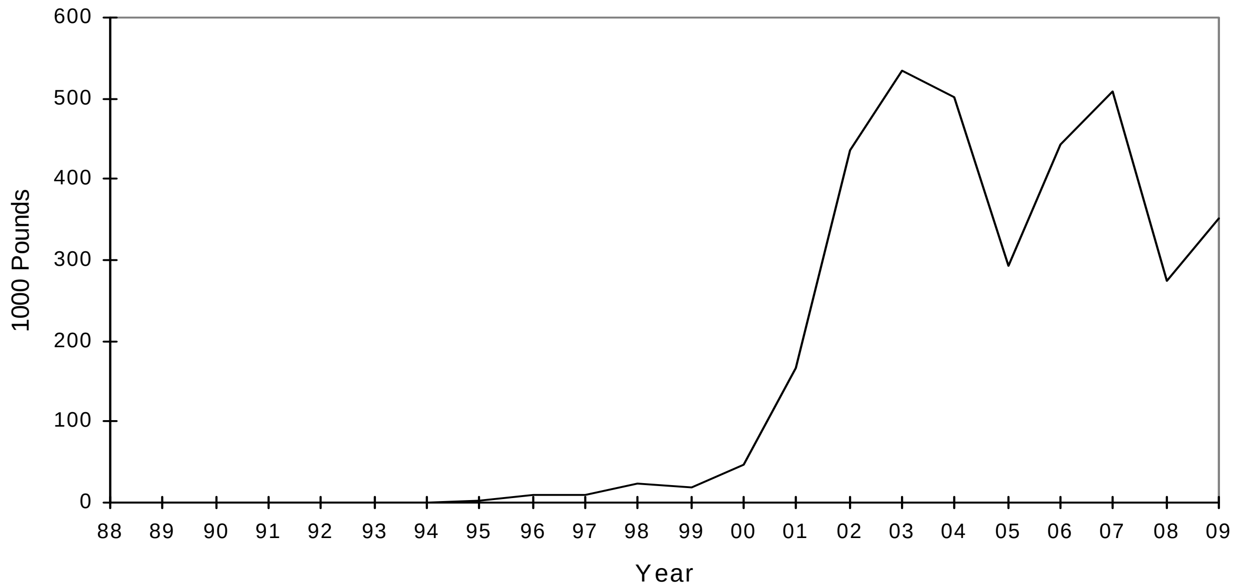
Interpretation: Estimated total landings of yellowfin tuna by longline gear increased 13% to 865,000 lbs in 2009; however trolling landing shows a big drop (87%) from 20,089lbs in 2008. However both gears show an increase (12%) in landings for 2009. Longline gear dominates the estimated yellowfin tuna landings for American Samoa vessels.

Estimated yellowfin tuna longline landings peaked during 2004 at 1,960,000 pounds; Estimated troll landings of yellowfin tuna peaked in1984 and 2009 landing is the lowest ever.

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

	Pounds Landed	
Year	**Longline**	**Trolling**
1982	0	7,038
1983	0	19,789
1984	0	58,704
1985	0	38,586
1986	0	51,439
1987	0	27,451
1988	1,775	48,319
1989	127	51,873
1990	0	25,188
1991	262	28,046
1992	0	23,916
1993	2,632	18,180
1994	1,716	49,415
1995	4,052	54,139
1996	25,662	37,051
1997	48,589	21,679
1998	92,528	6,762
1999	139,496	11,566
2000	190,564	4,827
2001	413,999	6,116
2002	1,060,315	12,353
2003	1,096,218	6,953
2004	1,959,674	5,939
2005	1,151,375	7,501
2006	1,095,952	9,106
2007	1,396,331	9,023
2008	749,825	20,089
2009	865,012	2,560
Average	**468,005**	**23,700**
Std. Dev.	**578,927**	**17,647**

Figure 10. American Samoa Annual Estimated Total Landings of Bigeye Tuna by Longlining



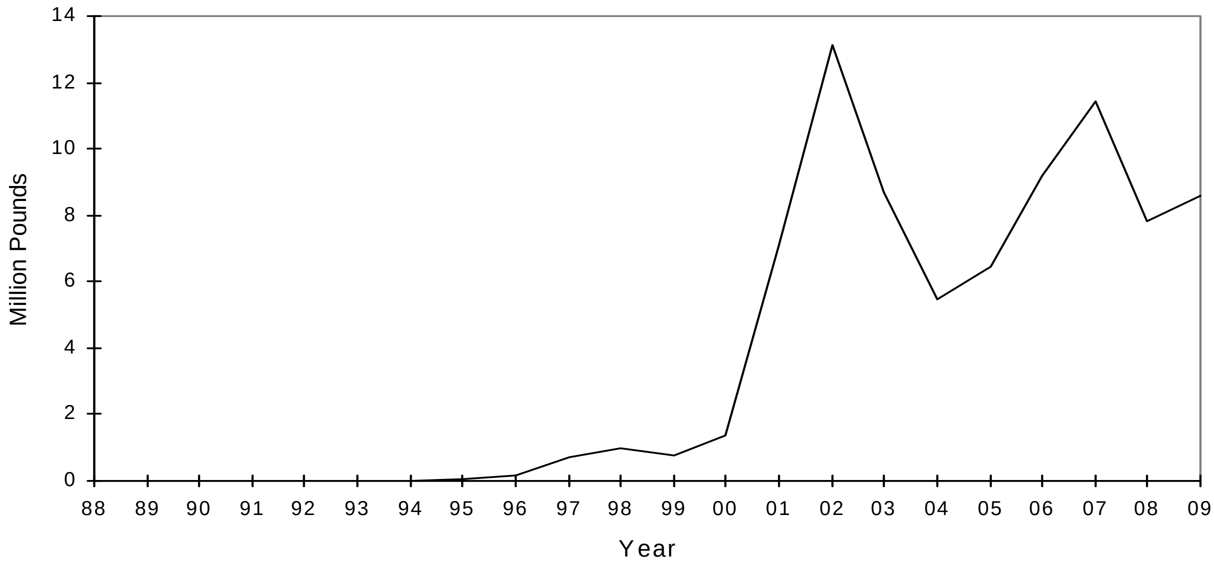
Interpretation: Estimated total longline landings of bigeye tuna in 2009 is 77 thousand pounds more than 2008. Estimated longline landings of bigeye tuna in 2003 is still the peak year.

Estimated bigeye tuna longline landings peaked during 2003 at 534,300 pounds.

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

Year	Pounds
1988	0
1989	0
1990	0
1991	0
1992	0
1993	708
1994	0
1995	2,191
1996	8,701
1997	8,808
1998	22,291
1999	19,211
2000	47,710
2001	165,755
2002	436,280
2003	534,903
2004	502,541
2005	293,605
2006	443,042
2007	509,385
2008	274,482
2009	351,509
Average	**164,596**
Std. Dev.	**202,779**

Figure 11. American Samoa Annual Estimated Total Landings of Albacore by Longlining

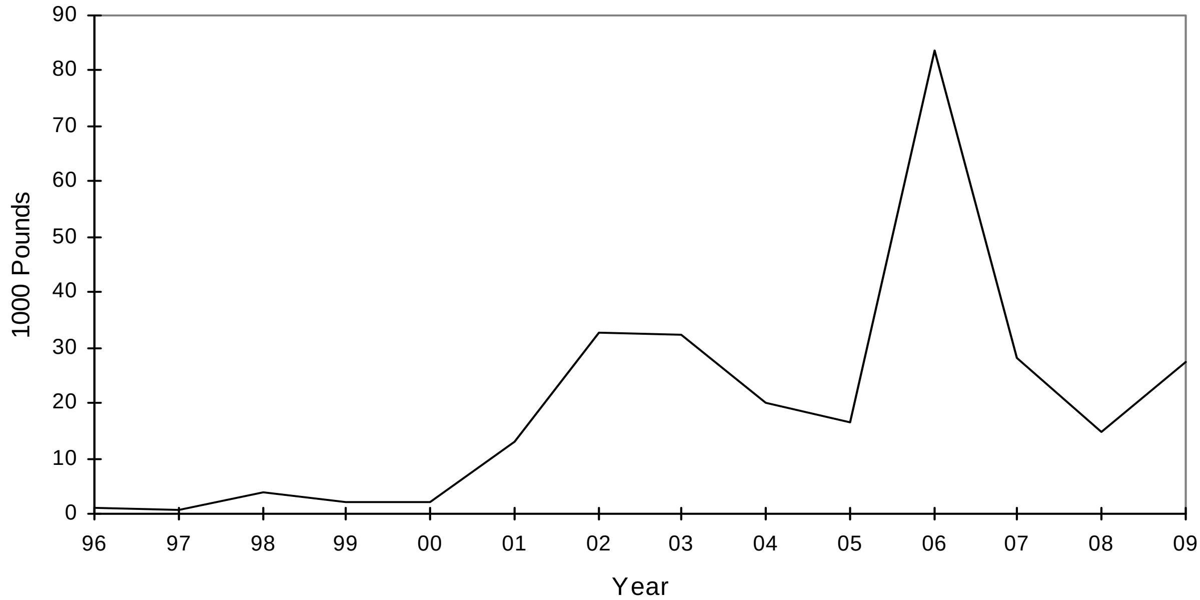


Interpretation: Estimated total albacore longline landings in 2009 are more than 8.6 million pounds. It is an increase of 9% from the 2008 estimates. The 2002 albacore landings estimate of 13.3 million pounds is the highest ever recorded in the 28 year history of the fishery. Since the longline fishery initially began, it has been the most commonly used method of fishing for pelagic species, especially for albacore tuna.

Calculation: The estimated total annual landings of albacore tuna is listed for the longline fishing methods as explained for Table 1 and Table 2. The average and standard deviation is calculated from 1988 onward.

Year	Pounds
1988	1,875
1989	241
1990	0
1991	1,730
1992	0
1993	315
1994	1,609
1995	58,949
1996	190,269
1997	689,397
1998	983,560
1999	743,038
2000	1,394,011
2001	7,120,245
2002	13,109,695
2003	8,693,212
2004	5,480,841
2005	6,429,023
2006	9,210,565
2007	11,438,307
2008	7,831,590
2009	8,604,024
Average	**3,726,477**
Std. Dev.	**4,364,162**

Figure 12. American Samoa Annual Estimated Total Landings of Swordfish by Longlining

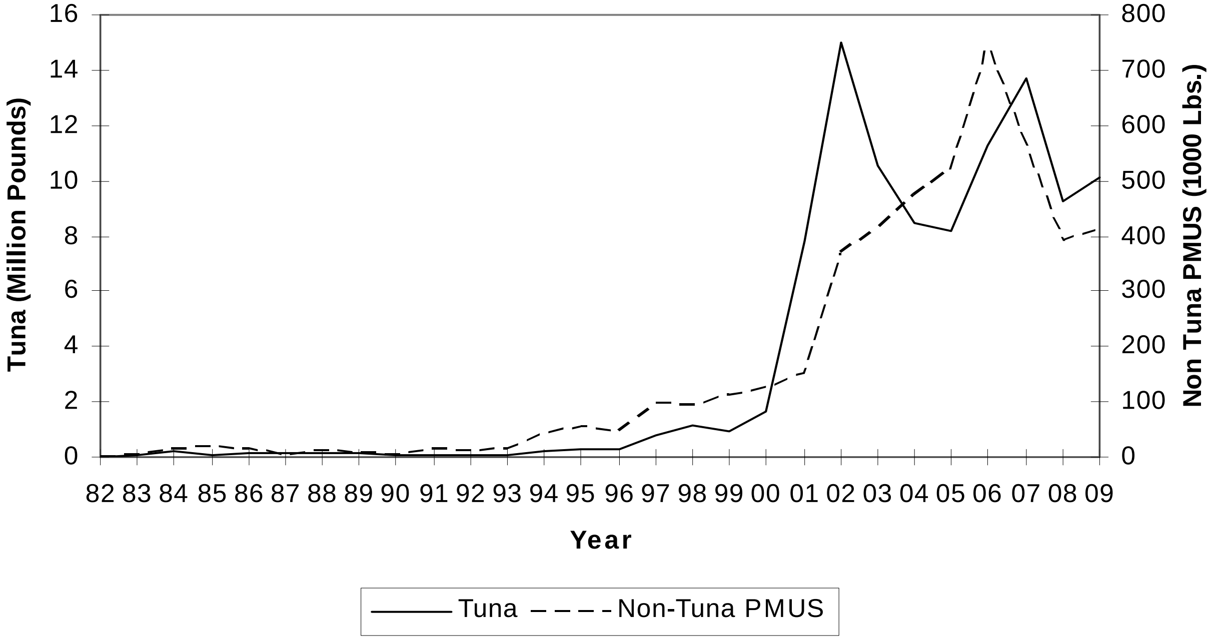


Interpretation: More than 27 thousand pounds of swordfish are estimated to have been landed in American Samoa in 2009, an increase of 45% (12,400 lbs) from 2008. This estimate is from longline gear only. The 2006 swordfish landing is the highest in 14 years.

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

Year	Pounds
1996	893
1997	701
1998	3,716
1999	2,259
2000	2,056
2001	13,091
2002	32,710
2003	32,231
2004	20,195
2005	16,491
2006	83,615
2007	28,287
2008	14,889
2009	27,361
Average	**19,893**
Std. Dev.	**21,055**

Figure 13. American Samoa Annual Commercial Landings of Tunas and Non-Tuna PMUS

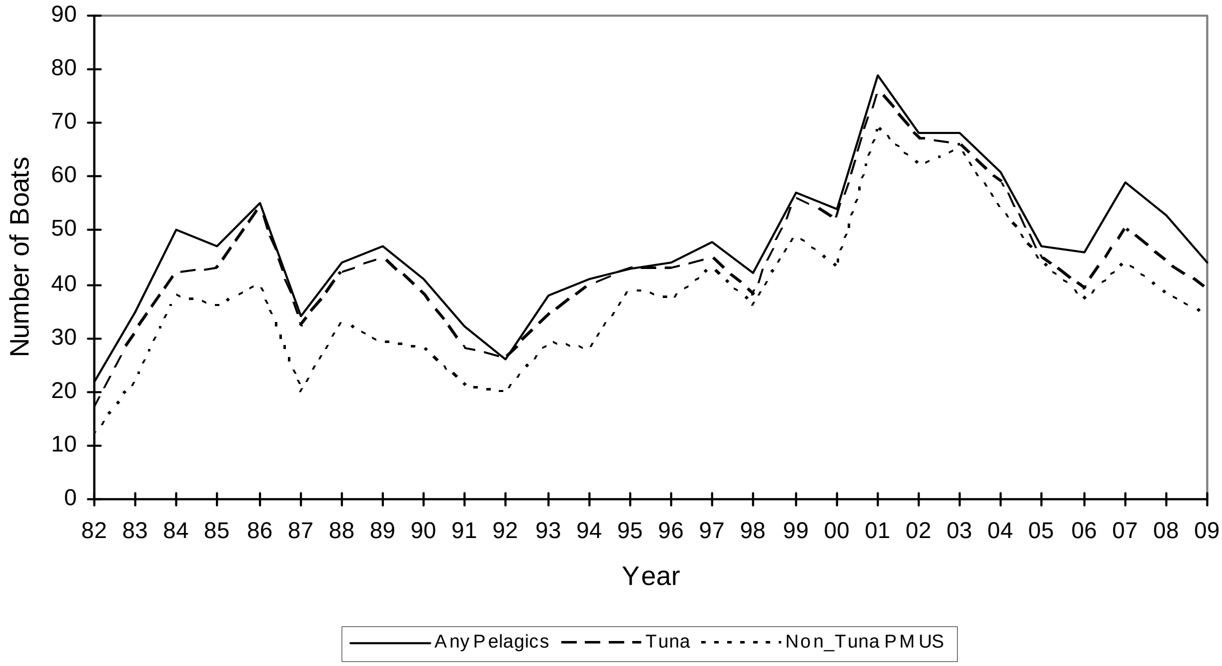


Interpretation: Estimated total commercial landings by American Samoa vessels in 2009 totaled more than 10.5 million pounds. Commercial landings for tuna increased to 10.1 million pounds from 9.2 million in 2008. Estimated 2009 Commercial landings for non-tuna PMUS also increased by 6% or 23,600 pounds. Commercial landings for tuna and for all species peaked in 2002, while non-tuna landings peaked in 2006.

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

Year	Pounds Landed Tuna	Non Tuna PMUS
1982	22,065	1,515
1983	85,069	4,441
1984	196,100	13,458
1985	99,987	17,515
1986	170,150	15,291
1987	132,238	4,841
1988	172,803	12,111
1989	113,545	8,164
1990	56,622	3,627
1991	58,027	15,027
1992	90,575	11,088
1993	44,407	14,479
1994	188,980	41,330
1995	281,804	55,056
1996	311,348	46,254
1997	799,911	97,956
1998	1,115,310	95,011
1999	946,855	109,638
2000	1,646,902	124,833
2001	7,800,928	151,951
2002	14,991,936	368,858
2003	10,554,312	411,833
2004	8,449,678	473,258
2005	8,159,461	518,561
2006	11,228,163	743,576
2007	13,727,477	558,635
2008	9,248,516	389,997
2009	10,124,404	413,647
Average	**3,600,628**	**168,641**
Std. Dev.	**4,929,482**	**212,817**

Figure 14. Number of American Samoa Boats Landing Any Pelagic Species, Tunas and Non-Tuna PMUS



Interpretation: The number of American Samoan vessels landing any pelagic species totaled 44 and totaled 39 for tuna species. The number of boats in all categories dropped. The number of vessels landing non-tuna PMUS decreased from 38 to 34 in 2009, and the number of boats landing tuna decreased by 5.

The highest number of boats landing any pelagic, tuna and non-tuna PMUS was 79, 76, and 70 respectively during 2001. Since the peak in 2001,the number of American Samoan vessels landing any pelagic species has decreased by 35; for tuna it is decreased by 37 and for non-tuna PMUS, it is decreased by 35 (see next page).

Year	Number of Boats Landing		
	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	47	45	29
1990	41	38	28
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	69
2002	68	67	62
2003	68	66	65
2004	61	59	54
2005	47	45	44
2006	46	39	37
2007	59	50	44
2008	53	44	38
2009	44	39	34
Average	**47**	**44**	**38**
Std. Dev	**12**	**13**	**13**

Calculation: Prior to 1997, each boat counted in the Any Pelagics column made at least one landing in an offshore creel survey interview of at least one species in Table 2 in the given year. Likewise each boat counted in the other two columns made at least one landing in an offshore creel survey interview of at least one species in the corresponding subgroup of Table 2 in the given year. In 1997 and after, the count of non-interviewed boats that made at least one landing of the appropriate species in a longline log was added to the count of interviewed boats from the offshore creel survey.

Figure 15. Number of American Samoa boats landing any pelagic species by longlining, trolling and all methods

Interpretation: The number of American Samoan vessels landing pelagic species using any method in 2009 decreased by 9 vessels, longline vessels decreased by 2, and trolling vessels decreased by 6. The drop in number of boats shows a declining trend in participation in longline fishing.

The number of American Samoan longline vessels has decreased by 36 (53%) since the peak count of 62 in 2001, as has the number of boats using any method decreased to 44 in 2009 (see next page).

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	47	1	44
1990	41	0	37
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	18
2002	68	58	16
2003	68	50	20
2004	61	41	18
2005	47	36	9
2006	46	31	9
2007	59	29	19
2008	53	28	16
2009	44	26	10
Average	**47**	**23**	**29**
Std. Dev.	**12**	**19**	**12**

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

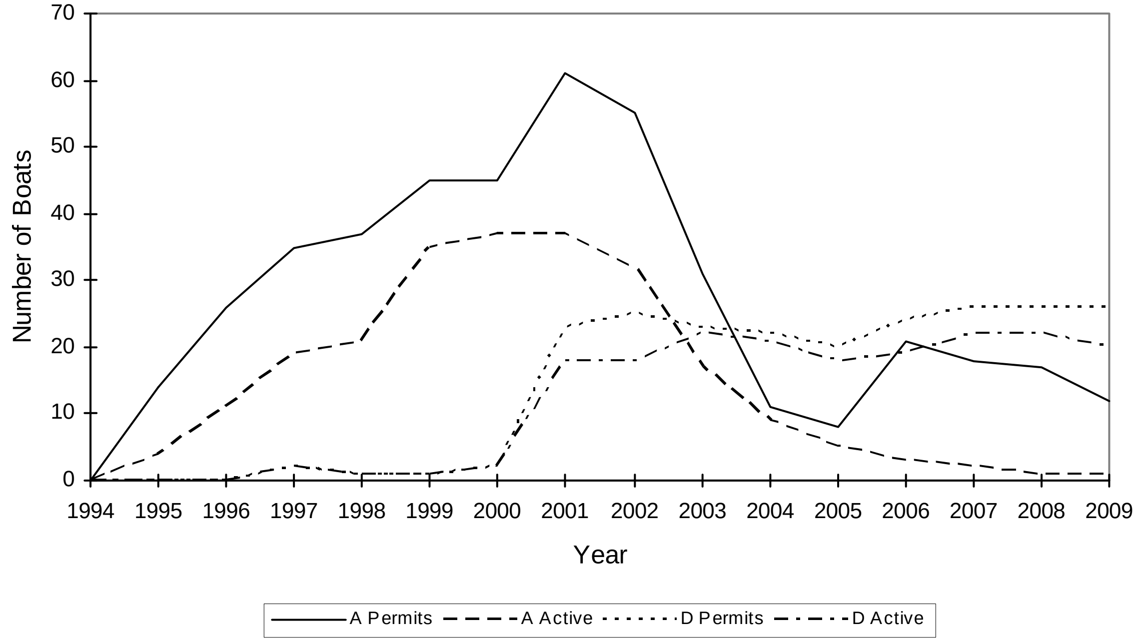
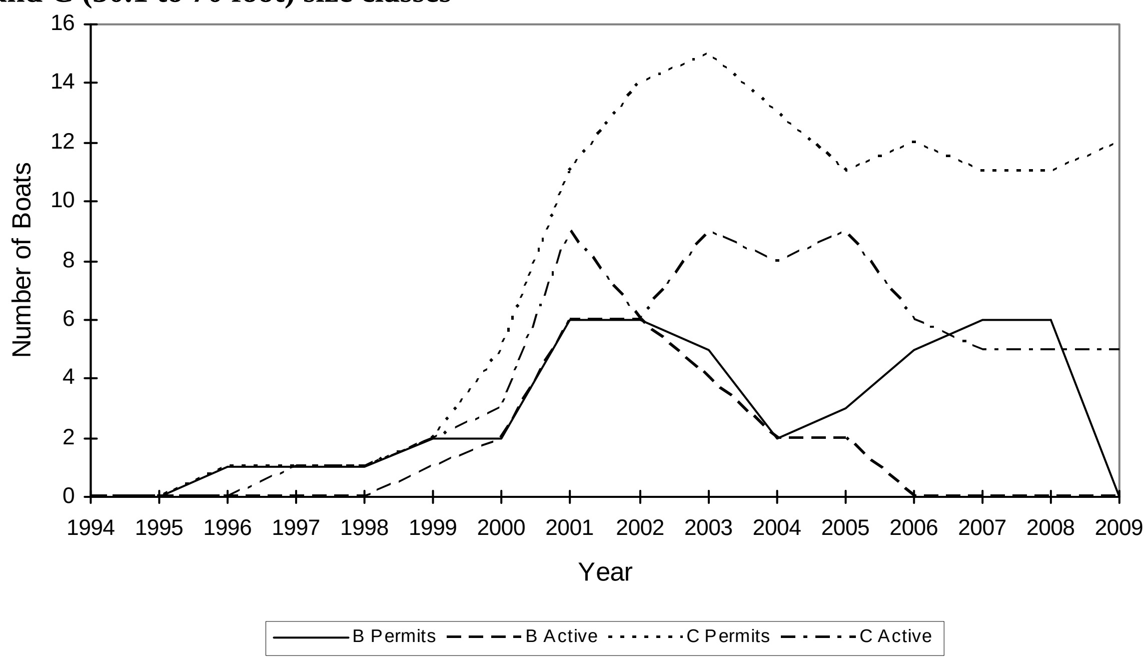


Figure 17. Number of permitted and active longline fishing vessels in the B (40.1 to 50 foot) and C (50.1 to 70 foot) size classes



Interpretation: 2009 shows only one Class A (<40 ft) boat, down from 12, was active in longline fishing (Figure 16). Local longline alias fall in Class A. The 2009 count shows a continuous declining trend since the 38 peak count in 2001. No boat in the Class B was active in 2009 (Figure 17). Of the 12 boats permitted in the Class C, 5 were active. The number of Class

C active boats, of the 12 permitted, remained at 5 in 2009. Class D (>70 ft) boats dominated longline fishing since 2003. During 2009, of the 26 permitted vessels, 20 boats were active, which is 2 fewer than 2008. The number of Class D boats increased to 22 in 2007 from 19 in 2006. Longer boats (Class C and D) seem to dominate longline fishing.

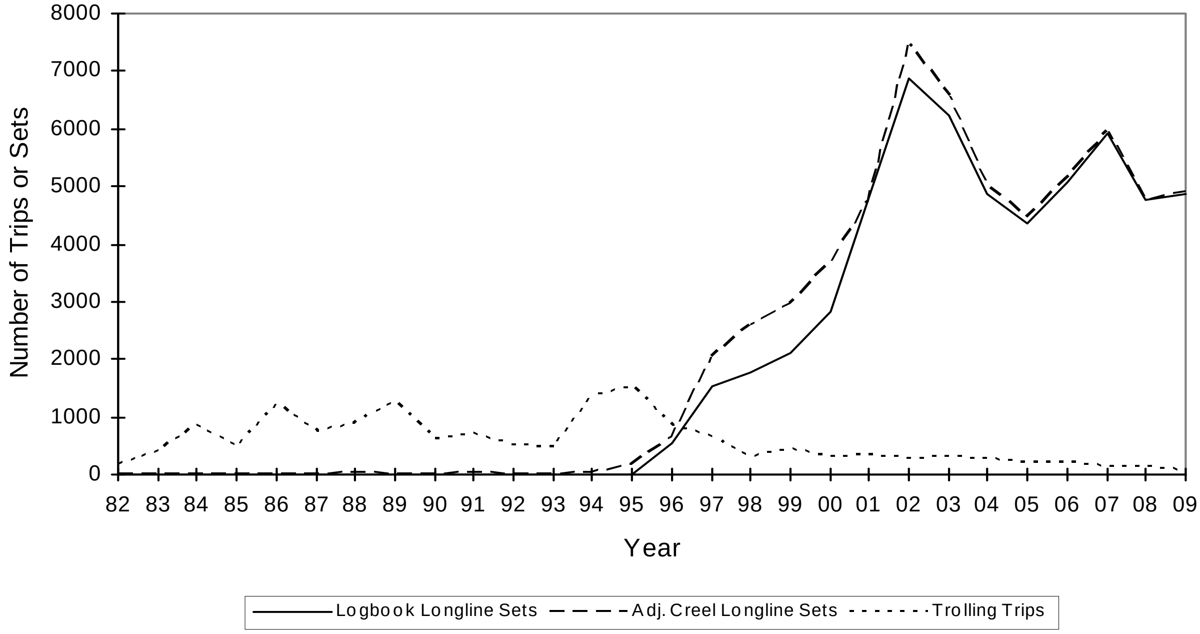
Calculation: For 2006, onwards the number of permits are the actual number of Limited Entry Longline Permits issued for each size class late in 2005. For earlier years, the number of permits are the number of federal general longline permits issued for each vessel size category. For the C and D size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

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

Table 8. Number of Issued and Active Permits in Classes A-D in American Samoa

	Class A < 40 Feet		Class B 40.1 - 50 Feet		Class C 50.1 - 70 Feet		Class D > 70 Feet	
Year	Permits	Active	Permits	Active	Permits	Active	Permits	Active
1994	0	0	0	0	0	0	0	0
1995	14	4	0	0	0	0	0	0
1996	26	11	1	0	1	0	0	0
1997	35	19	1	0	1	1	2	2
1998	37	21	1	0	1	1	1	1
1999	45	35	2	1	2	2	1	1
2000	45	37	2	2	5	3	2	2
2001	61	37	6	6	11	9	23	18
2002	55	32	6	6	14	6	25	18
2003	31	17	5	4	15	9	23	22
2004	11	9	2	2	13	8	22	21
2005	8	5	3	2	11	9	20	18
2006	21	3	5	0	12	6	24	19
2007	18	2	6	0	11	5	26	22
2008	17	1	6	0	11	5	26	22
2009	12	1	0	0	12	5	26	20

Figure 18. Number of American Samoa Fishing Trips or Sets for All Pelagic Species by Method



Interpretation: Longline sets increased by 2% in 2009 to 4,869 as per logbook. The creel survey also shows an increase of 3% to 4912 sets. The 2002 number of longline sets is the highest on record for both the logbook and creel counts.

The estimated number of troll trips decreased by 66 (46%; see next page) in 2009. The 2009 decrease in troll trips continues a consecutive decline since 2003.

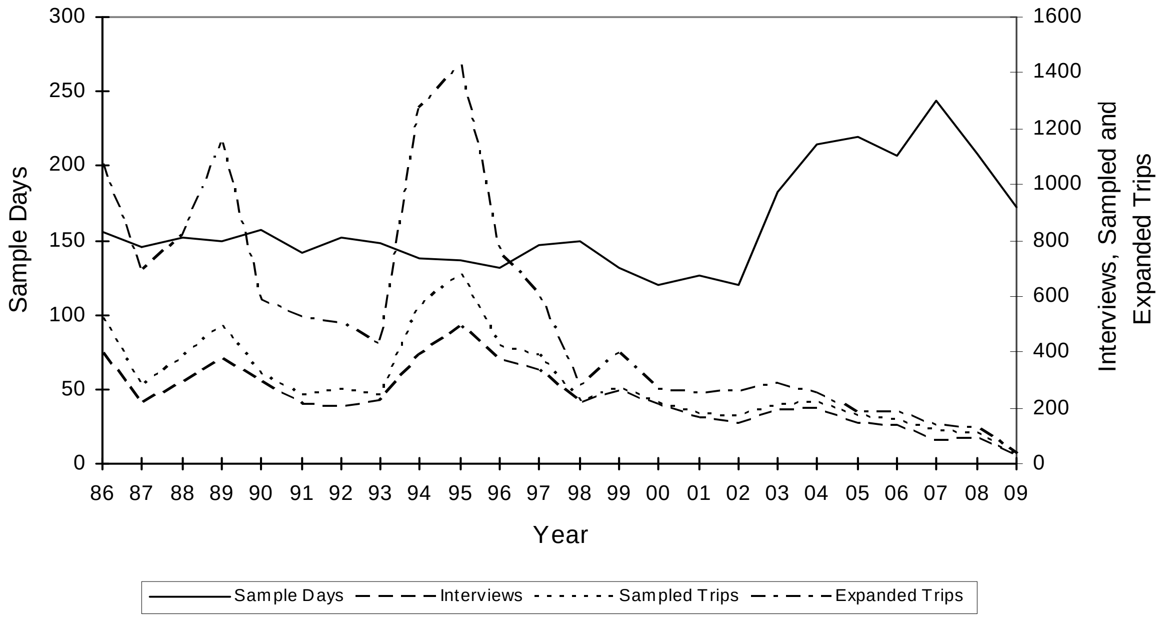
Calculation: The number of Troll Trips is calculated by first subtracting the total longline pounds in Table 1 from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips (from the offshore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

		Longline Sets	
Year	**Troll Trips**	**Logbook**	**Creel (Adj)**
1982	177	0	0
1983	406	0	0
1984	853	0	0
1985	464	0	0
1986	1,234	0	0
1987	751	0	0
1988	875	0	31
1989	1,269	0	3
1990	615	0	0
1991	699	0	21
1992	513	0	0
1993	481	0	16
1994	1,355	0	20
1995	1,548	0	187
1996	847	528	653
1997	656	1,528	2,037
1998	316	1,754	2,584
1999	429	2,108	2,967
2000	292	2,814	3,661
2001	330	4,801	4,725
2002	288	6,872	7,441
2003	310	6,221	6,561
2004	276	4,853	4,988
2005	211	4,359	4,475
2006	193	5,069	5,150
2007	145	5,919	5,967
2008	143	4,754	4,780
2009	77	4,869	4,912
Average	**563**	**4,032**	**4,350**
Std. Dev.	**394**	**1,871**	**1,758**

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 19. Number of American Samoa Sample Days, Trolling Interviews, and Trolling Trips

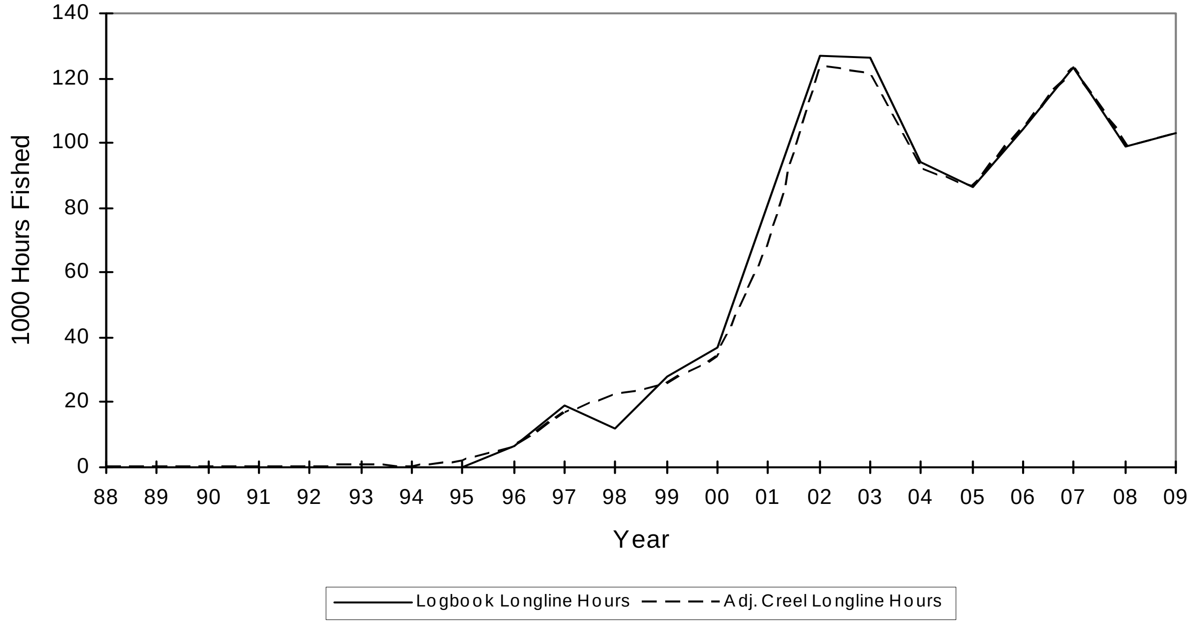


Interpretation: The number of trolling interviews recorded for 2009 totaled 27, a decrease of 97% from 90 in 2008. There were 172 sample days, a decrease of 36 days from 2008. The number of trolling trips sampled total 30, a decrease of 81 from 2008.

Year	Sample Days	Trolling Interviews	Trolling Trips Sampled	Trolling Trips Expanded
1986	156	398	523	1,077
1987	146	217	277	686
1988	152	285	379	817
1989	149	376	496	1,148
1990	157	293	321	583
1991	142	213	248	524
1992	152	206	263	503
1993	148	222	245	423
1994	138	387	567	1,273
1995	137	489	683	1,429
1996	131	377	420	754
1997	147	337	386	603
1998	150	220	227	280
1999	132	257	271	393
2000	120	212	221	263
2001	126	163	175	250
2002	120	143	169	259
2003	183	194	214	287
2004	214	198	219	252
2005	219	146	169	187
2006	207	133	156	182
2007	244	82	114	133
2008	208	90	111	132
2009	172	27	30	35
Average	**160**	**236**	**287**	**520**
Std. Dev.	**33**	**111**	**155**	**380**

Calculation: All data in this table and chart comes from the Tutuila and Manua Boat-Based Creel Survey. The number of Sample Days is the number of weekend/holiday and weekday sample days in the Tutuila Boat-based Creel survey for the year. The number of Trolling Interviews is the number of Tutuila pure trolling interviews without pooling, plus the number of unadjusted Manua pure trolling interviews for the year. The number of Sampled Trips is the number of pure trolling trips actually counted in the Tutuila and Manua surveys. The Expanded Number of Trips is the expanded number of Tutuila pure troll trips plus the number of Manua troll trips adjusted for the coverage factor.

Figure 20. Number of American Samoa Hours Fished for All Pelagic Species by Longlining



Interpretation: Longline hours fished increased for both Logbook and Creel in 2009. Longline hours fished from the logbook increased 4% to 103,056 in 2009. Creel hours fished showed a similar increase with about a 4% increase from 2008. The highest hours fished was in 2002.

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.

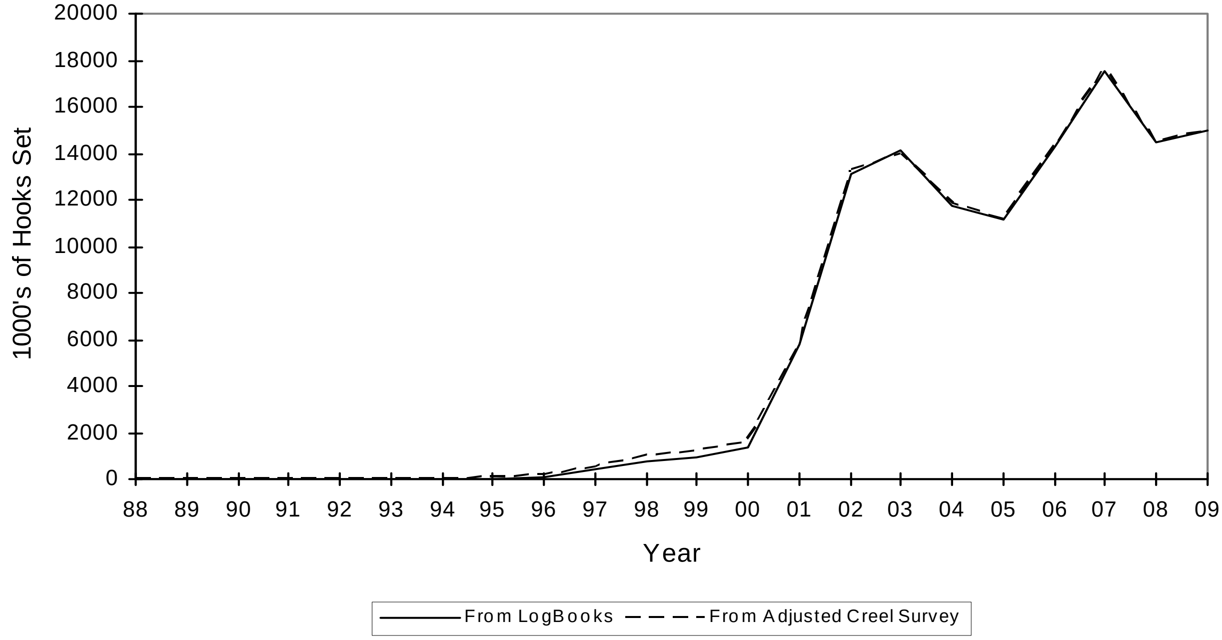
Prior to 1997, the number of longline trip-hours using creel survey data was the expanded number of longline fishing trip-hours from the offshore creel survey system. In 1997 and after, this number is the expanded number of longline fishing trip-hours from the offshore creel survey system for interviewed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

	Hours Fished	
Year	Longline Logbook	Longline Creel (Adj.)
1988	0	198
1989	0	17
1990	0	0
1991	0	164
1992	0	0
1993	0	296
1994	0	161
1995	0	1,860
1996	6,366	5,906
1997	19,065	16,956
1998	11,984	22,012
1999	27,708	25,721
2000	36,973	33,790
2001	81,291	67,755
2002	127,023	123,194
2003	126,282	121,664
2004	94,054	91,865
2005	86,332	86,164
2006	104,320	104,132
2007	123,267	122,610
2008	99,178	98,676
2009	103,056	103,196
Average	**47,586**	**46,652**
Std. Dev.	**49,721**	**48,350**

vessels. The average and standard deviation for Hours Fished from logbook data and creel data is calculated from 1996 onward for comparison.

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

Figure 21. Thousands of American Samoa Longline Hooks Set From Logbook and Creel Survey Data



Interpretation: The number of 1,000s hooks set by American Samoan longline vessels increased by 555 according to both logbook data and adjusted creel data. The 2007 estimate is the highest number of hooks recorded since 1996.

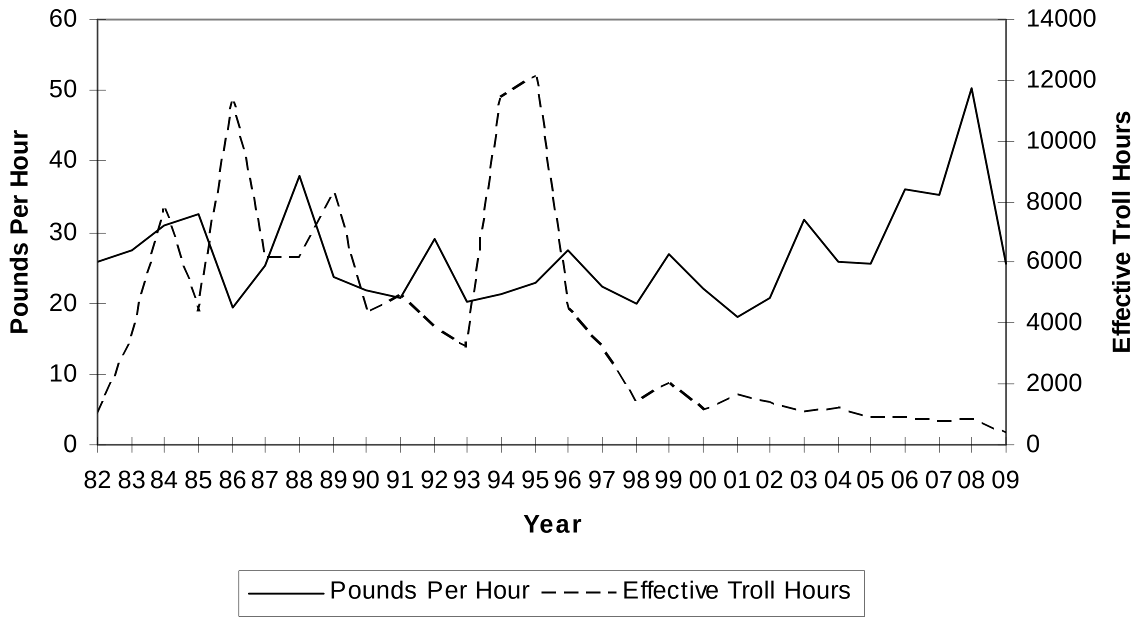
Calculation: The number of longline hooks using logbook data was obtained by summing the number of hooks for sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats and dividing by 1000.

Prior to 1997, the number of longline hooks using creel survey data was 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)
1988	0	1
1989	0	0
1990	0	0
1991	0	0
1992	0	0
1993	0	2
1994	0	0
1995	0	45
1996	99	157
1997	419	518
1998	771	1,042
1999	915	1,226
2000	1,335	1,587
2001	5,795	5,808
2002	13,096	13,245
2003	14,165	13,991
2004	11,742	11,806
2005	11,129	11,177
2006	14,262	14,319
2007	17,552	17,586
2008	14,444	14,464
2009	14,999	15,018
Average	**5,487**	**5,545**
Std. Dev.	**6,583**	**6,562**

Figure 22. American Samoa Pelagic Catch per

Hour of Trolling and Number of Trolling Hours



Interpretation: Trolling pounds-per-hour (PPH) decreased to about 50% from 50.44 PPH in 2008. The 2008 PPH figure is the highest ever in the 27-year record. Pounds-per-troll hour generally increased since 2001 until 2009, when they declined by half. Effective troll hours also decreased 50% to 405 hours in 2009 from 808 hours in 2008.

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 in 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	19.36	11,294
1987	25.34	6,179
1988	38.01	6,125
1989	23.79	8,370
1990	21.86	4,362
1991	20.64	4,884
1992	28.97	3,809
1993	20.09	3,216
1994	21.23	11,448
1995	22.94	12,143
1996	27.38	4,442
1997	22.31	3,144
1998	19.93	1,405
1999	26.81	1,981
2000	22.01	1,149
2001	18.09	1,655
2002	20.62	1,362
2003	31.78	1,044
2004	25.70	1,204
2005	25.44	862
2006	36.02	883
2007	35.15	723
2008	50.44	808
2009	25.64	405
Average	**26.66**	**3,915**
Std. Dev.	**6.94**	**3,436**

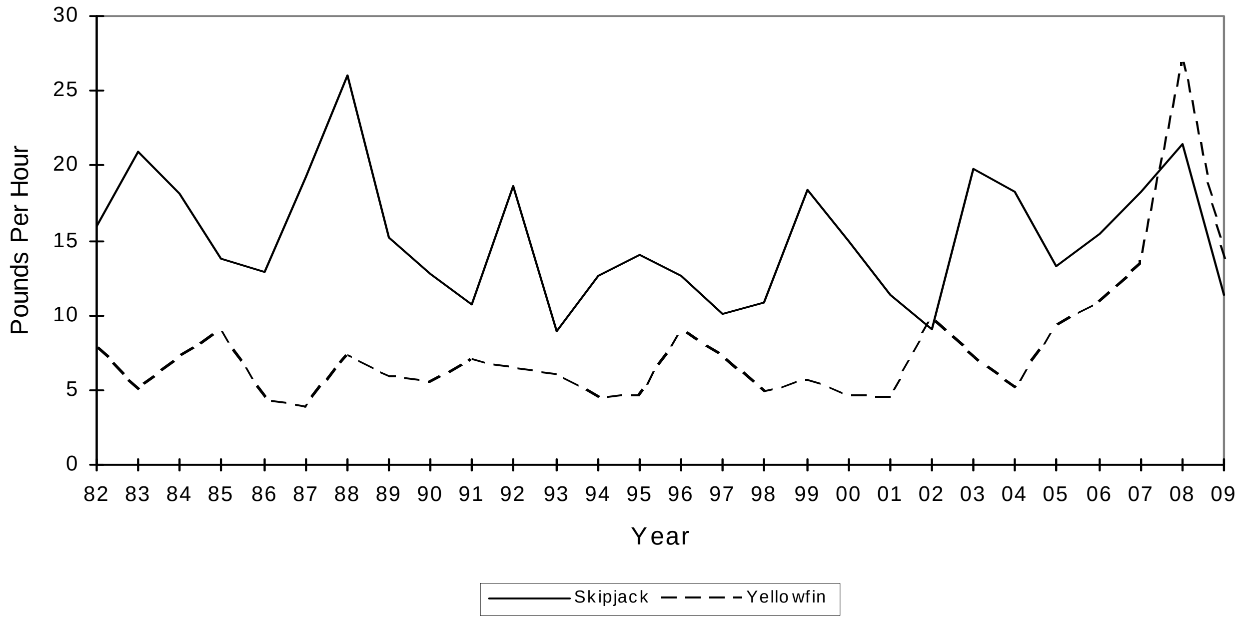
Figure 23. American Samoa trolling catch rates for blue marlin, mahimahi, and wahoo

Interpretation: Blue marlin pounds-per-hour (PPH) trolling showed zero pounds, the same as for 2008. Wahoo also showed a zero count in 2009 from 0.22 pounds recorded in 2008. A decrease of 0.29 PPH (32%) is recorded for mahimahi in 2009 from 0.90 PPH recorded in 2008.

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

	Pounds Caught Per Trolling Hour		
Year	**Blue Marlin**	**Mahimahi**	**Wahoo**
1982	0.00	0.92	0.14
1983	0.43	0.43	0.15
1984	0.91	0.28	0.09
1985	0.41	2.06	0.36
1986	0.39	0.90	0.15
1987	0.00	0.52	0.23
1988	1.79	1.13	0.22
1989	1.40	0.36	0.15
1990	1.05	0.70	0.30
1991	1.70	0.57	4.39
1992	1.29	0.62	1.04
1993	2.25	1.38	1.84
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	0.59	0.28
2003	1.39	1.49	0.59
2004	0.00	0.43	0.48
2005	0.00	0.21	0.94
2006	0.00	1.40	0.79
2007	0.31	0.98	1.29
2008	0.00	0.90	0.22
2009	0.00	0.61	0.00
Average	**0.80**	**0.82**	**0.65**
Std. Dev.	**0.76**	**0.44**	**0.84**

Figure 24. American Samoa Trolling Catch Rates for Skipjack and Yellowfin Tuna



Interpretation: Estimated 2009 pounds caught per trolling hour (PPTH) for skipjack and yellowfin tunas showed they both decreased. The PPTH for skipjack decreased by 10.10 pounds, from 21.50 PPTH in 2008 to 11.40 in 2009. The highest PPTH recorded was 26.00 in 1988.

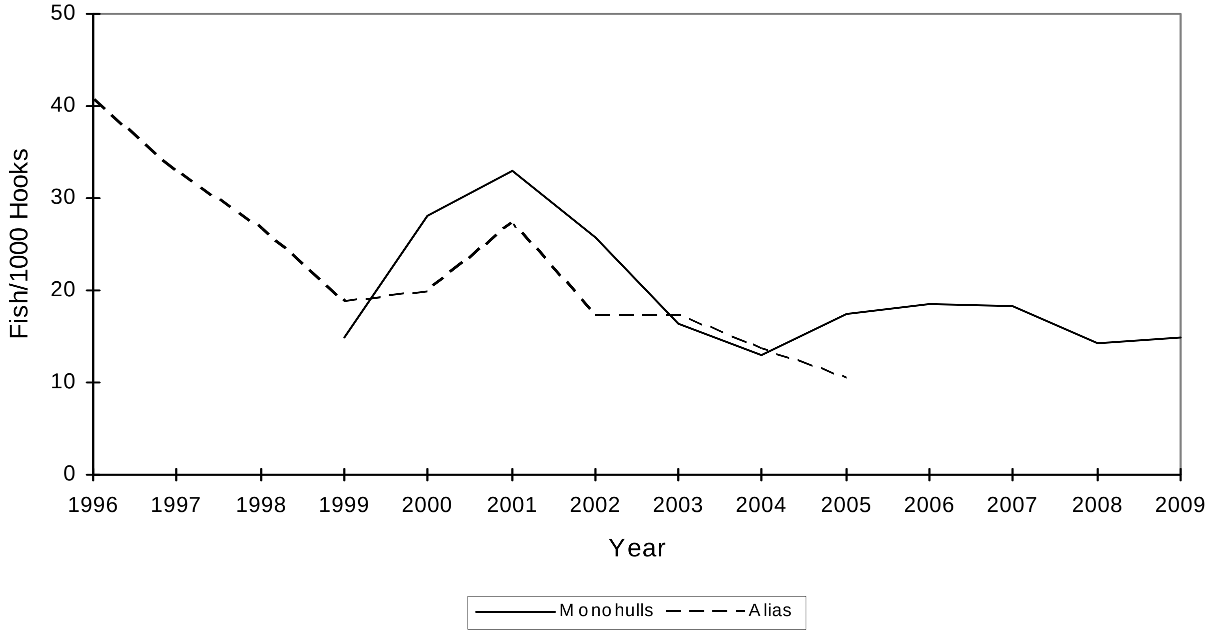
The yellowfin tuna PPTH also decreased by about 50% from a record high of 26.90 PPTH recorded in 2008. The highest skipjack PPTH was recorded in 1988, more than 20 yrs ago.

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

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

	Pounds Caught Per Trolling Hour	
Year	**Skipjack**	**Yellowfin**
1982	15.90	7.80
1983	21.00	5.04
1984	18.10	7.20
1985	13.80	8.90
1986	12.90	4.31
1987	19.30	3.88
1988	26.00	7.30
1989	15.20	5.90
1990	12.80	5.51
1991	10.70	7.06
1992	18.70	6.40
1993	8.89	6.06
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	14.90	4.61
2001	11.40	4.44
2002	9.03	9.83
2003	19.80	7.10
2004	18.20	5.10
2005	13.30	9.25
2006	15.40	10.80
2007	18.20	13.40
2008	21.50	26.90
2009	11.40	13.50
Average	**15.18**	**7.72**
Std. Dev.	**4.14**	**4.47**

Figure 25. American Samoa Catch per 1000 Hooks of Albacore by Alias and Monohull Vessels from Longline Logbook Data



Interpretation: Due to fishery data confidentiality issues because of low participation, albacore information for alia longline vessels for 2006 through to 2009 is omitted. Monohulls caught 14.8 albacore tuna per 1000 hooks in 2009, a slight increase of 0.6 fish from 14.2 fish caught per 1000 hooks in 2008. The highest number of fish caught per 1000 hooks is 32.9 back in 2001.

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

	Number of Fish Per 1000 Hooks	
Year	**Alias**	**Monohulls**
1996	40.6	--
1997	32.8	--
1998	26.6	--
1999	18.8	14.8
2000	19.8	28.0
2001	27.3	32.9
2002	17.2	25.8
2003	17.3	16.4
2004	13.7	12.9
2005	10.3	17.4
2006	--	18.4
2007	--	18.3
2008	--	14.2
2009	--	14.8

Table 9. American Samoa Catch per 1000 Hooks for Two Types of Longline Vessels from 1996 to 1999

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

Table 10. American Samoa Catch per 1000 Hooks for Two Types of Longline Vessels from 2000 to 2002

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

Table 11. American Samoa Catch per 1000 Hooks for Two Types of Longline Vessels from 2003 to 2005

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

Table 12. American Samoa Catch/1000 Hooks for All Longline Vessels from 2006 to 2009

Species	2006 All Vessels	2007 All Vessels	2008 All Vessels	2009 All Vessels
Skipjack tuna	3.2	2.3	2.4	2.3
Albacore tuna	18.4	18.3	14.2	14.8
Yellowfin tuna	1.6	1.9	1.0	1.1
Bigeye tuna	0.9	0.9	0.5	0.6
TUNAS SUBTOTALS	24.2	23.5	18.2	18.8
Mahimahi	0.4	0.1	0.1	0.2
Blue marlin	0.2	0.2	0.2	0.2
Wahoo	1.5	1.0	0.7	1.0
Sharks (all)	0.5	0.4	0.4	0.4
Swordfish	0.1	0.0	0.0	0.0
Spearfish	0.1	0.0	0.1	0.1
Oilfish	0.5	0.5	0.4	0.5
Pomfret	0.0	0.1	0.1	0.1
NON-TUNA PMUS SUBTOTALS	3.3	2.4	2.0	2.5
Pelagic fishes (unknown)	0.0	0.2	0.1	0.2
OTHER PELAGICS SUBTOTALS	0.0	0.2	0.1	0.2
TOTAL PELAGICS	**27.5**	**26.0**	**20.3**	**21.5**

Interpretation: Total pelagics catch/1000s hooks by all longline vessels in 2009 increased to 21.5 fish from 20.3 fish in 2008 (Table 12Table 2). CPUE for tunas increased slightly to 18.8 fish from 18.2 fish in 2008. Total catch per 1000 hooks for non tuna also increased from 2.0 to 2.5 during 2009. Other pelagics show an increase of 0.1. Albacore tuna CPUE increased to 14.8 from 14.2 in 2008 and it dominated the total tuna catch. With respect to catch/1000 hooks in 2009, skipjack tuna decreased by 0.1 to 2.3, yellowfin increased by 0.1, and bigeye increased by 0.1.

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

Figure 26. Average Albacore Weight-per-Fish

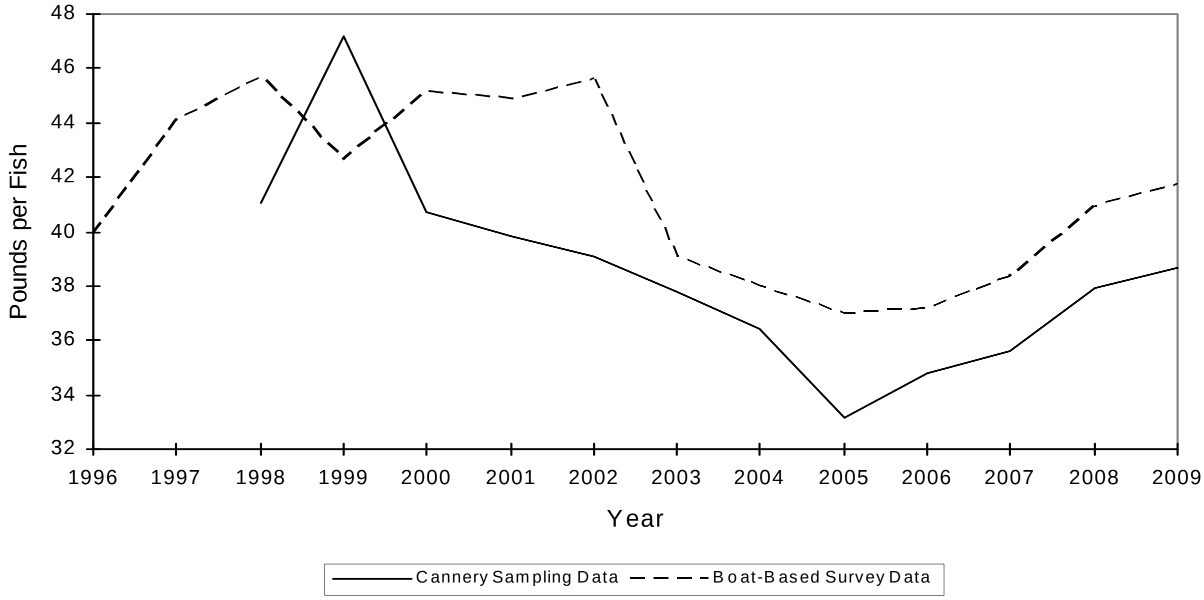
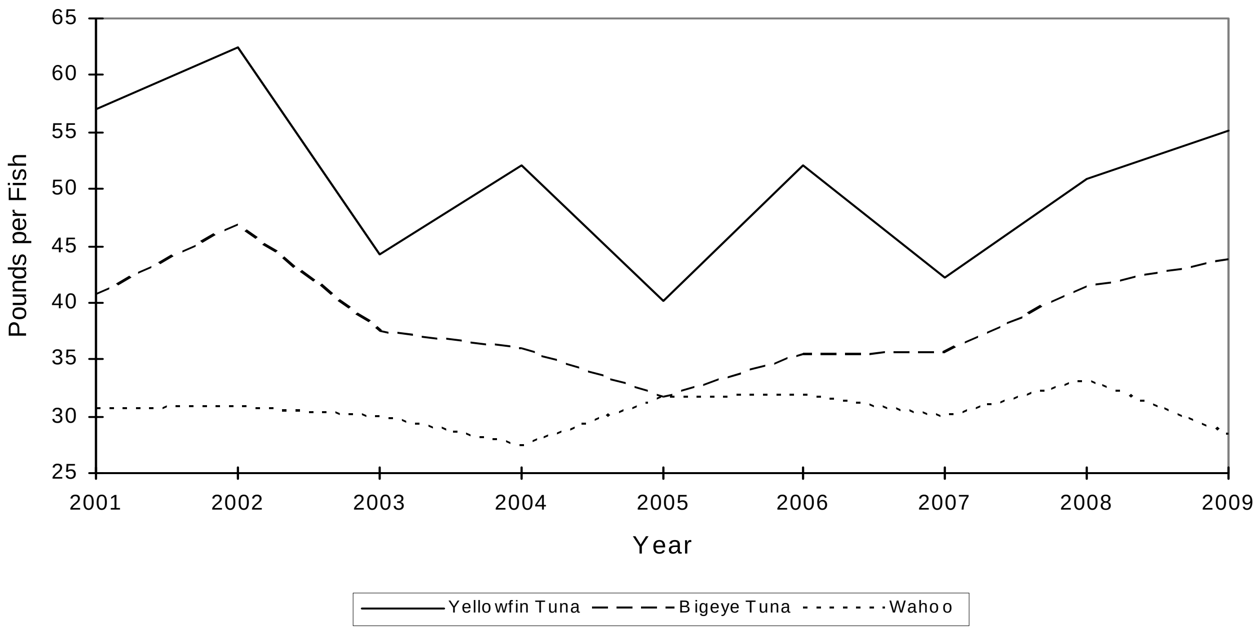


Figure 27. Average cannery sampled weight-per-fish for other cannery species



Interpretation: The table for cannery data represents the portion of the catch unloaded by larger vessels fishing further away from Tutuila, while the table from the Creel Survey represents fish caught by alias near Tutuila.

Albacore weight-per-fish increased to 41.8 lbs in 2009 from 40.9 in 2008 in creel interviews. Cannery sampled weight-per-albacore also shows an increase by 0.8 fish. Skipjack average weight per fish in cannery samples increased slightly by 0.1 in 2009, and in creel samples it showed no weight. Yellowfin showed an increase in average weight in creel samples by 32 lbs and an increase of 5.7 lbs in cannery samples. Bigeye average weight in 2009also increased in cannery samples by 2.2 lbs, but showed no weight in the creel survey. From the 2009 creel samples, wahoo average weight decreased by 0.6 lbs to 17.1 lbs and decreased by 4.7 lbs in the cannery samples. Mahimahi increased by 1.7 lbs from creel and decreased by 4 lbs from the cannery samples.

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

Calculation: The Creel Survey Annual Average Pounds/Fish for each species was calculated from the creel survey interviews by dividing the total pounds of each species sampled during the year by the number of fish of sampled during the year. If the fish were sampled as other than whole (i.e., 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 subsequently 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 farther out to sea from Tutuila

Table 13. Creel Survey Average Weight-per-Fish (1996-2001)

	Creel Survey Annual Average Pounds per Fish					
Species	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Skipjack tuna	9.6	8.4	12.5	9.7	11.6	14.8
Albacore tuna	39.9	44.0	45.7	42.6	45.1	44.8
Yellowfin tuna	37.9	44.2	45.9	33.1	38.1	31.3
Bigeye tuna	52.3	82.8	79.2	57.1	61.1	69.2
Mahimahi	26.2	25.6	23.3	22.3	24.8	19.7
Black marlin		148.3		101.9		67.2
Blue marlin	151.8	117.7	119.9	101.9	135.7	70.9
Wahoo	44.3	38.4	26.3	27.3	31.9	29.7
Sharks (all)	112.3	96.8	69.3	38.0	39.5	68.8
Swordfish	150.0	100.0	212.6	12.0		59.4
Sailfish	88.4	70.7	67.0	61.8	39.1	42.0
Spearfish				46.0		
Moonfish		70.3	33.5	57.7	30.9	102.5
Oilfish			12.7	10.0		23.9
Pomfret					16.5	
Barracudas	13.5	14.6	15.3	11.0	13.1	7.6
Rainbow runner		14.0	17.5	6.5		
Dogtooth tuna			10.0			15.6
Pelagic fishes (unknown)	61.8	8.0	45.3			

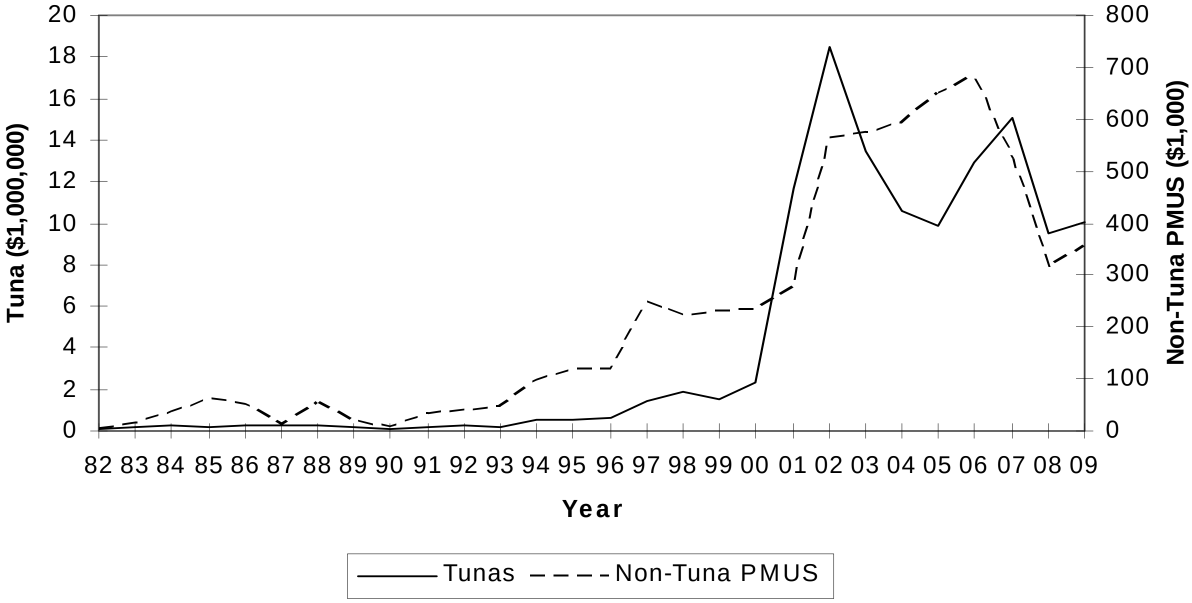
Table 14. Creel Survey Average Weight-per-Fish (2002-2009)

	Creel Survey Annual Average Pounds per Fish						
Species	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Skipjack tuna	8.2	7.9	8.0	12.5	7.4	13.5	
Albacore tuna	39.1	38.0	37.0	37.2	38.3	40.9	41.8
Yellowfin tuna	17.9	35.4	32.9	19.0	37.5	35.4	67.3
Bigeye tuna	40.8	44.1	42.7	37.1	62.2	39.0	
Mahimahi	20.2	21.5	18.5	17.6	21.5	22.8	24.5
Black marlin	69.1	93.8	78.1	91.5	105.9		
Blue marlin	87.6	50.1	117.9	175.7	136.2	84.1	
Wahoo	30.0	28.1	29.7	29.5	33.6	31.8	17.1
Sharks (all)	62.4	71.7		47.5	65.0		
Swordfish	106.9	40.2	25.6	28.3	115.9		
Sailfish	53.3	41.2	54.2	42.0	65.1	56.5	
Spearfish		46.0					
Moonfish	107.0	71.9	101.5	117.4	97.3		
Oilfish	16.3	8.5	1.9		5.9	12.9	
Pomfret		8.2	2.3	1.3	8.8		
Barracudas	8.7	11.3	10.5	8.2	9.6	10.5	
Rainbow runner		6.9	8.8		10.1		
Dogtooth tuna		16.2					

Table 15. Cannery Sampled Average Weight-per-Fish (2004-2009)

	Cannery Sampled Average Lbs. per Fish					
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Skipjack tuna	13.6	13.1	12.3	12.1	12.0	12.1
Albacore tuna	36.5	33.2	34.8	35.6	37.9	38.7
Yellowfin tuna	52.1	40.1	52.1	42.2	50.9	55.2
Bigeye tuna	35.9	31.6	35.5	35.6	41.4	43.6
Mahimahi	13.0	17.2	13.4	13.4	19.1	15.0
Blue marlin		45.8				
Wahoo	27.4	31.7	31.9	29.9	33.2	28.5
Swordfish	72.3		90.3			
Sailfish		22.9	21.7			
Moonfish		95.5	34.7			
Pomfret		7.8		5.4		
Rainbow runner	10.8					

Figure 28. American Samoa Annual Inflation-Adjusted Revenue in 2007 Dollars for Tuna and Non-Tuna PMUS



Interpretation: Inflation-adjusted revenues for 2009 increased by 5% to $10.0 million from $9.8 for all pelagic species landed by American Samoa vessels. Both tuna and non-tuna revenue showed increases in 2009. Inflation-adjusted tuna revenue in 2002 was the highest peak ever at more than $16.6 million; the 2007 adjusted revenue was second highest. The 2006 non-tuna PMUS revenue of $566,636 was the highest recorded in the 28-year history (see next page).

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	$45,367	$1,534	$3,665
1983	100.8	$58,561	$138,790	$5,828	$13,812
1984	102.7	$114,981	$267,446	$15,938	$37,072
1985	103.7	$95,157	$219,241	$26,800	$61,748
1986	107.1	$139,021	$310,156	$23,117	$51,575
1987	111.8	$110,012	$235,096	$5,267	$11,255
1988	115.3	$143,623	$297,587	$25,384	$52,596
1989	120.3	$110,343	$219,141	$9,338	$18,544
1990	129.6	$63,285	$116,634	$3,813	$7,027
1991	135.3	$94,344	$166,612	$17,923	$31,651
1992	140.9	$141,106	$239,174	$23,451	$39,750
1993	141.1	$80,250	$135,862	$28,181	$47,710
1994	143.8	$337,977	$561,380	$59,266	$98,440
1995	147.0	$319,213	$518,720	$73,194	$118,939
1996	152.5	$393,770	$616,644	$76,234	$119,382
1997	156.4	$941,063	$1,437,003	$162,262	$247,774
1998	158.4	$1,241,313	$1,871,900	$146,754	$221,304
1999	159.9	$1,016,156	$1,518,136	$153,286	$229,010
2000	166.7	$1,656,449	$2,373,691	$161,748	$231,785
2001	169.9	$8,319,735	$11,697,547	$196,923	$276,874
2002	172.1	$13,292,200	$18,449,573	$406,190	$563,792
2003	176.0	$9,920,062	$13,461,524	$422,704	$573,609
2004	188.5	$8,384,420	$10,623,060	$467,170	$591,904
2005	198.3	$8,206,541	$9,880,676	$539,924	$650,068
2006	204.3	$11,056,997	$12,925,629	$581,786	$680,107
2007	215.5	$13,583,174	$15,050,157	$471,547	$522,474
2008	231.5	$9,196,349	$9,490,632	$306,141	$315,937
2009	238.9	$10,009,903	$10,009,903	$354,474	$354,474
Average	**153.2**	**$3,537,321**	**$4,388,474**	**$170,221**	**$220,439**
Std. Dev.	**39.15**	**$4,742,793**	**$5,758,637**	**$186,825**	**$221,012**

Figure 29. American Samoa Average Inflation-Adjusted Price per Pound of Tunas and Non-Tuna PMUS

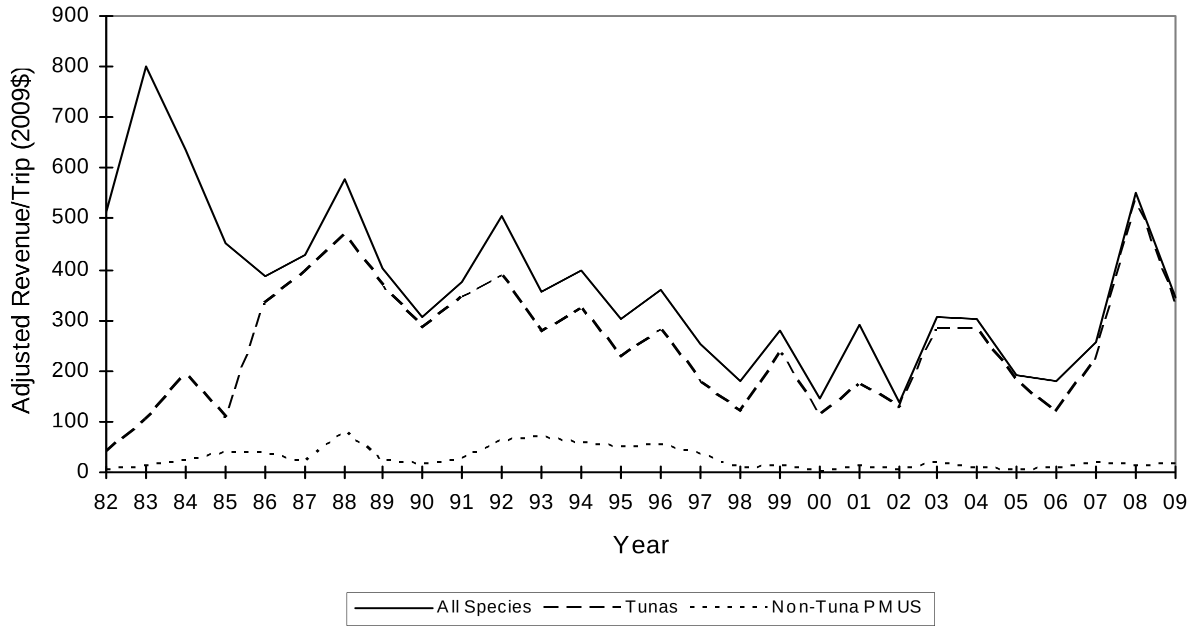
Interpretation: The average inflation-adjusted price-per-pound for tunas showed a decrease by 0.4 cents to 0.99 cents during 2009, and non-tuna PMUS showed an increase of 0.5 cents from 0.81 cents in 2008.

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

The unadjusted price/pound values for the pelagic species subgroups above were adjusted for inflation by multiplying the given year's price/pound by the 2006 CPI divided by the CPI for that year.

	Average Price/Pound ($)			
	Tunas		Non-Tuna PMUS	
Year	Unadjust.	Adjusted	Unadjust.	Adjusted
1982	$0.86	$2.06	$1.01	$2.42
1983	$0.69	$1.63	$1.31	$3.11
1984	$0.59	$1.36	$1.18	$2.75
1985	$0.95	$2.19	$1.53	$3.53
1986	$0.82	$1.82	$1.51	$3.37
1987	$0.83	$1.78	$1.09	$2.33
1988	$0.83	$1.72	$2.10	$4.34
1989	$0.97	$1.93	$1.14	$2.27
1990	$1.12	$2.06	$1.05	$1.94
1991	$1.63	$2.87	$1.19	$2.11
1992	$1.56	$2.64	$2.12	$3.58
1993	$1.81	$3.06	$1.95	$3.30
1994	$1.79	$2.97	$1.43	$2.38
1995	$1.13	$1.84	$1.33	$2.16
1996	$1.26	$1.98	$1.65	$2.58
1997	$1.18	$1.80	$1.66	$2.53
1998	$1.11	$1.68	$1.54	$2.33
1999	$1.07	$1.60	$1.40	$2.09
2000	$1.01	$1.44	$1.30	$1.86
2001	$1.07	$1.50	$1.30	$1.82
2002	$0.89	$1.23	$1.10	$1.53
2003	$0.94	$1.28	$1.03	$1.39
2004	$0.99	$1.26	$0.99	$1.25
2005	$1.01	$1.21	$1.04	$1.25
2006	$0.98	$1.15	$0.78	$0.91
2007	$0.99	$1.10	$0.84	$0.94
2008	$0.99	$1.03	$0.79	$0.81
2009	$0.99	$0.99	$0.86	$0.86
Average	**$1.07**	**$1.76**	**$1.29**	**$2.20**
Std. Dev.	**$0.29**	**$0.57**	**$0.36**	**$0.90**

Figure 30. American Samoa Average Inflation-Adjusted Revenue per Trolling Trip Landing Pelagic Species



Interpretation: Average inflation-adjusted revenues for all species decreased by 37% to $345 during 2009. The average inflation-adjusted revenue-per-troll-trip for tuna amounts to $328, a decrease of about 39% from $534 in 2008. Skipjack and yellowfin are the primary tuna landings by trollers (Table 1); in 2009, inflation-adjusted revenue-per-troll-trip for non-tuna PMUS increased 26% to $15.9. The highest average per trolling trip estimates for tunas was in 2008. The highest average for non-tuna was in 1988. Mahimahi and wahoo are the primary non-tuna PMUS landings for trollers (Table 1).

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

The unadjusted revenue/trip values for the pelagic species subgroups above and for all species were adjusted for inflation by multiplying the given year's revenue/trip by the 2003 consumer price index (CPI) divided by the CPI for that year.

Year	All Species		Tunas		Non-Tuna PMUS	
	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.
1982	$512	$214	$38	$16	$3.1	$1.3
1983	$801	$338	$102	$43	$12.3	$5.2
1984	$637	$274	$191	$82	$24.4	$10.5
1985	$452	$196	$107	$47	$36.4	$15.8
1986	$387	$173	$334	$150	$38.8	$17.4
1987	$430	$201	$395	$185	$19.4	$9.1
1988	$576	$278	$466	$225	$80.0	$38.6
1989	$401	$202	$368	$185	$24.8	$12.5
1990	$305	$166	$284	$154	$14.4	$7.8
1991	$375	$212	$344	$195	$27.2	$15.4
1992	$505	$298	$387	$228	$62.4	$36.8
1993	$357	$211	$274	$162	$70.6	$41.7
1994	$399	$241	$322	$194	$56.0	$33.7
1995	$304	$187	$226	$139	$48.3	$29.7
1996	$361	$230	$281	$180	$55.3	$35.3
1997	$253	$165	$177	$116	$35.3	$23.1
1998	$180	$119	$117	$78	$9.2	$6.1
1999	$279	$187	$235	$158	$11.1	$7.4
2000	$146	$102	$109	$76	$1.1	$0.8
2001	$290	$206	$174	$124	$12.1	$8.6
2002	$139	$101	$127	$91	$5.3	$3.8
2003	$307	$226	$283	$208	$19.0	$14.0
2004	$303	$239	$283	$223	$8.1	$6.4
2005	$191	$158	$178	$148	$5.1	$4.2
2006	$181	$155	$117	$100	$6.7	$5.7
2007	$258	$233	$223	$201	$19.7	$17.8
2008	$552	$535	$534	$518	$11.8	$11.4
2009	$345	$345	$328	$328	$15.9	$15.9
Average	**$365**	**$221**	**$250**	**$163**	**$26.2**	**$15.6**
Std. Dev.	**$152**	**$85**	**$118**	**$96**	**$21.5**	**$11.9**

B. Guam

Introduction

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 in 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 28-year time series. The 2009 total pelagic landings were approximately 719,892 pounds, an increase of 30% compared with 2008. Landings consisted primarily of five major species: mahimahi (Coryphaena hippurus), wahoo (Acanthocybium solandri), bonita or skipjack tuna (Katsuwonus pelamis), yellowfin tuna (Thunnus albacares), and Pacific blue marlin (Makaira mazara). Other minor species caught include rainbow runner (Elagatis bipinnulatus), kawakawa (Euthynnus affinis), dogtooth tuna (Gymnosarda unicolor), double-lined mackerel (Grammatorcynus bilineatus), and oilfish (Ruvettus pretiosus). Sailfish and sharks were also caught during 2009. However, these species were not encountered during offshore creel surveys and were not available for expansion in this year's report. While sailfish is kept, sharks are often discarded as bycatch. In addition to the above pelagic species, approximately a half dozen other species were landed incidentally this year.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from 193 in 1983 to 469 in 1998. This number decreased until 2001, but has generally been increasing since then. There were 368 boats involved in Guam's pelagic fishery in 2009, a decrease of 4% from 2008. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small but significant segment of the pelagic group is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews. Data and graphs for non-charters, charters, and bycatch are represented in this report.

There are general wide year-to-year fluctuations in the estimated landings of the five major pelagic species. Catch amounts for the five common species showed positive changes from 2008 levels. 2009 mahimahi catch increased more than 39% from 2008, while wahoo catch totals increased 33%, bonita increased more than 12% and Pacific blue marlin catch increased 235%.

Aggregate landings of all pelagics, tuna, and non-tuna Pelagic Management Unit Species (PMUS) increased in 2009 from 2008 levels. Landings of all pelagics increased 30%, with tuna PMUS increasing 20% and non-tuna PMUS increasing more than 39%. The number of trolling boats decreased by 4%, the number of trolling trips increased by 44%, and hours spent trolling increased by 56%. Fewer boats making more and longer trips may be a result of increasing prices paid for fish or increasing catches, as fish were more abundant in 2009 than they were in 2008.

Trolling catch rates (pounds per hour fished) showed a decrease compared with 2008. Total CPUE was down 15% with yellowfin and marlin showing the greatest increases, while bonita, mahimahi, and wahoo showed decreases.

Commercial landing data for 2009 showed a slight increase from 2008 levels. Commercial landings and revenues increased in 2009, with total adjusted revenues increasing 10%. The adjusted average price for all pelagics increased 11%, with tuna PMUS prices increasing 17% and non-tuna PMUS increasing 13%. Adjusted revenue per trolling trip increased 1% for all pelagics, increased 34.5% for tuna PMUS, and decreased 6.5% for non-tuna PMUS. Commercial landings have shown a decreasing trend over the past eight years. While the adjusted average price of pelagic species increased last year, the number of boats in the fishery decreased. A majority of trollers do not rely on the catch or selling of fish as their primary source of income. Additionally, Guam law required the government of Guam to provide locally caught fish to food services in government agencies, such as Department of Education and Department of Corrections. In 2002, the government of Guam began implementing cost-saving measures, including privatization of food services. The requirement that locally fish be used for food services, while still a part of private contracts, is not being enforced. This has allowed private contractors to import cheaper foreign fish, and reduced the sales of vendors selling locally caught fish, which had represented a substantial portion of sales of locally caught pelagic fish. The decrease in commercial sales seen following 2002 may be, in part, due to this change.

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

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

The makeshift ramp at Ylig Bay will be eliminated in 2010. Widening of the main road on the south east coast of Guam will cause removal of the ramp. In December 2006, a new launch ramp and facility was opened in Acfayan Bay, located in the village on Inarajan on the southeast coast of Guam. Monitoring of this ramp for pelagic fishing activity began in the beginning of 2007. In early 2007, this facility was damaged by heavy surf and has yet to be repaired, thus monitoring of this ramp is on hold until the ramp is repaired. The current financial situation for the government of Guam makes it unlikely this ramp will be repaired in the near future. With the loss of the Ylig ramp and the destruction of the ramp in Acfayan bay, there will be no boat launching facilities on the east side of Guam.

In March and April 2010, DAWR deployed 6 FADS. These were the first FADS deployed in nearly two years. DAWR has received five more systems and is awaiting good weather conditions to deploy the remaining 5. This should bring the number of FADS on station to thirteen of the fourteen considered to be a full complement.

For more information, the Council website is www.wpcouncil.org.

Plan Team Recommendations

2008 Recommendations

1. Streamline the procurement process to facilitate the redeployment of FADS.
2. Streamline the hiring process to facilitate filling biologist positions in the DAWR office.
3. Encourage commercial vendors to participate in the commercial receipts program.

Table 16. Guam 2009 Creel Survey - Pelagic Species Composition

Species	Total Landing (Lbs)	Non-Charter	Charter
Skipjack Tuna	295,250	281,827	13,423
Yellowfin Tuna	19,887	18,900	987
Kawakawa	4,313	3,554	759
Albacore	0	0	0
Bigeye Tuna	0	0	0
Other Tuna PMUS	145	145	0
Tuna PMUS	**319,595**	**304,426**	**15,169**
Mahimahi	111,811	99,331	12,480
Wahoo	98,345	78,274	20,071
Blue Marlin	9,705	6,807	2,898
Black Marlin	0	0	0
Striped Marlin	0	0	0
Sailfish	283	283	0
Shortbill Spearfish	0	0	0
Swordfish	0	0	0
Oceanic Sharks	497	497	0
Pomfrets	2,620	2,620	0
Oilfish	0	0	0
Moonfish	0	0	0
Misc. Longline Fish	0	0	0
Non-tuna PMUS	**223,261**	**187,812**	**35,449**
Dogtooth Tuna	2,602	2,400	202
Rainbow Runner	2,455	2,396	59
Barracudas	2,167	2,101	66
Oceanic Sharks	0	0	0
Misc. Troll Fish	0	0	0
Non-PMUS Pelagics	**7,224**	**6,897**	**327**
Total Pelagics	**550,080**	**499,135**	**50,945**

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.

Table 17. Guam 2009 Annual Commercial Average Price of Pelagic Species

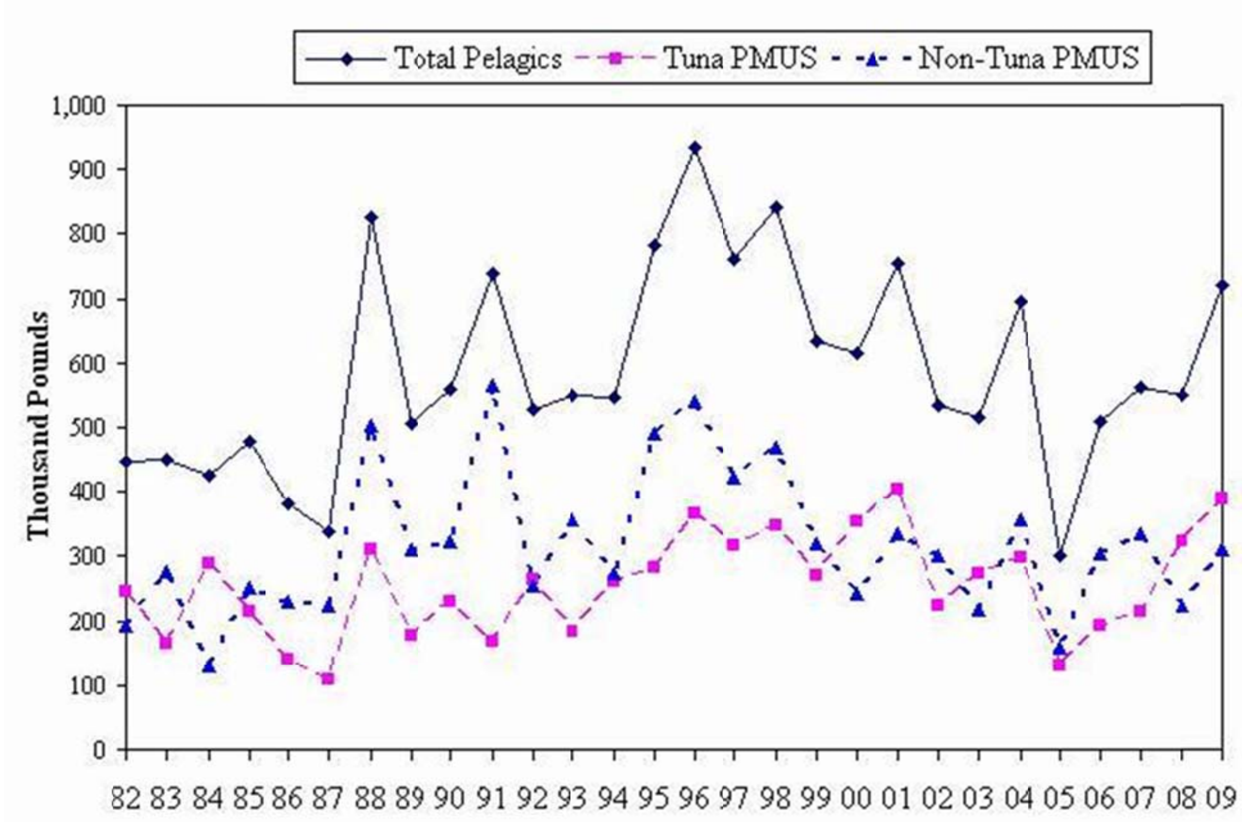
Species	Average Price ($/Lb)
Kawakawa	2.00
Yellowfin Tuna	2.09
Bonita/skipjack Tuna	**1.56**
Tunas Subtotal	1.70
Monchong	2.54
Swordfish	3.00
Sailfish	1.64
Marlin	1.43
Wahoo	2.00
Mahi / Dolphinfish	**1.87**
Non-tuna PMUS Subtotal	1.78
Barracuda	1.98
Rainbow Runner	2.17
Dogtooth Tuna	**1.53**
Non-PMUS Pelagic Subtotal	1.94
Pelagic Total	**1.77**

Source: The WPacFIN-sponsored commercial landings system.

Table 18. Annual Consumer Price Indexes and CPI Adjustment Factors

Year	Consumer Price Index	CPI Adjust Factor	Data Adjust Factor
1980	134.0	5.59	75
1981	161.4	4.64	80
1982	169.7	4.42	85
1983	175.6	4.27	90
1984	190.9	3.92	90
1985	198.3	3.78	90
1986	203.7	3.68	90
1987	212.7	3.52	80
1988	223.8	3.35	50
1989	248.2	3.02	55
1990	283.5	2.64	75
1991	312.5	2.40	80
1992	344.2	2.18	80
1993	372.9	2.01	75
1994	436.0	1.72	60
1995	459.2	1.63	60
1996	482.0	1.55	70
1997	491.3	1.53	80
1998	488.2	1.53	80
1999	497.2	1.51	80
2000	507.1	1.48	85
2001	500.0	1.50	85
2002	503.2	1.49	85
2003	517.0	1.45	85
2004	548.5	1.37	85
2005	590.5	1.27	80
2006	658.9	1.14	80
2007	703.5	1.07	65
2008	733.7	1.02	65
2009	**749.2**	**1.00**	**60**

Figure 31. Guam Annual Estimated Total Landings: All Pelagics, Tuna PMUS, and Non-Tuna PMUS



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

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 decreased until 2005. Since 2005, total catch has increased by more than 138% and was at the highest level since 2001. Factors relating to this cycle may have to do with the biology of the fish or be weather related. There is also anecdotal evidence from the average fishermen that pelagic fish are not caught consistently year round around Guam.

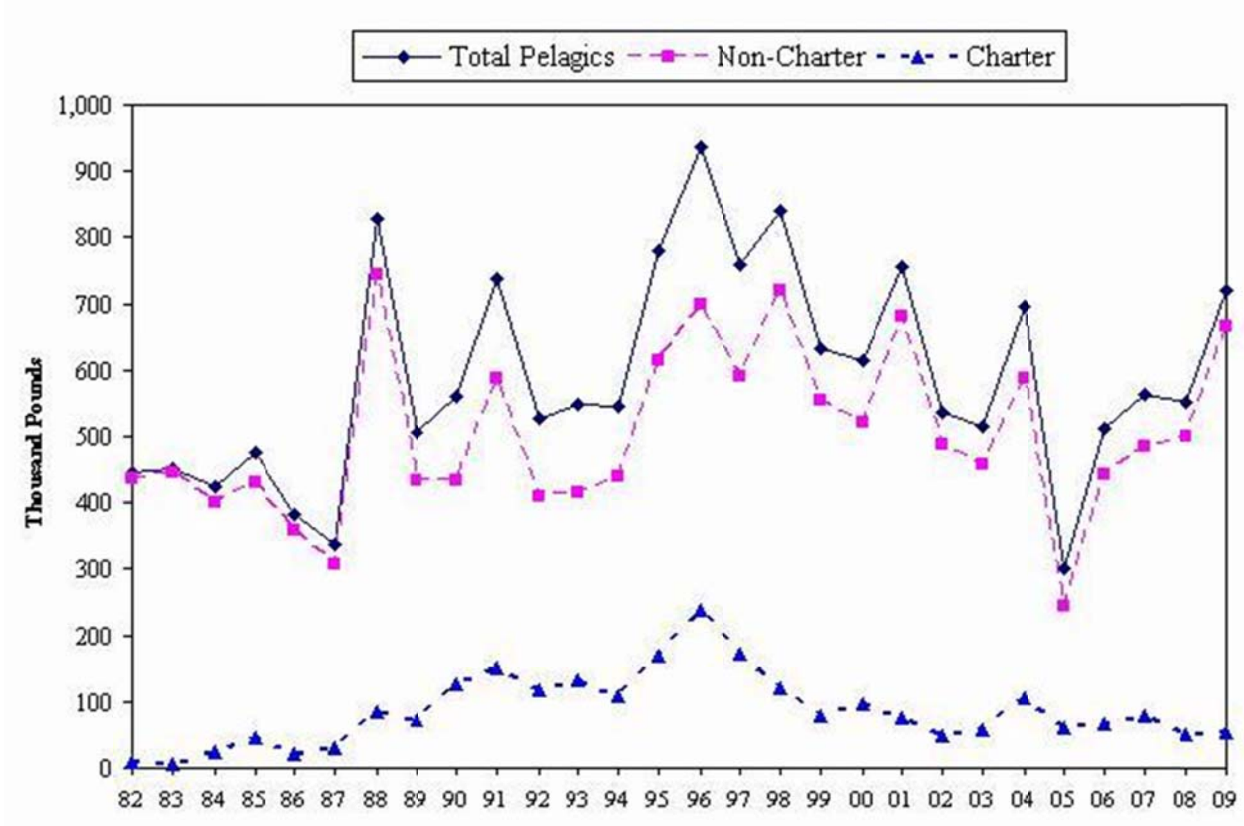
Compared with 2008, total pelagic and tuna PMUS increased 31% and 20% respectively, while non-tuna landings increased 39%. Non-tuna PMUS catch was near the 28 year average, while the tuna PMUS and total catch were well above the 28 year average. Generally, tuna species are consistently caught year round, with the other major pelagic species being more seasonal.

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	446,996	245,205	191,897
1983	450,823	166,105	277,179
1984	424,299	288,634	130,027
1985	477,073	215,686	252,707
1986	381,495	139,099	230,814
1987	338,354	108,729	222,521
1988	827,260	309,571	502,803
1989	505,811	177,158	310,755
1990	559,773	230,559	321,935
1991	737,653	168,669	566,242
1992	528,215	264,362	255,471
1993	548,295	184,394	357,787
1994	545,917	262,181	273,167
1995	781,389	283,055	489,757
1996	935,837	364,929	541,317
1997	759,936	316,552	420,967
1998	841,816	346,677	470,068
1999	632,319	271,359	320,529
2000	614,709	355,581	242,558
2001	754,999	403,691	336,571
2002	534,878	223,805	302,339
2003	514,820	273,029	217,440
2004	694,746	299,495	357,169
2005	301,487	129,489	159,929
2006	510,608	192,247	303,297
2007	562,513	214,014	334,599
2008	550,081	322,053	223,406
2009	**719,892**	**387,751**	**311,412**
Average	588,643	255,146	318,738
Standard Deviation	159,507	79,824	112,664

Figure 32. Guam Annual Estimated Total Pelagic Landings: Total Pelagics, Non-Charter, and Charter



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

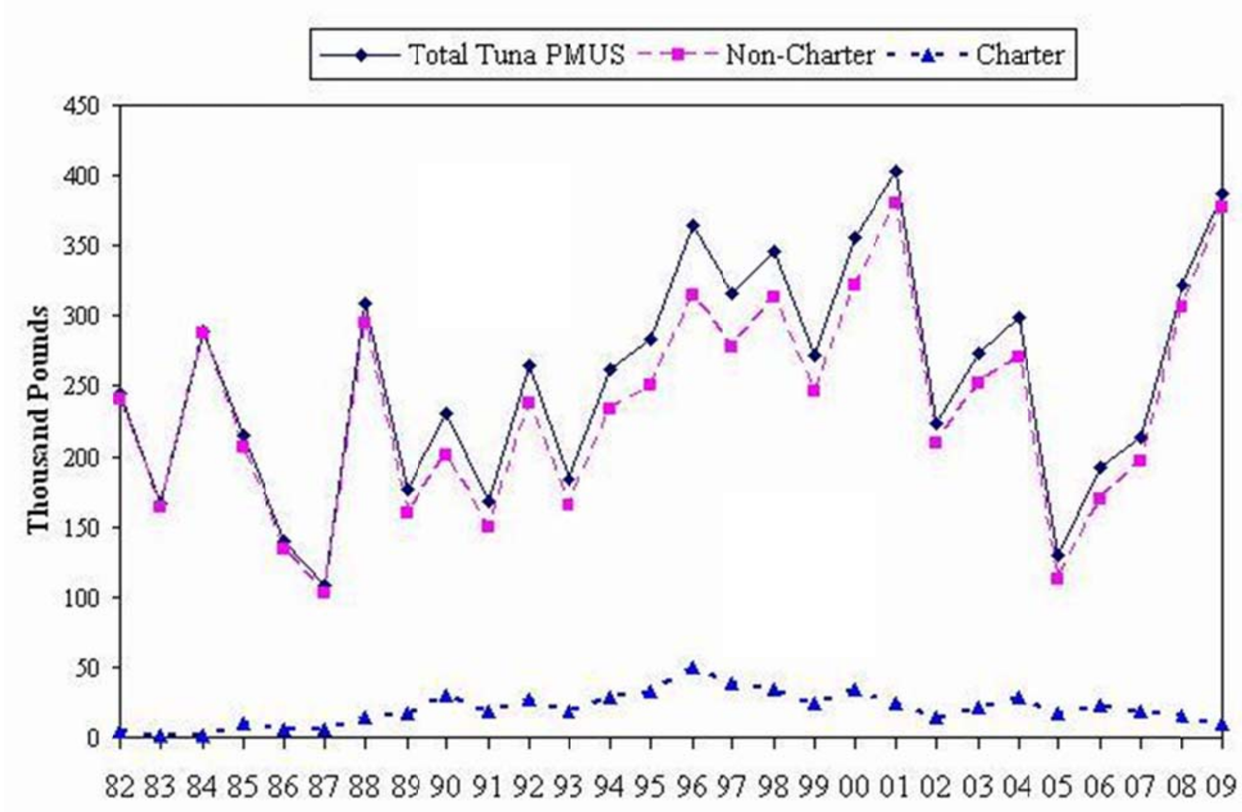
Interpretation: Non-charter trolling trips have always accounted for the bulk of the pelagic catch, although charter boats, which make up less than 5% of the troll fleet, account for a high proportion of trolling effort and catch. Prior to 1988, non-charter boats accounted for over 90% of the troll catch. 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 2009, total pelagic landings increased 31% and non-charter landings increased 33%, while charter landings increased 6%. Non-charter boats landed 92.5% of all pelagics in 2009.

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	446,996	437,861	9,135
1983	450,823	445,116	5,707
1984	424,299	401,687	22,612
1985	477,073	432,202	44,871
1986	381,495	359,020	22,475
1987	338,354	307,342	31,013
1988	827,260	743,415	83,845
1989	505,811	434,832	70,979
1990	559,773	434,361	125,412
1991	737,653	586,914	150,739
1992	528,215	409,548	118,667
1993	548,295	416,340	131,955
1994	545,917	438,677	107,239
1995	781,389	614,137	167,251
1996	935,837	698,544	237,293
1997	759,936	589,089	170,847
1998	841,816	719,841	121,975
1999	632,319	553,487	78,831
2000	614,709	519,677	95,032
2001	754,999	680,436	74,563
2002	534,878	486,790	48,087
2003	514,820	458,746	56,074
2004	694,746	588,217	106,529
2005	301,487	242,520	58,968
2006	510,608	443,504	67,104
2007	562,513	484,230	78,284
2008	550,081	499,137	50,945
2009	**719,892**	**665,842**	**54,050**
Average	588,643	503,268	85,374
Standard Deviation	159,507	125,248	54,132

Figure 33. Guam Annual Estimated Tuna PMUS landings: Total, Non-Charter, and Charter



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

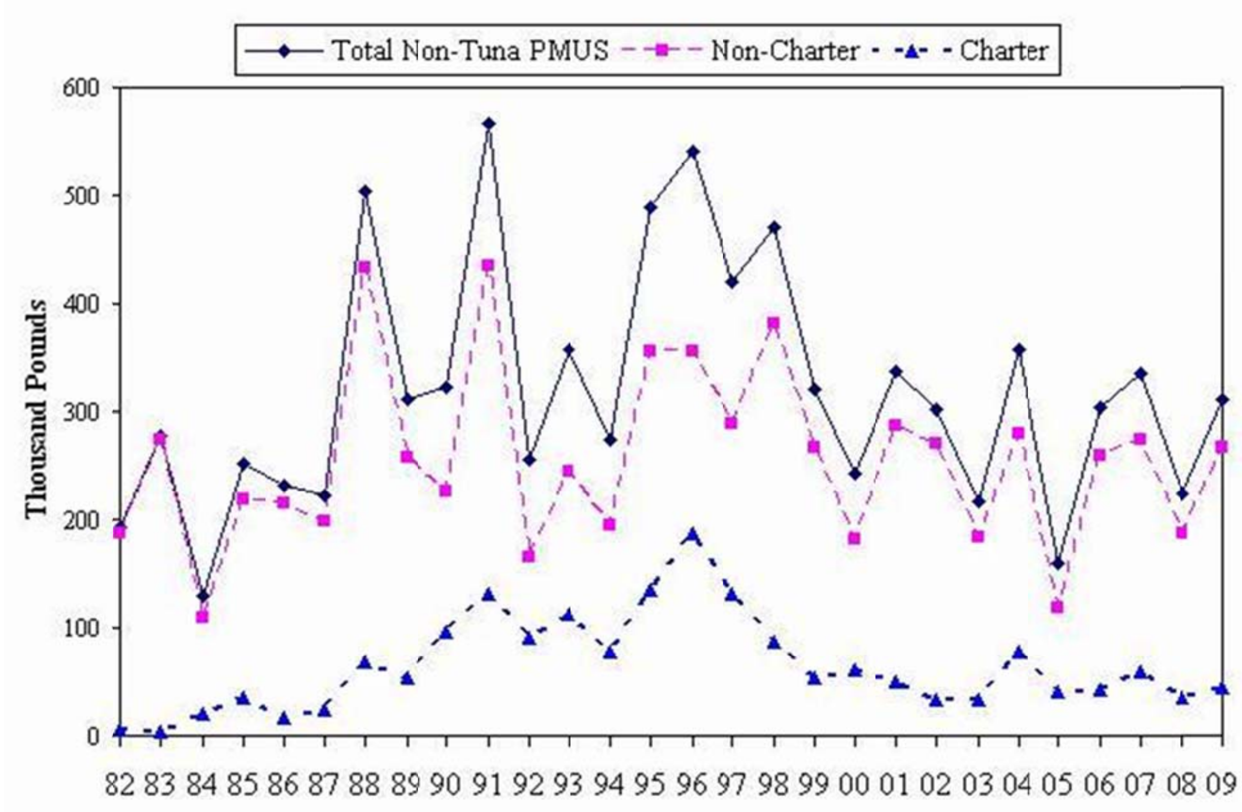
Interpretation: The general trend of the estimated total tuna landings shows an increasing trend between 1987 and 2001. Non-charter boats account for the bulk of the total tuna catch, up to 95% in the 1980's. This decreased when charter boat activity began increasing from the late 1980's until the mid 1990's. In 2009, 97% of tuna were caught by non-charter boats. In 2009, total tuna and non-charter landings increased by 20% and 23% respectively. Charter tuna landings decreased by 34% from 2008 totals. The 2009 estimated tuna PMUS landings were 52% higher than the 28 year average.

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	245,205	241,216	3,990
1983	166,105	164,377	1,729
1984	288,634	287,078	1,556
1985	215,686	205,965	9,721
1986	139,099	133,618	5,480
1987	108,729	102,529	6,199
1988	309,571	294,961	14,610
1989	177,158	159,766	17,392
1990	230,559	201,046	29,512
1991	168,669	149,568	19,100
1992	264,362	237,210	27,152
1993	184,394	165,609	18,786
1994	262,181	233,223	28,959
1995	283,055	250,837	32,218
1996	364,929	314,719	50,210
1997	316,552	277,987	38,566
1998	346,677	313,004	33,672
1999	271,359	246,794	24,565
2000	355,581	321,642	33,939
2001	403,691	379,991	23,701
2002	223,805	208,925	14,880
2003	273,029	251,484	21,545
2004	299,495	270,647	28,848
2005	129,489	113,040	16,450
2006	192,247	168,788	23,459
2007	214,014	196,056	17,958
2008	322,053	306,682	15,371
2009	**387,751**	**377,579**	**10,172**
Average	255,146	234,798	20,348
Standard Deviation	79,824	74,687	11,816

Figure 34. Guam Annual Estimated Non-Tuna PMUS Landings: Total, Non-Charter, and Charter



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

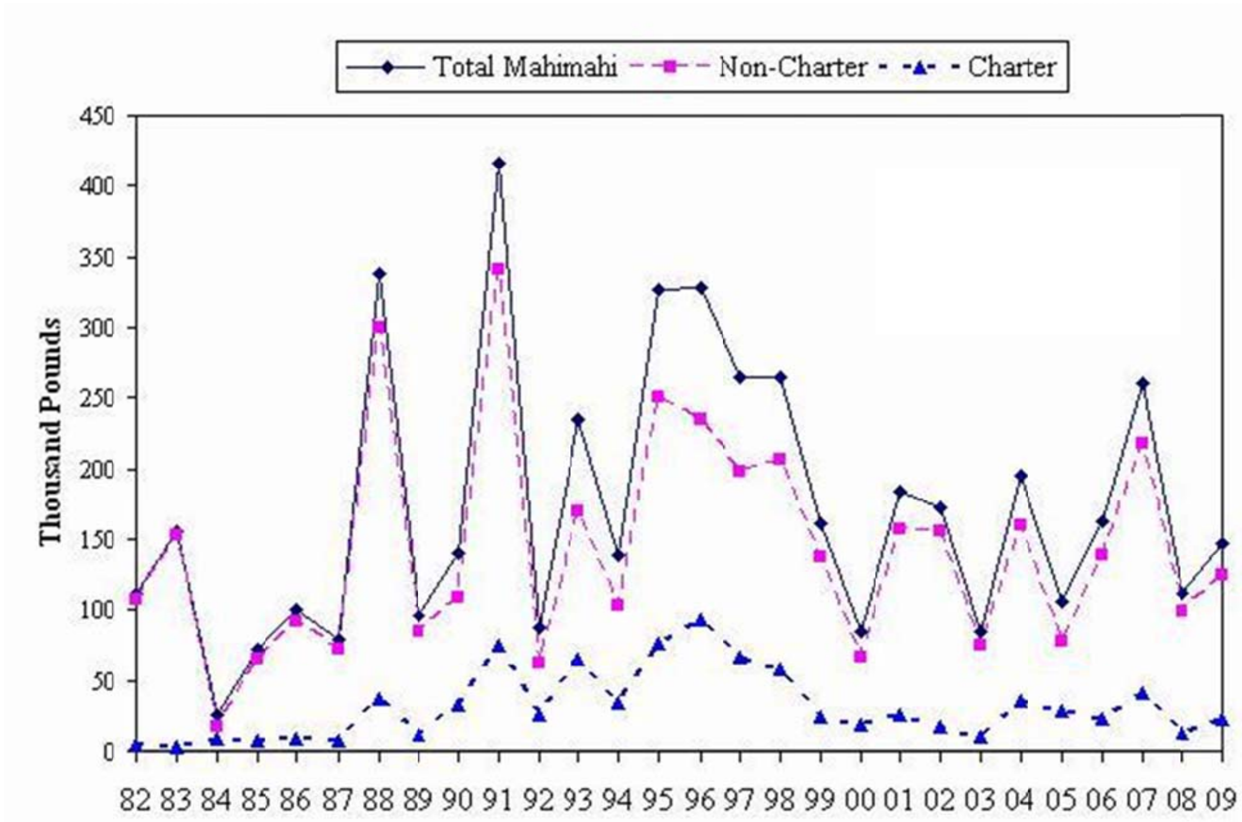
Interpretation: The estimated total non-tuna PMUS landings showed a general increase between 1984 and 1996, corresponding with an increase in boats entering the fishery. Non-charter trolling trips accounts for the bulk of the other PMUS catch. Up until the mid-1980's, non-charter boats accounted for 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 2009, total non-tuna PMUS and non-charter non-tuna PMUS increased 39% and 42% respectively when compared with 2008. Charter non-tuna PMUS increased 23%. Non-charter boats accounted for 86% of non-tuna PMUS catch in 2008.

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	191,897	187,108	4,788
1983	277,179	273,201	3,978
1984	130,027	108,971	21,056
1985	252,707	218,028	34,678
1986	230,814	213,897	16,917
1987	222,521	197,979	24,542
1988	502,803	433,773	69,030
1989	310,755	257,508	53,247
1990	321,935	226,558	95,378
1991	566,242	434,832	131,410
1992	255,471	165,097	90,374
1993	357,787	245,139	112,648
1994	273,167	195,134	78,032
1995	489,757	355,337	134,421
1996	541,317	354,822	186,495
1997	420,967	289,596	131,371
1998	470,068	382,281	87,787
1999	320,529	267,112	53,417
2000	242,558	181,863	60,695
2001	336,571	286,816	49,756
2002	302,339	269,555	32,784
2003	217,440	183,667	33,773
2004	357,169	279,872	77,297
2005	159,929	118,429	41,500
2006	303,297	259,979	43,318
2007	334,599	274,675	59,924
2008	223,406	187,958	35,449
2009	**311,412**	**267,565**	**43,847**
Average	318,738	254,170	64,568
Standard Deviation	112,664	82,328	43,943

Figure 35. Guam Annual Estimated Total Mahimahi Landings: Total, Non-Charter, and Charter



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.

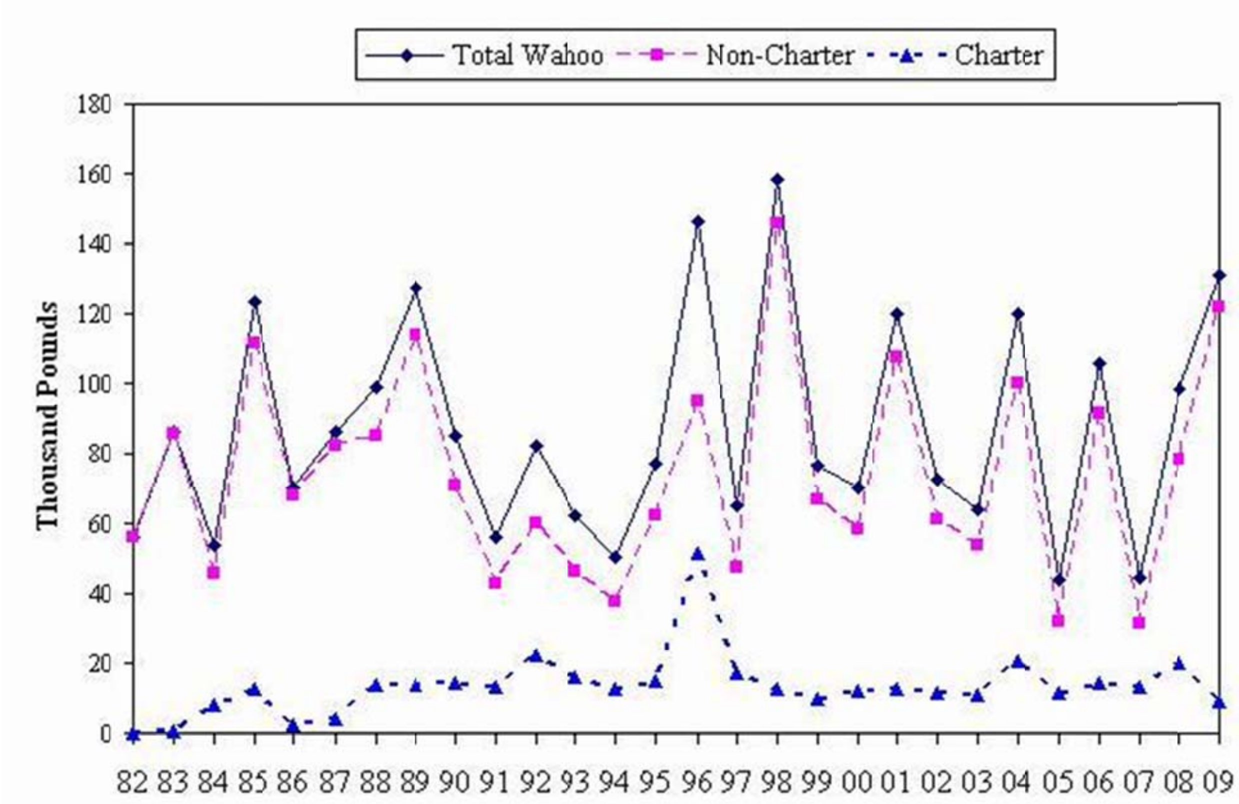
Interpretations: Historically, mahimahi catches have fluctuated wildly, with a good year followed by one or two down years. Catch peaked in 1996 and has been lower since, although still demonstrating the cyclical nature. Non-charter trips account for the bulk of the mahimahi catch, with charter activity 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 2009, mahimahi landings increased, with total and non-charter landings increasing 31% and 25%, respectively. Charter landings increased by 81%.

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	112,035	107,333	4,701
1983	156,340	153,158	3,183
1984	26,174	17,228	8,946
1985	72,361	65,442	6,919
1986	101,108	92,620	8,488
1987	79,480	72,200	7,280
1988	337,769	300,520	37,249
1989	96,043	84,791	11,253
1990	140,629	108,370	32,259
1991	415,944	341,139	74,805
1992	87,942	62,274	25,668
1993	234,979	169,662	65,317
1994	138,014	103,648	34,367
1995	326,979	250,910	76,069
1996	328,315	235,144	93,170
1997	265,157	198,344	66,813
1998	264,477	206,592	57,885
1999	161,936	137,811	24,126
2000	85,561	66,575	18,986
2001	183,278	157,293	25,986
2002	173,130	156,172	16,958
2003	84,739	74,766	9,973
2004	195,935	160,543	35,392
2005	105,715	77,931	27,784
2006	162,512	139,365	23,147
2007	259,828	218,521	41,307
2008	111,811	99,331	12,480
2009	**146,649**	**124,061**	**22,588**
Average	173,387	142,205	31,182
Standard Deviation	96,711	76,702	24,748

Figure 36. Guam Annual Estimated Total Wahoo Landings: Total, Non-Charter, and Charter



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.

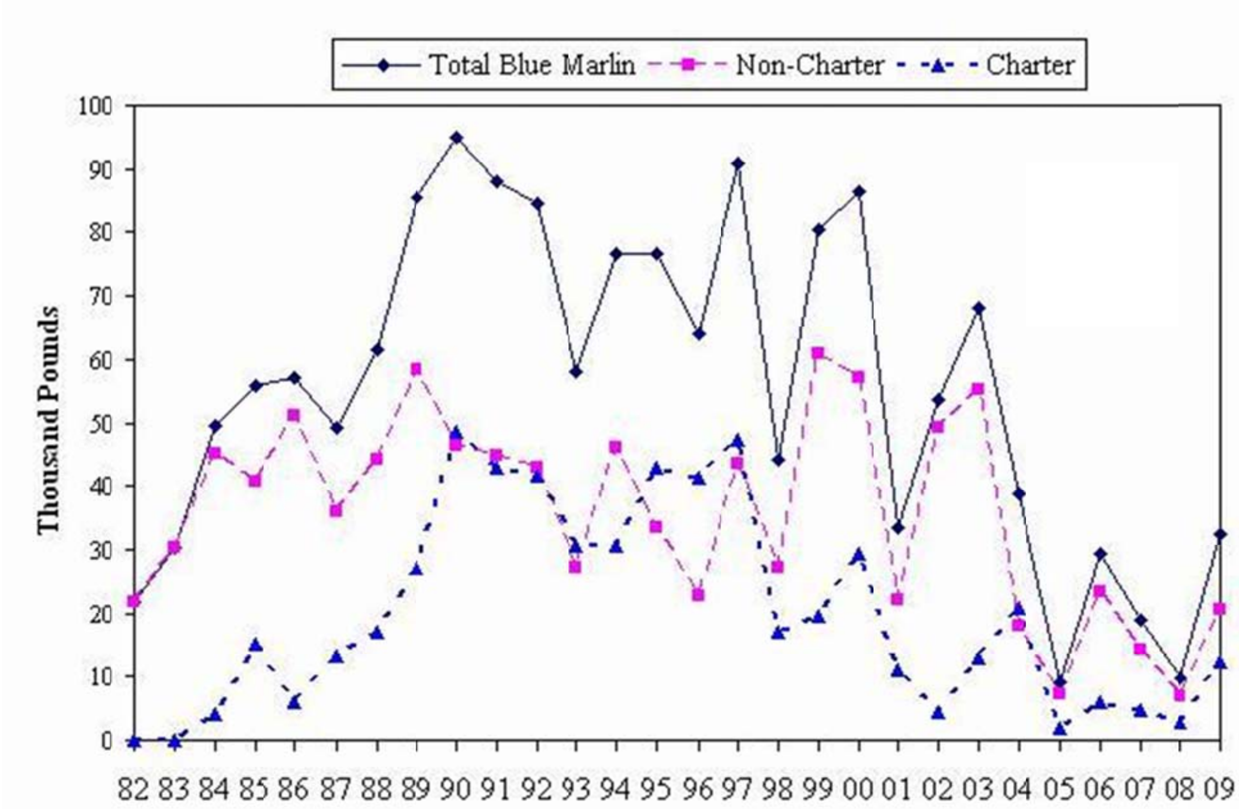
Interpretations: The wide fluctuations in wahoo landings are probably due to the high variability in the year-to-year abundance and availability of the stocks. Until 1987, non-charter landings accounted for over 95% of the total catch. In 1988, this percentage decreased due to an increase in charter boat activity. In 1996, wahoo charter landings peaked, accounting for 35% of the total catch. In 2009, total and non-charter, harvest of wahoo increased 33% and 55%, respectively, while charter wahoo catch decreased by 55% from 2008. Non-charter boats harvested 93% of the total wahoo harvest. The total wahoo catch was 50% above the 28 year average.

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	55,942	55,855	87
1983	86,530	85,735	795
1984	53,804	45,900	7,905
1985	123,685	111,144	12,540
1986	70,337	67,909	2,428
1987	86,465	82,477	3,989
1988	98,679	85,006	13,673
1989	127,325	113,557	13,768
1990	85,108	70,710	14,398
1991	55,926	42,633	13,293
1992	82,446	60,003	22,444
1993	62,550	46,532	16,018
1994	50,457	37,766	12,691
1995	77,391	62,365	15,026
1996	146,521	94,896	51,624
1997	65,034	47,693	17,341
1998	158,205	145,659	12,547
1999	76,338	66,673	9,665
2000	70,433	58,157	12,277
2001	119,765	107,150	12,616
2002	72,643	61,386	11,257
2003	64,266	53,505	10,761
2004	120,266	99,941	20,325
2005	43,906	32,201	11,704
2006	105,878	91,713	14,166
2007	44,528	31,166	13,362
2008	98,345	78,274	20,071
2009	**130,733**	**121,698**	**9,035**
Average	86,911	73,489	13,422
Standard Deviation	31,572	29,139	9,207

Figure 37. Guam Annual Estimated Ttotal Blue Marlin Landings: Total, Non-Charter, and Charter



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.

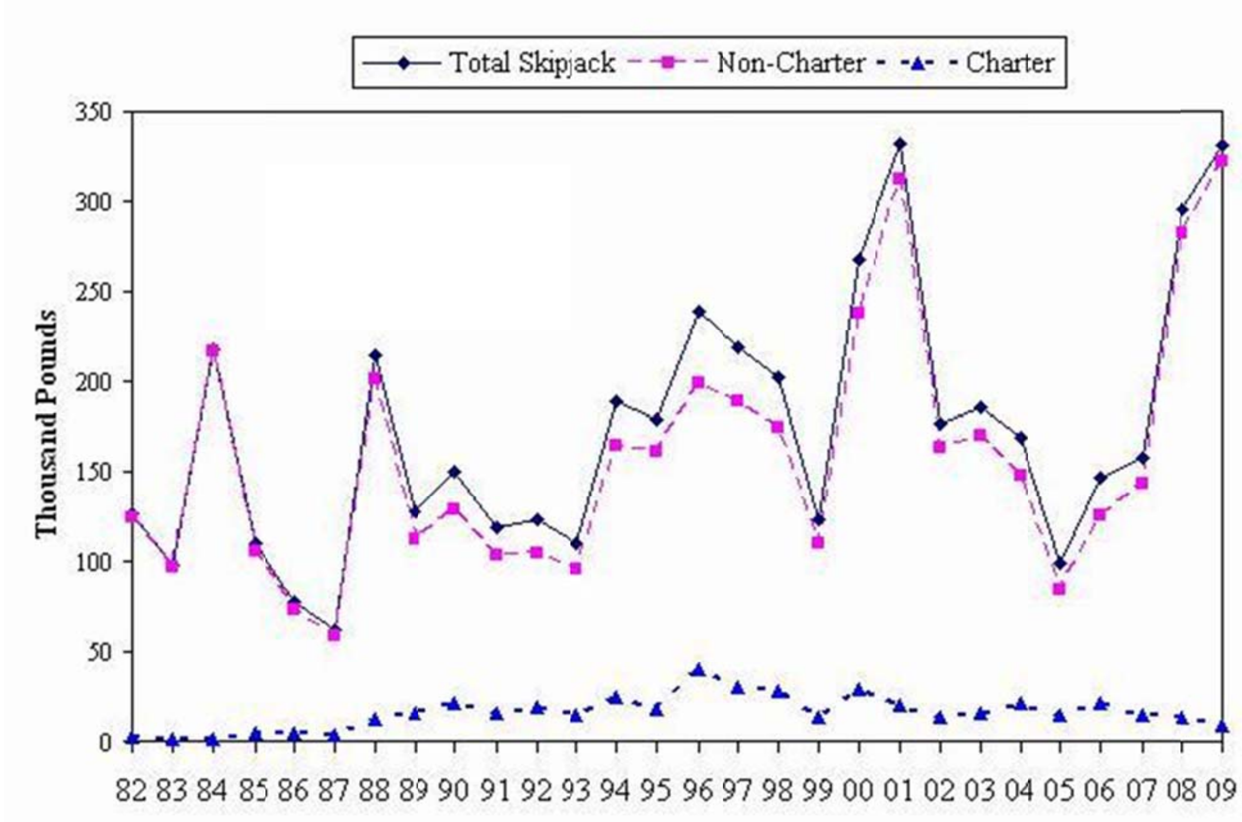
Interpretations: During the 1980's, non-charter boats accounted for the bulk of the blue marlin catch. In the early 1990's, charters share of the marlin catch began to increase, peaking at 64% in 1996. The increases were due to an increase in charter boat activity and the active targeting of blue marlin by charter boats during the summer months. The decrease in charter landings after 1997 corresponded to the decrease in tourist charter trips. In 2009, all categories of marlin catch increased. Total catch was up 236%, non- charter catch was up 200%, and charter catch was up 320% Charter blue marlin catch accounted for 37% of the total blue marlin harvest. Blue marlin landings were below the 28 year average in all categories, but increased from 2008 near record lows.

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	21,810	21,810	
1983	30,402	30,402	
1984	49,438	45,233	4,205
1985	55,945	40,726	15,219
1986	57,076	51,074	6,002
1987	49,360	36,087	13,274
1988	61,427	44,242	17,185
1989	85,515	58,477	27,038
1990	94,798	46,344	48,455
1991	87,869	44,899	42,970
1992	84,498	42,810	41,688
1993	57,992	27,280	30,713
1994	76,633	46,057	30,576
1995	76,569	33,535	43,034
1996	63,919	22,602	41,318
1997	90,777	43,559	47,217
1998	44,051	27,009	17,042
1999	80,537	61,032	19,505
2000	86,424	56,992	29,432
2001	33,302	22,148	11,154
2002	53,761	49,191	4,569
2003	68,204	55,165	13,039
2004	38,845	18,036	20,809
2005	9,270	7,258	2,012
2006	29,222	23,217	6,005
2007	18,994	14,148	4,846
2008	9,704	6,807	2,898
2009	**32,605**	**20,411**	**12,194**
Average	55,320	35,591	21,246
Standard Deviation	25,714	15,581	15,306

Figure 38. Guam Annual Estimated Total Skipjack Landings: Total, Non-Charter, and Charter



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.

Interpretations: Skipjack tuna catch has fluctuated over the reporting period, peaking in 2001. A drop in skipjack tuna during 2002 may be due to direct hits by two super typhoons, though the catch for 2002 is still above the 28 year average. The reason for the high numbers of 2001 is not clear. It could have to do with the biology of the species.

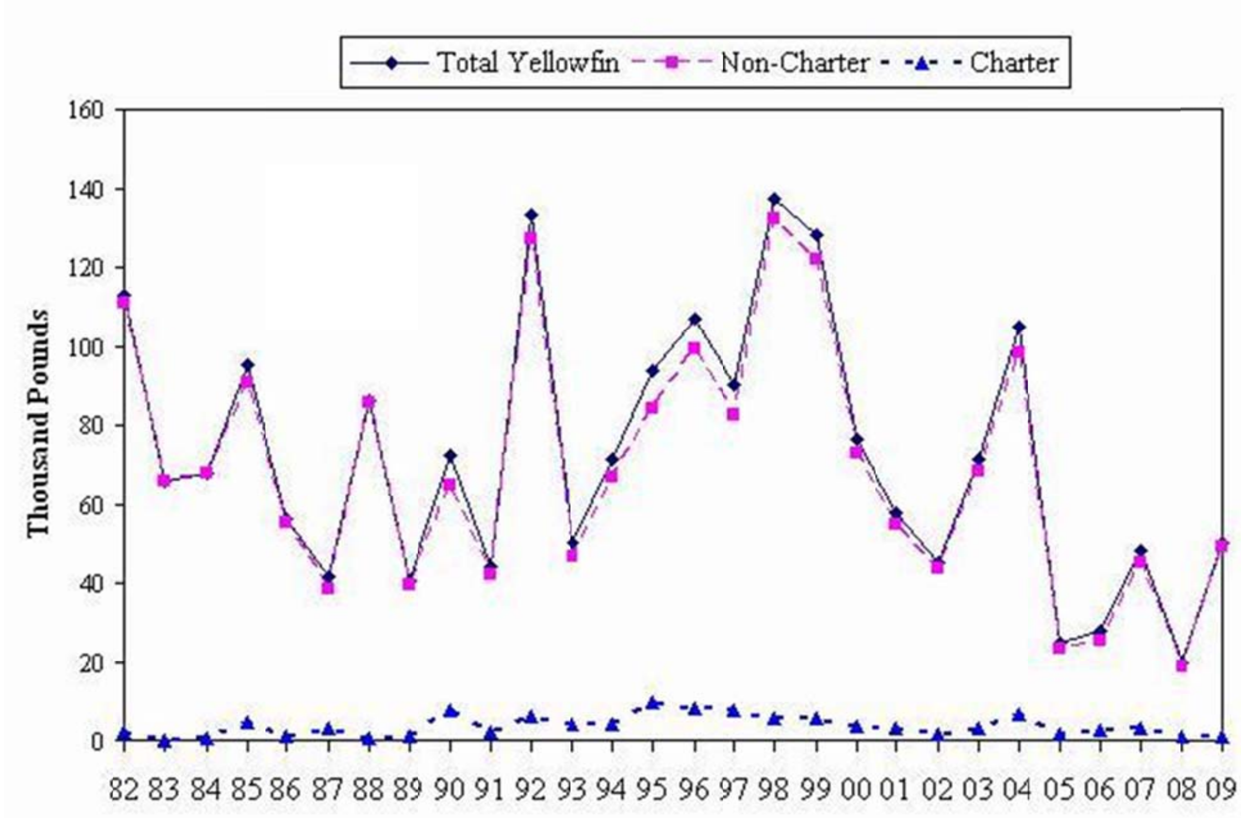
Total skipjack tuna landings and non-charter landings increased in 2009 by 12% and 14% respectively, while charter landings decreased by 38%. Total catch is 91% above the 28-year average.

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	126,721	124,545	2,176
1983	97,802	96,142	1,660
1984	218,307	217,152	1,155
1985	110,303	105,359	4,944
1986	78,283	73,878	4,405
1987	61,806	58,948	2,858
1988	214,328	201,561	12,766
1989	128,209	112,364	15,845
1990	149,502	128,910	20,592
1991	118,708	102,845	15,862
1992	123,373	104,117	19,257
1993	109,582	95,081	14,502
1994	188,784	164,288	24,496
1995	179,036	160,771	18,265
1996	238,583	198,888	39,695
1997	219,177	189,211	29,966
1998	201,694	173,892	27,801
1999	123,538	109,696	13,841
2000	267,699	238,330	29,368
2001	331,768	312,001	19,767
2002	176,356	163,504	12,852
2003	185,575	170,352	15,223
2004	168,838	147,447	21,391
2005	99,391	84,762	14,629
2006	146,658	126,042	20,616
2007	157,861	143,332	14,529
2008	295,250	281,827	13,423
2009	**331,063**	**322,682**	**8,381**
Average	173,150	157,426	15,724
Standard Deviation	71,863	68,751	9,407

Figure 39. Guam Annual Estimated Total Yellowfin Landings: Total, Non-Charter, and Charter



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.

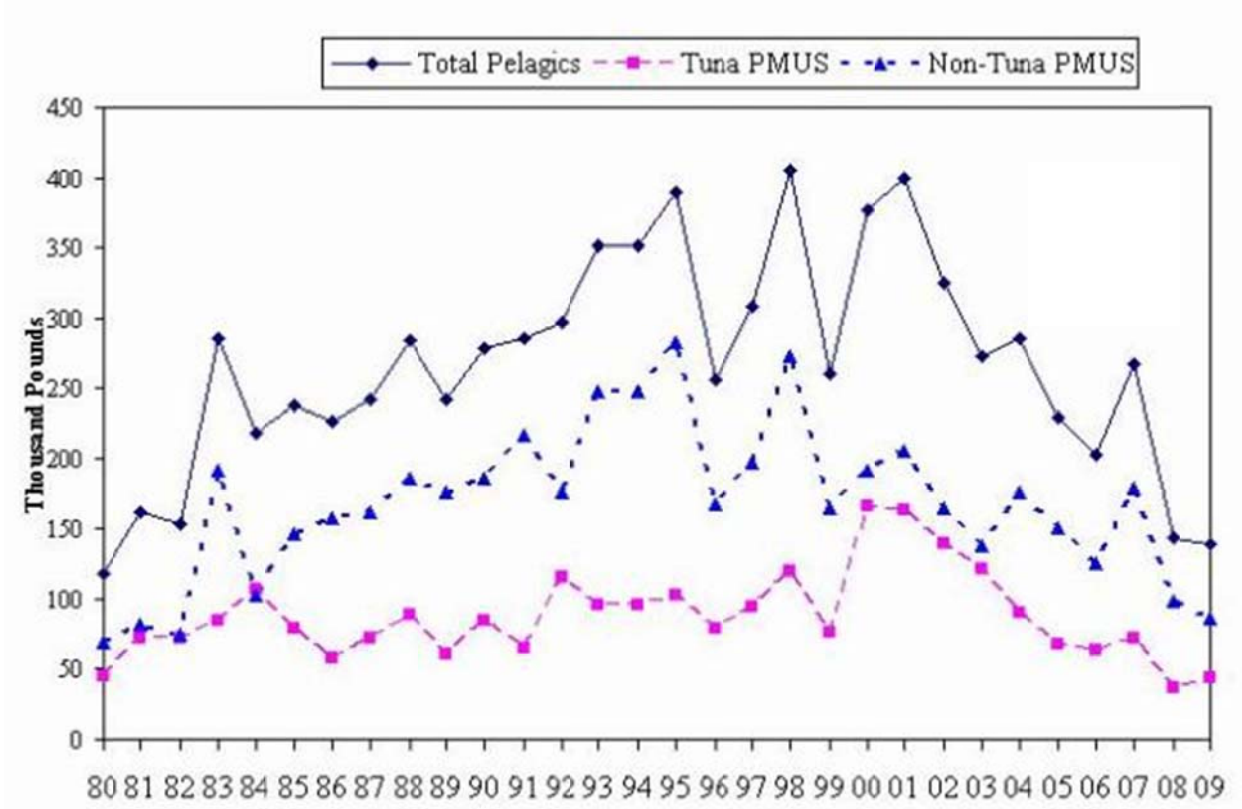
Interpretations: The overall yellowfin landings show wide fluctuations during the 28-year time series, although the total and non-charter estimated landings showed a significant decrease from 1998 to 2002. Charter landings of yellowfin tuna peaked in 1985, 1990, and 1995, and then showed a general decrease until 2002. Yellowfin tuna catch was up significantly in 2009, with total catch, non-charter catch, and charter catch up 153%, 160%, and 23%, respectively. Non-charter boats harvested 98% of the total yearly catch of yellowfin. Despite these increases, all three categories are well below their 28-year averages.

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	112,709	110,896	1,813
1983	65,996	65,996	
1984	67,975	67,710	266
1985	95,273	90,778	4,495
1986	56,024	55,035	989
1987	41,444	38,561	2,883
1988	86,251	85,682	569
1989	40,457	39,453	1,004
1990	72,394	64,942	7,452
1991	44,034	41,822	2,212
1992	133,170	127,311	5,859
1993	50,350	46,444	3,906
1994	71,221	67,022	4,199
1995	93,495	83,913	9,582
1996	107,038	99,005	8,033
1997	90,167	82,408	7,759
1998	137,429	132,020	5,409
1999	128,026	122,204	5,822
2000	76,651	72,967	3,684
2001	57,929	54,668	3,261
2002	45,089	43,336	1,753
2003	71,626	68,573	3,053
2004	104,954	98,255	6,700
2005	24,884	23,130	1,754
2006	28,049	25,419	2,630
2007	48,118	44,934	3,184
2008	19,888	18,900	987
2009	**50,279**	**49,065**	**1,214**
Average	72,176	68,587	3,721
Standard Deviation	32,778	31,333	2,570

Figure 40. Guam Annual Estimated Commercial Landings: All Pelagics, Tuna PMUS, and Non-Tuna PMUS



Source: The WPACFIN-sponsored commercial landings system.

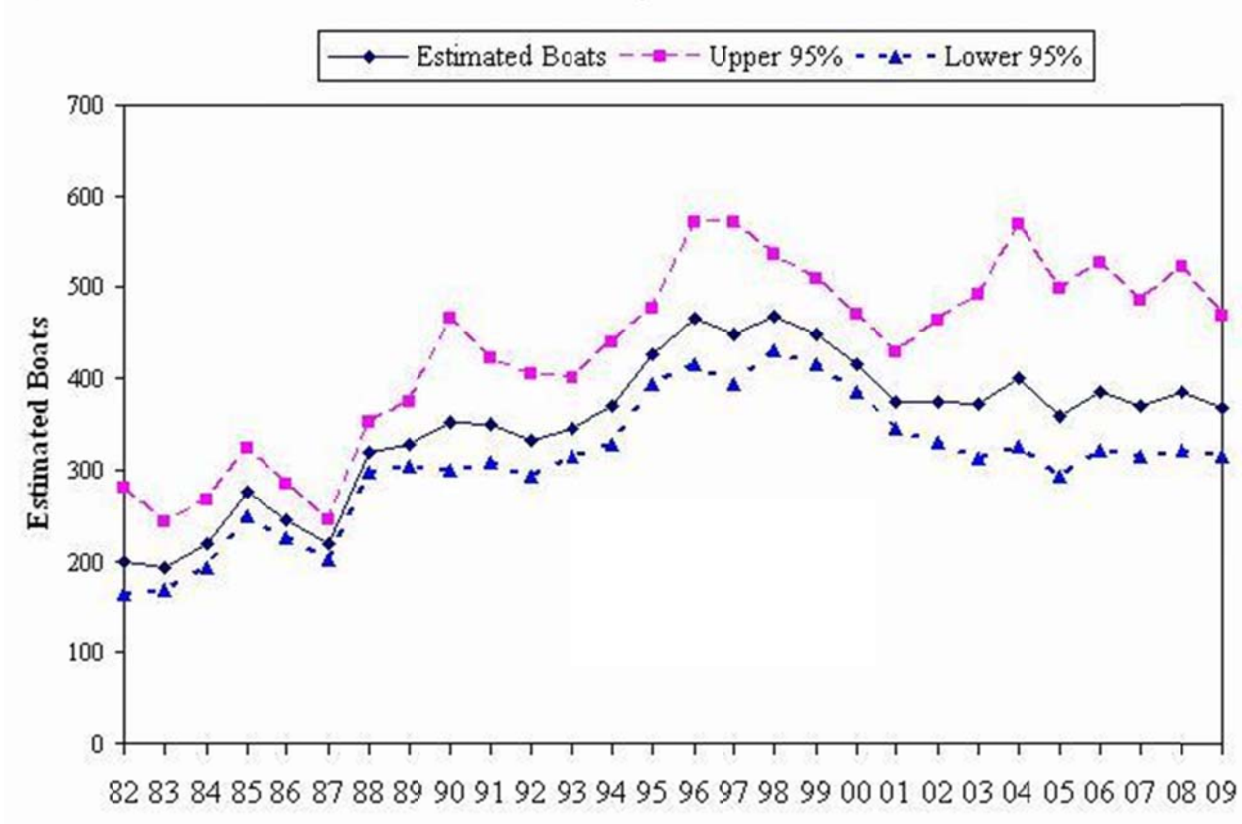
Interpretations: Commercial pelagic fishery landings have shown a general increase for the first 20 years in the 27-year time series. In 2002, the estimated commercial landings decreased overall by 17%, with a 15% decrease for tuna landings and a 20% decrease for landings of other PMUS, possibly due to direct hits by two super typhoons, resulting in boat damage, lack of tourist for the commercial charter boats, and unavailability of ice for fishermen. After a small increase in catch for 2004, the downward trend continued in 2009. Total commercial catch is 48% below the 28 year average.

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	255,281	78,636	166,702
1997	307,764	93,825	196,335
1998	405,666	120,186	272,882
1999	260,669	75,346	164,082
2000	376,192	165,898	190,761
2001	399,471	163,369	205,648
2002	325,299	139,009	164,853
2003	272,633	121,326	138,160
2004	285,545	89,479	175,777
2005	228,936	66,804	150,770
2006	203,139	63,579	125,847
2007	266,964	72,271	178,660
2008	144,110	36,009	98,207
2009	**138,854**	**43,760**	**86,040**
Average	266,493	87,486	167,227
Standard Deviation	77,625	31,685	55,303

Figure 41. Guam Estimated Number of Trolling Boats



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.

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 2009, the number of boats was 368, a decrease of 4% from 2008.

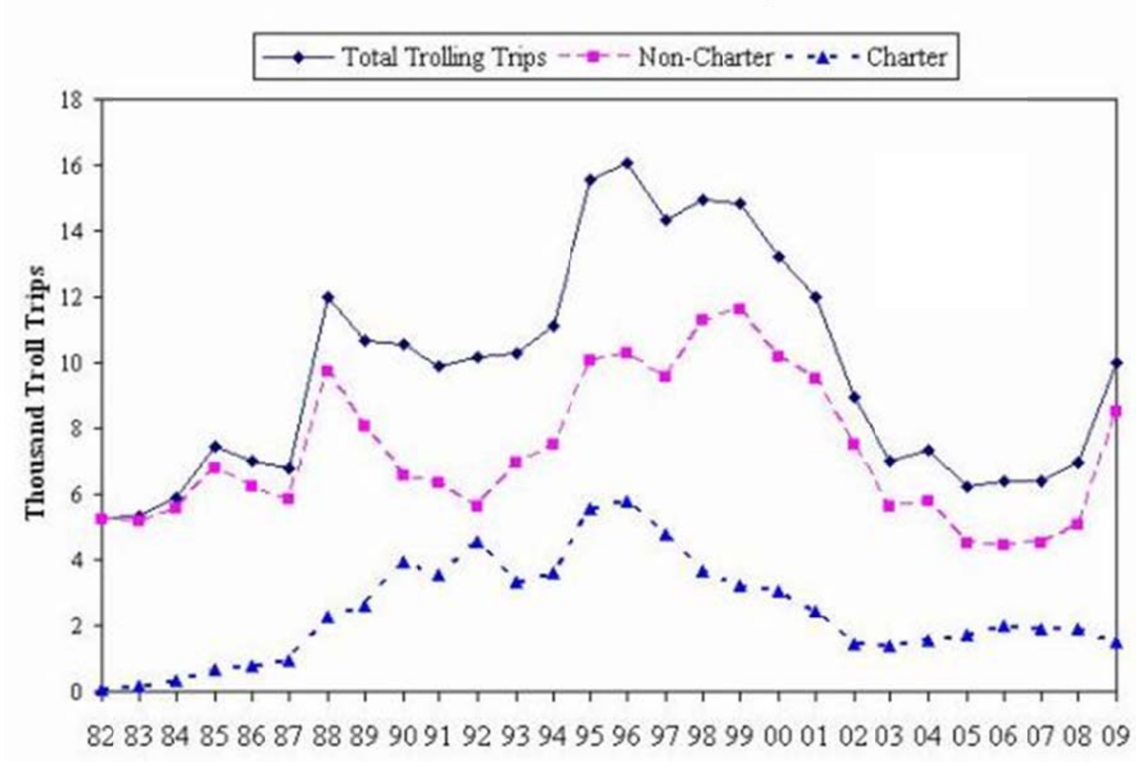
Calculation: Since only a fraction of the days of the year are sampled, it is not possible to know the exact number of boats participating in the fishery. The 2007 trolling boat log was converted and processed through a boat estimator model 1,000 times.

Estimated Number of Trolling Boats

Year	Estimated Boat	Upper 95%	Lower 95%
1982	199	280	165
1983	193	242	168
1984	219	267	193
1985	276	323	249
1986	246	284	226
1987	219	244	201
1988	320	353	297
1989	329	374	303
1990	352	467	299
1991	349	422	309
1992	332	405	294
1993	346	401	316
1994	369	439	329
1995	427	476	393
1996	466	572	415
1997	449	572	393
1998	469	537	430
1999	449	510	415
2000	416	470	385
2001	375	429	345
2002	375	464	330
2003	371	492	312
2004	401	568	326
2005	358	498	293
2006	386	527	321
2007	370	485	315
2008	385	523	322
2009	**368**	**468**	**316**

Year	Survey Days	Trips in Boat Log	Interviews
1982	46	393	363
1983	47	363	351
1984	54	486	365
1985	66	737	503
1986	49	629	382
1987	48	614	431
1988	51	1,032	698
1989	60	1,053	642
1990	60	1,098	804
1991	60	1,097	773
1992	60	1,170	843
1993	61	1,149	844
1994	69	1,224	878
1995	96	1,540	1,110
1996	96	1,543	1,146
1997	96	1,378	949
1998	96	1,477	1,051
1999	96	1,436	917
2000	96	1,338	854
2001	96	1,076	620
2002	84	730	396
2003	79	531	289
2004	96	716	366
2005	97	698	377
2006	96	763	413
2007	96	755	391
2008	96	788	405
2009	**96**	**1,018**	**604**

Figure 42. Guam Annual Estimated Number of Troll Trips: Total, Non-Charter, Charter



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

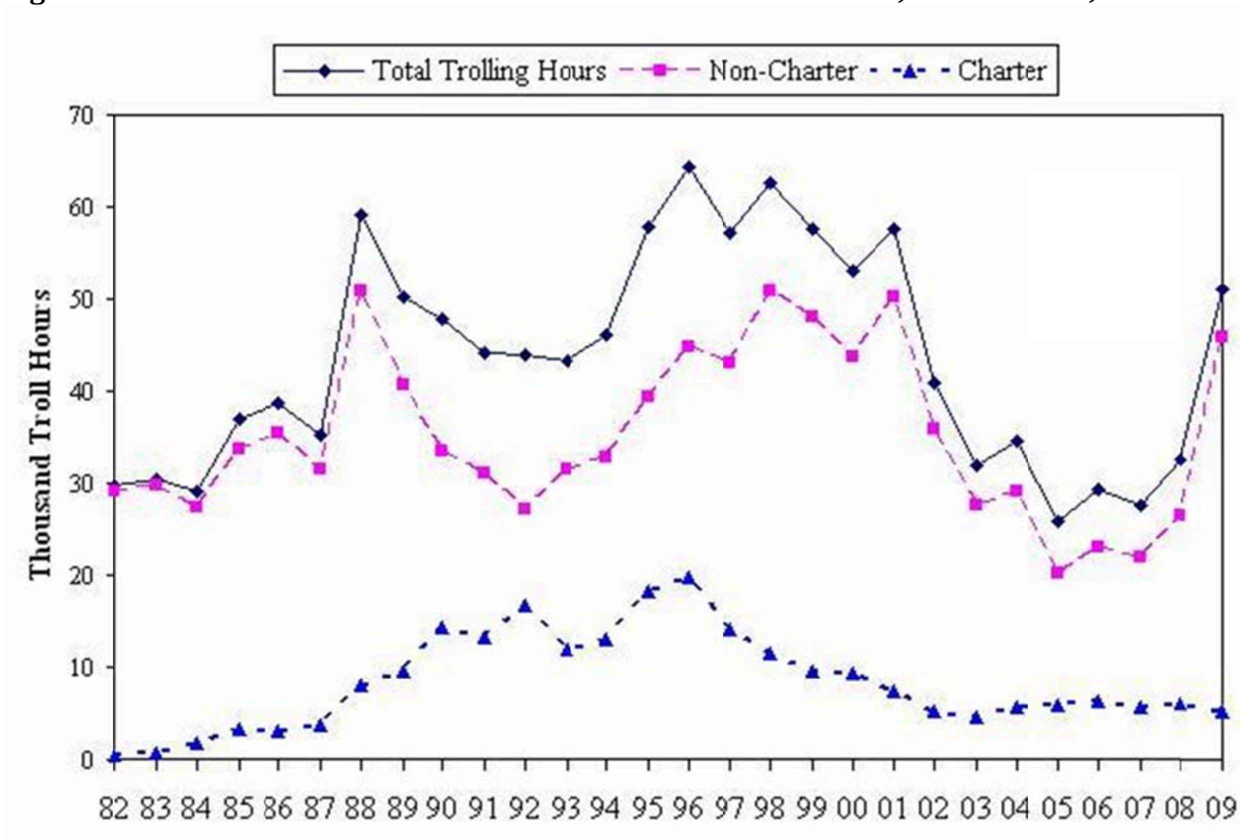
Interpretations: Non-charter and charter troll trips generally increased for the first 15 years of the 26-year time series. The number of troll trips began to decline in 1999 due to a number of factors including a continuing economic recession on the island, a decline in Asian visitors for charter boats, and an increase in cost to maintain, repair, and fuel boats for the average fishermen compared with fish caught for sale to make up for expenses. In 2009, the total number of troll trips increased by 44%, and the number of non-charter trips increased by 68%. The number of charter trips decreased, by 19%. The increase in non-charter trips may be attributed to an increase in pelagic fishes, especially bonita. The decrease in charter trips may be attributable to the global economic downturn. Total trips are 3% above the 28 year average.

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	10,660	8,049	2,612
1990	10,531	6,571	3,960
1991	9,868	6,317	3,550
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	16,060	10,274	5,787
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	7,307	5,754	1,553
2005	6,238	4,495	1,743
2006	6,414	4,440	1,973
2007	6,395	4,520	1,875
2008	6,947	5,057	1,891
2009	**10,014**	**8,488**	**1,526**
Average	9,733	7,282	2,452
Standard Deviation	3,365	2,202	1,578

Figure 43. Guam Annual Estimated Number of Troll Hours: Total, Non-Charter, Charter



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

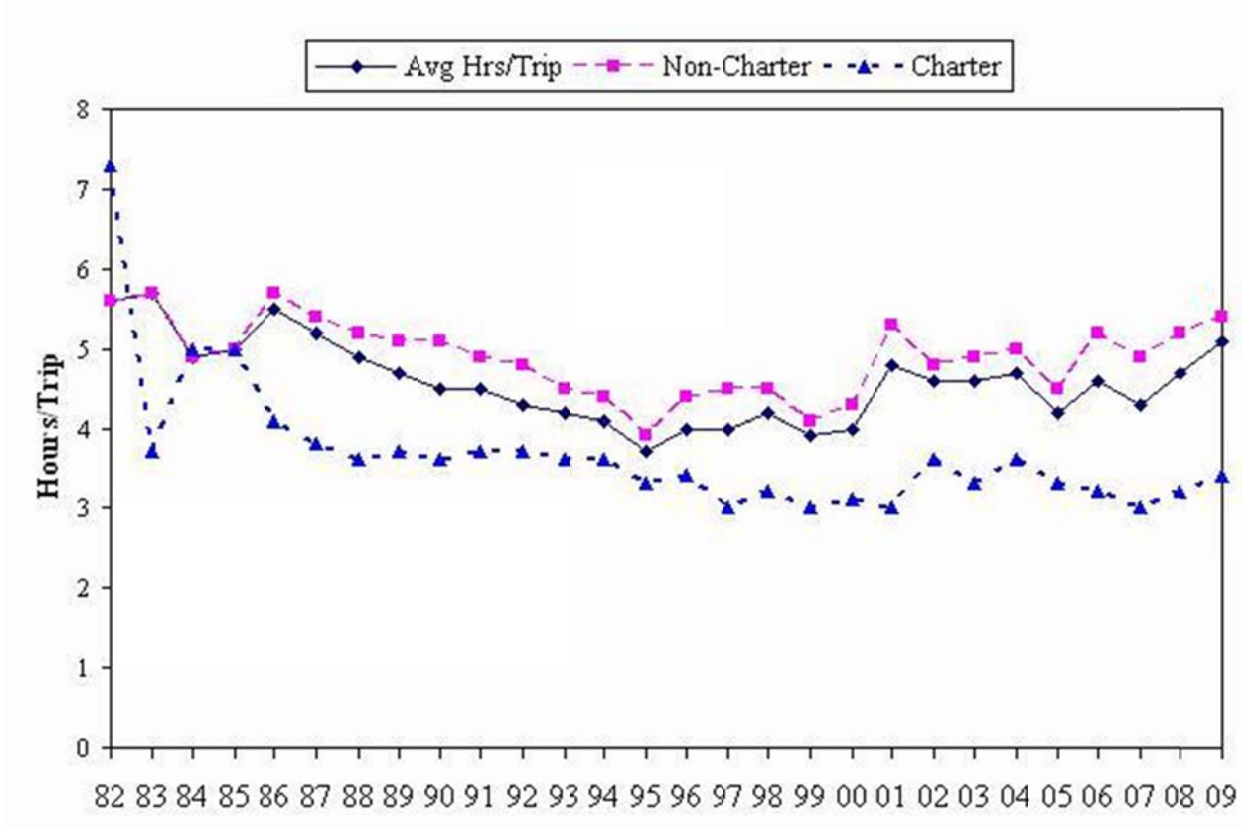
Interpretations: Trolling hours for non-charters and charters have generally increased over the past 20 years. Beginning in 1996, charter troll hours began to decrease. This corresponded to a downturn in Asian economies, which resulted in fewer charter trolling hours. After 2001, charter activity dropped off dramatically. Tourism was also down, due to the 9/11 attacks, the SARS scare, and two typhoons striking Guam in 2002. Since 2005, the number of hours trolling has generally been increasing. In 2009, total and non-charter totals increased by 57% and 73%, respectively, while charter hours decreased by 14%. The increase in hours trolling may be attributed to the lack of FADs, causing fishermen to make longer trips to fishing areas. Total trolling hours are 17.5% above the 28-year average.

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	29,115	27,332	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	50,220	40,685	9,535
1990	47,865	33,567	14,298
1991	44,136	30,981	13,155
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	64,452	44,748	19,704
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	34,635	29,026	5,608
2005	25,903	20,116	5,786
2006	29,250	22,987	6,263
2007	27,644	21,955	5,689
2008	32,624	26,538	6,087
2009	**51,145**	**45,890**	**5,255**
Average	43,521	35,158	8,363
Standard Deviation	11,953	9,122	5,268

Figure 44. Guam Annual Estimated Trip Length: Overall Average Hours/Trip, Non-Charter, Charter



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

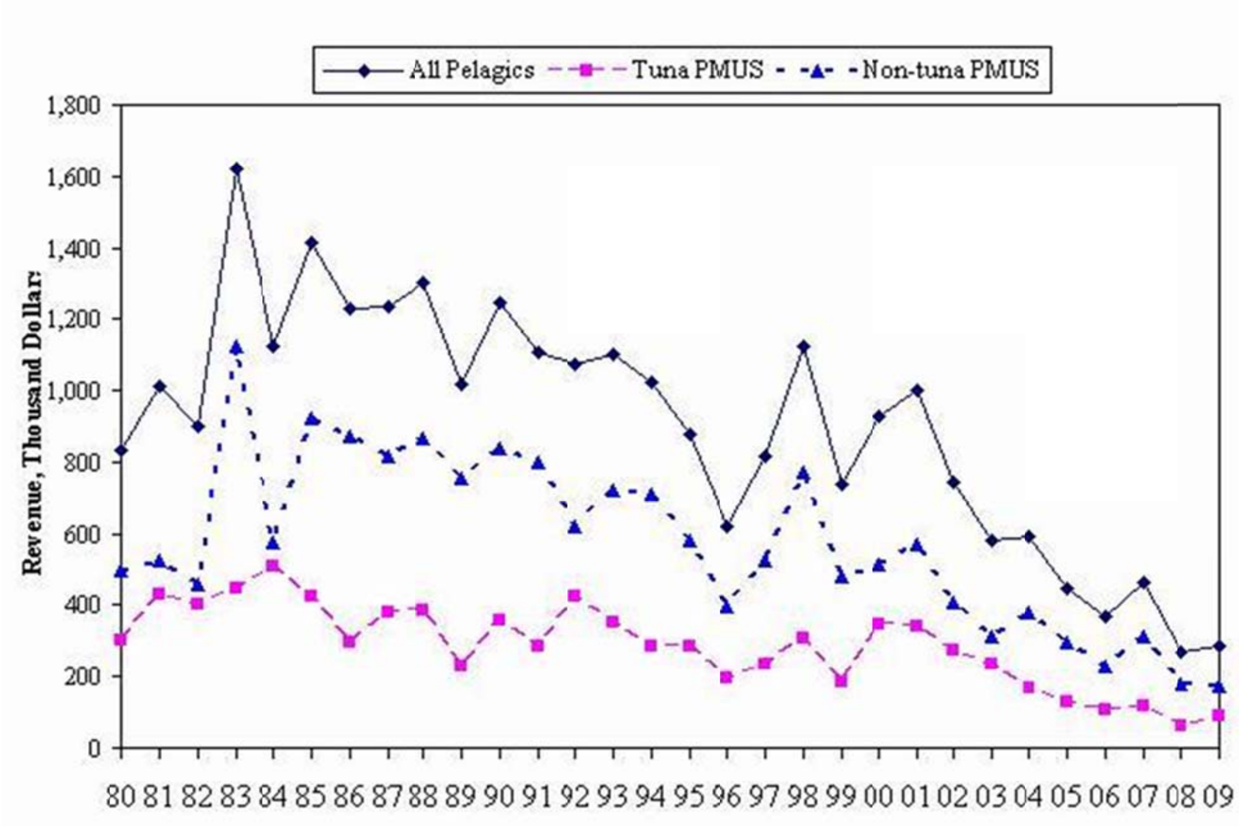
Interpretations: The overall average trolling trip increased slightly from 2008. The redeployment of fish aggregating devices (FADs) still provide charter boats and non-charter fishermen with a prescribed route for trolling activity, although many boats have been observed to be making longer trips to the banks located north and south of Guam. Overall trolling trip length appears to have remained fairly constant throughout the 28-year time series. In 2009, all three categories showed an increase, with the average number of hours trolling up 8%, and 11% higher than the 28 year average.

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

Estimated Trip Length (Hours/trip)

Year	Average Length	Non-Charter	Charter
1982	5.6	5.6	7.3
1983	5.7	5.7	3.7
1984	4.9	4.9	5.0
1985	5.0	5.0	5.0
1986	5.5	5.7	4.1
1987	5.2	5.4	3.8
1988	4.9	5.2	3.6
1989	4.7	5.1	3.7
1990	4.5	5.1	3.6
1991	4.5	4.9	3.7
1992	4.3	4.8	3.7
1993	4.2	4.5	3.6
1994	4.1	4.4	3.6
1995	3.7	3.9	3.3
1996	4.0	4.4	3.4
1997	4.0	4.5	3.0
1998	4.2	4.5	3.2
1999	3.9	4.1	3.0
2000	4.0	4.3	3.1
2001	4.8	5.3	3.0
2002	4.6	4.8	3.6
2003	4.6	4.9	3.3
2004	4.7	5.0	3.6
2005	4.2	4.5	3.3
2006	4.6	5.2	3.2
2007	4.3	4.9	3.0
2008	4.7	5.2	3.2
2009	**5.1**	**5.4**	**3.4**
Average	4.6	4.9	3.7
Standard Deviation	0.5	0.5	0.9

Figure 45. Guam Annual Estimated Inflation-Adjusted Commercial Revenues: All Pelagics, Tuna PMUS, and Non-Tuna PMUS



Source: The WPACFIN-sponsored commercial landings system.

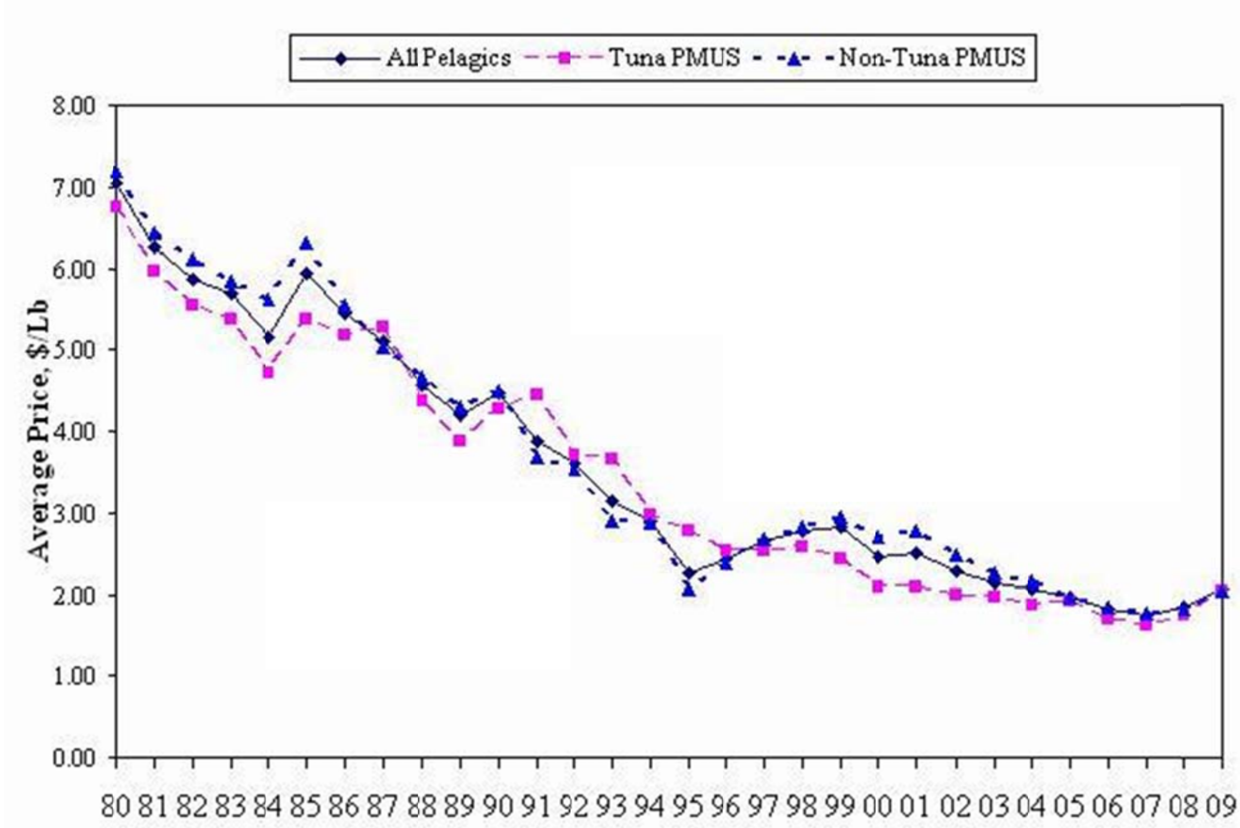
Interpretations: The estimated inflation-adjusted commercial revenues for 2009 increased 7% for all pelagics and 42% for tuna PMUS, and decreased 1.4% for non-tuna PMUS. Overall, commercial revenues have shown a gradual decrease since the early 1980's. A large drop occurring after 2003 can partly be attributed to a change in government policy (see introduction). This trend somewhat continued in 2009, with all three adjusted revenue categories well below the 28-year averages.

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 ($)

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	149,124	833,751	54,353	303,885	88,775	496,343
1981	218,384	1,013,740	92,914	431,309	113,212	525,531
1982	203,847	899,986	90,719	400,524	103,459	456,771
1983	380,231	1,622,063	105,308	449,244	262,817	1,121,177
1984	286,490	1,124,187	129,389	507,724	146,339	574,236
1985	373,796	1,412,200	112,286	424,215	244,423	923,431
1986	334,955	1,231,965	81,299	299,019	237,826	874,724
1987	350,828	1,235,616	107,642	379,116	231,451	815,169
1988	388,630	1,301,132	115,243	385,835	258,203	864,465
1989	337,586	1,018,834	76,865	231,980	249,421	752,751
1990	471,241	1,245,491	136,321	360,296	316,491	836,485
1991	462,191	1,107,871	119,640	286,778	333,096	798,431
1992	492,707	1,072,624	195,547	425,705	284,546	619,457
1993	547,835	1,100,601	175,360	352,299	358,592	720,411
1994	593,838	1,020,214	165,296	283,978	411,832	707,527
1995	537,889	877,835	173,629	283,363	356,256	581,410
1996	398,375	619,075	127,375	197,941	254,063	394,814
1997	534,352	814,887	154,819	236,099	344,972	526,082
1998	733,101	1,124,577	201,639	309,314	502,801	771,297
1999	489,605	737,835	122,023	183,889	319,342	481,249
2000	626,803	925,787	234,735	346,704	349,312	515,934
2001	667,648	1,000,136	228,652	342,520	379,174	568,002
2002	500,777	745,656	184,705	275,026	274,929	409,370
2003	399,989	579,584	163,423	236,800	214,143	310,294
2004	432,735	591,116	122,098	166,786	277,544	379,126
2005	353,131	448,123	100,720	127,814	232,336	294,834
2006	324,686	369,168	94,040	106,924	202,560	230,311
2007	437,861	466,322	109,201	116,299	296,385	315,650
2008	260,474	265,944	61,360	62,649	174,973	178,648
2009	**286,514**	**286,514**	**88,918**	**88,918**	**176,071**	**176,071**
Average	419,187	903,094	130,851	286,765	266,512	574,000
Standard Deviation	138,584	339,593	47,263	117,456	93,600	239,728

Figure 46. Guam Annual Estimated Inflation-Adjusted Average Prices: All Pelagics, Tuna PMUS, and Non-Tuna PMUS



Source: The WPACFIN-sponsored commercial landings system.

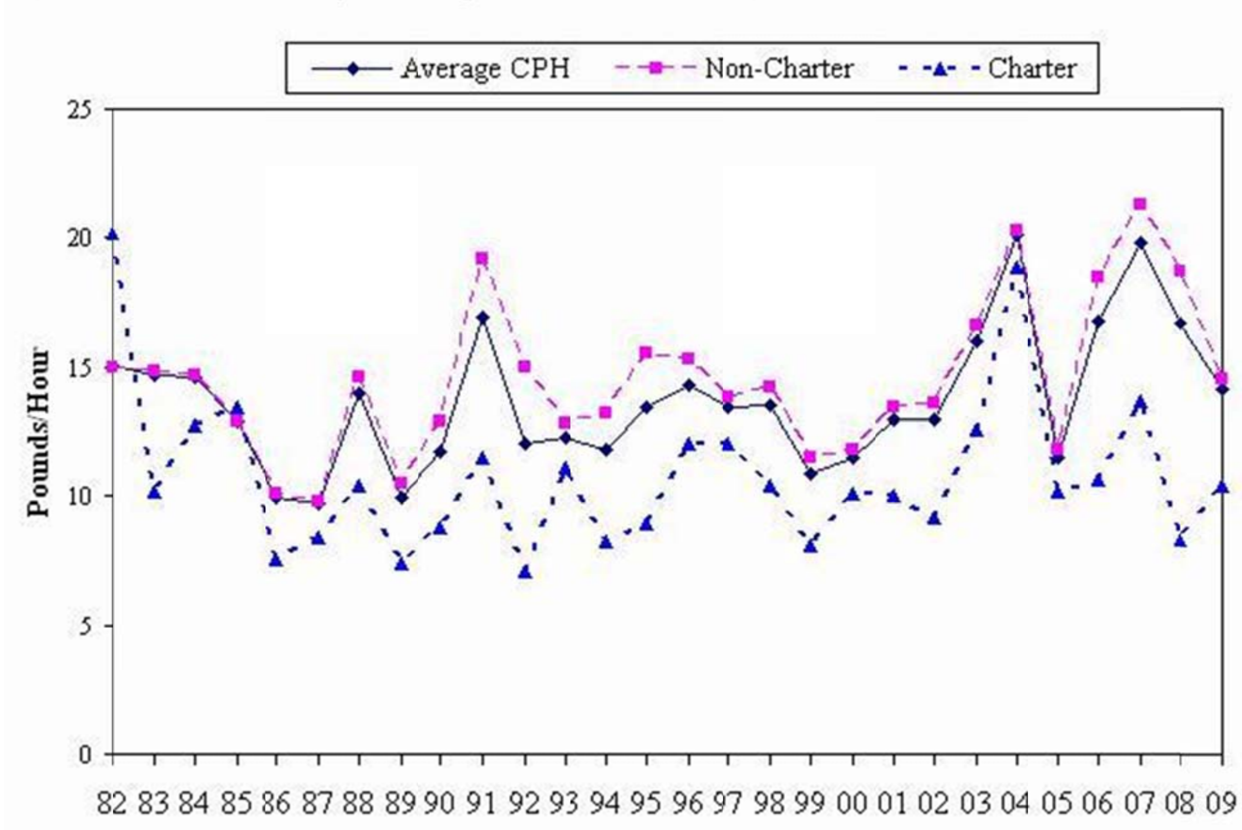
Interpretations: The inflation-adjusted price of tuna and other non-tuna PMUS has shown a dramatic decline since data on the pelagic fishery were first collected in 1980. In 2007, the trend started to change slightly. In 2009, this trend continued, with the adjusted price for all pelagics increasing 11%, 17% for tuna PMUS, and 13% for non-tuna PMUS species. All three categories are well below their 28 year averages. Locally caught pelagic fish continue to have to compete with cheaper pelagic fish caught by longliners. These are value-added products sold at several supermarkets and roadside vendors.

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)

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	1.26	7.05	1.21	6.75	1.29	7.19
1981	1.35	6.25	1.29	5.97	1.38	6.42
1982	1.33	5.86	1.25	5.54	1.38	6.10
1983	1.33	5.69	1.26	5.36	1.37	5.85
1984	1.31	5.16	1.20	4.72	1.43	5.61
1985	1.57	5.94	1.42	5.37	1.67	6.30
1986	1.48	5.45	1.41	5.18	1.51	5.56
1987	1.45	5.10	1.49	5.27	1.43	5.04
1988	1.37	4.57	1.31	4.38	1.39	4.66
1989	1.39	4.20	1.28	3.88	1.42	4.29
1990	1.69	4.46	1.62	4.28	1.70	4.50
1991	1.62	3.88	1.85	4.43	1.54	3.69
1992	1.66	3.61	1.70	3.71	1.62	3.52
1993	1.56	3.13	1.82	3.66	1.45	2.90
1994	1.69	2.91	1.73	2.98	1.67	2.87
1995	1.38	2.25	1.70	2.77	1.26	2.06
1996	1.56	2.43	1.62	2.52	1.52	2.37
1997	1.74	2.65	1.65	2.52	1.76	2.68
1998	1.81	2.77	1.68	2.57	1.84	2.83
1999	1.88	2.83	1.62	2.44	1.95	2.93
2000	1.67	2.46	1.41	2.09	1.83	2.70
2001	1.67	2.50	1.40	2.10	1.84	2.76
2002	1.54	2.29	1.33	1.98	1.67	2.48
2003	1.47	2.13	1.35	1.95	1.55	2.25
2004	1.52	2.07	1.36	1.86	1.58	2.16
2005	1.54	1.96	1.51	1.91	1.54	1.96
2006	1.60	1.82	1.48	1.68	1.61	1.83
2007	1.64	1.75	1.51	1.61	1.66	1.77
2008	1.81	1.85	1.70	1.74	1.78	1.82
2009	**2.06**	**2.06**	**2.03**	**2.03**	**2.05**	**2.05**
Average	1.56	3.57	1.51	3.44	1.59	3.64
Standard Deviation	0.19	1.59	0.21	1.53	0.20	1.66

Figure 47. Guam Trolling CPUE (pounds/hour): Average, Non-Charter, and Charter



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

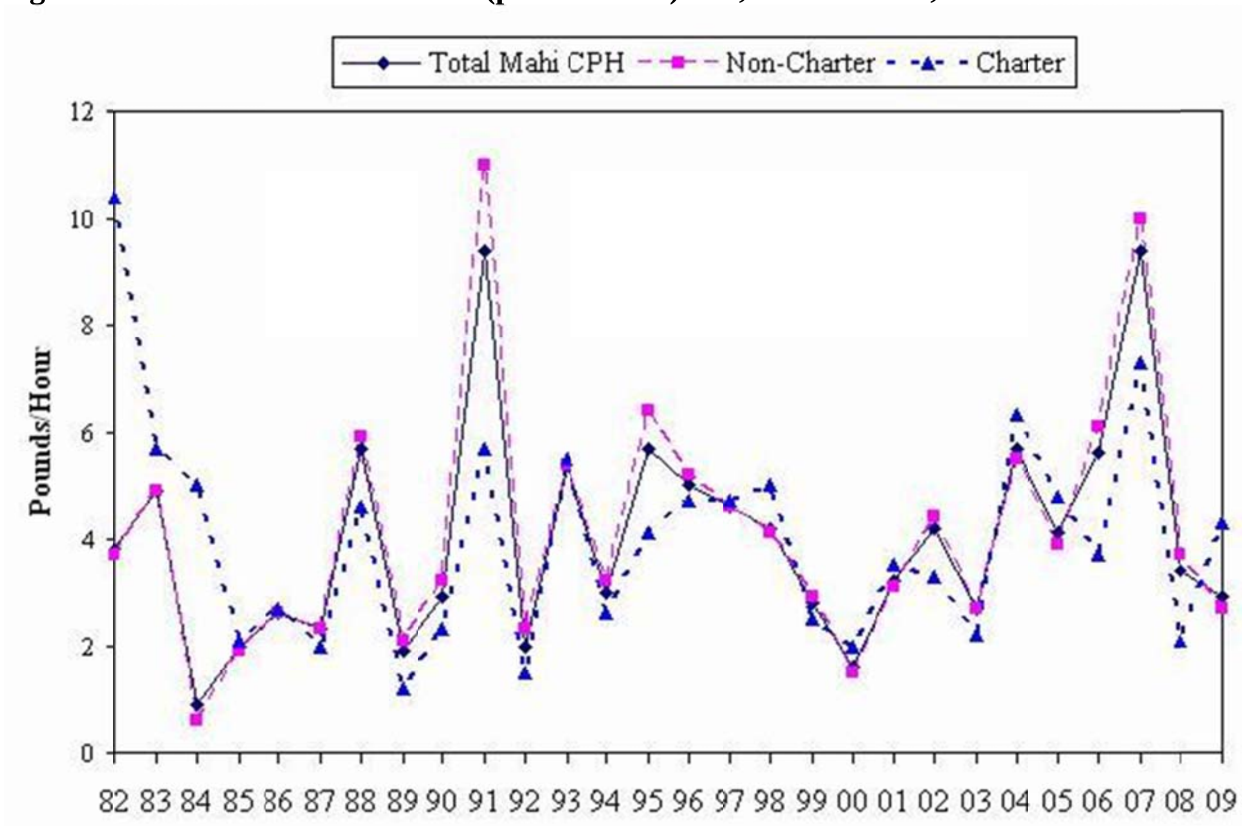
Interpretations: The fluctuations in CPUE are probably due to variability in the year-to-year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. This is especially true with charter boats targeting blue marlin during the summer months. In 2009, total overall and non-charter catch rates decreased 15% and 22%, respectively. Charter catch rates increased by 25%. 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.

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	9.7	9.8	8.4
1988	14.0	14.6	10.4
1989	9.9	10.5	7.4
1990	11.7	12.9	8.8
1991	16.9	19.2	11.5
1992	12.0	15.0	7.1
1993	12.3	12.8	11.1
1994	11.8	13.2	8.2
1995	13.4	15.5	8.9
1996	14.3	15.3	12.0
1997	13.4	13.8	12.0
1998	13.5	14.2	10.4
1999	10.9	11.5	8.1
2000	11.5	11.8	10.1
2001	13.0	13.4	10.0
2002	13.0	13.6	9.2
2003	16.0	16.6	12.6
2004	20.1	20.3	18.9
2005	11.5	11.8	10.2
2006	16.8	18.5	10.6
2007	19.8	21.3	13.7
2008	16.7	18.7	8.3
2009	**14.1**	**14.5**	**10.4**
Average	13.7	14.5	10.8
Standard Deviation	2.7	3.0	3.1

Figure 48. Guam Mahimahi CPUE (pounds/hour): All, Non-Charter, and Charter



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

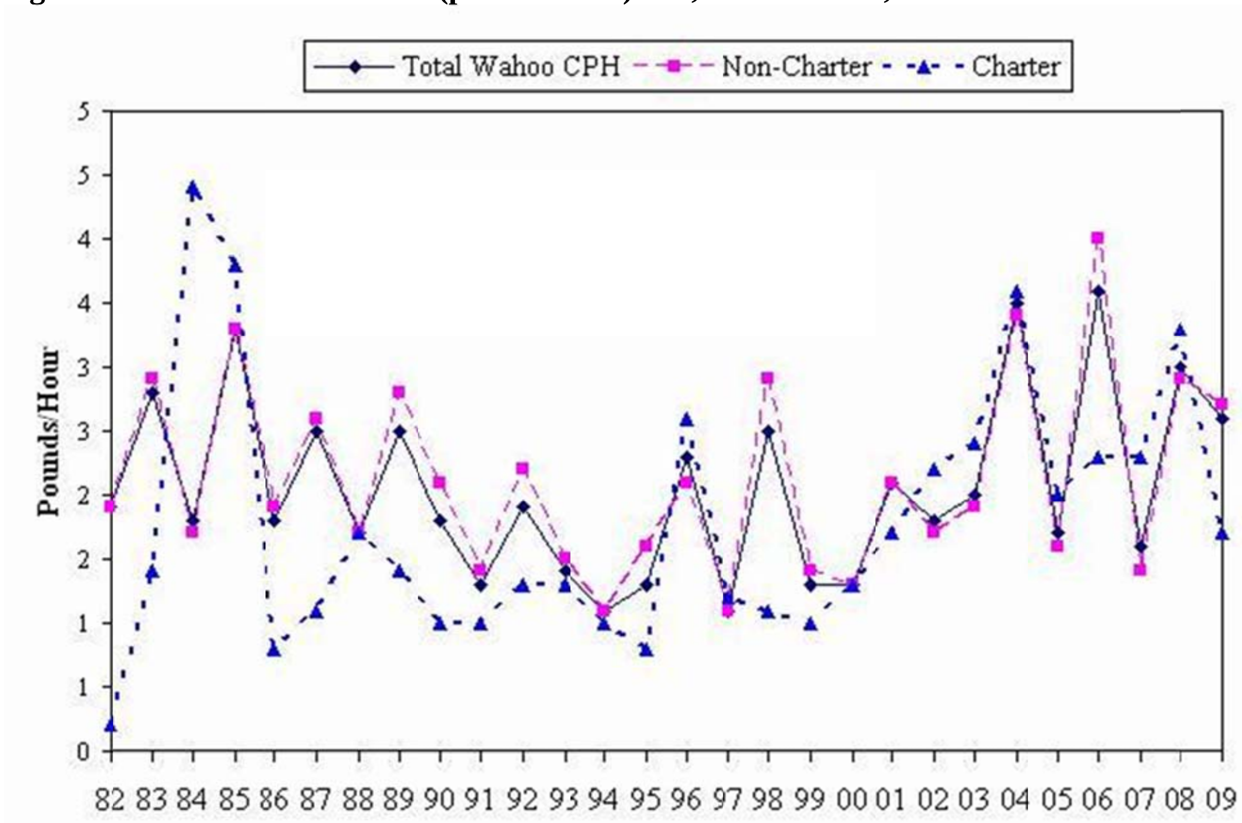
Interpretations: The wide fluctuations in mahimahi CPUE values are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is not possible to allocate species-specific effort to one particular species; effort used to target other species can result in artificially high or low catch rates for a given species. In 2009, the catch rate for total and non-charter mahimahi decreased 15%, and 27%, while charter CPUE increased by 104%. Total mahimahi CPUE is 27.5% below the 28 year average.

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	5.0
1985	2.0	1.9	2.1
1986	2.6	2.6	2.7
1987	2.3	2.3	2.0
1988	5.7	5.9	4.6
1989	1.9	2.1	1.2
1990	2.9	3.2	2.3
1991	9.4	11.0	5.7
1992	2.0	2.3	1.5
1993	5.4	5.4	5.5
1994	3.0	3.2	2.6
1995	5.7	6.4	4.1
1996	5.0	5.2	4.7
1997	4.6	4.6	4.7
1998	4.2	4.1	5.0
1999	2.8	2.9	2.5
2000	1.6	1.5	2.0
2001	3.2	3.1	3.5
2002	4.2	4.4	3.3
2003	2.7	2.7	2.2
2004	5.7	5.5	6.3
2005	4.1	3.9	4.8
2006	5.6	6.1	3.7
2007	9.4	10.0	7.3
2008	3.4	3.7	2.1
2009	**2.9**	**2.7**	**4.3**
Average	4.0	4.1	4.0
Standard Deviation	2.1	2.3	2.0

Figure 49. Guam Wahoo CPUE (pounds/hour): All, Non-Charter, and Charter



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

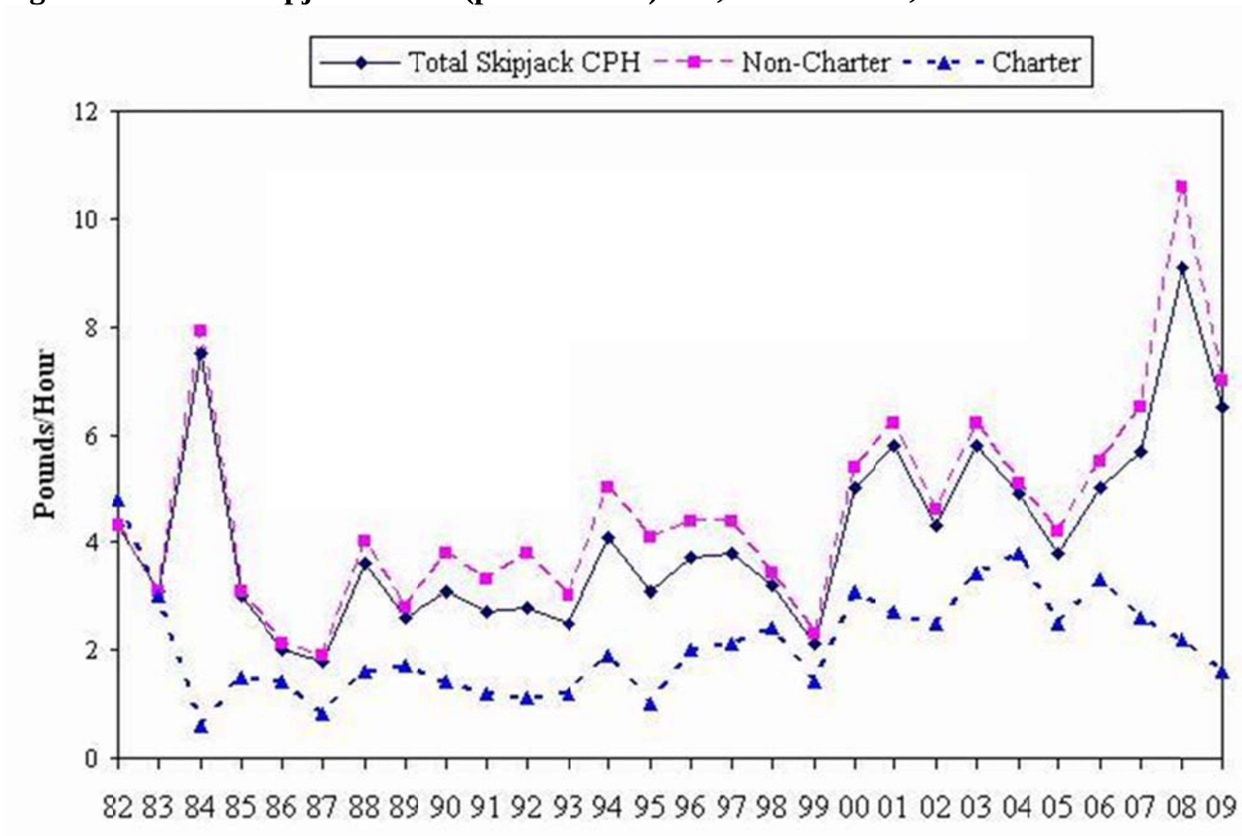
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year-to-year abundance and availability of the stocks. In 2009, all three categories declined. Total wahoo CPUE decreased by 13%, with non-charter CPUE decreasing by 7%. Charter CPUE decreased by 48%. Total CPUE is still 24% above the 28 year average.

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	1.8	1.7	4.4
1985	3.3	3.3	3.8
1986	1.8	1.9	0.8
1987	2.5	2.6	1.1
1988	1.7	1.7	1.7
1989	2.5	2.8	1.4
1990	1.8	2.1	1.0
1991	1.3	1.4	1.0
1992	1.9	2.2	1.3
1993	1.4	1.5	1.3
1994	1.1	1.1	1.0
1995	1.3	1.6	0.8
1996	2.3	2.1	2.6
1997	1.1	1.1	1.2
1998	2.5	2.9	1.1
1999	1.3	1.4	1.0
2000	1.3	1.3	1.3
2001	2.1	2.1	1.7
2002	1.8	1.7	2.2
2003	2.0	1.9	2.4
2004	3.5	3.4	3.6
2005	1.7	1.6	2.0
2006	3.6	4.0	2.3
2007	1.6	1.4	2.3
2008	3.0	2.9	3.3
2009	**2.6**	**2.7**	**1.7**
Average	2.1	2.1	1.8
Standard Deviation	0.7	0.8	1.0

Figure 50. Guam Skipjack CPUE (pounds/hour): All, Non-Charter, and Charter



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.

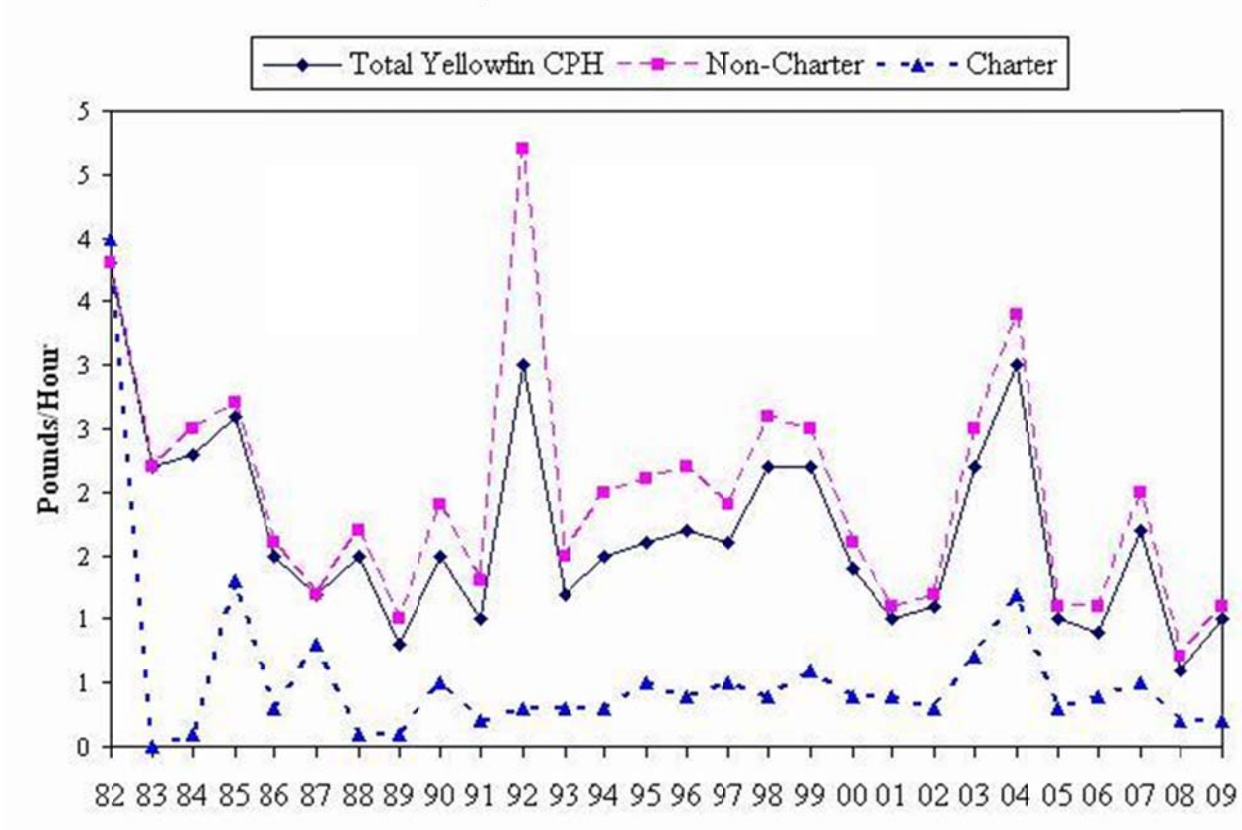
Interpretations: The wide fluctuations in CPUE for skipjack tuna are probably due to the high variability in the year-to-year abundance and availability of the stocks, although skipjack tuna is caught year round. However, it is not possible to allocate species-specific effort, since effort used to target other species can result in an artificially high or low catch rate for a given species. In 2009, the catch rates for total and non-charter decreased by 29% and 34%, respectively. Charter rates decreased 27% in 2009. Total CPUE was above their 28-year average.

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	7.9	0.6
1985	3.0	3.1	1.5
1986	2.0	2.1	1.4
1987	1.8	1.9	0.8
1988	3.6	4.0	1.6
1989	2.6	2.8	1.7
1990	3.1	3.8	1.4
1991	2.7	3.3	1.2
1992	2.8	3.8	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	4.4	2.0
1997	3.8	4.4	2.1
1998	3.2	3.4	2.4
1999	2.1	2.3	1.4
2000	5.0	5.4	3.1
2001	5.8	6.2	2.7
2002	4.3	4.6	2.5
2003	5.8	6.2	3.4
2004	4.9	5.1	3.8
2005	3.8	4.2	2.5
2006	5.0	5.5	3.3
2007	5.7	6.5	2.6
2008	9.1	10.6	2.2
2009	**6.5**	**7.0**	**1.6**
Average	4.1	4.6	2.1
Standard Deviation	1.7	1.9	1.0

Figure 51. Guam Yellowfin CPUE (pounds/hour): All, Non-Charter, and Charter



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.

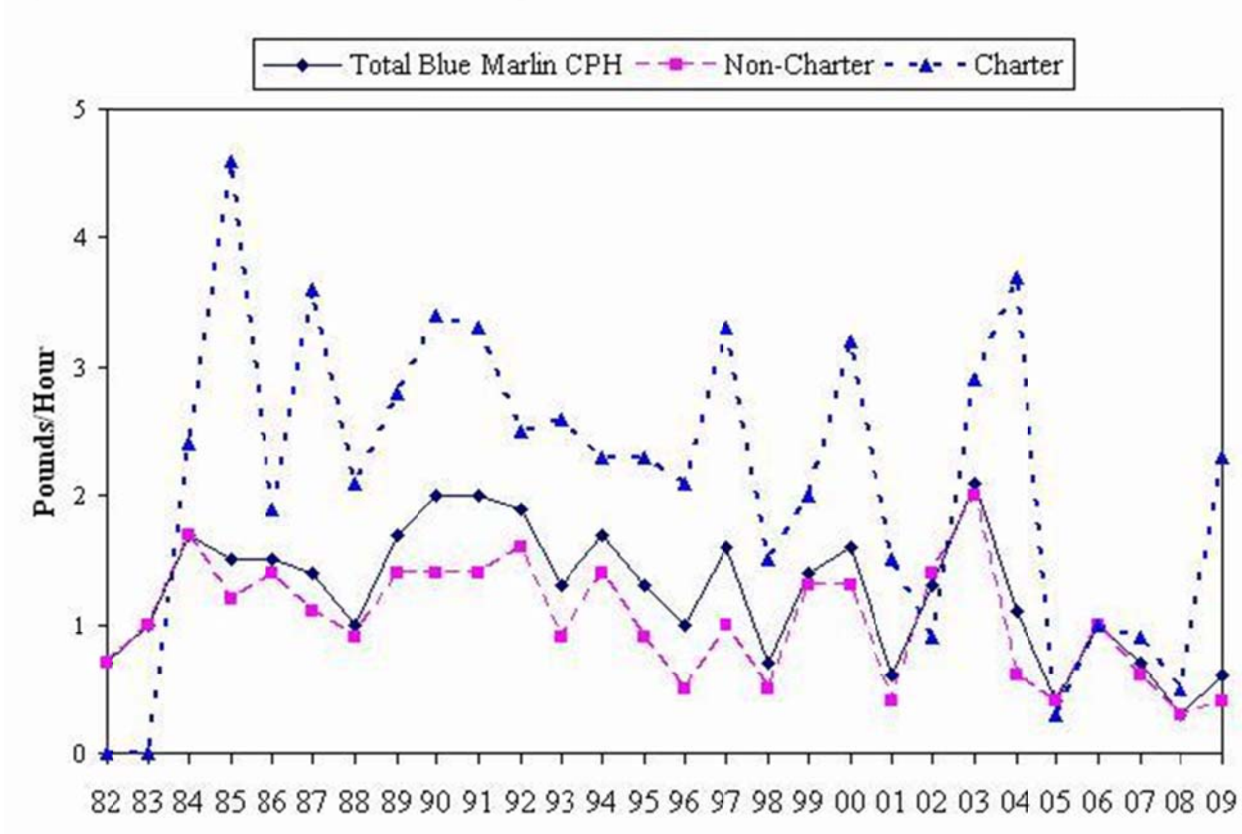
Interpretations: The wide fluctuations in CPUE for yellowfin tunas are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is not possible to allocate species-specific effort, since effort used to target other species can also result in an artificially high or low catch rate for a given species. In 2009, the yellowfin catch rates for total and non-charter catch increased by 67% and 57% respectively. Charter CPUE remained unchanged. All three categories are below their 28-year averages.

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	0.1
1985	2.6	2.7	1.3
1986	1.5	1.6	0.3
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	0.3
1993	1.2	1.5	0.3
1994	1.5	2.0	0.3
1995	1.6	2.1	0.5
1996	1.7	2.2	0.4
1997	1.6	1.9	0.5
1998	2.2	2.6	0.4
1999	2.2	2.5	0.6
2000	1.4	1.6	0.4
2001	1.0	1.1	0.4
2002	1.1	1.2	0.3
2003	2.2	2.5	0.7
2004	3.0	3.4	1.2
2005	1.0	1.1	0.3
2006	0.9	1.1	0.4
2007	1.7	2.0	0.5
2008	0.6	0.7	0.2
2009	**1.0**	**1.1**	**0.2**
Average	1.7	2.0	0.5
Standard Deviation	0.8	0.9	0.7

Figure 52. Guam Blue marlin CPUE (pounds/hour): All, Non-Charter, and Charter



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.

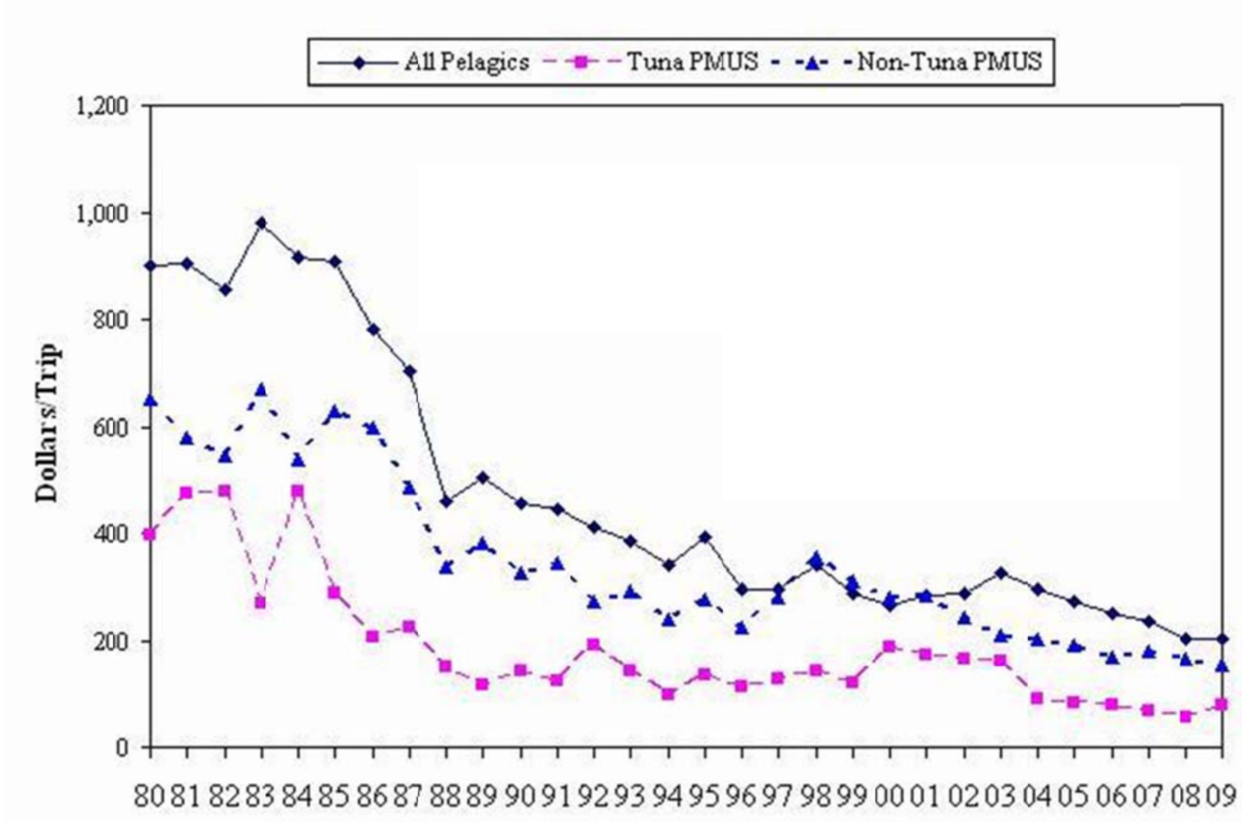
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year-to-year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. The 2009 blue marlin catch rates increased for all three categories. Total CPUE increased by 100%, while non-charter and charter increased by 33% and 360%, respectively. Total catch CPUE is 54% below the 28 year average.

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	2.4
1985	1.5	1.2	4.6
1986	1.5	1.4	1.9
1987	1.4	1.1	3.6
1988	1.0	0.9	2.1
1989	1.7	1.4	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	0.9	2.3
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	2.0
2000	1.6	1.3	3.2
2001	0.6	0.4	1.5
2002	1.3	1.4	0.9
2003	2.1	2.0	2.9
2004	1.1	0.6	3.7
2005	0.4	0.4	0.3
2006	1.0	1.0	1.0
2007	0.7	0.6	0.9
2008	0.3	0.3	0.5
2009	**0.6**	**0.4**	**2.3**
Average	1.3	1.0	2.3
Standard Deviation	0.5	0.5	1.1

Figure 53. Guam Annual Estimated Inflation-Adjusted Revenue per Trolling Trip: All Pelagics, Tuna PMUS, and Non-Tuna PMUS



Source: The WPacFIN-sponsored commercial landings system.

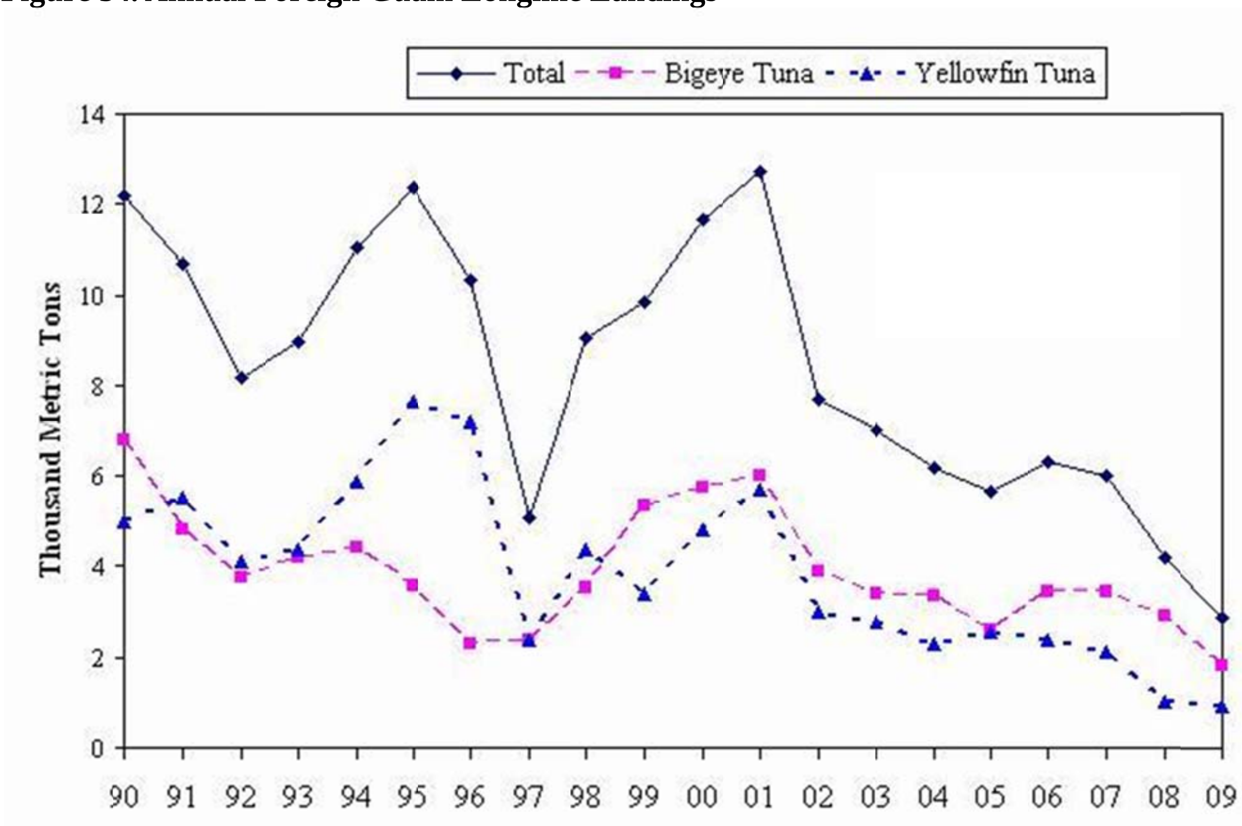
Interpretation: There has been a general decrease from 1980 in the adjusted revenues per trolling trip for all pelagics, tunas and other PMUS, although the revenue values have remained fairly constant for the past 9 years. In 2009, the adjusted revenue per trip increased for all pelagics by 1%. Tuna PMUS revenues increased by 35%, and non-tuna PMUS decreased by 7%. Despite continual declines in revenues, trolling effort still occurs since most charter and non-charter trolling boats do not rely on selling fish caught as their primary source of income and a reliable market exists for members of the local fishermen's cooperative, which provides additional income. The commercial data is given with the warning that this is only a partial year worth of data. The loss of the primary vendor providing commercial data reduces the reliability of this data.

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	901.88	71.14	397.74	116.20	649.67
1981	195.29	906.54	102.24	474.60	124.58	578.30
1982	194.29	857.79	108.45	478.81	123.68	546.05
1983	229.26	978.02	62.81	267.95	156.75	668.70
1984	233.01	914.33	121.56	477.00	137.48	539.47
1985	240.34	908.00	76.21	287.92	165.90	626.77
1986	212.25	780.66	55.68	204.79	162.89	599.11
1987	199.18	701.51	64.07	225.65	137.77	485.23
1988	137.30	459.68	44.98	150.59	100.78	337.41
1989	166.79	503.37	38.89	117.37	126.20	380.87
1990	172.68	456.39	53.19	140.58	123.50	326.41
1991	185.96	445.75	51.79	124.14	144.20	345.65
1992	188.33	409.99	86.72	188.79	126.18	274.69
1993	191.92	385.57	70.60	141.84	144.36	290.02
1994	197.09	338.60	56.32	96.76	140.32	241.07
1995	239.79	391.34	82.55	134.72	169.38	276.43
1996	191.10	296.97	72.55	112.74	144.71	224.88
1997	192.95	294.25	82.74	126.18	184.35	281.13
1998	221.01	339.03	92.81	142.37	231.44	355.03
1999	190.05	286.41	78.35	118.07	205.04	309.00
2000	179.42	265.00	127.01	187.59	189.00	279.15
2001	188.68	282.64	113.92	170.65	188.92	283.00
2002	193.42	288.00	109.41	162.91	162.85	242.48
2003	223.73	324.18	110.95	160.77	145.38	210.66
2004	215.10	293.83	65.56	89.55	149.03	203.57
2005	216.34	274.54	64.62	82.00	149.05	189.14
2006	219.47	249.54	68.83	78.26	148.26	168.57
2007	221.40	235.79	61.56	65.56	167.09	177.95
2008	196.13	200.25	55.86	57.03	159.29	162.64
2009	**202.16**	**202.16**	**76.76**	**76.76**	**152.00**	**152.00**
Average	199.86	472.40	77.60	184.66	152.55	346.84
Standard Deviation	23.65	257.40	23.59	122.28	27.75	160.76

Figure 54. Annual Foreign Guam Longline Landings



Source: The Bureau of Statistics and Plans.

Interpretation: Annual landings from a primarily foreign longline fishing fleet have ranged from a low of 2874 metric tons in 2009 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 for several reasons, including availability of fish stocks. Compared with 2008, the 2009 total longline landings decreased 32%, with bigeye landings decreasing 38% and yellowfin landings decreasing 8%. The 2009 totals were the lowest in the 20 year data set, and total catch was 66% below the 20 year average.

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

Foreign Longline Landings (Metric tons)

Year	Total	Bigeye	Yellowfin
1990	12,198	6,793	5,011
1991	10,707	4,824	5,505
1992	8,157	3,754	4,104
1993	8,981	4,178	4,379
1994	11,023	4,400	5,878
1995	12,366	3,560	7,635
1996	10,356	2,280	7,214
1997	5,093	2,395	2,392
1998	9,032	3,533	4,379
1999	9,865	5,328	3,404
2000	11,664	5,725	4,795
2001	12,716	5,996	5,711
2002	7,691	3,904	3,011
2003	7,010	3,418	2,788
2004	6,190	3,375	2,287
2005	5,660	2,618	2,574
2006	6,315	3,455	2,377
2007	5,991	3,439	2,134
2008	4,215	2,926	1,014
2009	2,874	1,813	934
Average	8,405	3,886	3,876
Standard Deviation	2,923	1,305	1,901

Table 19. Guam Trolling Bycatch: Non-Charter and Charter

	Species Name	Number Released: Alive	Dead/Injured	Both	All Caught	Bycatch (%)
Charter	*Tetrapterus angustirostris*	1	0	1	2	50.00
	Bycatch Total	1	0	1	2	50.00
	Compared to All Caught				695	**0.14**
Non Charter	*Katsuwonus pelamis*	**1**	**1**	**2**	**1766**	**0.11**
	Bycatch Total	1	1	2	1766	0.11
	Compared to All Caught				**2783**	**0.07**
All Bycatch	Bycatch Total	2	1	3	**1768**	**0.17**
	Compared to All Caught				**3478**	**0.09**

Table 20. Guam Trolling Bycatch: Summary

Year	Released alive	Released dead/ injured	Total Number Released	Total Number Landed	Percent Bycatch *	Interviews with Bycatch	Total Number of Interviews	Percent of Interviews with Bycatch
2001	7	3	10	5,289	0.2	10	461	2.2
2002	1	2	3	3,443	0.1	3	258	1.2
2003	5	0	5	3,026	0.2	2	178	1.1
2004	0	0	0	4,292		0	91	0
2005	3	0	3	2,631	.11	3		
2006	2	1	3	3,478	.09	3	413	.7
2007								
2008	1	0	1	3,495	.02	1	98	1.02
2009	2	1	3	3,478	.08	3	604	.05

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

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.

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

C. Hawaii

Introduction

Hawaii's pelagic fisheries, which include the longline, main Hawaiian Island (MHI) troll and handline, offshore handline, and aku boat (pole and line) fisheries, are the state's largest and most valuable. These pelagic fisheries landed an estimated 27.1 million pounds worth about $66.5 million (ex-vessel revenue) in 2009. 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 11% and 8% of the landings and revenue, respectively. The MHI handline, aku boat, offshore handline and other gear types made up the remainder.

The target species for the Hawaii fisheries are tunas and billfishes, but a variety of other pelagic species are also landed with some regularity. The largest component of the pelagic landings was tunas, which comprised 57% of the total in 2009. Bigeye tuna alone accounted for 70% of the tunas and 40% of all pelagic landings. Billfish landings made up 22% of the total landings in 2009. Swordfish was the largest of these, at 65% of the billfish and 15% of the total landings. Landings of other pelagic management unit species (PMUS) represented 21% of the total landings in 2009 with moonfish being the largest component at 7% of the total and 33% 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.

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

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

---

[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.

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

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

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

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

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

Offshore Handline Fishery: The offshore handline fishery includes pelagic species caught by Ika-Shibi (HDAR gear code 8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35), Miscellaneous Trolling Methods (6), Lure Trolling (61), and Hybrid Methods (97) in Areas 15217 (NOAA Weather Buoy W4), 15717 (NOAA Weather Buoy W2), 15815, 15818 (Cross Seamount) , 16019 (NOAA Weather Buoy W3), 16223 (NOAA

Weather Buoy W1), 175, 176, 181, 804, 807, 816, 817, 825, 839, 842, 892, 893, 894, 898, 900, 901, 15416, 15417, 15423, 15523, 15718, 15918, 15819, and 16221. This fishery also includes pelagic species caught by Deep Sea or Bottom Handline Methods (3) in Area 16223.

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

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

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

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

---

[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.

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

Hawaii Commercial Marine License information

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

A total of 3,404 fishermen were licensed in 2009, including 2,023 (59%) 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 (67%) and longline fishermen (23%). The remainder was issued to ika shibi and palu ahi (handline) (9%) and aku boat fishers (1%).

Primary Fishing Method	Number of licensees	
	2008	2009
Trolling	1,404	1,352
Longline	512	467
Ika Shibi & Palu Ahi	152	176
Aku Boat (Pole and Line)	22	28
Total Pelagic	2,090	2,023
Total All Methods	3,205	3,404

Plan Team Recommendations

2009 Recommendations

1. The Pelagic Plan Team recommends that the Hawaii module incorporate catch rate (lbs/hr), for trolling and handline in addition to lbs/trip for years 2003 and thereafter.

2. The Pelagic Plan Team made no recommendation on management measures for the Cross Seamount mixed gear pelagic fishery, other than to note that it had previously questioned the need for management in a fishery which participation was and still is clearly in decline. The Pelagic Plan Team did, however, recommend that the seamount monchong, *Eumigistes illustris*, be maintained in the Pelagics Fishery Ecosystem Plan Management Unit.

Table 21. Hawaii Commercial Pelagic Landings, Revenue, and Average Price by Species, 2008-2009

Species	2008 Pounds landed (x 1000)	2008 Ex-vessel revenue ($1000)	2008 Average price ($/lb)	2009 Pounds landed (x 1000)	2009 Ex-vessel revenue ($1000)	2009 Average price ($/lb)
Tuna PMUS						
Albacore	874	$1,351	$1.67	678	$1,071	$1.65
Bigeye tuna	13,571	$49,921	$3.71	10,753	$39,366	$3.66
Bluefin tuna	1	$0	-	2	$0	-
Skipjack tuna	1,279	$1,195	$1.31	1,098	$1,010	$1.42
Yellowfin tuna	3,536	$8,702	$2.70	2,844	$6,249	$2.52
Tuna PMUS subtotal	**19,260**	**$61,169**	**$3.33**	**15,375**	**$47,696**	**$3.27**
Billfish PMUS						
Swordfish	4,316	$7,206	$1.87	3,975	$7,256	$1.89
Blue marlin	1,161	$1,025	$1.11	1,154	$1,193	$1.16
Striped marlin	1,023	$1,053	$1.02	644	$947	$1.47
Other marlins	566	$378	$0.71	296	$295	$1.04
Billfish PMUS subtota	**7,067**	**$9,662**	**$1.79**	**6,070**	**$9,691**	**$1.54**
Other PMUS						
Mahimahi	1,432	$3,198	$2.54	1,464	$2,853	$2.22
Ono (wahoo)	976	$2,247	$2.62	751	$1,673	$2.77
Opah (moonfish)	1,335	$2,178	$1.68	1,896	$2,376	$1.28
Oilfish	491	$922	$1.87	544	$704	$1.29
Pomfrets	677	$1,672	$2.48	628	$1,381	$2.20
Sharks (whole weight)	416	$151	$0.44	373	$139	$0.47
Other PMUS subtotal	**5,327**	**$10,368**	**$2.10**	**5,657**	**$9,126**	**$1.75**
Other pelagics	47	$38	$1.08	46	$28	$1.15
Total pelagics	**31,702**	**$81,237**	**$2.75**	**27,148**	**$66,541**	**$2.57**

Interpretation: The total commercial pelagic landings in 2009 were 27.1 million pounds or down 14% from 2008 a decrease of 4.6 million pounds from the previous year. Tunas represented 57% of the total landings. Bigeye tuna landings were 10.8 million pounds in 2009, down 2.8 million pounds from the previous year. Bigeye tuna was the largest component of the landings (40%). Swordfish (15%) was the next largest, followed by yellowfin tuna (10%).

Total Hawaii commercial ex-vessel revenue ($66.5 million) decreased by 18% in 2009. Tunas comprised 72% of this total. Bigeye tuna alone accounted for 59% of the total revenue at $39.4 million. Yellowfin tuna revenue decreased 28% to $6.2 million. Billfish revenue ($9.7 million) was about the same as 2008. Swordfish was the second highest contributor to total revenue at $7.3 million. Revenue of other PMUS species decreased 12% in 2009. The total pelagic fish price decreased 7% in 2009. Average prices for tuna, billfish, and other PMUS all decreased by 2%, 14% and 17%, respectively, in 2009.

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

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

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

Table 22. Hawaii Commercial Pelagic Landings, Revenue, and Average Price by Fishery, 2008-2009.

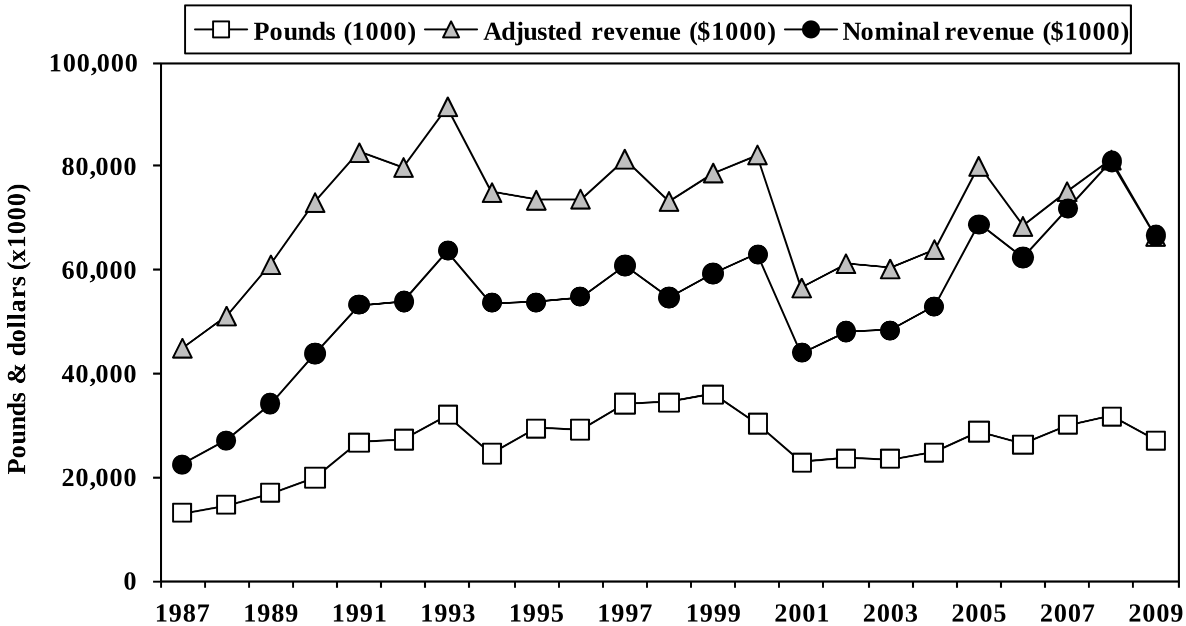
	2008			2009		
Fishery	**Pounds landed (x1000)**	**Ex-vessel revenue ($1000)**	**Average price ($/lb)**	**Pounds landed (x1000)**	**Ex-vessel revenue ($1000)**	**Average price ($/lb)**
Longline	26,694	$72,200	$2.83	22,145	$57,918	$2.68
MHI trolling	2,970	$5,503	$2.43	2,958	$5,198	$2.39
MHI handline	695	$1,416	$2.45	1,080	$1,860	$2.05
Offshore handline	328	$583	$2.32	286	$569	$2.09
Aku boat	704	$870	$1.24	511	$679	$1.33
Other gear	311	$665	$2.34	168	$317	$2.06
Total	**31,702**	**$81,237**	**$2.75**	**27,148**	**$66,541**	**$2.57**

Interpretation: The longline fishery is the largest commercial fishery in Hawaii. Longline landings and revenue were 22.1 million pounds and $57.9 million in 2009, respectively. Longline landings decreased by 4.6 million pounds and revenue decreased by $14.3 million. The average price for the longline fishery was also slightly lower in 2009. The MHI troll fishery is the second largest commercial fishery. It produced 3.0 million pounds worth $5.2 million in 2009. MHI troll landings was about the same as the previous year, while revenue decreased slightly. The MHI handline fishery produced 1.1 million pounds of pelagic landings worth $1.9 million, while the offshore handline fishery landings were 286,000 pounds worth $570,000 in 2009. Aku boat fishery landings was down 193,000 pounds while revenue decreased by $191,000 in 2009.

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 55. Hawaii Total Commercial Landings and Revenue, 1987-2009.

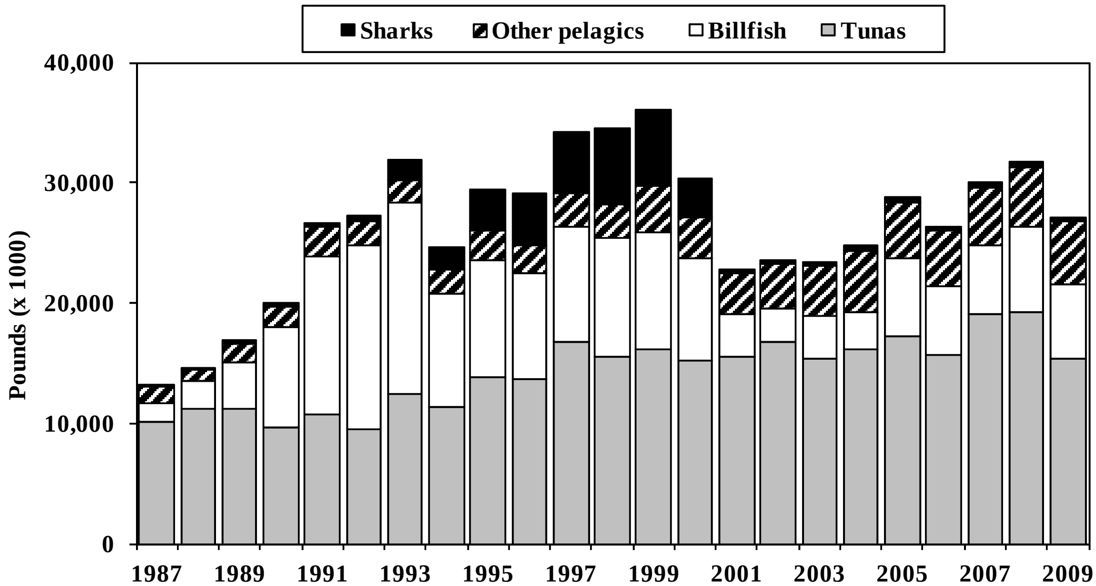


Interpretation: The landings decreased by 4.6 million pounds while revenue dropped by $14.7 million in 2009. Although commercial landings were above their long-term average in 2009, the ex-revenue fell below the adjusted long-term revenue. Gear and species specific changes over the 23-year period are explained in greater detail in the following figures and tables.

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

Year	Pounds (1000)	Nominal revenue ($1000)	Adjusted revenue ($1000)	Honolulu CPI
1987	13,025	$22,493	$45,025	114.9
1988	14,569	$27,090	$51,197	121.7
1989	16,860	$34,166	$61,058	128.7
1990	19,933	$43,850	$73,030	138.1
1991	26,664	$53,170	$82,629	148.0
1992	27,253	$53,810	$79,796	155.1
1993	31,931	$63,680	$91,483	160.1
1994	24,569	$53,610	$74,956	164.5
1995	29,437	$53,720	$73,501	168.1
1996	29,156	$54,710	$73,716	170.7
1997	34,165	$60,840	$81,403	171.9
1998	34,472	$54,628	$73,262	171.5
1999	36,005	$59,320	$78,728	173.3
2000	30,310	$63,023	$82,219	176.3
2001	22,782	$43,896	$56,592	178.4
2002	23,598	$48,040	$61,282	180.3
2003	23,478	$48,343	$60,265	184.5
2004	24,759	$53,023	$63,984	190.6
2005	28,742	$68,810	$80,012	197.8
2006	26,325	$62,333	$68,465	209.4
2007	30,061	$71,707	$75,137	219.5
2008	31,702	$80,848	$81,237	228.9
2009	27,148	$66,541	$66,541	230.0
Average	**26,388.9**	**53,984.8**	**71,109.5**	
SD	**6,090.2**	**13,678.6**	**11,333.4**	

Figure 56. Hawaii Commercial Tuna, Billfish, Shark, and Other PMUS Landings, 1987-2009.



Interpretation: Hawaii's pelagic landings decreased 14% in 2009 and was primarily attributed to tuna landings, which went down 20% from 2008. There were less billfish and shark landings, but this was partially offset by a slight increase in landings of other pelagics. As shown in previous tables, the tuna was composed predominantly of bigeye tuna and billfish landings were primarily attributable to swordfish.

Source and Calculations: The landings values are obtained by adding the landings values for species in the pelagic species groups defined below and all of the longline and non-longline fisheries for each year.

Tunas: Albacore, Bigeye tuna, Bluefin tuna, Kawakawa, Skipjack tuna, Yellowfin tuna, Unclassified tuna

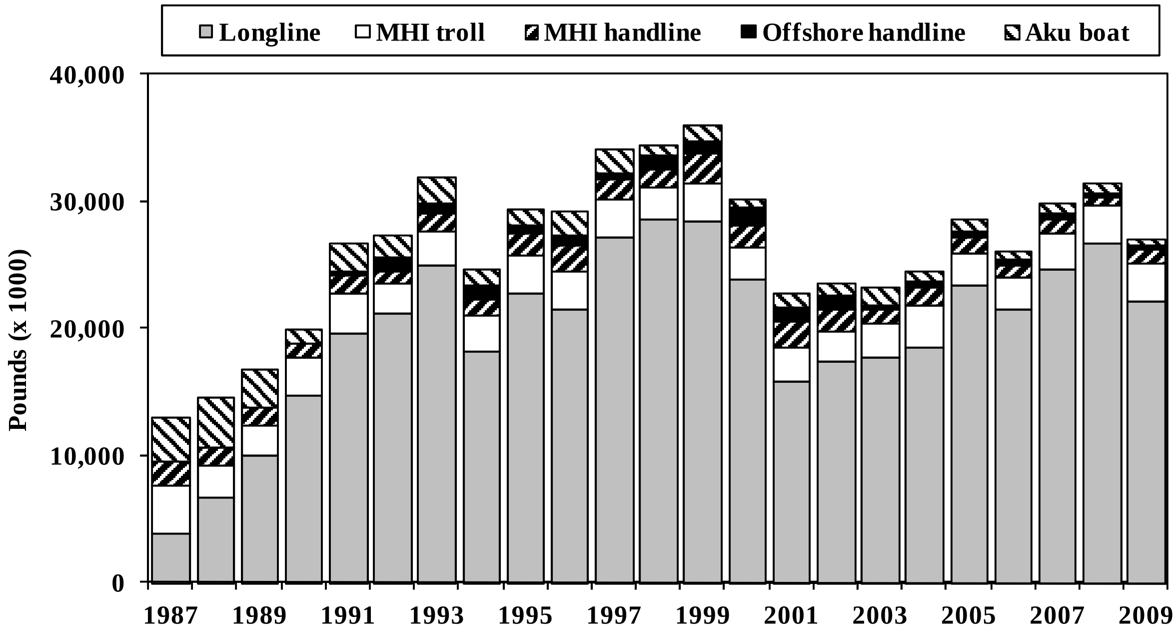
Billfishes: Blue marlin, Black marlin, Sailfish, Spearfish, Striped marlin, Swordfish, & Unclassified billfish

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, Oceanic white-tip sharks, & Unclassified sharks

	Hawaii pelagic landings (1000 pounds)				
Year	**Tunas**	**Billfish**	**Other pelagics**	**Sharks**	**Total**
1987	10,130	1,558	1,294	43	13,025
1988	11,197	2,301	978	94	14,570
1989	11,223	3,880	1,553	203	16,860
1990	9,726	8,278	1,707	222	19,933
1991	10,794	13,129	2,423	318	26,664
1992	9,461	15,355	2,026	410	27,252
1993	12,417	15,928	1,850	1,736	31,931
1994	11,309	9,526	1,977	1,757	24,570
1995	13,820	9,723	2,426	3,468	29,437
1996	13,685	8,796	2,349	4,327	29,157
1997	16,813	9,492	2,850	5,010	34,165
1998	15,556	9,923	2,782	6,212	34,473
1999	16,145	9,758	3,828	6,273	36,005
2000	15,157	8,545	3,340	3,253	30,302
2001	15,561	3,469	3,414	333	22,778
2002	16,773	2,728	3,727	366	23,594
2003	15,375	3,470	4,266	358	23,469
2004	16,160	3,020	5,161	418	24,759
2005	17,248	6,405	4,690	393	28,736
2006	15,697	5,661	4,633	337	26,328
2007	19,126	5,657	4,857	418	30,058
2008	19,276	7,067	4,943	416	31,702
2009	15,400	6,070	5,305	373	27,148
Average	**14,263.0**	**7,380.0**	**3,146.9**	**1,597.3**	**26,387.6**
SD	**2,942.2**	**4,002.4**	**1,358.1**	**2,061.2**	**6,090.1**

Figure 57. Total Commercial Pelagic Landings by Gear Type 1987-2009.

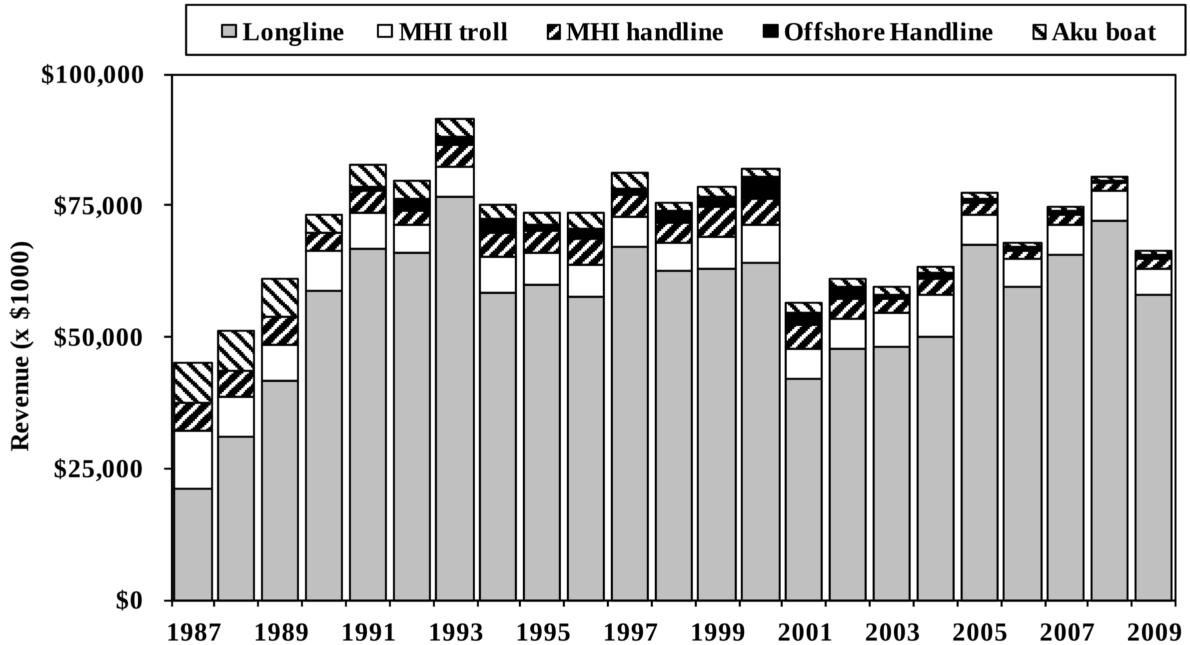


Interpretation: Hawaii commercial pelagic landings in 2009 decreased by 14% and were dominated by longline landings. MHI troll and MHI handline fisheries are the next two largest fisheries in Hawaii. MHI troll landings have remained relatively constant since 1987 while MHI handline landings fluctuated. The offshore handline fishery grew in the early 1990s with landings leveling off from 2003. In contrast, aku boat landings have declined from the late 1980s due to attrition of an aging fleet.

Source and Calculations: The landings values are obtained by adding the landings values of all species of each fishery for each year. The total 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	3,893	3,709	1,914	-	3,503	13,025
1988	6,713	2,445	1,471	-	3,940	14,569
1989	9,966	2,401	1,487	-	2,962	16,860
1990	14,790	2,901	1,060	68	1,116	19,933
1991	19,608	3,102	1,477	331	2,146	26,664
1992	21,190	2,394	946	987	1,735	27,253
1993	25,005	2,578	1,532	679	2,137	31,931
1994	18,138	2,810	1,287	1,175	1,159	24,569
1995	22,733	2,966	1,733	714	1,291	29,437
1996	21,564	2,994	1,962	793	1,844	29,156
1997	27,160	3,016	1,479	563	1,947	34,165
1998	28,655	2,471	1,368	1,134	845	34,472
1999	28,377	3,013	2,414	888	1,312	36,005
2000	23,791	2,562	1,717	1,458	708	30,310
2001	15,800	2,737	2,070	1,080	994	22,782
2002	17,392	2,387	1,699	1,067	936	23,598
2003	17,654	2,700	1,092	386	1,378	23,478
2004	18,493	3,378	1,406	487	656	24,759
2005	23,325	2,603	1,289	398	932	28,742
2006	21,510	2,584	817	483	661	26,325
2007	24,699	2,832	983	598	654	30,061
2008	26,694	2,970	695	328	704	31,702
2009	22,145	2,958	1,080	286	511	27,148
Average	**19,969.3**	**2,804.8**	**1,433.8**	**604.4**	**1,481.4**	**26,388.9**
SD	**6,507.2**	**330.8**	**422.7**	**416.2**	**937.8**	**6,090.2**

Figure 58. Total Commercial Pelagic Ex-Vessel Revenue by Gear Type 1987-2009.

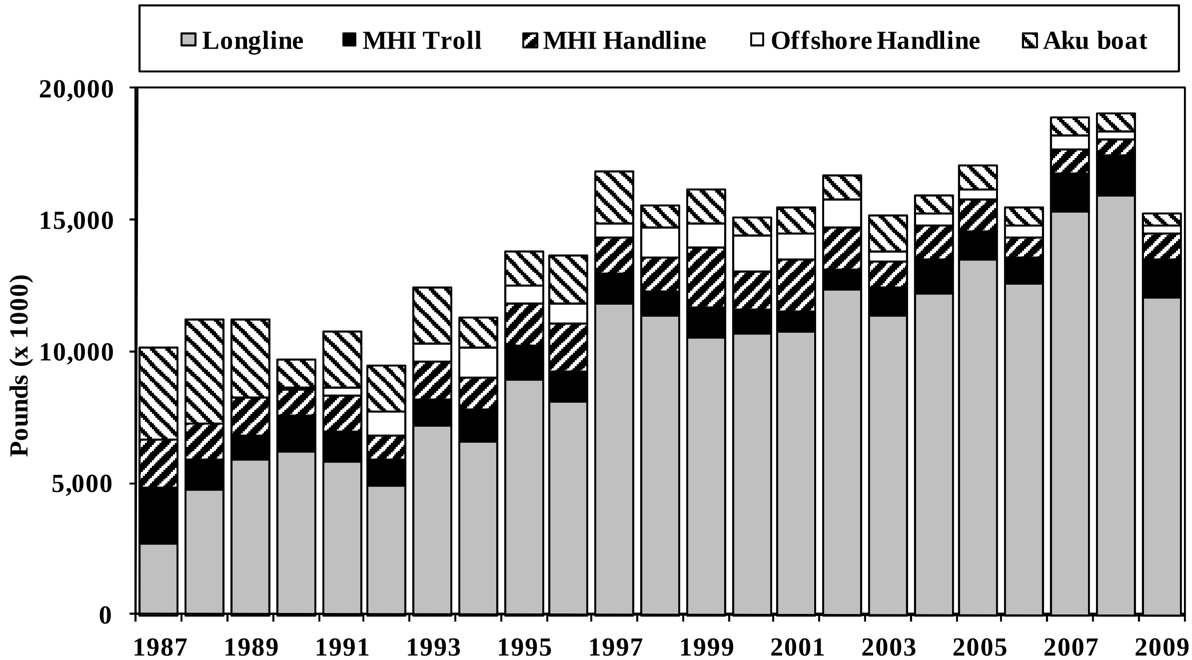


Interpretation: Ex-vessel revenue from Hawaii's pelagic fisheries decreased 18% in 2009 mainly due to lower revenue by the longline fishery. Revenue also declined slightly for the MHI troll, offshore handline, and aku boat fisheries. The longline fishery was still the largest revenue generating fishery followed by the MHI troll and MHI handline fisheries. The offshore handline fishery grew in the early 1990s with revenue consistently below $1 million from 2005. Revenue from the aku boat fishery declined from the late 1980s due to fleet attrition and lower landings.

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 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	$21,176	$11,082	$5,217	-	$7,509	$45,028
1988	$31,127	$7,323	$5,016	-	$7,679	$51,144
1989	$41,459	$6,968	$5,222	-	$7,409	$61,058
1990	$58,806	$7,485	$3,471	$162	$3,119	$73,050
1991	$66,719	$6,989	$3,935	$828	$4,205	$82,708
1992	$65,822	$5,579	$2,601	$2,190	$3,581	$79,809
1993	$76,664	$5,482	$4,201	$1,616	$3,469	$91,447
1994	$58,427	$6,847	$4,383	$2,722	$2,566	$74,945
1995	$59,699	$6,117	$4,295	$1,319	$2,121	$73,581
1996	$57,534	$6,265	$4,944	$1,754	$3,219	$73,726
1997	$66,969	$6,004	$4,073	$1,085	$3,202	$81,332
1998	$62,508	$5,379	$3,700	$2,275	$1,483	$75,396
1999	$62,890	$6,218	$5,708	$1,667	$2,222	$78,746
2000	$64,247	$7,145	$4,820	$4,329	$1,524	$82,232
2001	$41,892	$5,897	$4,521	$2,265	$1,805	$56,566
2002	$47,799	$5,738	$3,712	$2,098	$1,607	$61,187
2003	$48,127	$6,494	$2,632	$716	$1,663	$60,268
2004	$49,951	$8,210	$3,029	$1,027	$1,041	$63,930
2005	$67,477	$5,722	$2,462	$488	$1,251	$77,654
2006	$59,688	$5,323	$1,490	$552	$967	$68,459
2007	$65,733	$5,679	$1,658	$832	$703	$75,138
2008	$72,200	$5,503	$1,416	$583	$870	$81,237
2009	$57,918	$5,198	$1,860	$569	$679	$66,541
Average	**$56,731.8**	**$6,462.9**	**$3,668.0**	**$1,264.3**	**$2,778.0**	**$71,094.9**
SD	**$13,225.1**	**$1,287.9**	**$1,299.3**	**$1,054.3**	**$2,132.8**	**$11,298.7**

Figure 59. Hawaii Commercial Tuna Landings by Gear Type, 1987-2009

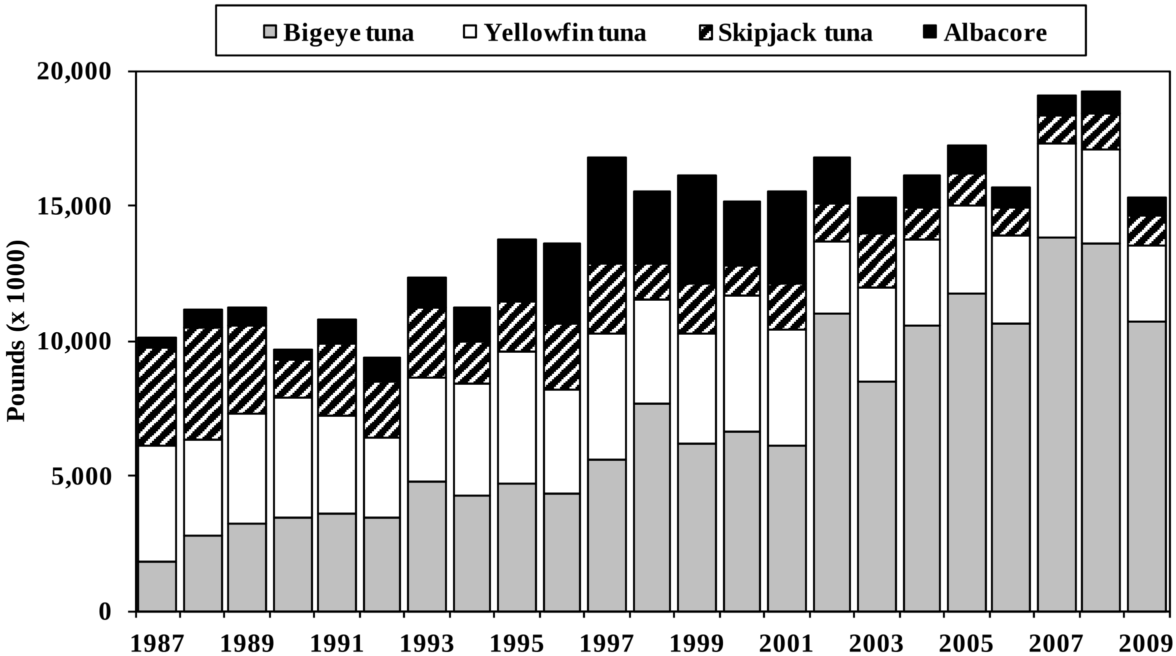


Interpretation: Longline gear was the largest single contributor to Hawaii commercial tuna landings since 1988 and reached a record level in 2008. It then decreased 24% in 2009. Tuna landings by the MHI troll fishery were highest in 1987, dropped the following year, and remained around its long-term average thereafter. Landings by the MHI handline fishery peaked in 1999 and dropped to a record low in 2008 and increased 62% in 2009. Offshore handline tuna landings in 2009 have not been lower since 1990. The aku boat fishery was on a declining trend with landings below 1 million pounds in 9 of the past 10 years.

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

	Hawaii tuna landings by gear type (1000 pounds)					
Year	Longline	MHI Troll	MHI Handline	Offshore Handline	Aku boat	Total
1987	2,705	2,136	1,782	-	3,501	10,130
1988	4,725	1,141	1,395	-	3,936	11,197
1989	5,921	904	1,393	-	2,961	11,223
1990	6,162	1,401	981	66	1,116	9,726
1991	5,797	1,145	1,380	326	2,146	10,794
1992	4,908	980	885	966	1,721	9,461
1993	7,205	964	1,458	656	2,134	12,417
1994	6,540	1,240	1,213	1,157	1,158	11,309
1995	8,898	1,295	1,642	694	1,291	13,820
1996	8,074	1,146	1,845	776	1,844	13,685
1997	11,826	1,107	1,384	554	1,942	16,813
1998	11,359	933	1,298	1,121	845	15,556
1999	10,529	1,135	2,302	867	1,312	16,145
2000	10,700	877	1,440	1,397	707	15,156
2001	10,730	799	1,942	1,045	993	15,561
2002	12,348	804	1,598	1,010	935	16,773
2003	11,337	1,088	1,015	379	1,375	15,375
2004	12,197	1,316	1,286	462	654	16,158
2005	13,464	1,117	1,201	390	931	17,250
2006	12,623	977	749	469	661	15,696
2007	15,354	1,383	931	569	653	19,127
2008	15,960	1,463	603	311	703	19,276
2009	12,084	1,422	978	273	509	15,400
Average	**9,628.1**	**1,164.1**	**1,334.8**	**674.4**	**1,479.5**	**14,263.0**
SD	**3,590.1**	**289.2**	**404.6**	**355.6**	**937.1**	**2,942.2**

Figure 60. Species Composition of the Tuna Landings, 1987-2009

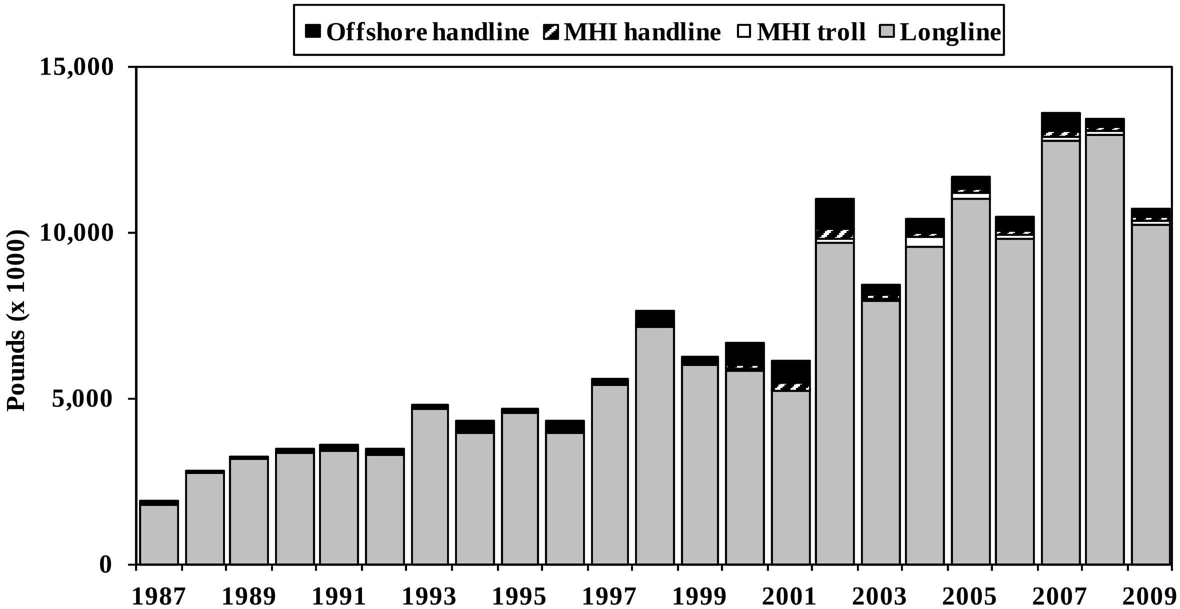


Interpretation: Bigeye tuna was the largest component of the tuna landings, reached a record level in 2007, and was 22% lower in 2009. Yellowfin tuna was the second largest component of the tuna landings with landings peaking in 2000; it was 44% lower in 2009. Yellowfin tuna landings were below their long-term average for the past 6 years. Skipjack tuna landings decreased over time and were below their long-term average from 2004-2009. Albacore landings grew rapidly peaking in 1999 and declined thereafter, dropping to less than 1 million pounds in the past four years.

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

	Hawaii tuna landings (1000 pounds)				
Year	Bigeye tuna	Yellowfin tuna	Skipjack tuna	Albacore	Total
1987	1,813	4,316	3,633	344	10,130
1988	2,770	3,551	4,156	695	11,197
1989	3,208	4,064	3,298	626	11,223
1990	3,425	4,460	1,389	422	9,726
1991	3,573	3,661	2,691	846	10,794
1992	3,456	2,943	2,099	854	9,461
1993	4,768	3,872	2,546	1,122	12,417
1994	4,280	4,106	1,553	1,293	11,309
1995	4,667	4,940	1,814	2,328	13,820
1996	4,330	3,851	2,426	3,020	13,685
1997	5,595	4,628	2,608	3,920	16,813
1998	7,641	3,896	1,326	2,645	15,556
1999	6,212	4,012	1,909	3,979	16,145
2000	6,642	5,037	1,127	2,331	15,157
2001	6,124	4,306	1,694	3,421	15,561
2002	10,971	2,664	1,435	1,671	16,773
2003	8,513	3,477	1,989	1,348	15,375
2004	10,566	3,175	1,183	1,168	16,160
2005	11,735	3,245	1,189	1,046	17,248
2006	10,628	3,235	1,043	767	15,697
2007	13,778	3,550	1,011	769	19,126
2008	13,571	3,536	1,279	874	19,276
2009	10,753	2,844	1,098	678	15,400
Average	**6,913.8**	**3,798.7**	**1,934.6**	**1,572.4**	**14,263.0**
SD	**3,658.8**	**638.7**	**880.0**	**1,128.6**	**2,942.2**

Figure 61. Hawaii Bigeye Tuna Landings, 1987-2009

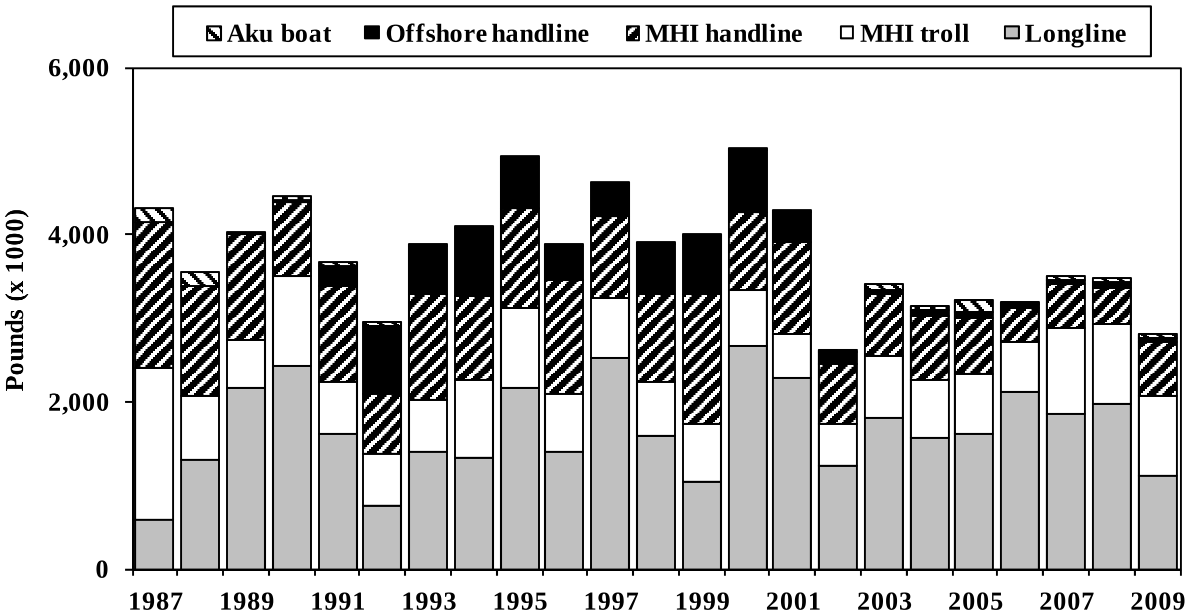


Interpretation: Annual bigeye tuna landings have increased more than seven-fold over the 20-year period, peaking at 13.8 million pounds in 2007 then declining to 10.7 million in 2009. The longline fishery typically produces over 90% of the bigeye tuna. The offshore handline fishery was the second largest producer of bigeye tuna in Hawaii accounting for 2% of the total in 2009. Combined MHI troll and MHI handline landings of bigeye tuna yielded 2% of the total.

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

	Hawaii bigeye tuna landings (1000 pounds)				
Year	Longline	MHI troll	MHI handline	Offshore handline	Total
1987	1,796	11	6	-	1,813
1988	2,732	10	28	-	2,770
1989	3,178	11	19	-	3,208
1990	3,338	15	41	31	3,425
1991	3,423	11	45	94	3,573
1992	3,277	9	19	151	3,456
1993	4,677	4	2	85	4,768
1994	3,940	6	10	324	4,280
1995	4,522	10	33	102	4,667
1996	3,940	4	11	375	4,330
1997	5,399	6	52	138	5,595
1998	7,113	5	15	508	7,641
1999	5,995	7	46	164	6,212
2000	5,836	15	141	650	6,642
2001	5,193	23	226	660	6,124
2002	9,676	86	353	850	10,971
2003	7,922	82	74	313	8,513
2004	9,544	328	125	385	10,566
2005	10,977	188	142	321	11,735
2006	9,765	154	135	414	10,628
2007	12,741	139	188	526	13,778
2008	12,908	163	82	245	13,571
2009	10,214	138	88	228	10,753
Average	**6,439.4**	**62.0**	**81.8**	**328.2**	**6,913.8**
SD	**3,353.1**	**85.1**	**86.0**	**221.9**	**3,658.8**

Figure 62. Hawaii Yellowfin Tuna Landings, 1987-2009

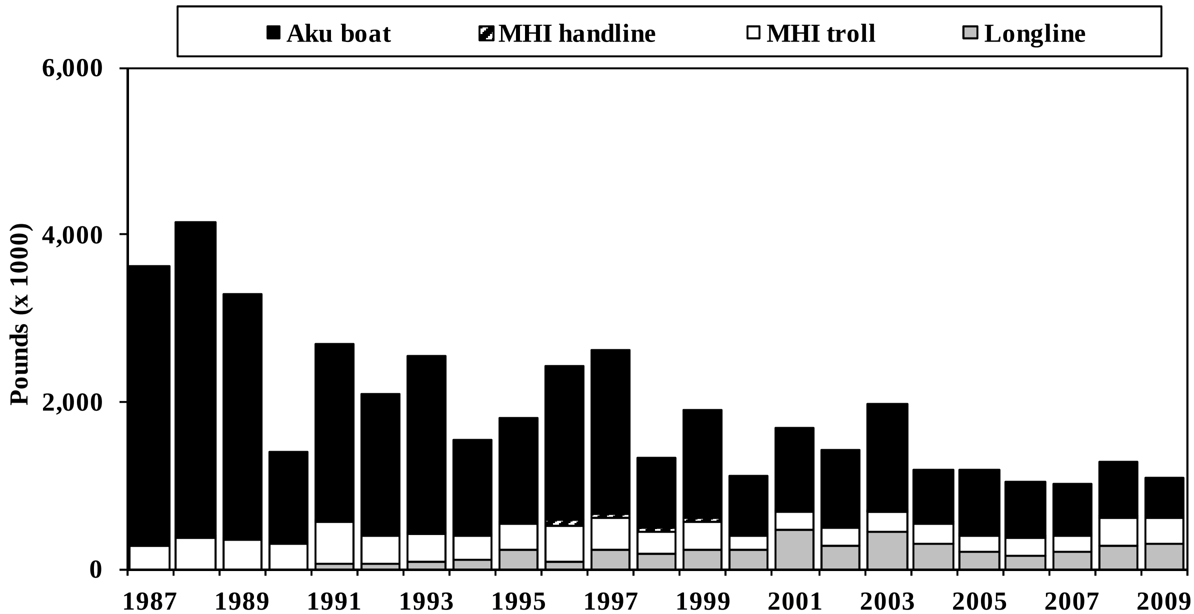


Interpretation: Annual landings of yellowfin tuna were low during the past eight years. The longline fishery typically had the highest yellowfin tuna landings. The MHI troll fishery was usually the second largest producer of yellowfin tuna followed by the MHI handline and offshore handline fisheries,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

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.

	Hawaii yellowfin tuna landings (1000 pounds)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	575	1,828	1,734	-	173	4,316
1988	1,309	764	1,310	-	168	3,551
1989	2,174	559	1,266	-	21	4,064
1990	2,421	1,089	876	35	39	4,460
1991	1,617	615	1,154	232	44	3,661
1992	763	606	722	816	36	2,943
1993	1,392	616	1,283	571	10	3,872
1994	1,336	914	1,003	834	19	4,106
1995	2,159	949	1,207	591	34	4,940
1996	1,389	707	1,352	401	2	3,851
1997	2,515	712	986	415	0	4,628
1998	1,592	636	1,052	613	3	3,896
1999	1,042	687	1,559	703	21	4,012
2000	2,656	670	937	739	2	5,037
2001	2,277	542	1,078	379	4	4,306
2002	1,235	500	711	151	6	2,664
2003	1,815	732	746	52	73	3,477
2004	1,564	690	770	75	38	3,175
2005	1,624	708	662	67	149	3,245
2006	2,117	589	413	52	6	3,235
2007	1,856	1,033	518	42	50	3,550
2008	1,981	941	437	65	50	3,536
2009	1,111	956	649	45	37	2,844
Average	**1,674.8**	**784.5**	**975.0**	**343.9**	**42.8**	**3,798.7**
SD	**556.0**	**280.7**	**351.1**	**296.0**	**51.6**	**638.7**

Figure 63. Hawaii Skipjack Tuna Landings, 1987-2009

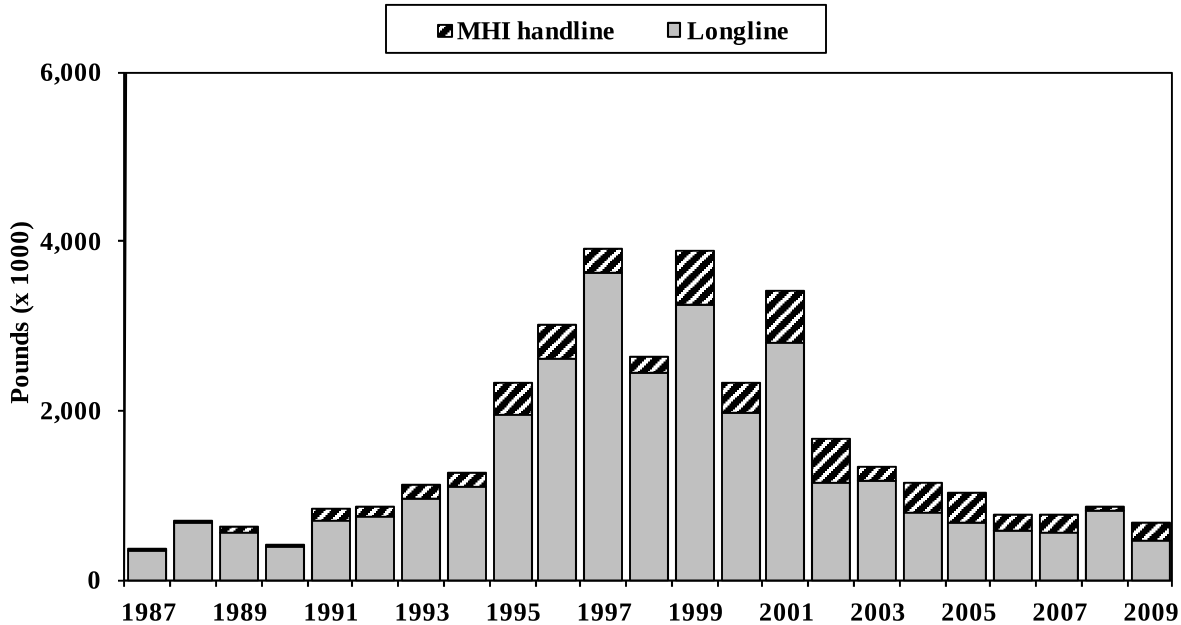


Interpretation: Skipjack tuna landings were on a declining trend; landings in 2009 were 43% below the long-term average. Since the aku boat fishery accounted for most of the skipjack tuna landings, the main source of overall decline was from this fishery. Skipjack tuna landings by the aku boat fishery were below the long-term average for the past 12 years. The decline in skipjack tuna landings was not apparent or as apparent in other fisheries. Skipjack tuna landings by the longline fishery were on an increasing trend while landings by the MHI troll fishery were slightly above their long-term average in 2008 and 2009.

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.

	Hawaii skipjack tuna landings (1000 pounds)				
Year	Longline	MHI troll	MHI handline	Aku boat	Total
1987	3	277	25	3,328	3,633
1988	8	351	29	3,768	4,156
1989	22	318	20	2,938	3,298
1990	12	278	26	1,073	1,398
1991	66	504	19	2,102	2,691
1992	49	347	21	1,682	2,099
1993	79	332	14	2,121	2,546
1994	116	283	21	1,133	1,553
1995	223	318	17	1,256	1,814
1996	91	424	69	1,842	2,426
1997	234	376	56	1,942	2,608
1998	168	278	38	842	1,326
1999	219	347	52	1,291	1,909
2000	221	181	14	704	1,127
2001	455	215	30	988	1,694
2002	282	203	20	927	1,443
2003	438	237	16	1,292	1,989
2004	294	247	23	615	1,183
2005	197	191	21	779	1,189
2006	160	221	10	648	1,043
2007	202	192	15	600	1,011
2008	263	346	20	645	1,279
2009	298	303	23	471	1,098
Average	**178.3**	**294.2**	**26.0**	**1,434.3**	**1,935.4**
SD	**128.3**	**80.3**	**14.7**	**912.0**	**879.5**

Figure 64. Hawaii Albacore Landings, 1987-2009

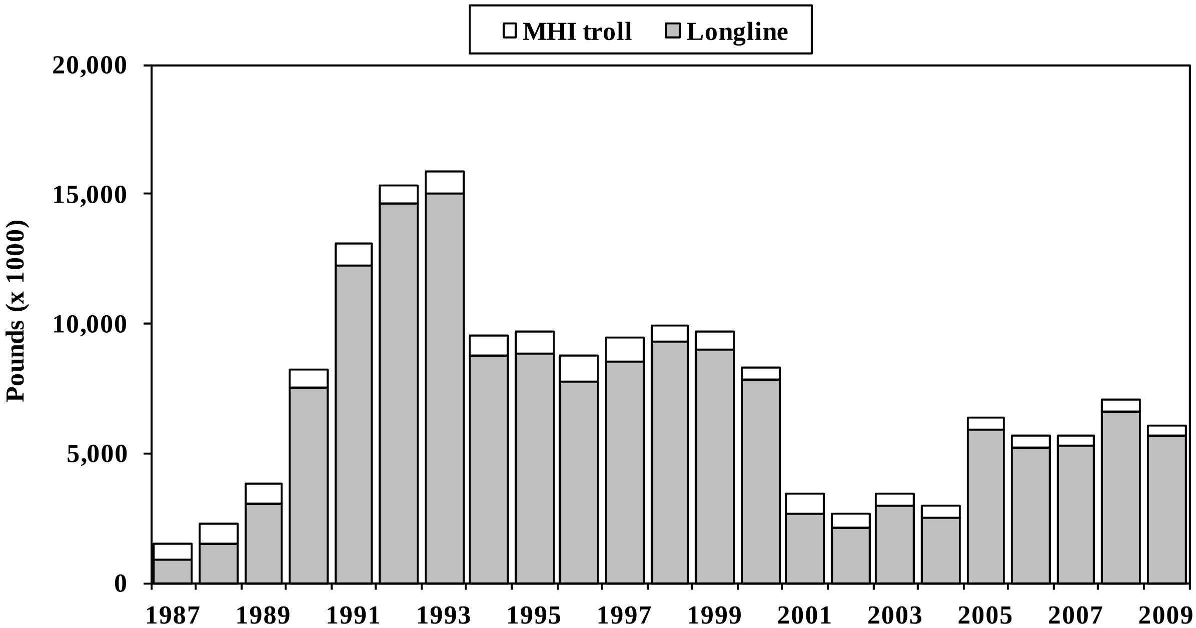


Interpretation: Albacore landings increased more than 11-fold from 1987 to 1999 and were on a declining trend thereafter. Albacore landings in 2009 were only 43% compared to its long-term average. The longline and MHI handline fisheries account for almost all of the albacore landings and were responsible for the overall decline. Longline landings of albacore peaked in 1997 and declined thereafter. Albacore landings by the MHI handline fishery were relatively small but grew over the 21-year period, peaking at 642,000 pounds in 1999. On rare occasions, the MHI troll fishery has encountered short "runs" of albacore, but those landings were negligible in comparison.

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

	Hawaii albacore landings (1000 pounds)			
Year	Longline	MHI troll	MHI handline	Total
1987	331	1	12	344
1988	676	1	18	695
1989	547	1	78	626
1990	390	1	31	422
1991	687	2	157	846
1992	735	3	116	854
1993	965	3	154	1,122
1994	1,095	22	176	1,293
1995	1,938	10	380	2,328
1996	2,606	5	409	3,020
1997	3,626	7	287	3,920
1998	2,450	4	191	2,645
1999	3,250	87	642	3,979
2000	1,979	5	347	2,331
2001	2,803	13	605	3,421
2002	1,145	9	511	1,668
2003	1,160	10	176	1,348
2004	791	7	351	1,168
2005	662	14	370	1,046
2006	577	2	188	767
2007	554	7	208	769
2008	807	3	62	874
2009	459	7	211	678
Average	**1,314.5**	**9.7**	**246.9**	**1,572.3**
SD	**992.6**	**17.6**	**179.2**	**1,128.5**

Figure 65. Hawaii Commercial Billfish Landings by Gear Type, 1987-2009

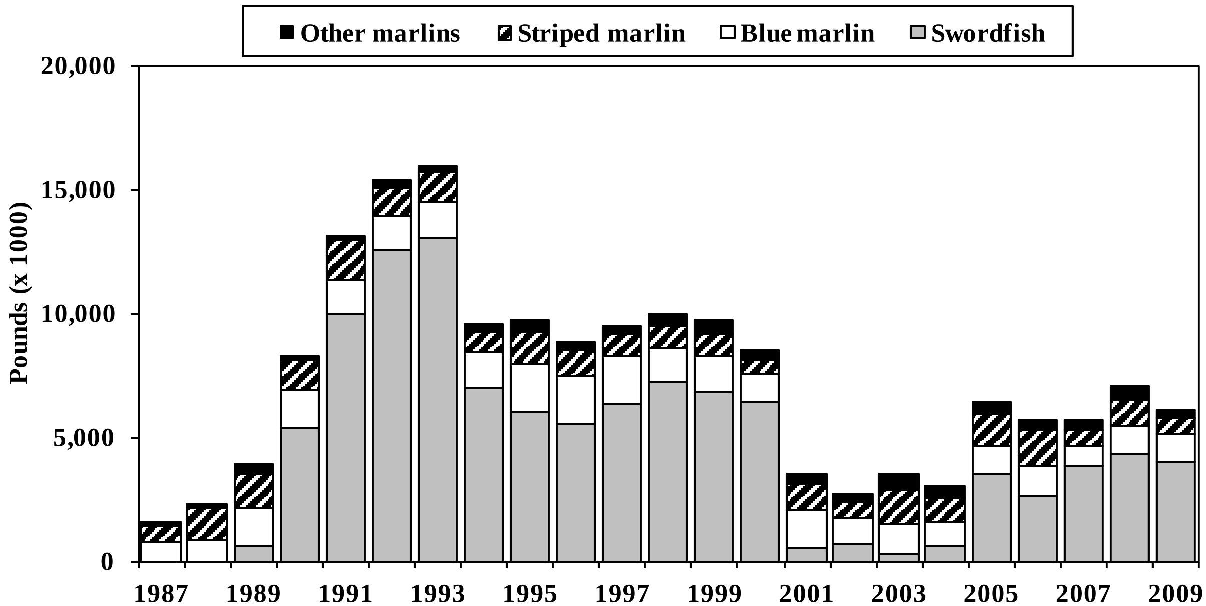


Interpretation: Two major factors affected billfish landings since 1987. The first was the growth of the longline fishery for swordfish in the early 1990s. The second was a series of management decisions intended to minimize longline interactions with sea turtles. These decisions strongly affected the amount of swordfish-targeted effort and the associated landings. In contrast, billfish landings by the MHI troll fishery and the MHI handline fishery were relatively small. The longline fishery accounted for the majority of the billfish landings throughout the 23-year period. Billfish landings by the MHI troll fishery were below the long-term average for the past 8 years.

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 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	862	666	30	1,558
1988	1,537	736	28	2,301
1989	3,043	805	32	3,880
1990	7,519	732	27	8,278
1991	12,208	890	31	13,129
1992	14,656	683	16	15,355
1993	15,034	870	24	15,928
1994	8,737	770	19	9,526
1995	8,837	856	30	9,723
1996	7,723	1,042	31	8,796
1997	8,517	935	40	9,492
1998	9,277	626	20	9,923
1999	8,958	769	31	9,758
2000	7,828	506	201	8,546
2001	2,630	780	51	3,469
2002	2,160	535	26	2,728
2003	2,954	491	18	3,472
2004	2,472	481	23	3,020
2005	5,909	474	17	6,403
2006	5,248	395	13	5,660
2007	5,322	316	14	5,657
2008	6,594	448	17	7,067
2009	5,648	405	15	6,070
Average	**6,681.4**	**661.4**	**32.7**	**7,380.0**
SD	**3,924.2**	**198.0**	**37.8**	**4,002.4**

Figure 66. Species Composition of the Billfish Landings, 1987-2009

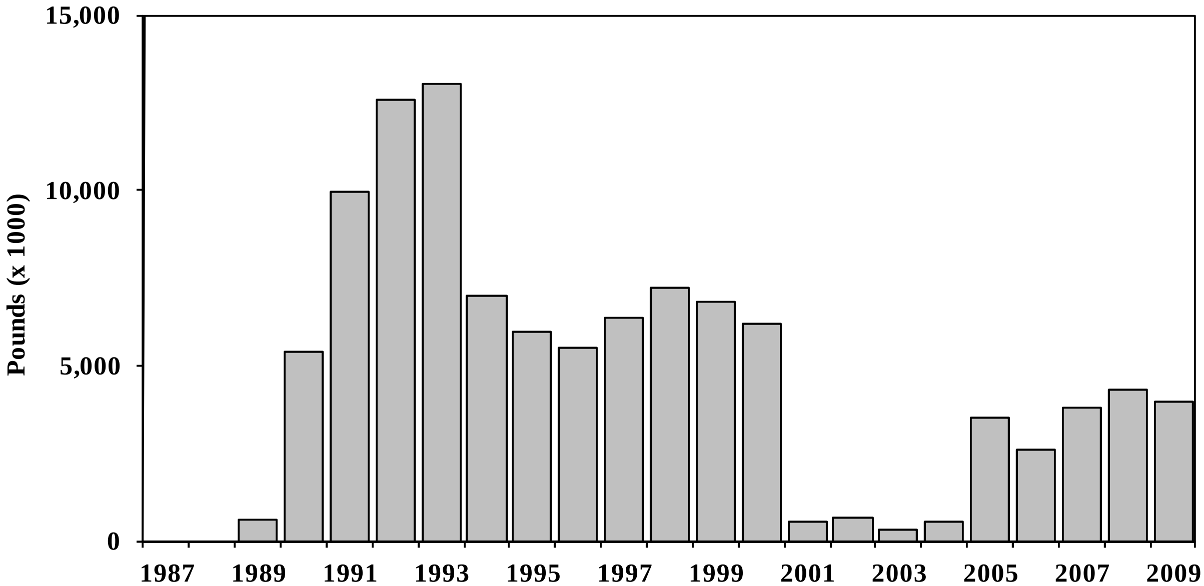


Interpretation: The billfish landings consisted mostly of marlins and small landings of swordfish from 1987 through 1989. However, in 1990 the billfish composition changed and total landings more than doubled as longline vessels began targeting swordfish. Swordfish landings continued to dominate billfish landings from 1990 through 2000 despite a 46% decrease in 1994. Swordfish landings dropped 91% in 2001 from regulatory actions and remained low through 2004. Swordfish reestablished itself as the dominant component of the billfish landings from 2005 through 2009 when targeting of swordfish was allowed again under a new suite of regulations. Blue marlin composed 19% of the billfish landings with landings peaking in 1995-1997. Striped marlin landings peaked in 1991, declined to a low in 2000, recovered close to its long-term average in 2003-2006 and 2008, but was relatively low in 2007 and 2009.

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 of longline, MHI troll, MHI handline, offshore handline, aku boat, and other gear.

	Hawaii billfish landings (1000 lbs)				
Year	**Swordfish**	**Blue marlin**	**Striped marlin**	**Other marlins**	**Total**
1987	60	687	667	144	1,558
1988	65	812	1,230	194	2,301
1989	635	1,502	1,403	340	3,880
1990	5,383	1,484	1,246	164	8,278
1991	9,953	1,417	1,552	208	13,129
1992	12,569	1,339	1,098	349	15,355
1993	13,036	1,434	1,191	266	15,928
1994	7,010	1,454	796	267	9,526
1995	5,994	1,952	1,313	464	9,723
1996	5,529	1,931	1,044	292	8,796
1997	6,368	1,908	861	354	9,492
1998	7,208	1,403	891	421	9,923
1999	6,855	1,432	866	605	9,758
2000	6,414	1,146	548	438	8,545
2001	562	1,527	1,001	380	3,469
2002	703	1,050	615	360	2,728
2003	316	1,176	1,373	606	3,470
2004	599	993	937	491	3,020
2005	3,538	1,136	1,222	510	6,405
2006	2,581	1,223	1,438	418	5,661
2007	3,796	846	637	379	5,657
2008	4,316	1,161	1,023	566	7,067
2009	3,975	1,154	644	296	6,070
Average	**4,672.4**	**1,311.6**	**1,025.9**	**370.0**	**7,380.0**
SD	**3,812.7**	**336.4**	**294.6**	**132.8**	**4,002.4**

Figure 67. Hawaii Swordfish Landings, 1987-2009

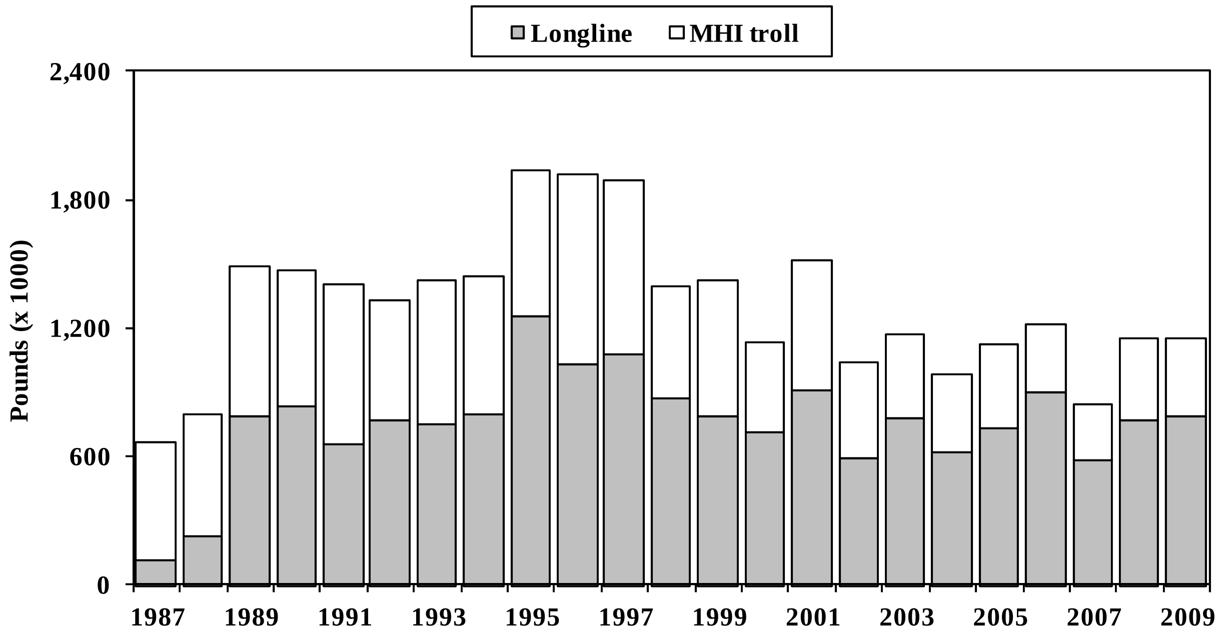


Interpretation: The trend in swordfish landings reflected both an increase in the number of vessels in the longline fishery and widespread targeting of swordfish by the fishery. Swordfish landings rose rapidly, peaking in 1993, and falling the following year. Landings remained relatively steady up to 2000, but dropped dramatically as a result of increased regulations and prohibition on targeting swordfish by the longline fishery. Although the longline fishery for swordfish was reopened under a new set of regulations in April 2004, landings remained low. Swordfish landings increased during 2005 through 2009 as longline fishers became more proficient using techniques mandated under the new requirements. Swordfish landings by the MHI handline fishery were negligible.

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

	Swordfish landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	52	1	7	60
1988	52	2	11	65
1989	619	2	14	635
1990	5,372	1	10	5,383
1991	9,939	1	13	9,953
1992	12,566	0	3	12,569
1993	13,027	0	9	13,036
1994	7,002	1	7	7,010
1995	5,981	1	12	5,994
1996	5,517	1	11	5,529
1997	6,352	1	15	6,368
1998	7,193	1	14	7,208
1999	6,835	1	19	6,855
2000	6,215	5	193	6,414
2001	519	4	39	562
2002	681	3	19	703
2003	301	1	12	316
2004	549	0	16	599
2005	3,527	1	10	3,538
2006	2,573	1	8	2,581
2007	3,781	2	12	3,796
2008	4,299	1	14	4,316
2009	3,961	1	12	3,975
Average	**4,648.4**	**1.4**	**20.9**	**4,672.4**
SD	**3,813.8**	**1.2**	**38.1**	**3,812.7**

Figure 68. Hawaii Blue Marlin Landings, 1987-2009



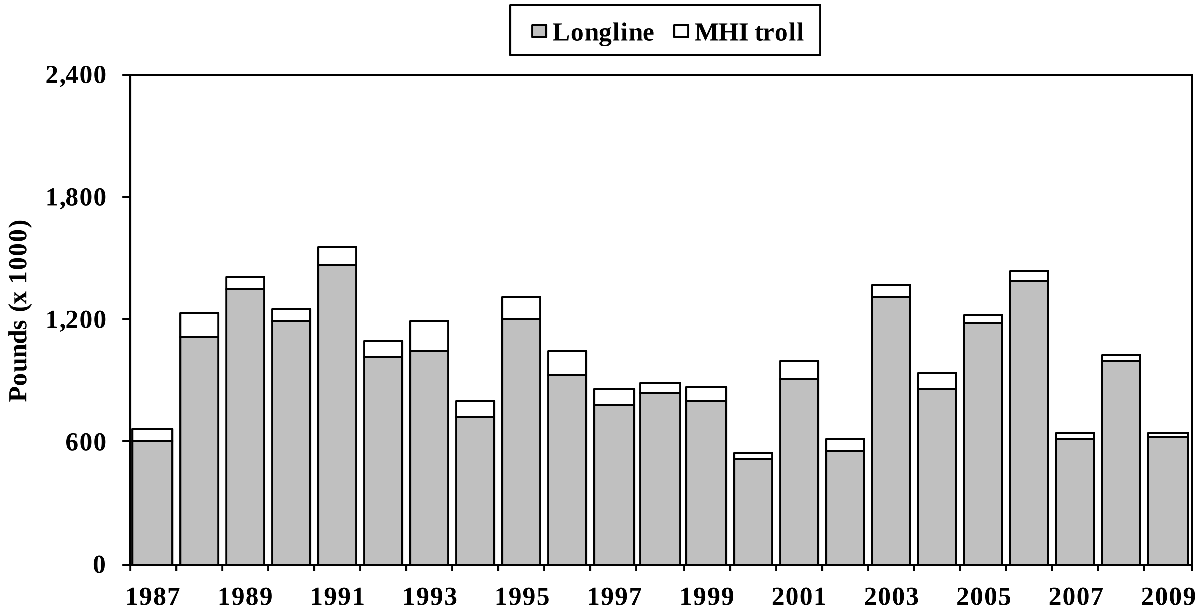
Interpretation: Blue marlin landings rose in the late 1980s, peaked in the mid 1990s, and were below the long-term average during the past 8 years. The troll fishery accounted for a large proportion of blue marlin landings up through the 1990s with the longline fishery responsible for most of the blue marlin landings thereafter. Blue marlin landings by the longline fishery were above the long-term average for the past two years, while blue marlin landings by the MHI troll fishery were below the long-term average for the past eight years.

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

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

	Blue marlin landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	112	557	18	687
1988	225	575	12	812
1989	784	704	14	1,502
1990	834	638	12	1,484
1991	654	749	14	1,417
1992	765	565	9	1,339
1993	748	675	11	1,434
1994	798	648	8	1,454
1995	1,257	684	11	1,952
1996	1,030	885	16	1,931
1997	1,074	814	20	1,908
1998	870	527	6	1,403
1999	787	635	10	1,432
2000	711	422	5	1,146
2001	909	608	5	1,527
2002	593	446	6	1,050
2003	777	390	5	1,176
2004	623	360	5	993
2005	731	395	6	1,136
2006	897	318	4	1,223
2007	577	263	2	846
2008	766	388	3	1,161
2009	790	361	2	1,154
Average	**752.7**	**548.2**	**8.9**	**1,311.6**
SD	**241.3**	**167.8**	**5.1**	**336.4**

Figure 69. Hawaii Striped Marlin Landings, 1987-2009



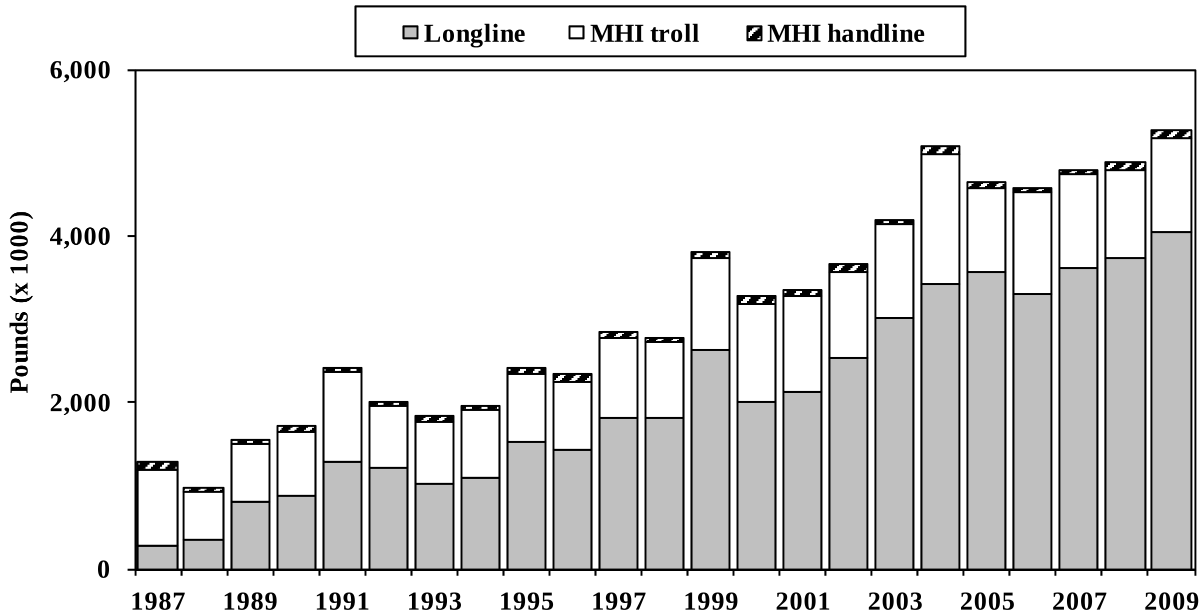
Interpretation: Striped marlin landings varied over the 23-year period with relatively low levels in 2007 and 2009. Striped marlin was landed primarily by the longline fishery. The MHI troll fishery was the second largest producer of striped marlin in Hawaii. The MHI troll landings were close to the long-term average, but only contributed 4% to the total. There was substantial annual variation in landings of striped marlin by the MHI troll fishery.

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

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

	Striped marlin landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	599	66	2	667
1988	1,110	118	2	1,230
1989	1,350	52	1	1,403
1990	1,186	59	1	1,246
1991	1,462	89	1	1,552
1992	1,013	83	2	1,098
1993	1,039	150	2	1,191
1994	719	76	1	796
1995	1,198	114	1	1,313
1996	923	119	2	1,044
1997	775	83	3	861
1998	834	57	0	891
1999	803	62	1	866
2000	517	30	1	548
2001	902	93	5	1,001
2002	550	65	1	615
2003	1,308	63	1	1,373
2004	858	74	2	937
2005	1,177	44	0	1,222
2006	1,390	47	0	1,438
2007	609	28	0	637
2008	993	30	0	1,023
2009	619	24	0	644
Average	**953.7**	**70.7**	**1.2**	**1,025.9**
SD	**284.3**	**32.7**	**1.1**	**294.6**

Figure 70. Hawaii Commercial Landings of Other Pelagic MUS by Gear Type, 1987-2009

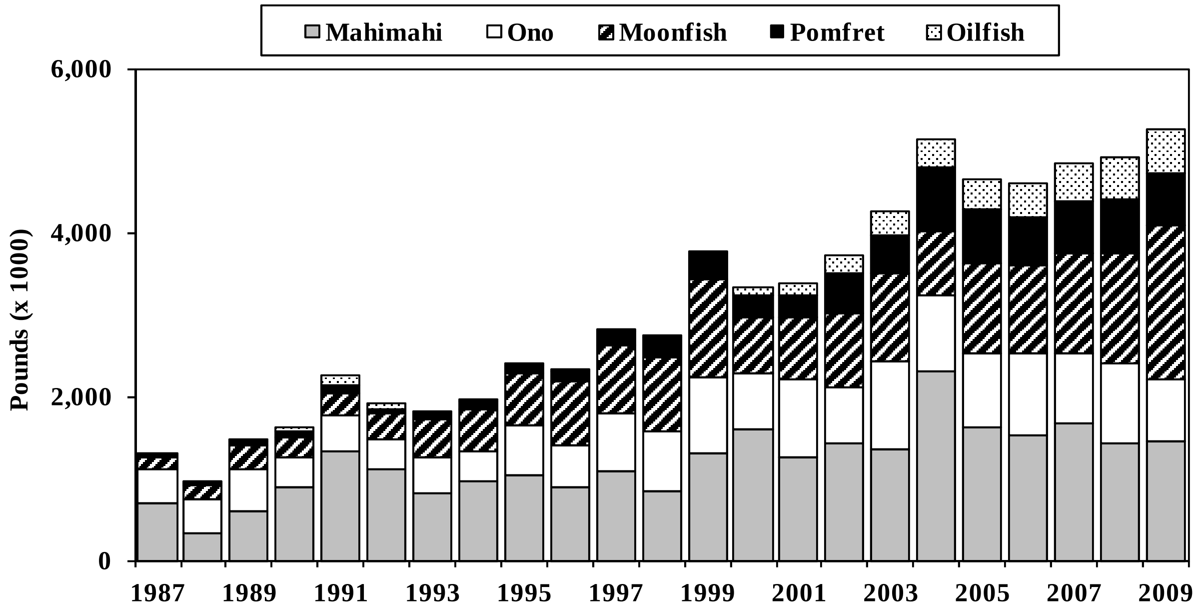


Interpretation: The landings of other pelagic PMUS were considerably greater than the long-term average. The increase in other PMUS landings was attributed primarily to the longline fishery. The MHI troll fishery was the second largest contributor to other PMUS landings and was above its long-term average in 2009. The other PMUS landings by the MHI handline and offshore handline fisheries were relatively low.

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

	Landings of other PMUS by gear type (1000 lbs)					
Year	**Longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Aku boat**	**Total**
1987	283	907	102	-	2	1,294
1988	357	569	48	-	4	978
1989	799	691	62	-	1	1,553
1990	887	768	52	0	0	1,707
1991	1,285	1,067	66	5	0	2,423
1992	1,216	731	46	21	14	2,027
1993	1,030	744	50	23	3	1,850
1994	1,104	800	55	18	0	1,977
1995	1,530	815	61	20	0	2,426
1996	1,440	806	85	17	0	2,348
1997	1,807	974	55	9	5	2,850
1998	1,807	912	49	13	0	2,781
1999	2,618	1,109	82	20	0	3,829
2000	2,013	1,179	76	69	1	3,347
2001	2,114	1,159	77	41	1	3,418
2002	2,525	1,048	75	44	1	3,730
2003	3,010	1,120	59	18	3	4,275
2004	3,410	1,581	97	22	2	5,162
2005	3,563	1,013	71	9	1	4,696
2006	3,306	1,213	55	14	0	4,633
2007	3,613	1,133	38	19	1	4,859
2008	3,731	1,059	75	15	1	4,943
2009	4,046	1,129	85	12	2	5,305
Average	**2,065.0**	**979.4**	**66.1**	**20.5**	**1.8**	**3,148.3**
SD	**1,154.5**	**224.0**	**17.1**	**15.4**	**3.0**	**1,359.0**

Figure 71. Species Composition of Other Pelagic MUS Landings, 1987-2009

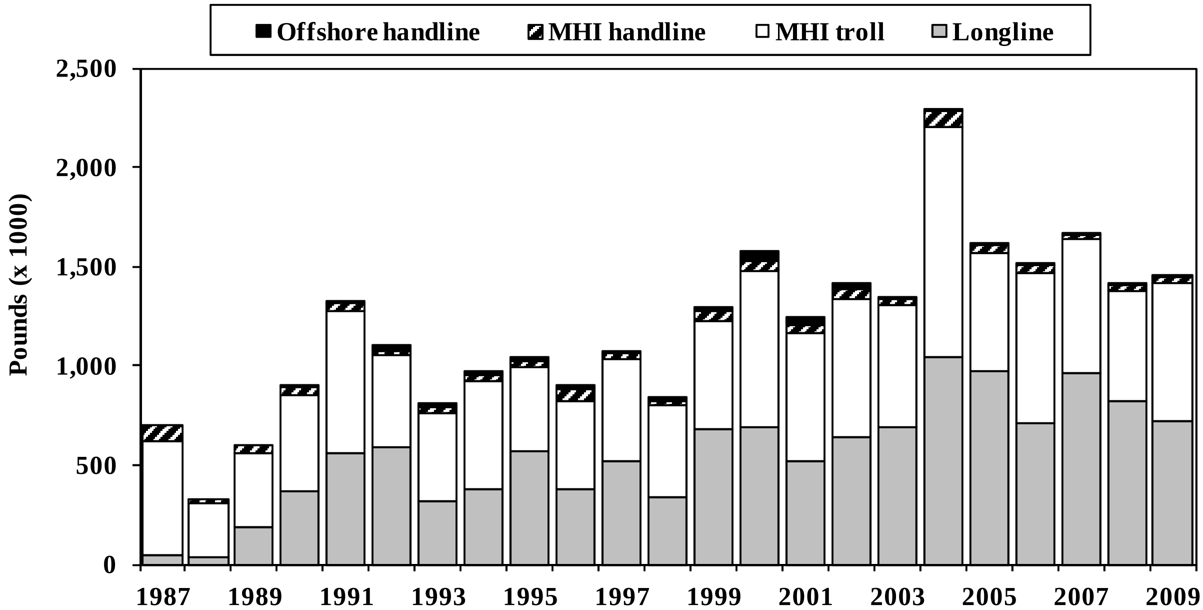


Interpretation: Mahimahi was typically the largest component of other PMUS landings, but moonfish landings exceeded mahimahi landings in 2009. Mahimahi landings were above the long-term average for the past eleven years. Ono landings increased gradually and were consistently above their long-term average from 1997. Moonfish, pomfret, and oilfish increased at the highest rates during the 23-year period due to increased landings by the longline fishery.

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

	Landings of other PMUS by species (1000 lbs)					
Year	**Mahimahi**	**Ono**	**Moonfish**	**Pomfret**	**Oilfish**	**Total**
1987	704	400	152	23	2	1,294
1988	332	406	182	18	3	978
1989	597	522	274	63	24	1,553
1990	894	353	253	66	52	1,707
1991	1,322	456	270	75	130	2,423
1992	1,112	365	320	37	85	2,026
1993	814	450	454	92	0	1,850
1994	974	351	524	85	4	1,977
1995	1,044	606	629	93	10	2,426
1996	899	514	760	121	11	2,349
1997	1,077	715	823	178	15	2,850
1998	839	725	922	225	26	2,782
1999	1,293	929	1,210	313	29	3,828
2000	1,587	683	685	277	93	3,340
2001	1,252	945	768	276	143	3,414
2002	1,419	687	910	492	201	3,727
2003	1,363	1,053	1,091	459	278	4,266
2004	2,311	919	783	769	344	5,161
2005	1,626	892	1,094	658	386	4,690
2006	1,521	1,000	1,082	583	417	4,633
2007	1,675	857	1,223	618	458	4,857
2008	1,432	976	1,335	677	491	4,943
2009	1,464	751	1,896	628	544	5,305
Average	**1,197.8**	**676.4**	**767.0**	**296.8**	**162.9**	**3,146.9**
SD	**428.7**	**236.6**	**437.9**	**253.5**	**185.1**	**1,358.1**

Figure 72. Hawaii Mahimahi Landings, 1987-2009

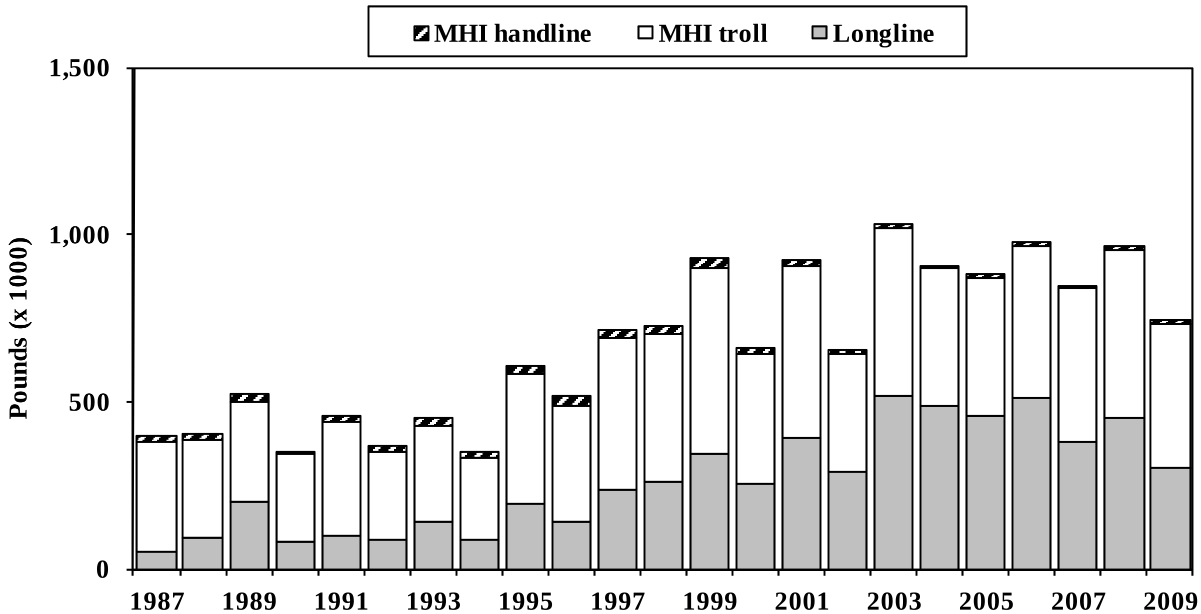


Interpretation: Mahimahi landings were higher than the long-term average for the past ten years. The highest landing for this species was in 2004 with record landings by both the longline and troll fisheries. Ninety-six percent of mahimahi landings were attributable to the MHI troll and longline fisheries in 2009. Both the MHI troll and longline landings were above their respective long-term averages during the past eight years. The MHI handline, offshore handline, and aku boat landings of mahimahi in 2009 were very low and below their long-term averages.

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

	Mahimahi landings (1000 lbs)					
Year	**Longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Aku boat**	**Total**
1987	45	579	78	-	2	704
1988	39	264	25	-	4	332
1989	183	379	34	-	1	597
1990	366	491	37	0	0	894
1991	555	718	44	5	0	1,322
1992	593	461	24	21	14	1,112
1993	316	444	27	23	3	814
1994	377	546	33	18	0	974
1995	570	419	35	20	0	1,044
1996	375	451	56	17	0	899
1997	518	517	27	9	5	1,077
1998	336	464	26	13	0	839
1999	679	545	49	20	0	1,293
2000	694	786	48	54	1	1,587
2001	523	637	47	35	1	1,252
2002	645	694	48	26	1	1,419
2003	686	619	30	14	3	1,363
2004	1,041	1,166	72	14	2	2,311
2005	972	595	44	7	1	1,626
2006	714	753	36	8	0	1,521
2007	966	675	21	6	1	1,675
2008	821	556	31	9	1	1,432
2009	720	692	34	7	2	1,464
Average	**553.7**	**584.8**	**39.3**	**14.2**	**1.8**	**1,197.8**
SD	**272.7**	**180.5**	**14.7**	**12.7**	**3.0**	**428.7**

Figure 73. Hawaii Ono (Wahoo) Landings, 1987-2009

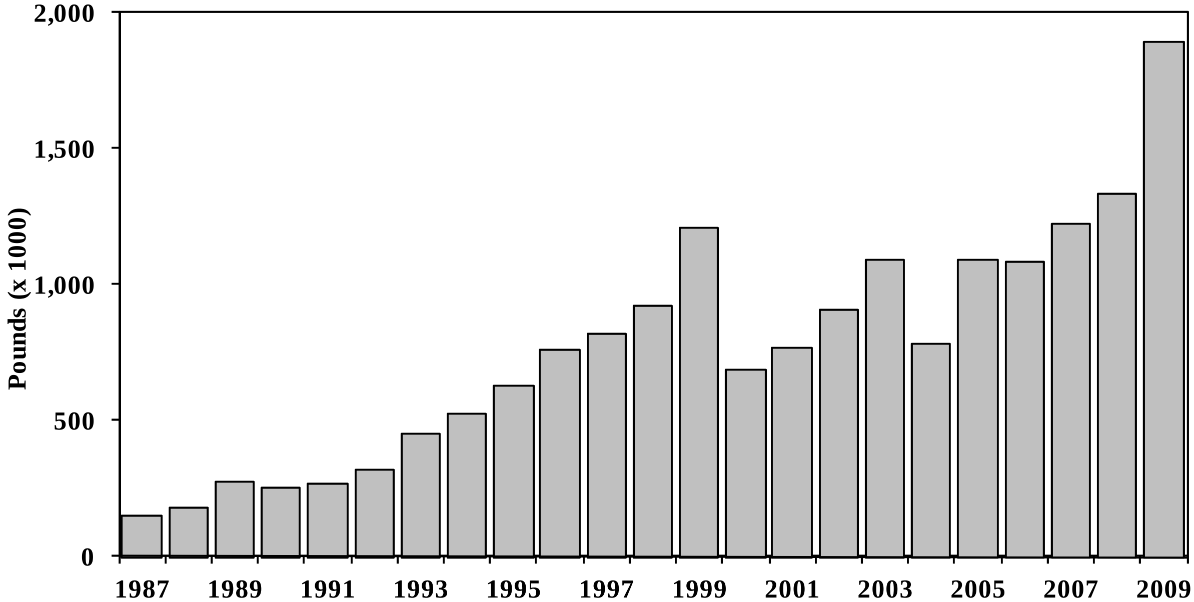


Interpretation: Ono landings were above the long-term average from 1997, with the highest total in 2003. The longline and MHI troll fisheries accounted for 98% of the ono landings in 2009. The MHI troll fishery typically contributed the greatest fraction of these landings and was followed by the longline fishery.

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

	Ono landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	53	324	23	400
1988	90	298	18	406
1989	202	298	22	522
1990	80	262	11	353
1991	101	337	18	456
1992	85	262	18	365
1993	142	286	22	450
1994	87	245	19	351
1995	195	388	23	606
1996	140	347	27	514
1997	239	451	25	715
1998	262	442	21	725
1999	343	558	28	929
2000	256	386	18	683
2001	390	516	18	945
2002	292	350	15	687
2003	519	498	13	1,053
2004	486	412	8	919
2005	458	414	10	892
2006	511	457	9	1,000
2007	381	456	7	857
2008	454	500	11	976
2009	299	435	12	751
Average	**263.7**	**388.0**	**17.2**	**676.4**
SD	**154.5**	**90.0**	**6.2**	**236.6**

Figure 74. Hawaii Moonfish Landings, 1987-2009

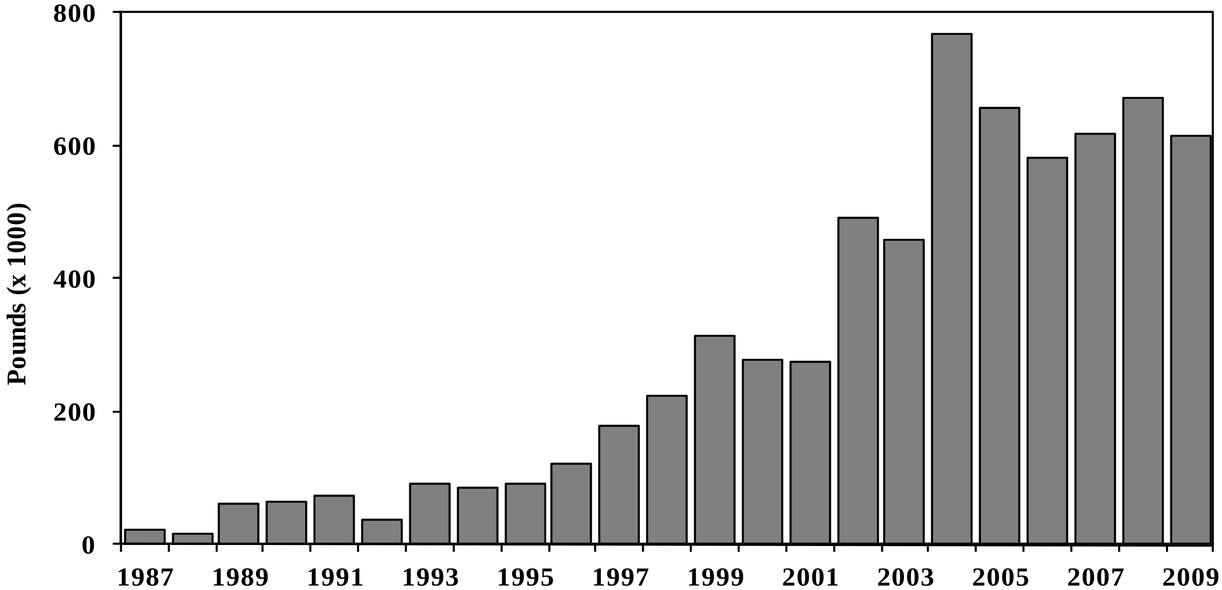


Interpretation: Moonfish are unique among the PMUS because they are caught exclusively by the longline fishery. Moonfish landings was a record 1.9 million pounds in 2009. Moonfish appear to have 3 cycles where there several consecutive years of increasing landings followed by a drop during the past 11 years.

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

	Moonfish landings (1000 lbs)	
Year	Longline	Total
1987	152	152
1988	182	182
1989	274	274
1990	253	253
1991	270	270
1992	320	320
1993	454	454
1994	524	524
1995	629	629
1996	760	760
1997	823	823
1998	922	922
1999	1,210	1,210
2000	685	685
2001	768	768
2002	910	910
2003	1,091	1,091
2004	783	783
2005	1,093	1,094
2006	1,082	1,082
2007	1,223	1,223
2008	1,335	1,335
2009	1,896	1,896
Average	766.9	767.0
SD	437.8	437.9

Figure 75. Hawaii Pomfret Landings, 1987-2009

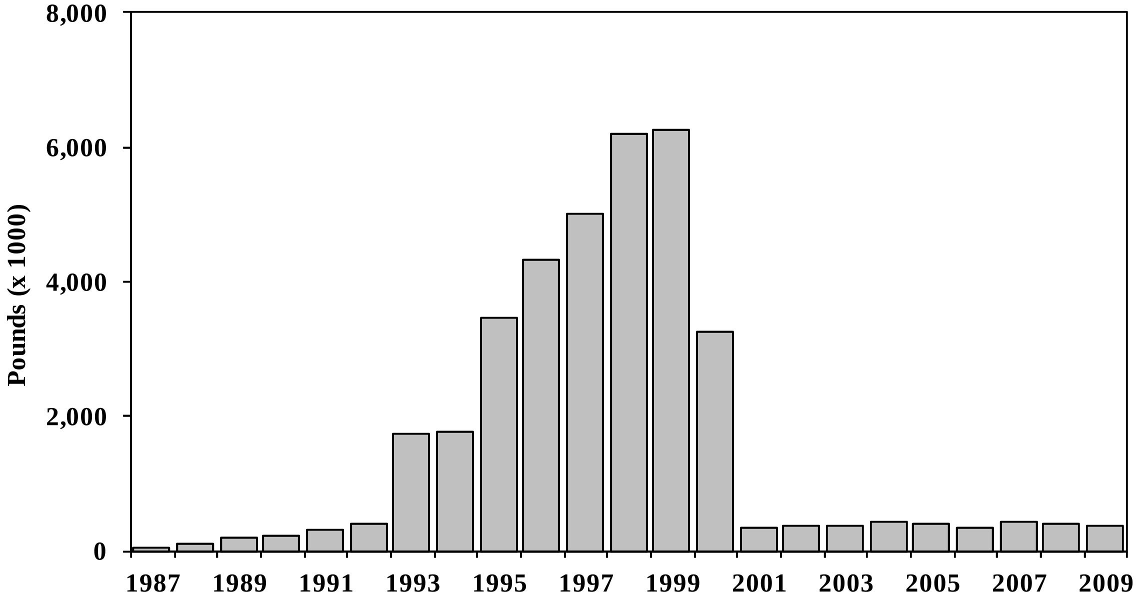


Interpretation: Landings of pomfrets came primarily from the longline fishery. The total in 2007 was the third highest over the 21 year period; record landings occurred in 2004. Pomfret landings rose gradually from 1987 to 1996 with substantially higher landings observed from 2002, peaking in 2004, and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

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

	Pomfret landings (1000 lbs)			
Year	**Longline**	**MHI handline**	**Offshore handline**	**Total**
1987	23	0	-	23
1988	18	0	-	18
1989	49	0	-	63
1990	66	0	0	66
1991	75	0	0	75
1992	37	0	0	37
1993	92	0	0	92
1994	85	0	0	85
1995	93	0	0	93
1996	121	0	0	121
1997	178	0	0	178
1998	225	0	0	225
1999	313	0	0	313
2000	272	3	0	277
2001	268	6	0	276
2002	463	6	14	492
2003	416	6	0	459
2004	735	14	5	769
2005	632	9	1	658
2006	558	8	3	583
2007	572	6	11	618
2008	612	32	3	677
2009	576	35	4	628
Average	**281.7**	**5.4**	**1.8**	**296.8**
SD	**236.1**	**9.7**	**3.7**	**253.5**

Figure 76. Hawaii Shark Landings, 1987-2009

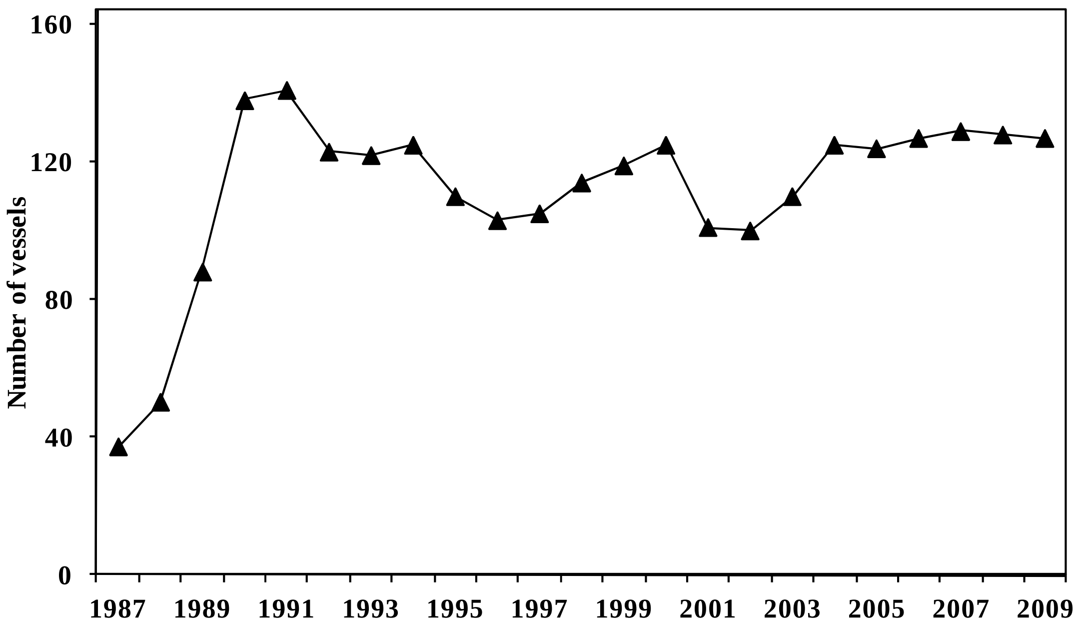


Interpretation: Sharks were landed almost exclusively by the longline fishery. Shark landings increased dramatically from 1987 to a peak of 6.3 million pounds in 1999. Sharks were landed headed and gutted in the late 1980's but a market for shark fins began in the early 1990's. Finning sharks then became 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 that was passed shortly thereafter. These regulatory measures caused a 90% decline in shark landings observed in 2001 with landings remaining low through 2009. Shark landings consisted primarily of mako and thresher sharks marketed as a fresh product in steak form.

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

	Shark landings (1000 lbs)	
Year	**Longline**	**Total**
1987	43	43
1988	94	94
1989	203	203
1990	222	222
1991	318	318
1992	410	410
1993	1,736	1,736
1994	1,757	1,757
1995	3,468	3,468
1996	4,327	4,327
1997	5,010	5,010
1998	6,212	6,212
1999	6,272	6,273
2000	3,250	3,253
2001	326	333
2002	359	366
2003	353	358
2004	414	418
2005	389	393
2006	333	337
2007	410	418
2008	409	416
2009	367	373
Average	**1,594.9**	**1,597.3**
SD	**2,062.3**	**2,061.2**

Figure 77. Number of Hawaii-Based Longline Vessels, 1987-2009



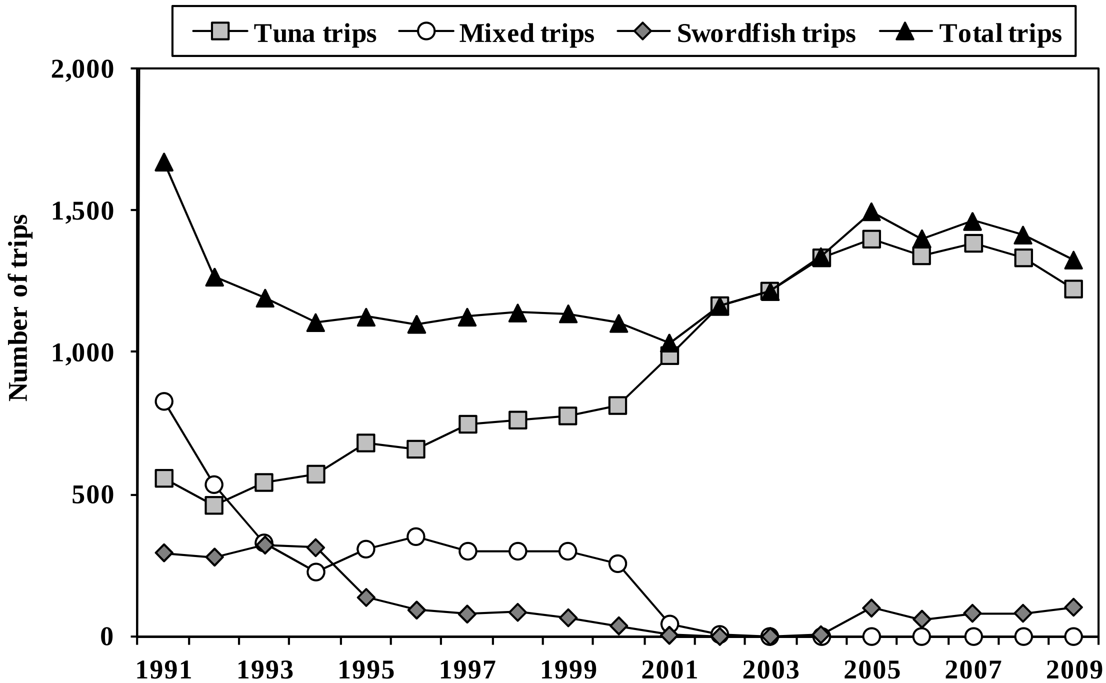
Interpretation: There were 127 active Hawaii-based longline vessels in 2009, one less than the previous year. Ninety-nine longline vessels set their gear deep to target tunas exclusively throughout the entire year while 28 vessels switched between setting their gear deep to target tunas and setting shallow to target swordfish during 2009.

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 1991-2009 based on date of landing.

Year	Vessels
1987	37
1988	50
1989	88
1990	138
1991	141
1992	123
1993	122
1994	125
1995	110
1996	103
1997	105
1998	114
1999	119
2000	125
2001	101
2002	100
2003	110
2004	125
2005	124
2006	127
2007	129
2008	128
2009	127
Average	**111.8**
SD	**25.1**

Figure 78. Number of Trips by the Hawaii-Based Longline Fishery, 1991-2009

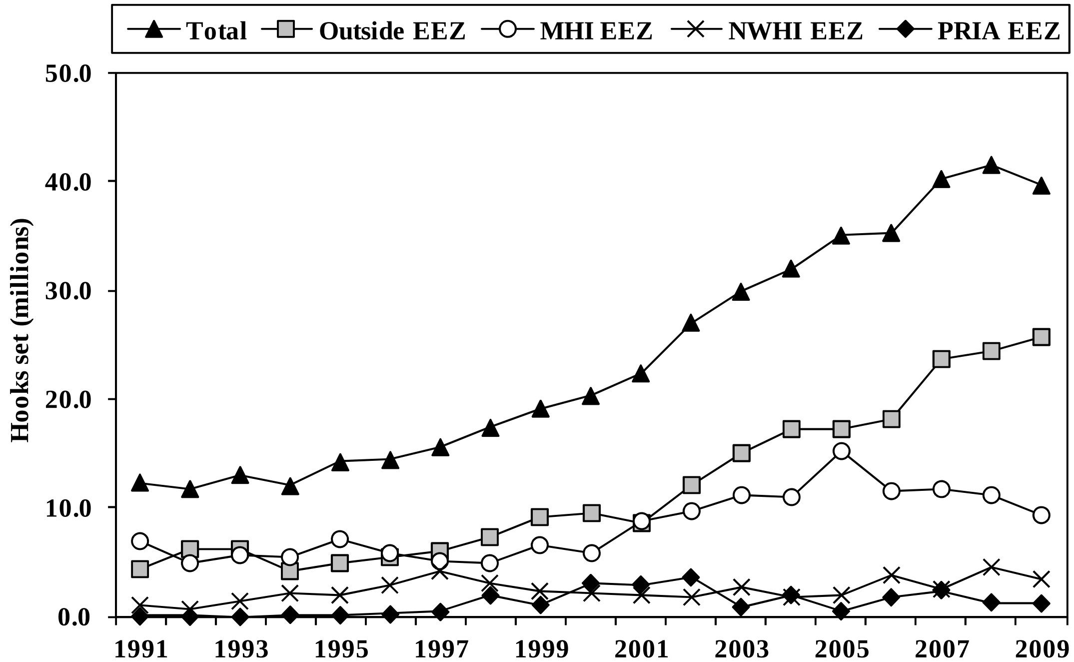


Interpretation: The Hawaii-based longline fleet made 1,326 trips in 2009. Total number of trips was above the long-term average in 2009. A large majority of the trips, 1224 trips or 94% of the total trips, targeted tunas with the remainder targeted swordfish. The shallow-set sector swordfish made a record 102 swordfish trips in 2009.

Source and Calculations: The number of trips was compiled from NMFS federal longline logbook data collected from 1991 to 2009. The trip summary was based on landing date. The trip type was determined by an interview with the vessel captain or assigned by FMEP staff on the basis of gear characteristics, fishing techniques and locations, catch composition and past targeting strategy.

	Hawaii longline trip activity			
Year	Total trips	Tuna trips	Mixed trips	Swordfish trips
1991	1,671	556	823	292
1992	1,266	458	531	277
1993	1,192	542	331	319
1994	1,106	568	228	310
1995	1,125	682	307	136
1996	1,100	657	351	92
1997	1,125	745	302	78
1998	1,140	760	296	84
1999	1,137	776	296	65
2000	1,103	814	252	37
2001	1,034	987	43	4
2002	1,163	1,163	2	0
2003	1,215	1,215	0	0
2004	1,338	1,332	0	6
2005	1,496	1,397	0	99
2006	1,401	1,341	0	60
2007	1,462	1,381	0	81
2008	1,414	1,333	0	81
2009	1,326	1,224	0	102
Average	**1,253.4**	**943.7**	**198.0**	**111.7**
SD	**170.9**	**334.7**	**226.7**	**106.8**

Figure 79. Number of Hooks Set by the Hawaii-Based Longline Fishery, 1991-2009

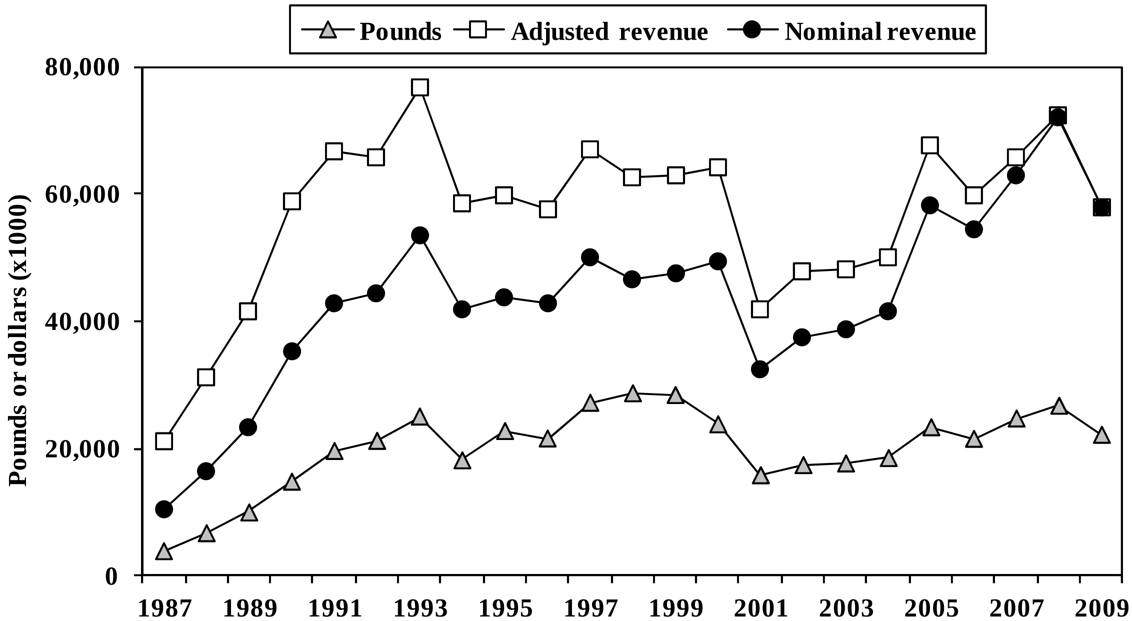


Interpretation: The total number of hooks set by the Hawaii-based longline fishery increased steadily from 11.7 million hooks in 1994 to a record 41.5 million hooks in 2007, then decreased to 39.5 million in 2009. Much of the increase is due to the shift in effort from swordfish and mixed target to tuna. 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 (65%) and MHI EEZ (23%) in 2009. Effort in the NWHI EEZ (9%) and the EEZ of Pacific Remote Island Areas (PRIAs) (3%) decreased slightly in 2009.

Source and Calculations: Number of hooks set was compiled from NMFS federal longline logbook data collected from 1991 to 2009. The summary of hooks set was based on date of haul.

	Number of hooks set by area (milions)				
Year	Outside EEZ	MHI EEZ	NWHI EEZ	PRIA EEZ	Total
1991	4.4	6.9	1.1	0.1	12.3
1992	6.1	4.9	0.7	0.0	11.7
1993	6.2	5.6	1.3	0.0	13.0
1994	4.1	5.5	2.2	0.2	12.0
1995	4.9	7.1	2.0	0.2	14.2
1996	5.4	5.9	2.9	0.2	14.4
1997	6.0	5.1	4.1	0.4	15.6
1998	7.4	5.0	3.1	1.9	17.4
1999	9.1	6.6	2.4	1.1	19.1
2000	9.5	5.7	2.1	3.0	20.3
2001	8.6	8.8	2.0	2.9	22.4
2002	12.0	9.7	1.8	3.5	27.0
2003	15.0	11.2	2.7	0.9	29.9
2004	17.3	11.0	1.8	2.0	32.0
2005	17.3	15.2	2.0	0.5	35.0
2006	18.2	11.5	3.8	1.8	35.3
2007	23.6	11.7	2.5	2.4	40.2
2008	24.4	11.2	4.6	1.3	41.5
2009	25.7	9.3	3.4	1.2	39.6
Average	**11.85**	**8.30**	**2.44**	**1.24**	**23.83**
SD	**7.25**	**3.02**	**1.02**	**1.13**	**10.70**

Figure 80. Hawaii Longline Landings and Revenue, 1987-2009



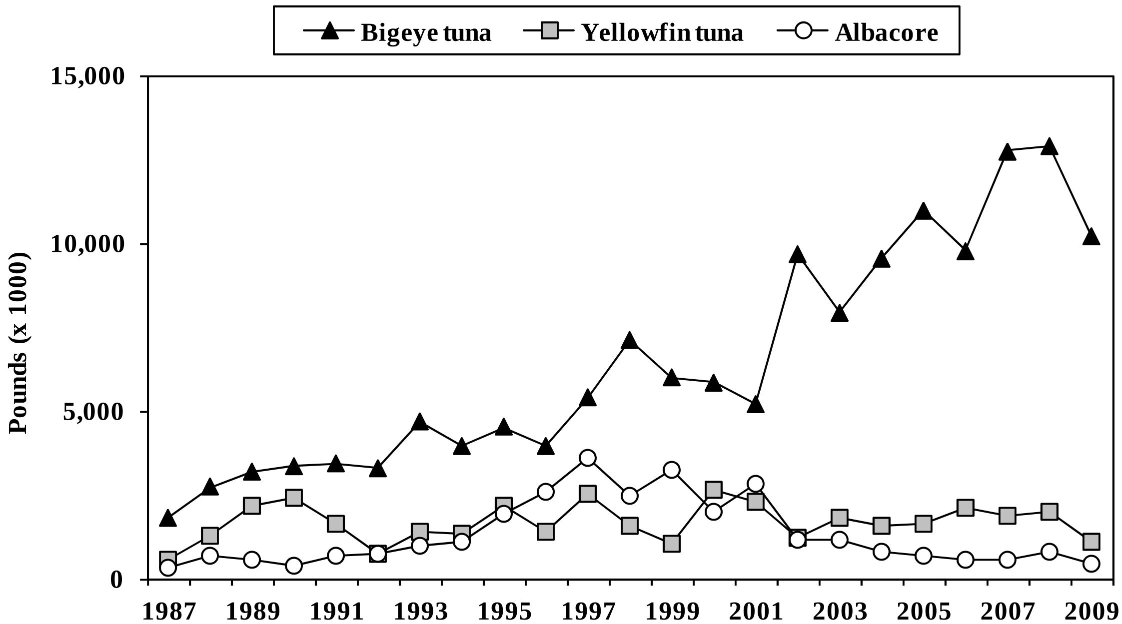
Interpretation: Hawaii longline landings trended upwards from 2001 and decreased 17% in 2009. However, total longline landings in 2009 was still 11% higher than long-term average. Inflation adjusted revenue also trended higher during the same period peaking at $72 million in 2008 and decreasing 20% the following year. Revenue in 2009 was still 25% higher than long-term average.

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

Total catch and revenue estimates were calculated by extrapolating NMFS market sample data from 1987-1990, 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 1991-1999, and the HDAR Dealer data from 2000 to 2009. The adjusted revenue was calculated by multiplying nominal revenue by the Honolulu CPI for the current year and then dividing by the Honolulu CPI.

Year	Pounds	Adjusted revenue	Nominal revenue	Honolulu CPI
1987	3,893	$21,176	$10,579	114.9
1988	6,713	$31,127	$16,470	121.7
1989	9,966	$41,459	$23,199	128.7
1990	14,790	$58,806	$35,309	138.1
1991	19,608	$66,719	$42,932	148.0
1992	21,190	$65,822	$44,387	155.1
1993	25,005	$76,664	$53,365	160.1
1994	18,138	$58,427	$41,788	164.5
1995	22,733	$59,699	$43,632	168.1
1996	21,564	$57,534	$42,700	170.7
1997	27,160	$66,969	$50,052	171.9
1998	28,655	$62,508	$46,609	171.5
1999	28,377	$62,890	$47,386	173.3
2000	23,791	$64,247	$49,247	176.3
2001	15,800	$41,892	$32,494	178.4
2002	17,392	$47,799	$37,470	180.3
2003	17,654	$48,127	$38,606	184.5
2004	18,493	$49,951	$41,394	190.6
2005	23,325	$67,477	$58,030	197.8
2006	21,510	$59,688	$54,342	209.4
2007	24,699	$65,733	$62,732	219.5
2008	26,694	$72,200	$71,855	228.9
2009	22,145	$57,918	$57,918	230.0
Average	**19,969.3**	**$56,731.8**	**$43,586.8**	
SD	**6,507.2**	**$13,225.1**	**$14,130.1**	

Figure 81. Hawaii Longline Tuna Landings, 1987-2009



Interpretation: The three major tuna species landed by the Hawaii-based longline fishery are bigeye tuna, yellowfin tuna, and albacore. Landings of bigeye tuna decreased to 10.2 million pounds in 2009, down from a peak of 12.9 million pounds in 2008. It was also the largest component of the longline landings and made up 84% of the tuna landings. Yellowfin tuna was below their long-term average in 2009 at 1.1 million pounds. Albacore landings were 65% below their long-term average in 2009 and showed a substantial decline from the peak in 1997. The longline fishery also landed small amounts of skipjack tuna and bluefin tuna.

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 (1987-1990) or multiplying the number of fish from the logbook data by the average weight from the sample or HDAR Dealer data (1991-2009).

	Hawaii longline tuna landings (1000 lbs)					
Year	Bigeye tuna	Yellowfin tuna	Albacore	Skipjack tuna	Bluefin tuna	Total
1987	1,796	575	331	3	0	2,705
1988	2,732	1,309	676	8	0	4,725
1989	3,178	2,174	547	22	0	5,921
1990	3,338	2,421	390	12	1	6,162
1991	3,423	1,617	687	66	4	5,797
1992	3,277	763	735	49	84	4,908
1993	4,677	1,392	965	79	92	7,205
1994	3,940	1,336	1,095	116	53	6,540
1995	4,522	2,159	1,938	223	56	8,898
1996	3,940	1,389	2,606	91	48	8,074
1997	5,399	2,515	3,626	234	52	11,826
1998	7,113	1,592	2,450	168	36	11,359
1999	5,995	1,042	3,250	219	23	10,529
2000	5,836	2,656	1,979	221	7	10,700
2001	5,193	2,277	2,803	455	2	10,730
2002	9,676	1,235	1,145	282	2	12,348
2003	7,922	1,815	1,160	438	1	11,337
2004	9,544	1,564	791	294	1	12,197
2005	10,977	1,624	662	197	1	13,464
2006	9,765	2,117	577	160	1	12,623
2007	12,741	1,856	554	202	0	15,354
2008	12,908	1,981	807	263	1	15,960
2009	10,214	1,111	459	298	2	12,084
Average	6,439.4	1,674.8	1,314.5	178.3	20.3	9,628.1
SD	3,353.1	556.0	992.6	128.3	29.3	3,590.1

Figure 82. Hawaii Longline Billfish Landings, 1987-2009

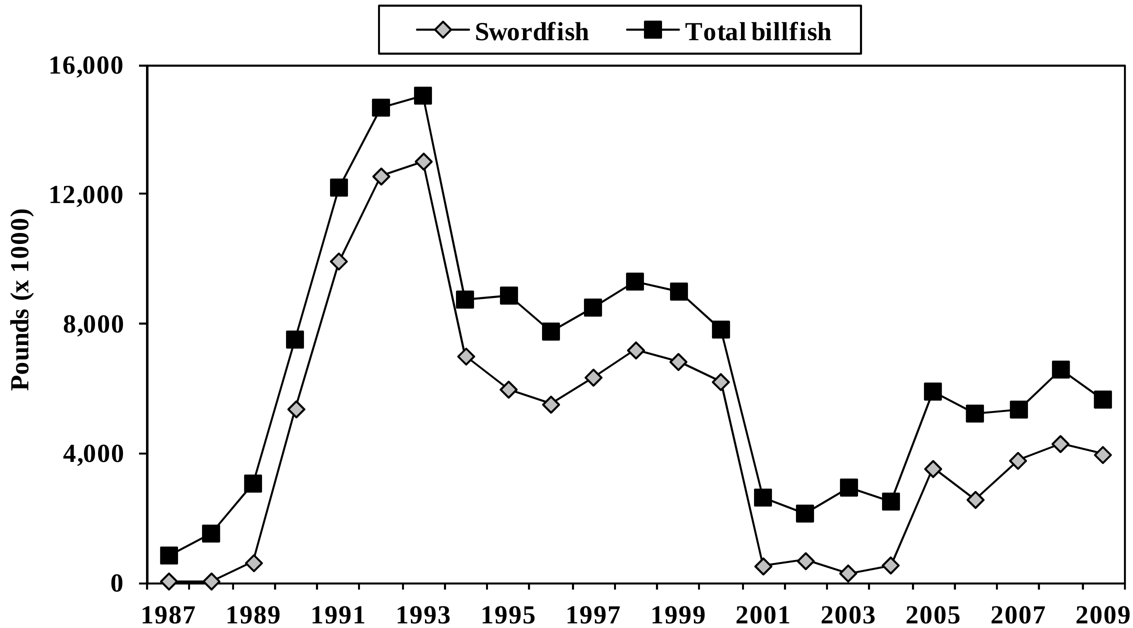
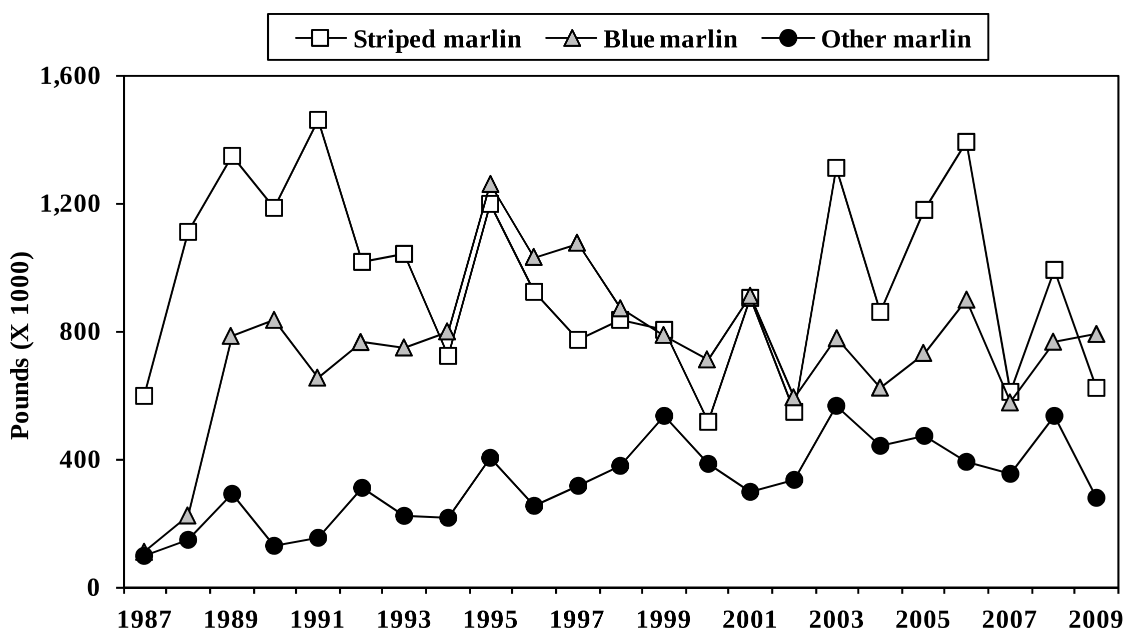


Figure 83. Hawaii Longline Marlin Landings, 1987-2009



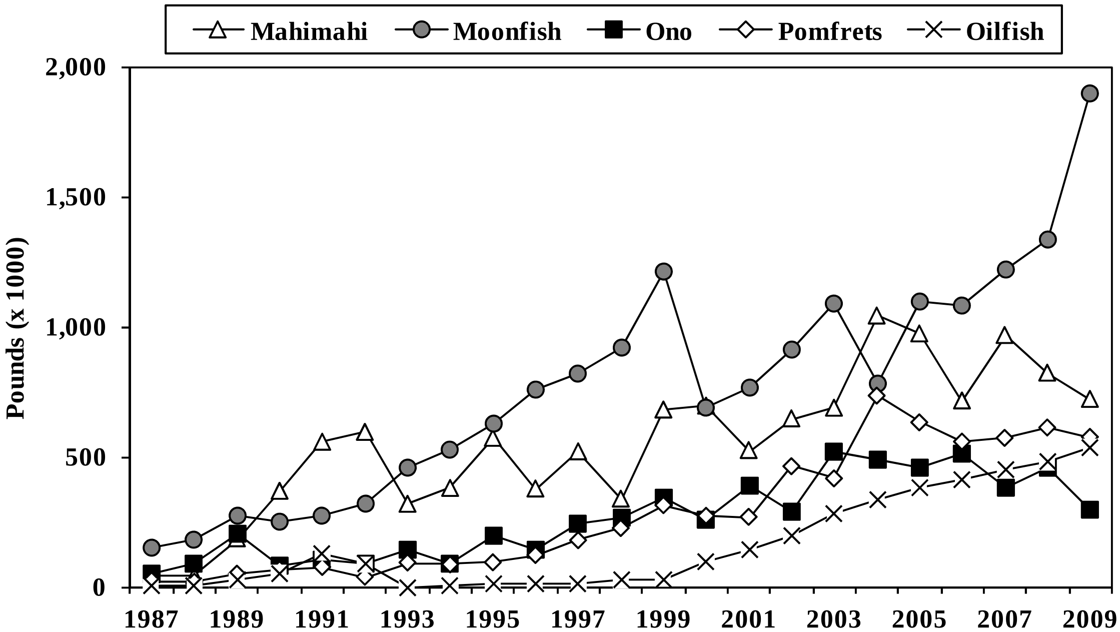
Interpretation: Billfish landings were 5.6 million pounds in 2009, 15% below the long-term average. The decrease observed in 2009 was attributable mainly to lower swordfish, striped marlin, and other marlin landings. The swordfish-targeted longline fishery target was able to operate throughout the entire year because the fishery managed to keep the number of loggerhead and leatherback sea turtle interactions below the allowable levels. Swordfish landings by the shallow-set sector of the Hawaii longline fishery in 2009 were significantly higher than those landed during 2001-2004 when this sector of the longline fishery was closed.

Marlins are caught incidentally by the longline fishery and are retained because they sell for a moderate market price. Striped marlin and blue marlin are the largest component of the marlin landings. Striped marlin landings were substantially below their long-term average in 2009; down by 35% while blue marlin landings were 5 % higher than the long-term landings.

	Hawaii longline billfish landings (1000 lbs)				
Year	Swordfish	Striped marlin	Blue marlin	Other marlin	Total billfish
1987	52	599	112	99	862
1988	52	1,110	225	150	1,537
1989	619	1,350	784	290	3,043
1990	5,372	1,186	834	127	7,519
1991	9,939	1,462	654	153	12,208
1992	12,566	1,013	765	312	14,656
1993	13,027	1,039	748	220	15,034
1994	7,002	719	798	218	8,737
1995	5,981	1,198	1,257	401	8,837
1996	5,517	923	1,030	253	7,723
1997	6,352	775	1,074	316	8,517
1998	7,193	834	870	380	9,277
1999	6,835	803	787	533	8,958
2000	6,215	517	711	385	7,828
2001	519	902	909	299	2,630
2002	681	550	593	337	2,160
2003	301	1,308	777	567	2,954
2004	549	858	623	442	2,472
2005	3,527	1,177	731	473	5,909
2006	2,573	1,390	897	389	5,248
2007	3,781	609	577	355	5,322
2008	4,299	993	766	536	6,594
2009	3,961	619	790	277	5,648
Average	**4,648.4**	**953.7**	**752.7**	**326.6**	**6,681.4**
SD	**3,813.8**	**284.3**	**241.3**	**131.8**	**3,924.2**

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 (1992-2009).

Figure 84. Hawaii Longline Landings of Other Pelagic MUS, 1987-2009



Interpretation: Longline landings of other pelagic PMUS show an increasing trend with landings at 4.0 million pounds in 2009, 96% above the long-term average. Moonfish was a dominant component in this category at 1.9 million pounds in 2009, 147% above the long-term average. Mahimahi composed a large fraction of the landings with landings 30% higher than the long-term average in 2009. Ono, pomfret, and oilfish landings increased substantially during the 21-year period with record landings in 2003, 2004, and 2009, respectively.

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 (1987-1990) or multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data (1991-2009).

	Hawaii longline landings of other pelagic PMUS (1000 lbs)					
Year	**Mahimahi**	**Moonfish**	**Ono**	**Pomfrets**	**Oilfish**	**Total**
1987	45	152	53	23	2	283
1988	39	182	90	18	3	357
1989	183	274	202	49	24	799
1990	366	253	80	66	52	887
1991	555	270	101	75	130	1,285
1992	593	320	85	37	85	1,216
1993	316	454	142	92	0	1,030
1994	377	524	87	85	4	1,104
1995	570	629	195	93	10	1,530
1996	375	760	140	121	11	1,440
1997	518	823	239	178	15	1,807
1998	336	922	262	225	26	1,807
1999	679	1,210	343	313	29	2,618
2000	694	685	256	272	93	2,013
2001	523	768	390	268	141	2,114
2002	645	910	292	463	200	2,525
2003	686	1,091	519	416	277	3,010
2004	1,041	783	486	735	335	3,410
2005	972	1,093	458	632	380	3,563
2006	714	1,082	511	558	412	3,306
2007	966	1,223	381	572	448	3,613
2008	821	1,335	454	612	480	3,731
2009	720	1,896	299	576	536	4,046
Average	**553.7**	**766.9**	**263.7**	**281.7**	**160.6**	**2,065.0**
SD	**272.7**	**437.8**	**154.5**	**236.1**	**181.7**	**1,154.5**

Figure 85. Hawaii Longline Blue and Total Shark Landings, 1987-2009

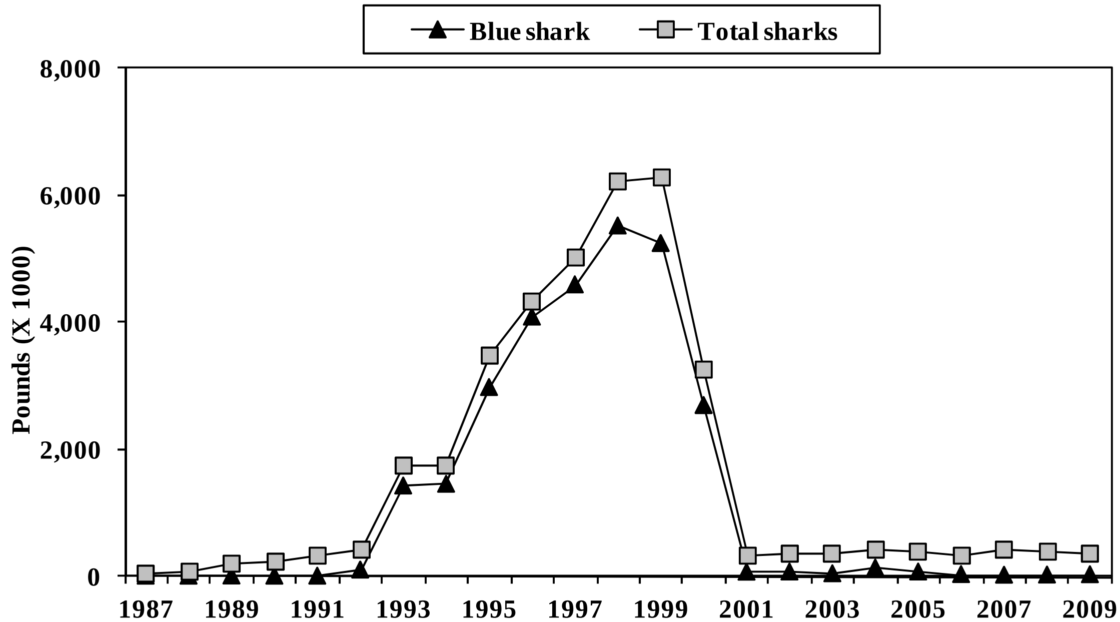
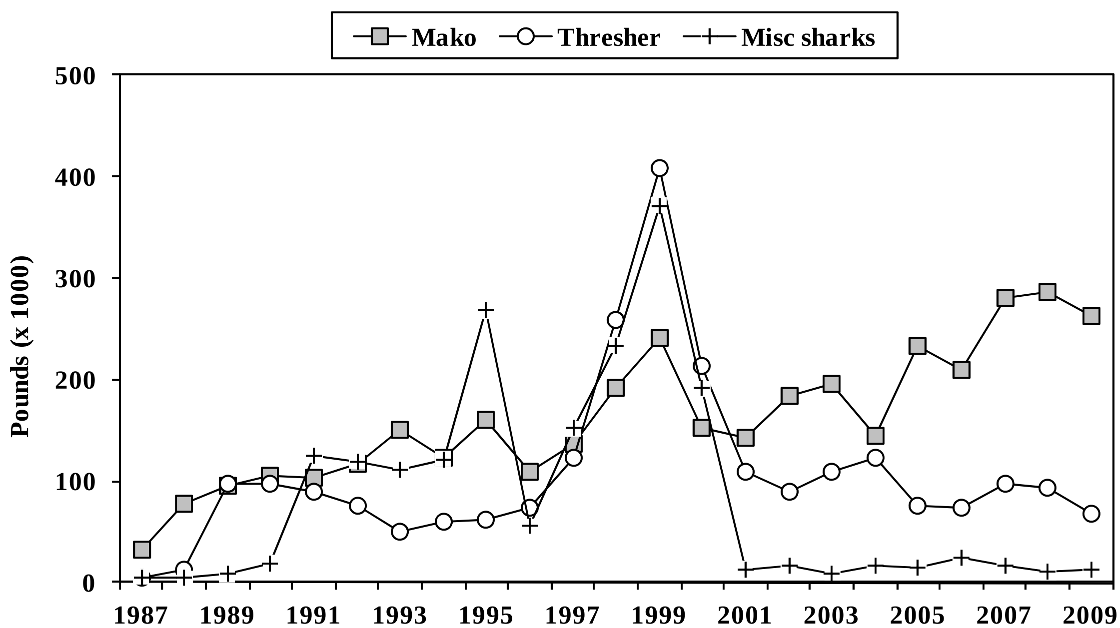


Figure 86. Hawaii Longline Mako, Thresher and Other Shark Landings, 1987-2009



Interpretation: Shark landings in 2009 were 76% below the long-term average. Shark landings have been low since 2001 due to State and Federal laws which prohibit the practice of finning and landing sharks without the associated carcass. Blue shark and other sharks were retained for fins only, so landings dropped significantly when laws prohibiting the practice took effect. Mako and thresher sharks were retained for their flesh and had landings substantially lower and less variable compared to blue shark.

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

	Hawaii longline shark landings (1000 lbs)				
Year	Blue shark	Mako	Thresher	Misc sharks	Total sharks
1987	0	33	5	5	43
1988	0	77	13	4	94
1989	2	95	98	8	203
1990	0	105	98	19	222
1991	0	104	89	125	318
1992	97	117	76	120	410
1993	1,423	150	51	112	1,736
1994	1,450	124	61	122	1,757
1995	2,978	160	62	268	3,468
1996	4,088	110	73	56	4,327
1997	4,598	137	123	152	5,010
1998	5,527	192	259	234	6,212
1999	5,249	242	409	372	6,272
2000	2,693	153	213	191	3,250
2001	63	142	109	13	326
2002	67	184	90	17	359
2003	39	196	109	9	353
2004	130	145	123	16	414
2005	66	233	75	15	389
2006	26	210	73	25	333
2007	15	281	97	17	410
2008	18	287	93	10	409
2009	24	263	68	12	367
Average	**1,241.4**	**162.6**	**107.3**	**83.6**	**1,594.9**
SD	**1,916.4**	**67.1**	**85.1**	**101.6**	**2,062.3**

Table 23. Hawaii-Based Longline Catch (number of fish) by Area, 1991-2009

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Main Hawaiian Islands EEZ											
1991	**22,517**	**7,150**	5,763	13,598	**2,881**	**18,117**	**8,197**	17,672	**1,885**	**2,569**	13,295
1992	**22,982**	**3,846**	3,979	7,102	**2,761**	**9,838**	**3,368**	13,313	**1,194**	**2,387**	11,748
1993	**25,031**	**8,895**	6,496	4,388	**2,720**	**10,426**	**3,440**	9,366	**2,641**	**3,261**	12,955
1994	**27,022**	**6,815**	10,833	2,842	**3,344**	**6,494**	**3,213**	**17,660**	**1,332**	**3,626**	14,455
1995	**31,899**	**13,018**	18,271	5,239	**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	2,530	1,557	2,446	3,492	17,628	1,202	2,752	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	39,907	10,058	2,593	1,422	1,742	**12,247**	**8,292**	25,255	4,751	3,454	25,876
2004	49,152	8,847	3,031	1,166	1,135	**6,665**	5,372	26,631	3,204	2,707	25,022
2005	52,856	**13,762**	4,606	2,464	1,594	**6,953**	**7,796**	**40,170**	5,473	4,228	27,277
2006	32,799	6,731	1,598	916	1,547	7,479	3,881	16,869	4,130	3,298	17,824
2007	43,887	6,127	1,236	1,926	636	2,406	3,250	21,602	2,863	2,947	16,725
2008	34,807	**13,090**	1,303	1,210	991	3,397	4,917	14,791	2,562	2,456	13,188
2009	23,829	2,611	490	2,587	602	1,946	1,846	9,562	1,253	2,477	11,091
Northwestern Hawaiian Islands EEZ											
1991	4,473	1,375	481	9,472	342	3,845	1,082	2,003	134	70	10,604
1992	2,624	396	311	5,228	244	1,776	330	2,321	77	187	9,042
1993	7,760	2,019	1,413	9,565	509	2,861	754	2,279	198	398	17,507
1994	10,726	2,015	5,592	9,752	554	2,679	719	3,037	227	707	28,346
1995	9,011	3,630	5,097	8,400	1,379	5,076	1,557	5,836	902	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	1,208	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
2006	20,383	4,162	1,005	256	480	3,291	1,660	4,005	1,322	1,291	12,865
2007	11,390	1,973	966	2,385	161	1,212	737	3,011	476	927	7,416
2008	18,378	8,062	1,271	2,700	913	3,939	2,622	7,041	1,590	1,384	9,135
2009	11,350	1,779	1,781	2,152	262	1,262	713	1,709	490	1,034	6,008
Pacific Remote Island Areas EEZ											
1991	374	439	30	25	17	60	45	84	21	0	237
1992	70	42	0	16	7	1	7	6	8	0	223
1993	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
2006	6,698	7,353	2,359	134	614	520	528	1,126	1,486	311	3,499
2007	14,509	3,257	1,432	248	426	383	567	870	1,677	137	4,452
2008	5,977	2,245	2,421	120	310	292	603	1,530	1,118	126	2,671
2009	3,977	1,920	1,068	138	291	205	435	343	550	159	3,506

Table 22 (Cont.) Hawaii-Based Longline Catch (number of fish) by Area, 1991-2009

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Outside EEZ											
1991	13,559	4,305	**7,777**	**43,194**	1,008	6,730	3,511	**19,766**	695	440	**47,047**
1992	18,228	3,595	**15,523**	**61,968**	1,506	4,434	1,963	**41,044**	1,169	719	**73,884**
1993	22,008	5,147	**22,551**	**65,601**	1,895	4,920	1,486	**14,367**	1,600	856	**124,139**
1994	9,227	3,037	**14,553**	**30,698**	742	1,946	1,130	12,283	877	733	**71,150**
1995	18,577	6,419	**22,125**	**23,758**	3,125	4,885	3,207	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**	**29,600**	**1,851**	4,868	**7,375**	**27,862**	**5,438**	**5,628**	**51,797**
2000	**37,828**	9,933	**21,649**	**27,668**	**1,770**	**2,455**	**3,485**	**32,601**	**4,402**	**3,046**	**42,968**
2001	27,712	9,460	**27,841**	**2,545**	**2,440**	5,209	3,413	17,715	**7,117**	3,068	**20,149**
2002	**62,017**	4,278	**9,643**	**2,275**	**2,025**	3,076	**4,076**	**22,407**	**4,791**	**4,658**	**23,197**
2003	**56,292**	**12,958**	**13,783**	**1,780**	**2,439**	8,437	7,092	**25,742**	**10,991**	**6,955**	**29,193**
2004	**74,231**	**11,541**	**10,941**	**3,569**	**3,020**	6,589	**7,743**	**35,065**	**10,593**	**4,905**	**38,288**
2005	**68,365**	11,468	**6,901**	**15,796**	**2,072**	6,493	6,207	31,779	**9,505**	**8,193**	**35,944**
2006	**58,785**	**12,324**	**6,460**	**15,279**	**3,063**	**9,728**	**6,372**	**30,615**	**10,197**	**7,909**	**34,316**
2007	**89,650**	**14,923**	**7,210**	**19,714**	**2,068**	**4,206**	**5,999**	**57,398**	**7,540**	**10,360**	**47,170**
2008	**93,162**	11,129	**11,648**	**19,960**	**2,011**	**6,781**	**7,789**	**43,878**	**8,969**	**11,156**	**37,524**
2009	**79,841**	**7,086**	**6,812**	**16,969**	**3,118**	**4,537**	**6,385**	**52,068**	**6,532**	**17,690**	**40,103**
Total catch											
1991	40,923	13,269	14,051	66,289	4,248	28,752	12,835	39,525	2,735	3,079	71,183
1992	43,904	7,879	19,813	74,314	4,518	16,049	5,668	56,684	2,448	3,293	94,897
1993	54,803	16,062	30,460	79,554	5,124	18,210	5,681	26,018	4,442	4,515	154,608
1994	48,102	13,516	31,129	43,345	4,677	11,292	5,117	33,017	2,513	5,090	114,656
1995	59,947	23,650	45,789	37,418	8,766	22,554	11,758	59,879	6,567	6,151	101,521
1996	63,575	17,586	57,329	38,259	6,685	15,750	7,772	23,311	4,461	7,315	100,992
1997	79,775	29,045	71,084	39,622	8,255	12,637	9,011	49,319	8,282	8,244	85,838
1998	98,871	21,738	48,833	43,776	5,341	14,347	11,516	22,183	8,281	9,184	99,937
1999	80,474	16,973	67,393	38,241	4,928	14,438	17,096	44,380	10,279	12,406	87,799
2000	74,580	38,348	39,042	37,108	4,508	7,928	8,969	57,844	7,744	6,945	79,098
2001	78,727	37,078	51,466	4,169	6,407	16,437	8,997	44,954	13,274	7,781	46,912
2002	140,796	20,375	20,589	3,668	3,971	8,892	9,941	48,223	8,878	9,290	50,635
2003	107,234	27,930	20,864	3,544	5,659	25,959	18,471	55,398	18,396	11,898	69,546
2004	142,114	25,907	17,341	5,191	4,846	15,164	14,586	66,611	15,610	8,562	75,024
2005	129,358	28,974	13,637	24,354	4,321	15,794	15,210	77,962	16,167	13,332	75,707
2006	118,665	30,570	11,422	16,585	5,704	21,018	12,441	52,615	17,135	12,809	68,504
2007	159,436	26,280	10,844	24,273	3,291	8,207	10,553	82,881	12,556	14,371	75,763
2008	152,324	34,526	16,643	23,990	4,225	14,409	15,931	67,240	14,239	15,122	62,518
2009	118,997	13,396	10,151	21,846	4,273	7,950	9,379	63,682	8,825	21,360	60,708

Interpretation: The bolded numbers in Table 5 show the area with the highest catch for a particular species. Longline catches of albacore, swordfish, and sharks were highest outside of the U.S. EEZ. Bigeye tuna, blue marlin, striped 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 PRIA EEZ in 1999-2002, and were typically highest outside of the U.S. EEZ thereafter. The highest catches for mahimahi were outside of the EEZ and the MHI EEZ.

Source and Calculations: Catches (number of fish) by area were compiled from NMFS federal longline logbook data collected from 1991 to the current year. The catch tables (based on date of haul) were summaries of fish kept and released. The bolded numbers were the areas where the catch for that species was highest for the year.

Table 24. Average Weight of the Hawaii-Based Longline Landings by Species, 1987-2009

Year	Tunas: Bigeye tuna	Yellowfin tuna	Albacore	Skipjack tuna	Bluefin Tuna
1987	77	82	63	18	-
1988	83	103	60	19	-
1989	77	104	62	19	-
1990	81	122	61	21	638
1991	85	118	52	20	185
1992	77	99	45	17	192
1993	88	93	44	17	203
1994	81	97	41	18	190
1995	79	95	51	18	271
1996	64	80	53	17	223
1997	71	89	55	20	239
1998	74	76	55	20	177
1999	75	62	52	20	202
2000	79	67	54	17	166
2001	68	62	55	18	190
2002	71	62	56	16	151
2003	77	67	56	19	273
2004	69	62	46	16	207
2005	88	58	50	15	238
2006	84	68	51	12	-
2007	82	73	54	15	-
2008	86	57	52	17	-
2009	87	77	47	18	-
Average	**78.4**	**81.4**	**52.8**	**17.7**	**234.1**
SD	**6.7**	**19.4**	**5.7**	**2.1**	**113.1**

Year	Billfish: Swordfish	Striped marlin	Blue marlin	Spearfish	Sailfish	Black marlin
1987	129	66	161	34	52	208
1988	119	57	157	31	51	151
1989	130	62	165	31	55	191
1990	152	62	199	35	55	204
1991	153	58	173	32	51	184
1992	178	66	175	34	45	155
1993	171	64	157	34	49	136
1994	163	64	171	33	55	167
1995	171	58	156	33	47	72
1996	157	58	154	31	40	-
1997	163	66	134	31	46	190
1998	176	60	165	32	43	167
1999	188	55	164	29	45	131
2000	180	62	157	35	57	150
2001	146	48	142	31	48	151
2002	146	55	150	33	59	222
2003	141	49	145	31	56	150
2004	137	53	132	30	39	185
2005	164	72	175	31	40	196
2006	167	64	158	30	50	186
2007	174	74	176	33	48	192
2008	198	67	183	33	60	249
2009	195	68	185	28	44	0
Average	**160.8**	**61.2**	**162.3**	**32.0**	**49.3**	**173.2**
SD	**21.2**	**6.6**	**16.2**	**1.8**	**6.1**	**37.5**

Table 23 (cont). Average weight of the Hawaii- Based Longline Landings by Species, 1987-2009

	Other PMUS					Sharks	
		Ono				Mako	Thresher
Year	Mahimahi	(Wahoo)	Moonfish	Pomfrets	Oilfish	shark	shark
1987	21	33	111	15	20	124	97
1988	20	32	108	18	22	137	122
1989	23	35	104	18	23	161	158
1990	19	36	98	18	22	162	167
1991	15	32	97	17	23	135	180
1992	11	35	98	16	22	144	176
1993	13	33	101	16	21	147	199
1994	12	34	103	17	13	153	164
1995	10	31	101	16	23	178	172
1996	17	31	105	15	-	177	156
1997	13	30	103	17	-	161	160
1998	16	32	101	15	-	177	171
1999	16	34	98	14	-	177	202
2000	14	33	100	14	18	168	166
2001	12	29	99	13	16	175	166
2002	14	33	98	13	17	182	166
2003	13	29	93	12	16	184	196
2004	16	31	92	11	16	173	169
2005	13	28	83	13	17	177	202
2006	14	30	85	13	17	176	193
2007	12	31	86	15	16	189	190
2008	12	32	89	14	15	184	205
2009	12	33	90	15	15	186	193
Average	**14.7**	**32.0**	**97.5**	**15.0**	**18.5**	**166.4**	**172.6**
SD	**3.4**	**2.1**	**7.3**	**2.0**	**3.3**	**18.3**	**25.6**

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

The three main tuna species, bigeye tuna, yellowfin tuna, and albacore, exhibited changes throughout 1987-2009. The average weight of bigeye tuna showed a small change over the 21 year period, ranging from 64 pounds to 88 pounds. Bigeye tuna average weight was more than 80 pounds for the past five years and was 87 pounds in 2009. Yellowfin tuna average weight showed the most variation ranging from 58 pounds to 122 pounds. The average weight of yellowfin tuna was more than 100 pounds in earlier years and decreased to less than 80 pounds from 1998. This probably reflects a trend of increasing effort in the EEZ of Kingman Reef and Palmyra Atoll where relatively small yellowfin tuna are caught. The average weight of albacore was 60 pounds or more from 1987 until 1990 then declined to less than 50 pounds during 1992-94. This decline was related to increasing incidental landings of small albacore far north of the Hawaiian Islands by longliners targeting swordfish. The average weight of albacore then increased as a greater proportion of longline effort shifted back to target tunas although small fish were landed in 2004 and 2009.

Swordfish landed by tuna-targeted trips were smaller than from swordfish-targeted trips. Average weight for swordfish was lowest in the late 1980s when the longline fishery targeted tunas only. The average weight increased in the early 1990s as the number of swordfish-target trips grew. Average weight peaked at 188 pounds in 1999 and was about the same in the following year. Swordfish-directed effort (shallow-set longlining) was restricted or prohibited from 2001 through the earlier part of 2004. As a result, almost all the longline effort was directed towards tuna (deep-set longline); during that time, swordfish average weight dropped below 150 pounds. Swordfish average weight increased to more than 160 pounds from 2005 when the longline fishery was allowed to target swordfish once again and was 195 pounds in 2009.

Average weight of blue marlin varied substantially and ranged from 132 pounds in 2004 to 199 pounds in 1990. Blue marlin mean weight was above its long-term mean weight from 2007 and was 185 in 2009. Average weight of striped marlin show very little variation over the 20-year period ranging from 48 pounds in 2001 to a record 74 pounds in 2007.

Source and Calculations: Average weight of the longline landings was summarized from the NMFS, Honolulu Laboratory and HDAR market sampling data from 1987 to 1999. The average weight was calculated from the State Commercial Marine Dealer data identified as landed by longline fishing during 2000 to 2009. 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.

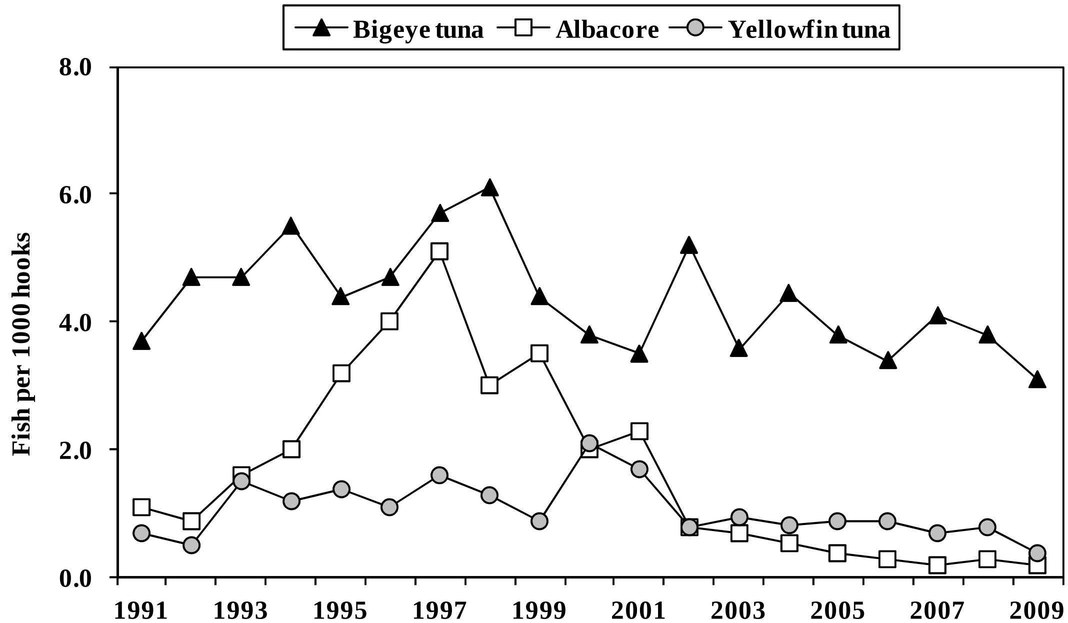
Table 25. Bycatch, Retained Catch, and Total Catch for the Hawaii-Based Longline Fishery, 2009

Interpretation: Bycatch of the Hawaii-based longline fishery was measured in number of fish released. The total bycatch for all species combined was 15% in 2009. Tunas, which are the primary target species of the longline fleet, had a low bycatch rate (2%). The number of bigeye tuna released was highest for all tuna species although the bycatch rate was relatively low (1%). Swordfish had a bycatch rate of 7% in 2009. Although marlins and other miscellaneous pelagic catch are not targeted, these species are highly marketable and also have low rates of discards (1% and 2%, respectively). Ninety-seven percent of the sharks caught by the longline fishery were released. Blue shark and other sharks are not marketable and therefore a high percentage of those species were discarded. In contrast, a relatively higher proportion of mako and thresher sharks were kept since there was a market for their flesh.

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

	Number released	Percent released	Kept	Caught
Tuna				
Albacore	397	3.9	9,754	10,151
Bigeye tuna	1,336	1.1	117,661	118,997
Bluefin tuna	0	0.0	12	12
Skipjack tuna	1,003	5.6	16,943	17,946
Yellowfin tuna	196	1.5	13,200	13,396
Other tuna	1	8.3	11	12
Billfish				
Blue marlin	31	0.7	4,242	4,273
Spearfish	89	1.0	8,749	8,838
Striped marlin	97	1.2	7,853	7,950
Other marlin	14	2.6	527	541
Swordfish	1,513	6.9	20,333	21,846
Other pelagic fish				
Mahimahi	1,937	3.0	61,745	63,682
Moonfish	240	1.1	21,120	21,360
Oilfish	681	2.1	32,117	32,798
Pomfret	200	0.5	36,735	36,935
Wahoo	36	0.4	8,789	8,825
Miscellaneous fish	62	8.3	683	745
Total (non-shark)	**7,833**	**2.1**	**360,474**	**368,307**
Sharks				
Blue shark	47,930	99.5	238	48,168
Mako shark	2,319	62.1	1,416	3,735
Thresher shark	6,664	95.1	345	7,009
Other sharks	1,678	93.4	118	1,796
Total sharks	**58,591**	**96.5**	**2,117**	**60,708**

Figure 87. Hawaii Longline CPUE for Major Tunas on Tuna Trips, 1991-2009



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, then declined to a record low of 3.1 in 2009. Bigeye tuna CPUE was usually highest in the MHI EEZ.

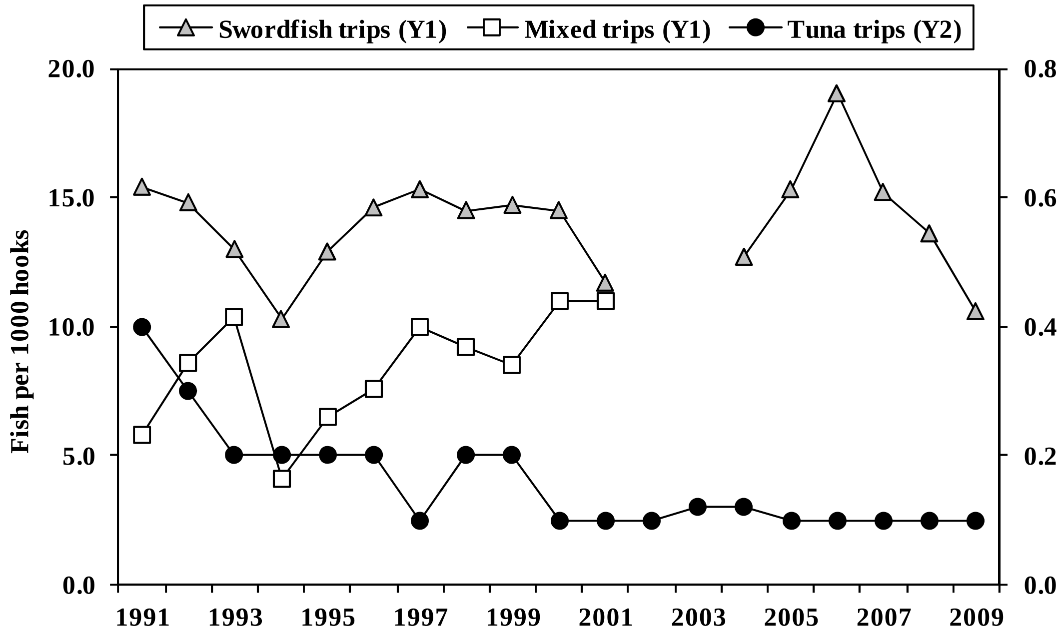
Albacore generally sells for a substantially lower price than bigeye tuna, so it is seldom targeted or caught incidentally. Albacore CPUE rose rapidly in the early 1990s, peaked in 1997, then declined to a record low of 0.2 fish per 1000 hooks in 2007 and 2009. Albacore CPUE is usually higher outside of the U.S. EEZ.

CPUE for yellowfin tuna peaked at 2.1 in 2000, declined just below 1 fish two years later and remained low thereafter. Yellowfin tuna CPUE was a record low 0.4 in 2009. High yellowfin tuna CPUEs were observed in the EEZ of Kingman Reef and Palmyra Atoll.

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.

	Tuna trip CPUE (fish per 1000 hooks)		
Year	**Bigeye tuna**	**Albacore**	**Yellowfin tuna**
1991	3.7	1.1	0.7
1992	4.7	0.9	0.5
1993	4.7	1.6	1.5
1994	5.5	2.0	1.2
1995	4.4	3.2	1.4
1996	4.7	4.0	1.1
1997	5.7	5.1	1.6
1998	6.1	3.0	1.3
1999	4.4	3.5	0.9
2000	3.8	2.0	2.1
2001	3.5	2.3	1.7
2002	5.2	0.8	0.8
2003	3.6	0.7	0.9
2004	4.5	0.5	0.8
2005	3.8	0.4	0.9
2006	3.4	0.3	0.9
2007	4.1	0.2	0.7
2008	3.8	0.3	0.8
2009	3.1	0.2	0.4
Average	**4.35**	**1.69**	**1.07**
SD	**0.83**	**1.47**	**0.44**

Figure 88. Hawaii Longline Swordfish CPUE by Trip Type, 1991-2009



Interpretation: Swordfish-targeted trips had the highest swordfish CPUE of all trip types. Swordfish CPUE on swordfish target trips declined to a low in 1994 but returned to typical swordfish catch rates the subsequent year up through 2000. Swordfish target effort was drastically reduced in 2001, prohibited in 2002 and 2003 due to sea turtle conservation measures, then reopened under a new set of regulations in April 2004. A few swordfish trips were made before the end of the year and had a respectable swordfish CPUE. In 2005, the first complete year since its reopening, the swordfish fishery managed to equal a record CPUE of 15.3 fish per 1000 hooks previously attained in 1997. The swordfish fishery was closed in March 2006 due to reaching the limit of 17 loggerhead turtle interactions, but attained a record CPUE of 19 that has since declined to 10.6 in 2009.

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

	Swordfish CPUE (fish per 1000 hooks)		
Year	**Swordfish trips**	**Mixed trips**	**Tuna trips**
1991	15.4	5.8	0.4
1992	14.8	8.6	0.3
1993	13.0	10.4	0.2
1994	10.3	4.1	0.2
1995	12.9	6.5	0.2
1996	14.6	7.6	0.2
1997	15.3	10.0	0.1
1998	14.5	9.2	0.2
1999	14.7	8.5	0.2
2000	14.5	11.0	0.1
2001	11.7	11.0	0.1
2002	-	-	0.1
2003	-	-	0.1
2004	12.7	-	0.1
2005	15.3	-	0.1
2006	19.0	-	0.1
2007	15.2	-	0.1
2008	13.6	-	0.1
2009	10.6	-	0.1
Average	**14.01**	**8.43**	**0.16**
SD	**2.07**	**2.24**	**0.08**

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

Figure 89. Longline Blue Marlin CPUE by Trip Type, 1992-2009

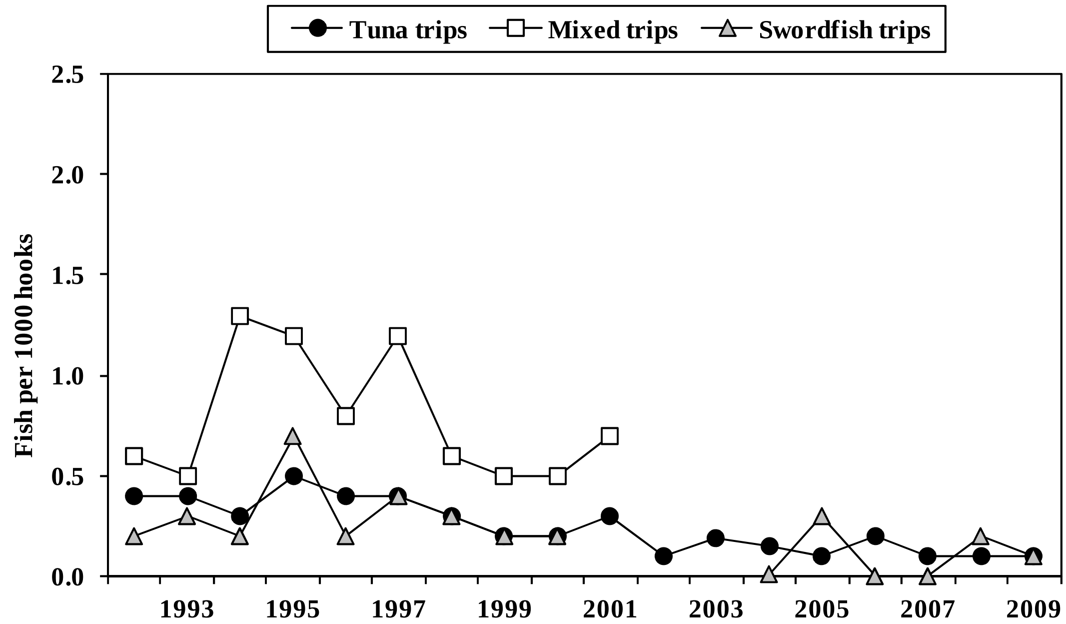
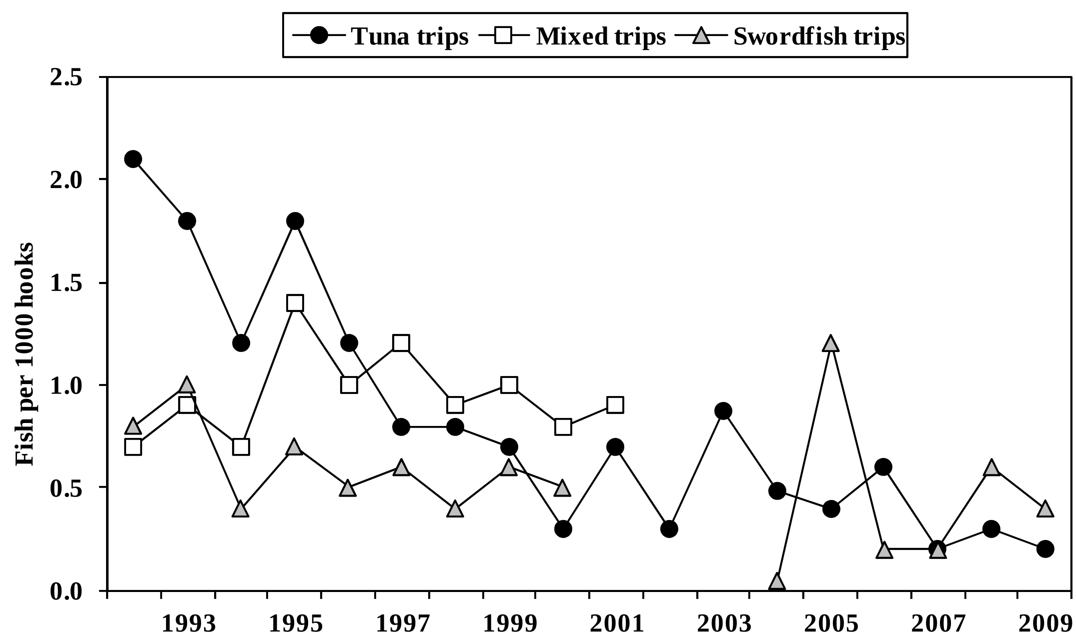


Figure 90. Longline Striped Marlin CPUE by Trip Type, 1992-2009



	Blue marlin			Striped marlin		
Year	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	**Poor species identification precluded quantification in 1991**					
1992	0.4	0.6	0.2	2.1	0.7	0.8
1993	0.4	0.5	0.3	1.8	0.9	1.0
1994	0.3	1.3	0.2	1.2	0.7	0.4
1995	0.5	1.2	0.7	1.8	1.4	0.7
1996	0.4	0.8	0.2	1.2	1.0	0.5
1997	0.4	1.2	0.4	0.8	1.2	0.6
1998	0.3	0.6	0.3	0.8	0.9	0.4
1999	0.2	0.5	0.2	0.7	1.0	0.6
2000	0.2	0.5	0.2	0.3	0.8	0.5
2001	0.3	0.7	-	0.7	0.9	-
2002	0.1	-	-	0.3	-	-
2003	0.2	-	-	0.9	-	-
2004	0.2	-	0.0	0.5	-	0.1
2005	0.1	-	0.3	0.4	-	1.2
2006	0.2	-	0.0	0.6	-	0.2
2007	0.1	-	0.0	0.2	-	0.2
2008	0.1	-	0.2	0.3	-	0.6
2009	0.1	-	0.1	0.2	-	0.4
Average	**0.25**	**0.79**	**0.22**	**0.82**	**0.95**	**0.54**
SD	**0.13**	**0.32**	**0.18**	**0.58**	**0.22**	**0.30**

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 through 2001. Striped marlin CPUE was higher on tuna-target trips in the early to mid-1990s and converged with catch rates of swordfish and mixed trips and remained low thereafter. CPUE for both blue marlin and striped marlin were lower in the more recent years of the time series.

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

Figure 91. Hawaii Longline Mahimahi CPUE by Trip Type, 1991-2009

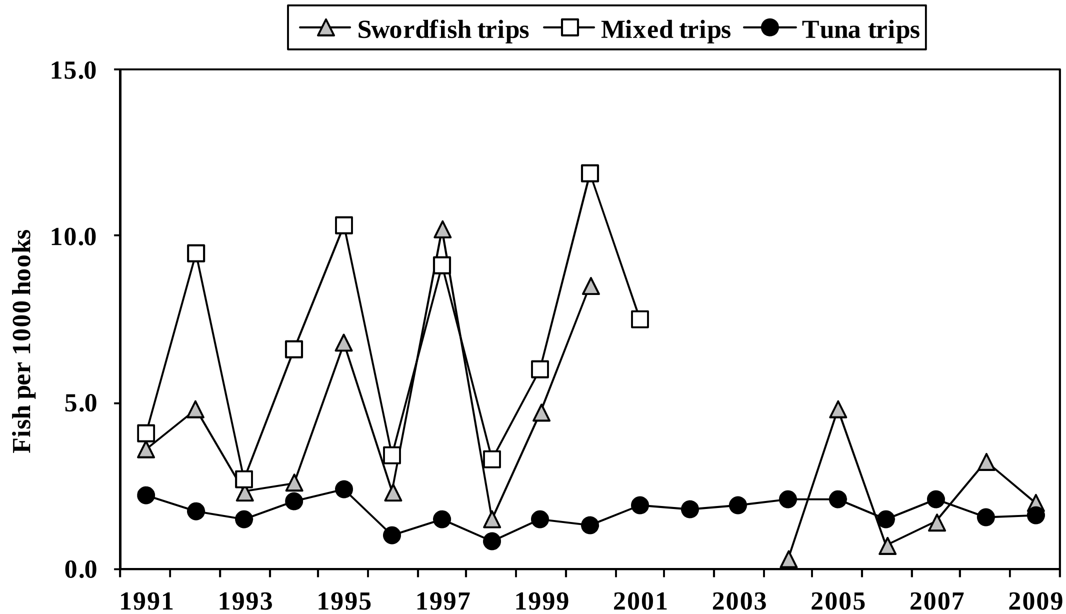
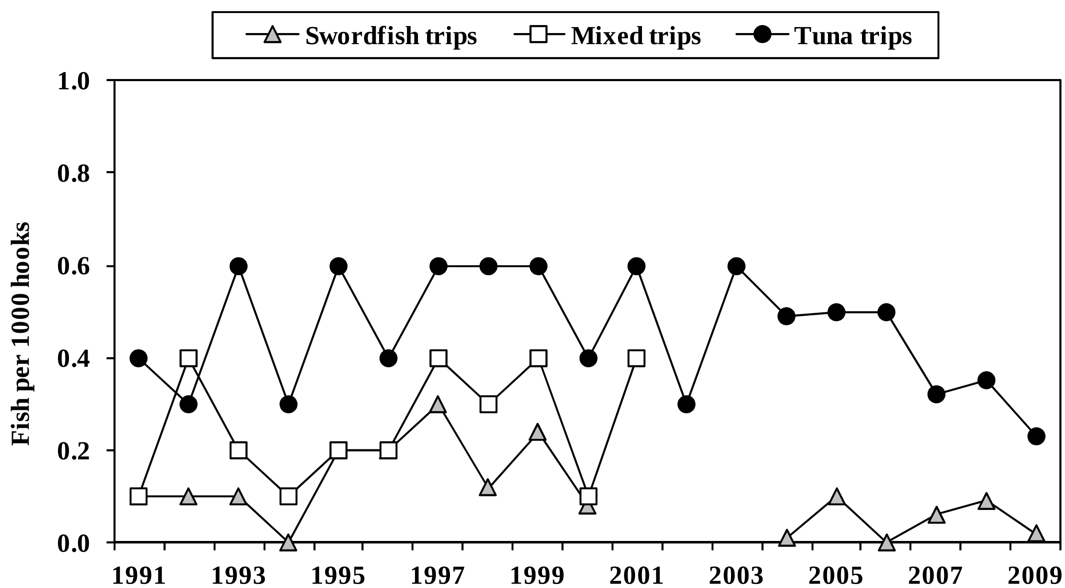


Figure 92. Hawaii Longline Ono (Wahoo) CPUE by Trip Type, 1991-2009



Year	Mahimahi			Ono		
	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	2.2	4.1	3.6	0.4	0.1	0.1
1992	1.7	9.5	4.8	0.3	0.4	0.1
1993	1.5	2.7	2.3	0.6	0.2	0.1
1994	2.0	6.6	2.6	0.3	0.1	0.0
1995	2.4	10.3	6.8	0.6	0.2	0.2
1996	1.0	3.4	2.3	0.4	0.2	0.2
1997	1.5	9.1	10.2	0.6	0.4	0.3
1998	0.8	3.3	1.5	0.6	0.3	0.1
1999	1.5	6.0	4.7	0.6	0.4	0.2
2000	1.3	11.9	8.5	0.4	0.1	0.1
2001	1.9	7.5	-	0.6	0.4	-
2002	1.8	-	-	0.3	-	-
2003	1.9	-	-	0.6	-	-
2004	2.1	-	0.3	0.5	-	0.0
2005	2.1	-	4.8	0.5	-	0.1
2006	1.5	-	0.7	0.5	-	0.0
2007	2.1	-	1.4	0.3	-	0.1
2008	1.6	-	3.2	0.4	-	0.1
2009	1.6	-	2.0	0.2	-	0.0
Average	**1.71**	**6.76**	**3.73**	**0.46**	**0.25**	**0.11**
SD	**0.41**	**3.16**	**2.80**	**0.13**	**0.13**	**0.09**

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 (Figure 91). Mahimahi CPUE was higher with much more annual variability on swordfish and mixed-target trips. The highest mahimahi CPUE was by mixed trips at 11.9 in 2000. Ono CPUE was consistently higher on tuna trips (Figure 92). Ono CPUE in 2009 was negligible.

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.

Figure 93. Hawaii Longline Moonfish CPUE by Trip Type, 1991-2009

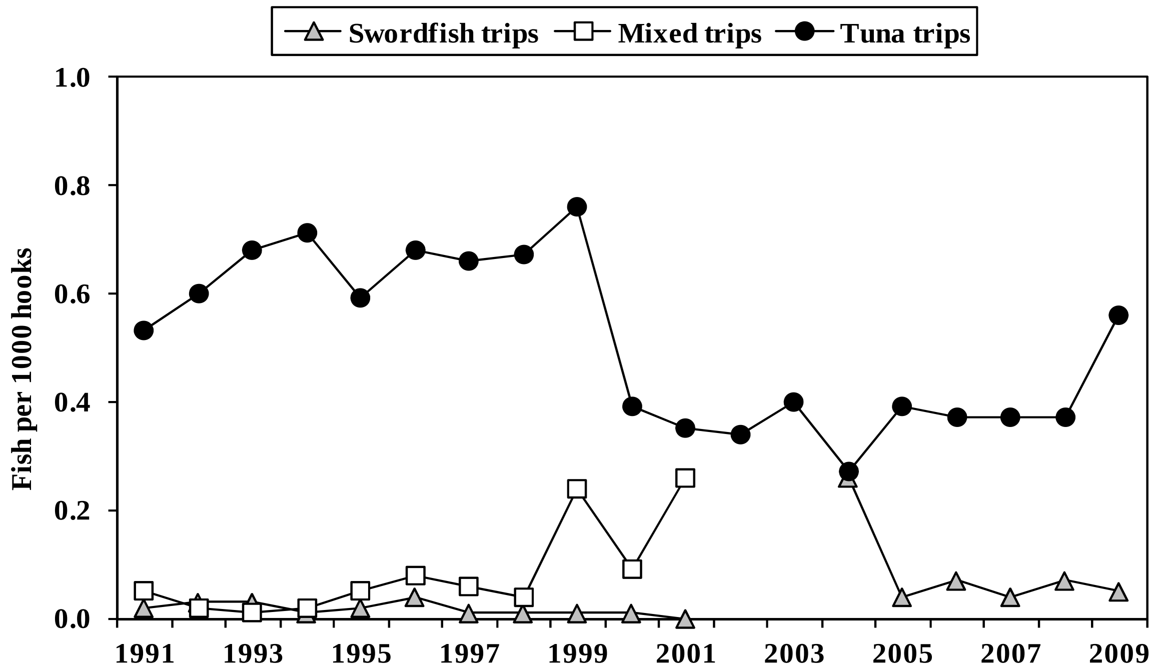
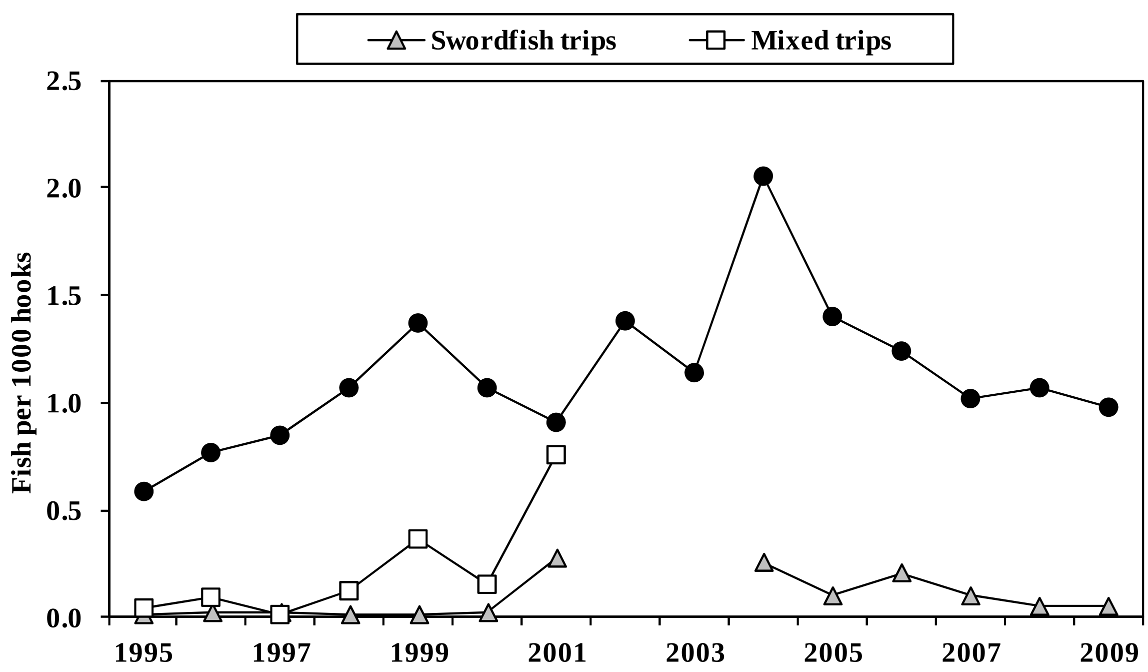


Figure 94. Hawaii Longline Pomfret CPUE by Trip Type, 1994-2009

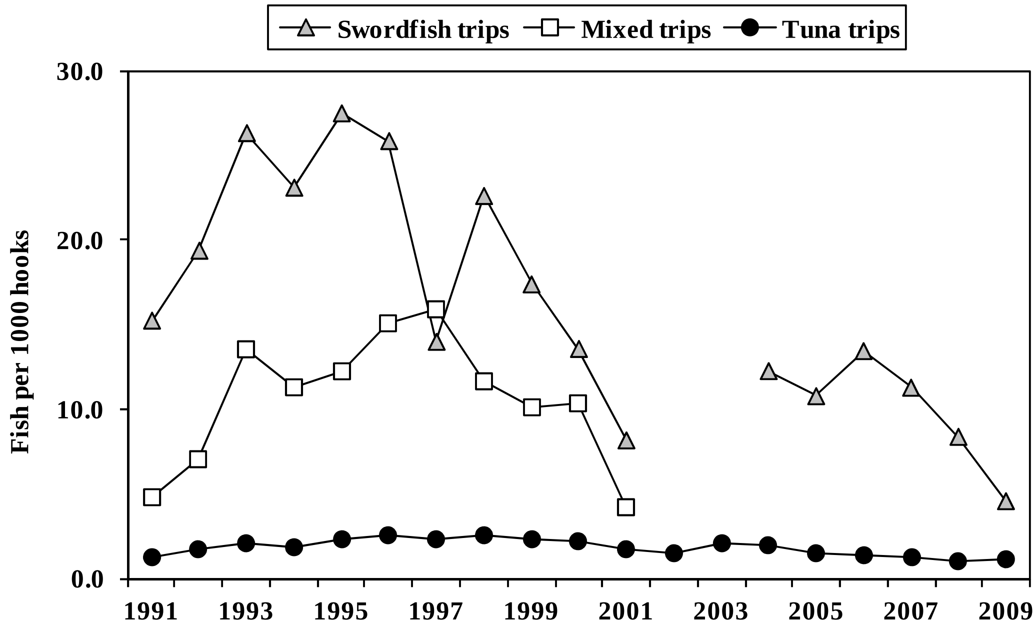


Year	Moonfish			Pomfret		
	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	0.5	0.1	0.0	-	-	-
1992	0.6	0.0	0.0	-	-	-
1993	0.7	0.0	0.0	-	-	-
1994	0.7	0.0	0.0	-	-	-
1995	0.6	0.1	0.0	0.6	0.0	0.0
1996	0.7	0.1	0.0	0.8	0.1	0.0
1997	0.7	0.1	0.0	0.9	0.0	0.0
1998	0.7	0.0	0.0	1.1	0.1	0.0
1999	0.8	0.2	0.0	1.4	0.4	0.0
2000	0.4	0.1	0.0	1.1	0.2	0.0
2001	0.4	0.3	0.0	0.9	0.8	0.3
2002	0.3	-	-	1.4	-	-
2003	0.4	-	-	1.1	-	-
2004	0.3	-	0.3	2.1	-	0.3
2005	0.4	-	0.0	1.4	-	0.1
2006	0.4	-	0.1	1.2	-	0.2
2007	0.4	-	0.0	1.0	-	0.1
2008	0.4	-	0.1	1.1	-	0.1
2009	0.6	-	0.1	1.0	-	0.1
Average	**0.51**	**0.08**	**0.04**	**1.13**	**0.22**	**0.09**
SD	**0.16**	**0.09**	**0.06**	**0.34**	**0.27**	**0.10**

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 2000-2008 appear to be about half compared to the period 1993-1999. Pomfret CPUE on tuna trips showed a general increase from 1995 through 2004 then declined in the following years.

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

Figure 95. Hawaii Longline Blue Shark CPUE by Trip Type, 1991-2009

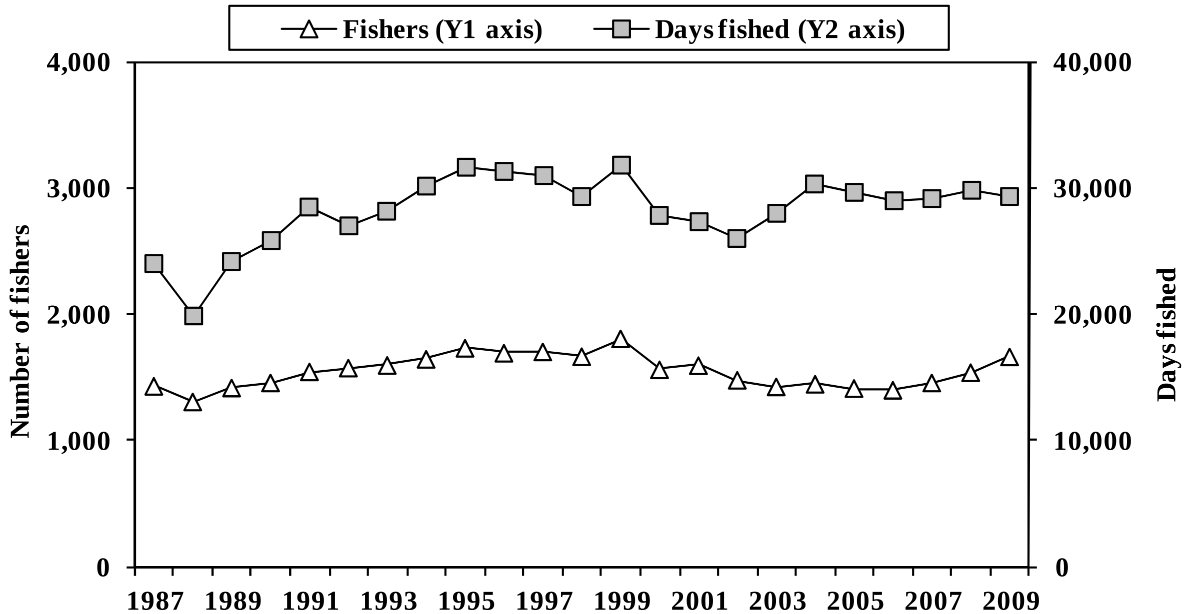


Interpretation: Blue sharks are caught incidentally by the longline fishery. The blue shark CPUE on swordfish-targeted trips is always considerably greater (by about 8-fold) than on tuna-targeted trips. Blue shark CPUE on swordfish targeted trips peaked at 28 in 1995 and declined to 8 in 2001. Blue shark CPUE was stable after the swordfish fishery was reopened in 2004, although it never achieved the high catch rates from the prior time period. 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. Blue shark CPUE declined to a record low 4.6 in 2009.

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	15.1	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	10.8	-	1.5
2006	13.5	-	1.4
2007	11.3	-	1.3
2008	8.4	-	1.0
2009	4.6	-	1.1
Average	**16.12**	**10.58**	**1.82**
SD	**6.95**	**3.86**	**0.50**

Figure 96. Number of Main Hawaiian Islands Troll Fishers and Days Fished, 1987-2009



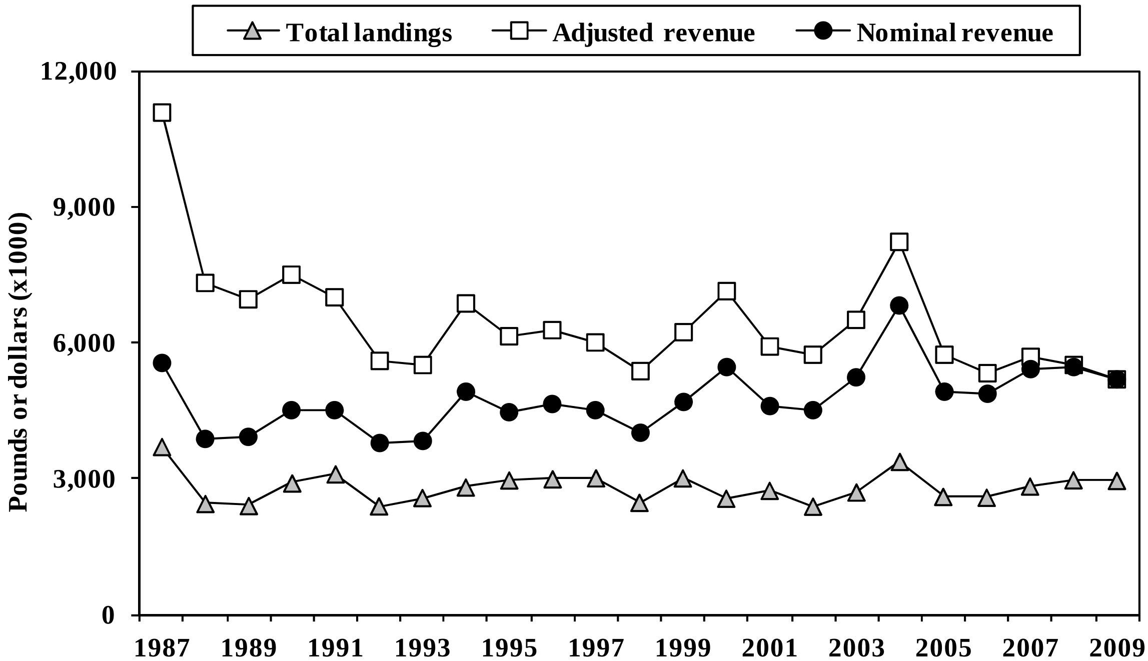
Interpretation: The Main Hawaiian Islands (MHI) troll fishers rose from 1988, peaked in 1999, decreased the following year and remained relatively unchanged up to 2008 with a apparent above average participation in 2009. There were 1,667 MHI troll fishers in 2009. The pattern for number of days fished by the MHI troll fishery was similar to that of the number of fishers up until 2002 where effort seemed to increase before participation.

Year	Fishers	Days fished
1987	1,432	24,092
1988	1,306	19,912
1989	1,418	24,132
1990	1,458	25,830
1991	1,547	28,452
1992	1,578	27,003
1993	1,599	28,170
1994	1,648	30,093
1995	1,737	31,611
1996	1,697	31,238
1997	1,707	31,015
1998	1,669	29,406
1999	1,812	31,801
2000	1,564	27,796
2001	1,597	27,271
2002	1,480	26,070
2003	1,427	28,041
2004	1,448	30,404
2005	1,414	29,609
2006	1,400	28,918
2007	1,458	29,221
2008	1,541	29,881
2009	1,667	29,334
Average	**1,548.0**	**28,230.4**
SD	**130.1**	**2,813.1**

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

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

Figure 97. Main Hawaiian Islands Troll Landings and Revenue, 1987-2009

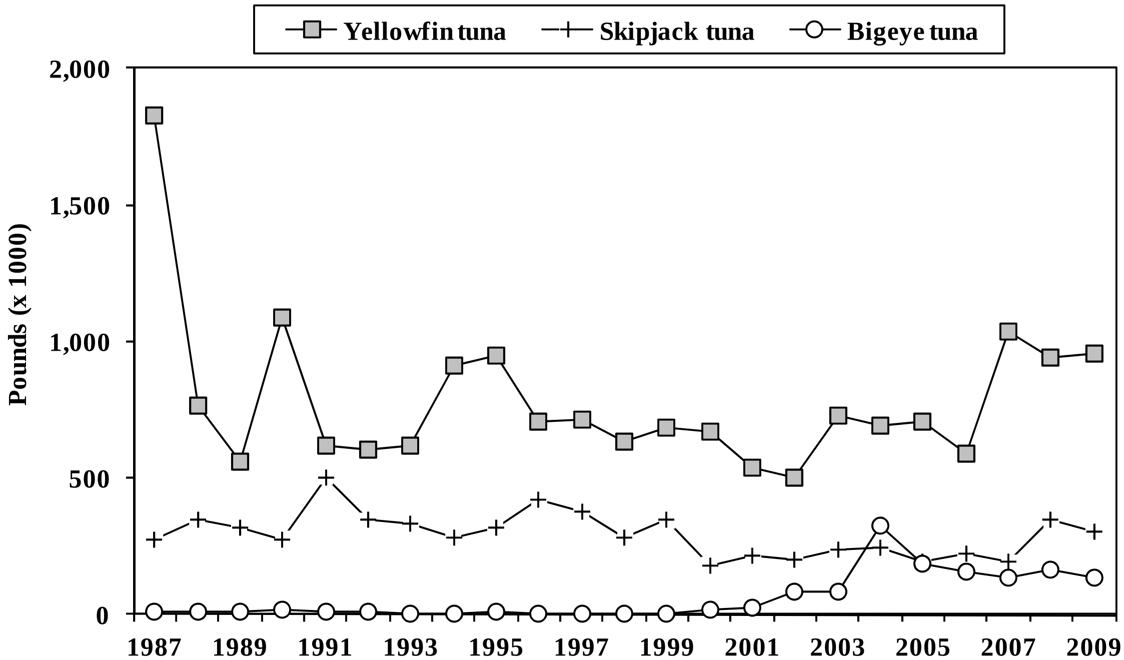


Interpretation: The total landings by the MHI troll fishery in 2009 was 3 million pounds worth an estimated $5.2 million. Total landings were close to its long-term average but adjusted revenue was 20% below at a record low and far below its long-term average. Landings ranged from 2.4 million pounds to 3.7 million pounds from 1987-2009. Adjusted revenue varied substantially from $5.2 million in 2009 to $11.1 million in 1987.

Source and Calculations: Total landings and nominal revenue for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the MHI troll fishery. The adjusted revenue is calculated by dividing the nominal revenue by the Honolulu CPI for the respective year then multiplying the result by the current year (2009) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	3,709	$11,082	$5,536	114.9
1988	2,445	$7,323	$3,875	121.7
1989	2,401	$6,968	$3,899	128.7
1990	2,901	$7,485	$4,494	138.1
1991	3,102	$6,989	$4,497	148.0
1992	2,394	$5,579	$3,762	155.1
1993	2,578	$5,482	$3,816	160.1
1994	2,810	$6,847	$4,897	164.5
1995	2,966	$6,117	$4,471	168.1
1996	2,994	$6,265	$4,650	170.7
1997	3,016	$6,004	$4,487	171.9
1998	2,471	$5,379	$4,011	171.5
1999	3,013	$6,218	$4,685	173.3
2000	2,562	$7,145	$5,477	176.3
2001	2,737	$5,897	$4,574	178.4
2002	2,387	$5,738	$4,498	180.3
2003	2,700	$6,494	$5,209	184.5
2004	3,378	$8,210	$6,804	190.6
2005	2,603	$5,722	$4,921	197.8
2006	2,584	$5,323	$4,846	209.4
2007	2,832	$5,679	$5,420	219.5
2008	2,972	$5,503	$5,477	228.9
2009	2,958	$5,198	$5,198	230.0
Average	**2,804.9**	**$6,462.9**	**$4,761.0**	
SD	**330.9**	**$1,287.9**	**$709.7**	

Figure 98. Main Hawaiian Islands Troll Tuna Landings, 1987-2009



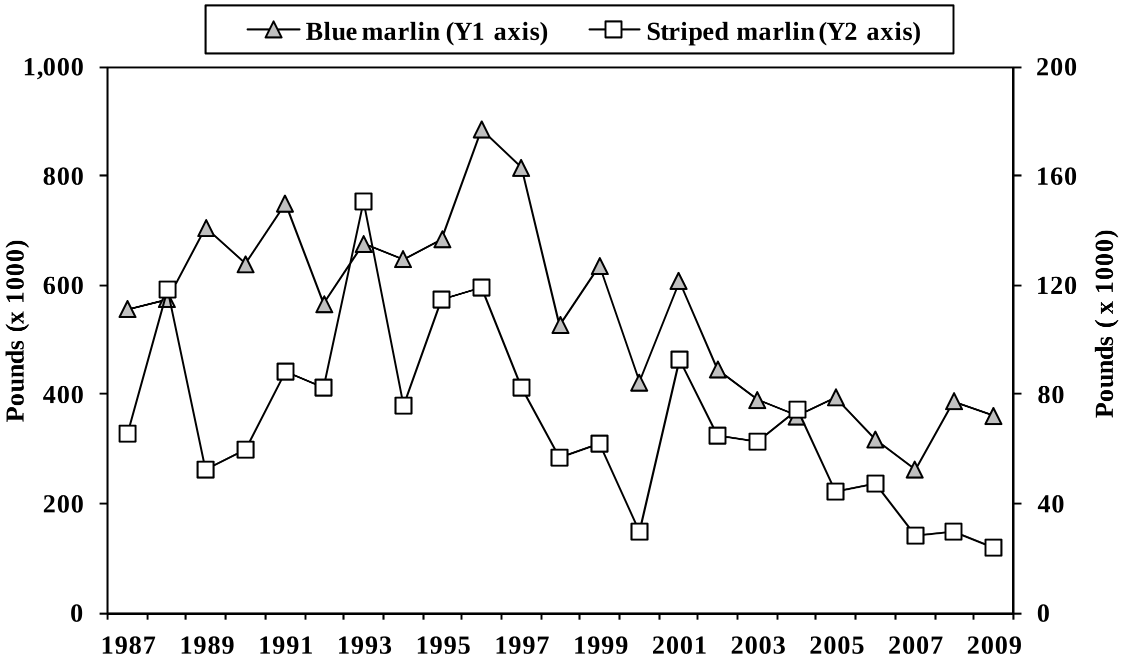
Interpretation: The MHI troll tuna landings were composed predominantly of yellowfin tuna. Yellowfin tuna landings increased dramatically from the mid 1980s, dropped in the late 1980s and remained relatively stable thereafter. Skipjack tuna was the second largest component of the MHI troll landings.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

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

.

	MHI troll tuna landings (1000 pounds)					
Year	Yellowfin tuna	Skipjack tuna	Bigeye tuna	Albacore	Other tunas	Total tunas
1987	1,828	277	11	1	19	2,136
1988	764	351	10	1	16	1,141
1989	559	318	11	1	14	904
1990	1,089	278	15	1	18	1,401
1991	615	504	11	2	13	1,145
1992	606	347	9	3	15	980
1993	616	332	4	3	9	964
1994	914	283	6	22	15	1,240
1995	949	318	10	10	9	1,295
1996	707	424	4	5	6	1,146
1997	712	376	6	7	6	1,107
1998	636	278	5	4	10	933
1999	687	347	7	87	7	1,135
2000	670	181	15	5	6	877
2001	542	215	23	13	5	799
2002	500	203	86	9	6	804
2003	732	237	82	10	27	1,088
2004	690	247	328	7	45	1,316
2005	708	191	188	14	15	1,117
2006	589	221	154	2	12	977
2007	1,033	192	139	7	11	1,383
2008	941	346	163	3	8	1,463
2009	956	303	138	7	17	1,422
Average	**784.5**	**294.2**	**62.0**	**9.7**	**13.4**	**1,164.1**
SD	**280.7**	**80.3**	**85.1**	**17.6**	**8.8**	**289.2**

Figure 99. Main Hawaiian Islands Troll Billfish Landings, 1987-2009

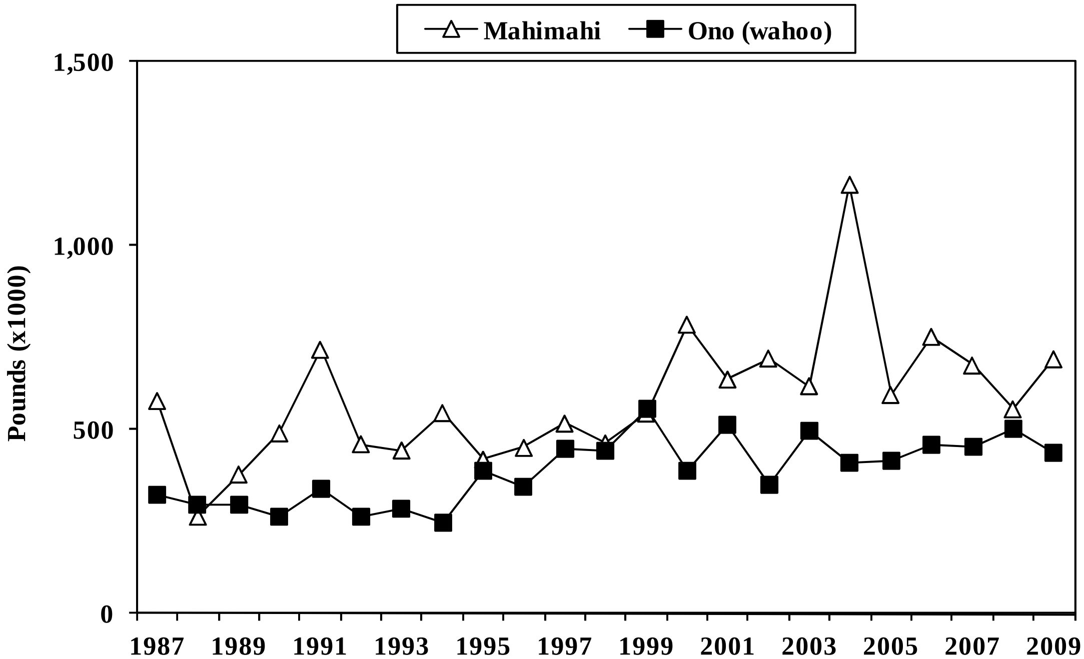


Interpretation: Billfish landings by the MHI troll fishery in 2009 were 405,000 pounds, 39% below the long-term average. Landings of billfish by the MHI troll fishery consisted primarily of blue marlin. Blue marlin landings peaked at 885,000 pounds in 1996 and decreased thereafter. Striped marlin landings in this fishery were at a record low 24,000 pounds in 2009. Both blue marlin and striped marlin were on a decreasing trend from the mid1990s. The MHI troll fishery also had small landings of other billfish, e.g., including spearfish, sailfish, swordfish, and black marlin.

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

	MHI troll billfish landings (1000 pounds)				
Year	Blue marlin	Striped marlin	Other billfish	Swordfish	Total billfishes
1987	557	66	42	1	666
1988	575	118	41	2	736
1989	704	52	47	2	805
1990	638	59	33	1	732
1991	749	89	52	1	890
1992	565	83	35	0	683
1993	675	150	44	0	870
1994	648	76	46	1	770
1995	684	114	57	1	856
1996	885	119	37	1	1,042
1997	814	83	36	1	935
1998	527	57	41	1	626
1999	635	62	71	1	769
2000	422	30	49	5	506
2001	608	93	75	4	780
2002	446	65	22	3	535
2003	390	63	37	1	491
2004	360	74	46	0	481
2005	395	44	35	1	474
2006	318	47	29	1	395
2007	263	28	23	2	316
2008	388	30	29	1	448
2009	361	24	19	1	405
Average	**548.2**	**70.7**	**41.1**	**1.4**	**661.4**
SD	**167.8**	**32.7**	**13.9**	**1.2**	**198.0**

Figure 100. Main Hawaiian Islands Troll Landings of Other Pelagic PMUS, 1987-2009

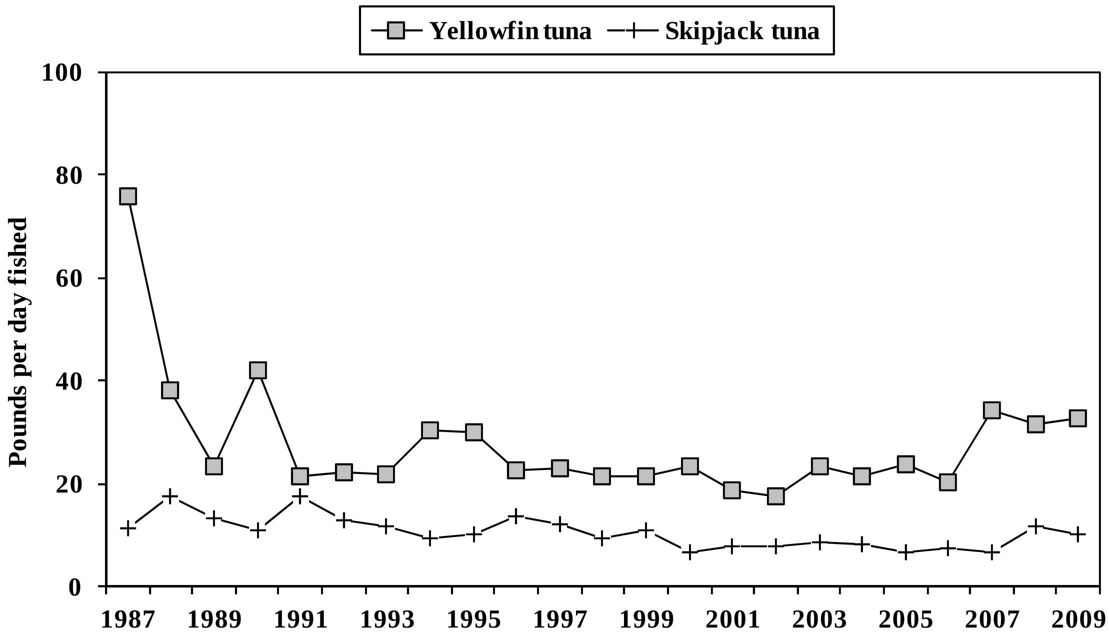


Interpretation: Landings of "other pelagic" species by the MHI troll fishery in 2009 was 1.1 million pounds, 15% above the long-term average. Mahimahi and ono comprised majority of these landings. Both mahimahi and ono landings in 2009 were above their long term average by 18% and 12%, respectively and both species were on slightly increasing trends.

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

	MHI troll other pelagic landings (1000 pounds)			
Year	Mahimahi	Ono (wahoo)	Misc pelagics	Total other pelagics
1987	579	324	3	907
1988	264	298	6	569
1989	379	298	14	691
1990	491	262	16	768
1991	718	337	12	1,067
1992	461	262	8	731
1993	444	286	13	744
1994	546	245	9	800
1995	419	388	8	815
1996	451	347	7	806
1997	517	451	5	974
1998	464	442	6	912
1999	545	558	6	1,109
2000	786	386	7	1,179
2001	637	516	6	1,159
2002	694	350	4	1,048
2003	619	498	3	1,120
2004	1,166	412	3	1,581
2005	595	414	4	1,013
2006	753	457	3	1,213
2007	675	456	3	1,133
2008	556	500	4	1,061
2009	692	435	4	1,131
Average	**584.8**	**388.0**	**6.7**	**979.6**
SD	**180.5**	**90.0**	**3.8**	**224.1**

Figure 101. Main Hawaiian Islands Troll Tuna Landings per Day/Hour Fished, 1987-2009



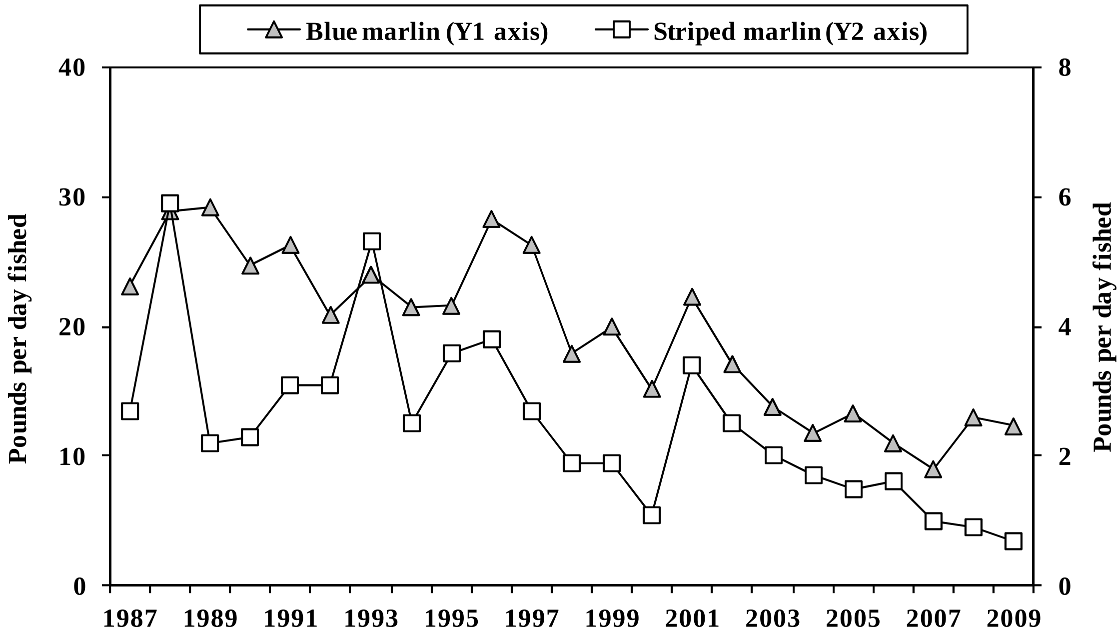
Interpretation: MHI troll yellowfin tuna CPUE was consistently higher than skipjack tuna CPUE. . Yellowfin tuna peaked at 76 pounds in 1987, dropped to 23 pounds per trip in 1989 and remained close to that level from 1991. Yellowfin tuna CPUE was higher than the long-term average for the past three years with CPUE at 33 pounds per trip in 2009. Skipjack tuna CPUE was 10 pounds in 2009.

Source and Calculations: These numbers are the landings of yellowfin tuna and skipjack tuna by the MHI troll fishery during each year divided by the number of MHI troll days fished (Figure 37) during that year. For the smaller table the landings are divided by the number of MHI troll hours fished. The landings values used here are the actual pounds landed from the (HDAR) commercial fish landings data. They are not replaced by pounds sold from the HDAR fish dealer data when the pounds sold is greater than the pounds landed in 2000 and later.

MHI troll tuna CPUE (pounds per day fished)		
Year	Yellowfin tuna	Skipjack tuna
1987	75.9	11.5
1988	38.3	17.6
1989	23.2	13.2
1990	42.2	10.8
1991	21.6	17.7
1992	22.4	12.9
1993	21.9	11.8
1994	30.4	9.4
1995	30.0	10.0
1996	22.6	13.6
1997	23.0	12.1
1998	21.6	9.5
1999	21.6	10.9
2000	23.3	6.5
2001	18.7	7.9
2002	17.4	7.8
2003	23.3	8.5
2004	21.3	8.1
2005	23.9	6.5
2006	20.4	7.6
2007	34.4	6.6
2008	31.5	11.6
2009	32.6	10.3
Average	27.89	10.54
SD	12.28	3.12

MHI troll tuna CPUE (pounds per hours fished)		
Year	Yellowfin tuna	Skipjack tuna
2003	3.9	1.4
2004	3.6	1.4
2005	4.1	1.1
2006	3.5	1.3
2007	5.9	1.1
2008	5.4	2.0
2009	5.5	1.8
Average	4.55	1.43
SD	1.04	0.34

Figure 102. Main Hawaiian Island Troll Marlin Landings per Day/Hour Fished, 1987-2009



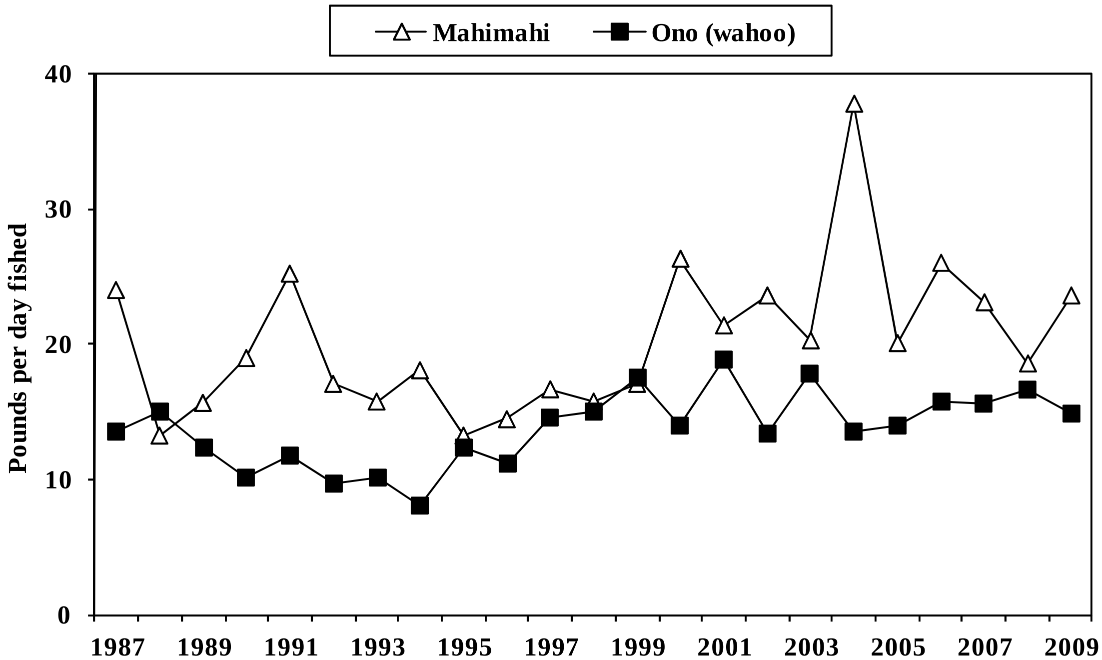
Interpretation: CPUE for blue marlin was substantially higher compared to the CPUE for striped marlin. CPUE for both blue marlin and striped marlin in 2009 was below their long-term average by 37% and 72%, respectively. Blue marlin and striped marlin CPUE were both at or below their long-term average for the past eight years. The CPUE for both blue marlin and striped marlin appeared to be on a downward trend from the mid 1990s.

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

MHI troll marlin CPUE (pounds per hours fished)		
Year	Blue marlin	Striped marlin
2003	2.3	0.3
2004	2.0	0.3
2005	2.3	0.3
2006	1.9	0.3
2007	1.5	0.2
2008	2.2	0.2
2009	2.1	0.1
Average	2.04	0.23
SD	0.28	0.08

MHI troll marlin CPUE (pounds per day fished)		
Year	Blue marlin	Striped marlin
1987	23.1	2.7
1988	28.9	5.9
1989	29.2	2.2
1990	24.7	2.3
1991	26.3	3.1
1992	20.9	3.1
1993	24.0	5.3
1994	21.5	2.5
1995	21.6	3.6
1996	28.3	3.8
1997	26.3	2.7
1998	17.9	1.9
1999	20.0	1.9
2000	15.2	1.1
2001	22.3	3.4
2002	17.1	2.5
2003	13.8	2.0
2004	11.8	1.7
2005	13.3	1.5
2006	11.0	1.6
2007	9.0	1.0
2008	13.0	0.9
2009	12.3	0.7
Average	19.63	2.50
SD	6.27	1.31

Figure 103. Main Hawaiian Island Troll Mahimahi and Ono Landings per Day/Hour Fished, 1987-2009



Interpretation: Mahimahi CPUE for the MHI troll fishery was slightly higher and more variable than that for ono. The CPUE for both mahimahi and ono in 2009 were both above their long-term average by 16% and 8%, respectively. CPUE for both species have been on an upward trend since the mid-1990s.

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

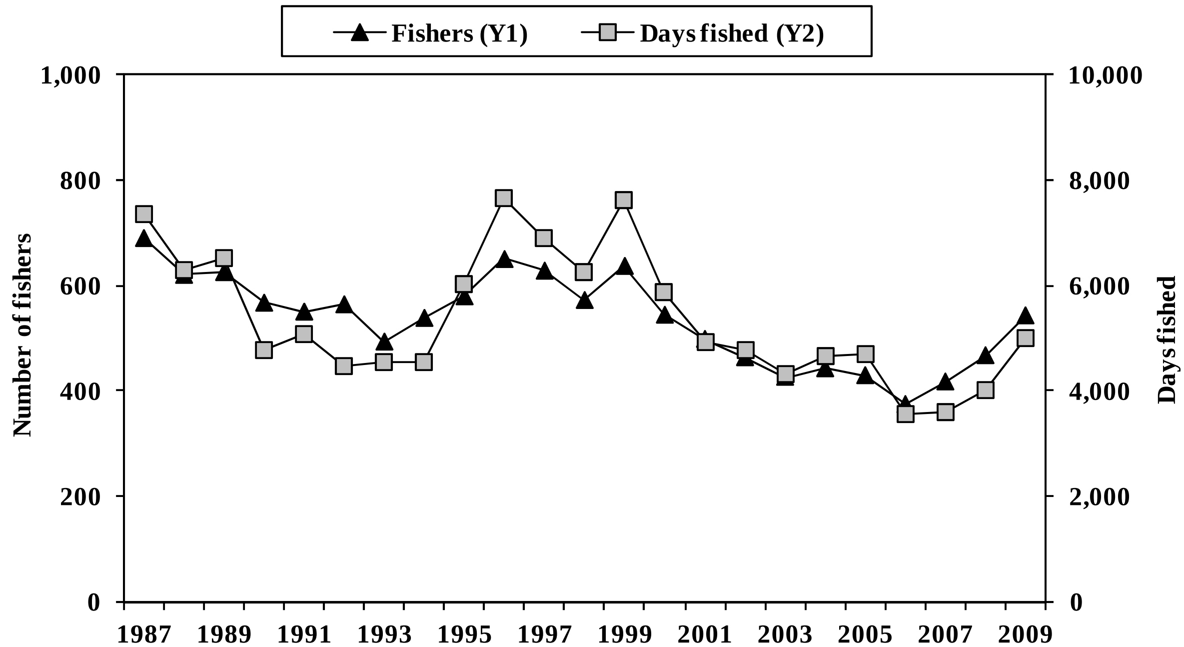
MHI troll mahimahi and ono CPUE (pounds per hours fished)

Year	Mahimahi	Ono (wahoo)
2003	3.4	3.0
2004	6.3	2.3
2005	3.4	2.4
2006	4.4	2.7
2007	3.9	2.6
2008	3.2	2.9
2009	4.0	2.5
Average	4.08	2.62
SD	1.07	0.26

MHI troll mahimahi and ono CPUE (pounds per day fished)

Year	Mahimahi	Ono (wahoo)
1987	24.0	13.5
1988	13.3	15.0
1989	15.7	12.3
1990	19.0	10.1
1991	25.2	11.8
1992	17.1	9.7
1993	15.8	10.2
1994	18.1	8.1
1995	13.3	12.3
1996	14.5	11.1
1997	16.7	14.6
1998	15.8	15.0
1999	17.1	17.5
2000	26.3	13.9
2001	21.4	18.9
2002	23.6	13.4
2003	20.3	17.8
2004	37.7	13.5
2005	20.1	14.0
2006	26.0	15.8
2007	23.1	15.6
2008	18.6	16.7
2009	23.6	14.8
Average	20.27	13.72
SD	5.54	2.76

Figure 104. Number of Main Hawaiian Islands Handline Fishers and Number of Days Fished, 1987-2009



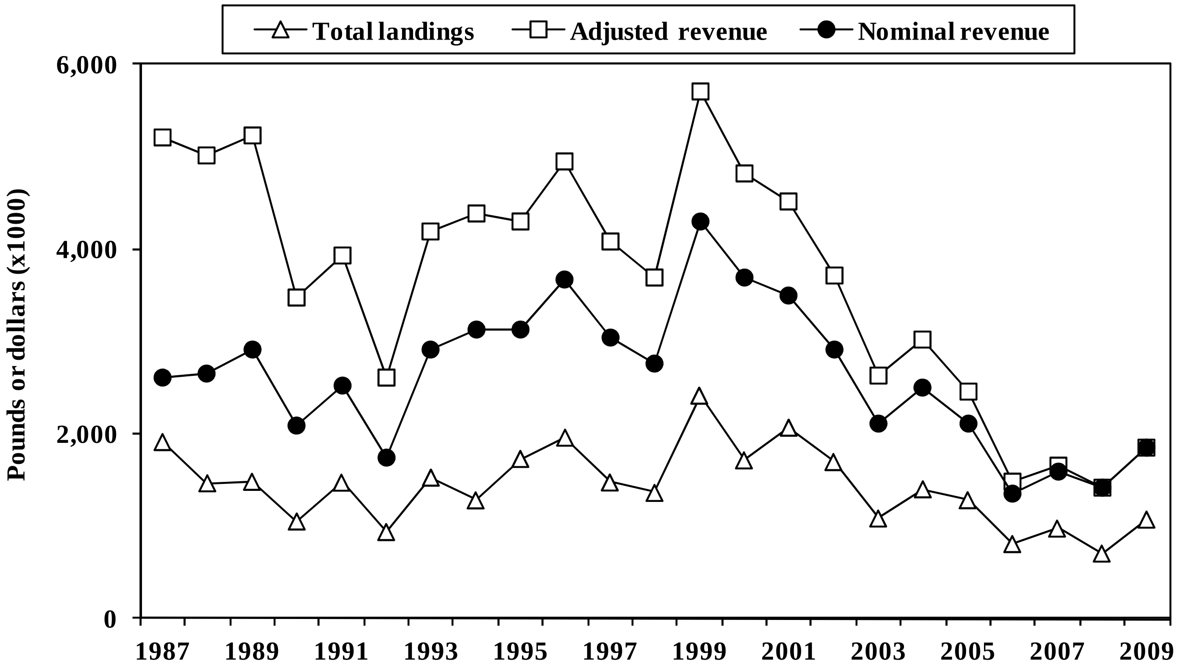
Interpretation: There were 543 MHI handline fishers that fished 5,015 days in 2009. The number of fishers was close to the long-term average while days fished was 7% below the long-term average effort. MHI handline effort decreased from the mid 1990s and reached a low in 2006 and has increased during the past three years.

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

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

Year	Fishers	Days fished
1987	690	7,356
1988	620	6,280
1989	625	6,511
1990	567	4,791
1991	550	5,072
1992	564	4,462
1993	493	4,537
1994	538	4,548
1995	579	6,022
1996	650	7,655
1997	628	6,911
1998	572	6,259
1999	637	7,625
2000	544	5,862
2001	498	4,912
2002	463	4,770
2003	426	4,320
2004	442	4,658
2005	429	4,712
2006	374	3,578
2007	417	3,584
2008	467	4,024
2009	543	5,015
Average	**535.5**	**5,368.0**
SD	**85.7**	**1,239.2**

Figure 105. Main Hawaiian Island Handline Landings and Revenue, 1987-2009

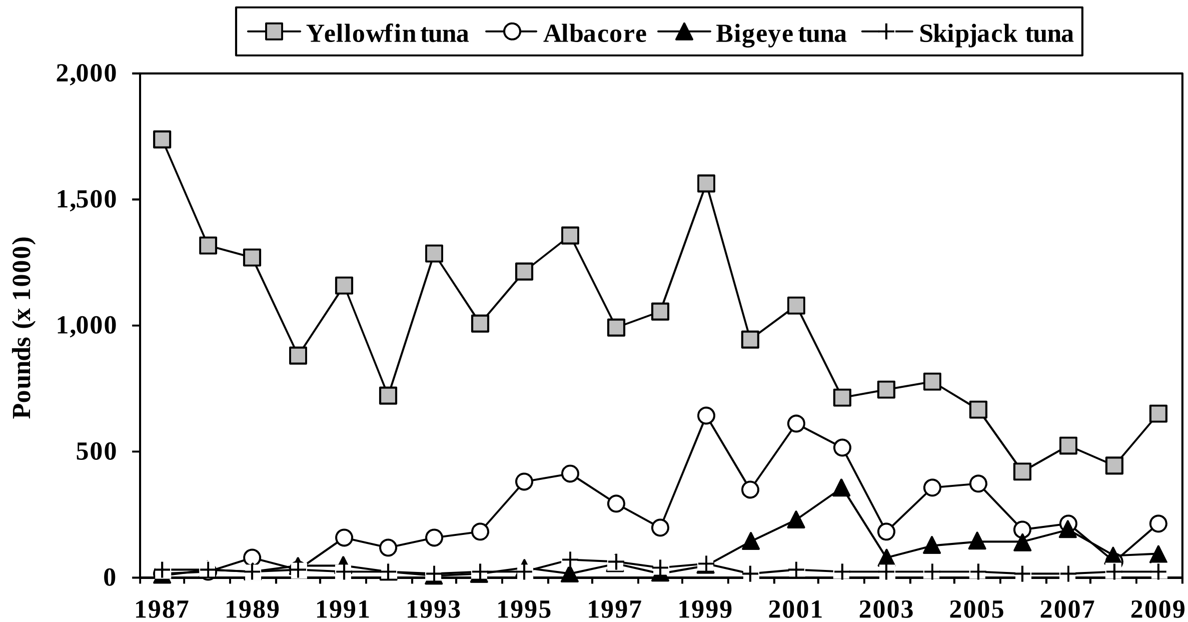


Interpretation: Total landings by the MHI handline fishery in 2009 were 1.1 million pounds, worth an estimated $1.9 million. Total landings and revenue by this fishery was below the long-term values by 26% and 49%, respectively. The recent pattern for MHI handline fishery landings and revenue was similar to the trip activity, which consisted of a decreasing trend from 1999.

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

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	1,914	$5,217	$2,606	114.9
1988	1,471	$5,016	$2,654	121.7
1989	1,487	$5,222	$2,922	128.7
1990	1,060	$3,471	$2,084	138.1
1991	1,477	$3,935	$2,532	148.0
1992	946	$2,601	$1,754	155.1
1993	1,532	$4,201	$2,924	160.1
1994	1,287	$4,383	$3,135	164.5
1995	1,733	$4,295	$3,139	168.1
1996	1,962	$4,944	$3,669	170.7
1997	1,479	$4,073	$3,044	171.9
1998	1,368	$3,700	$2,759	171.5
1999	2,414	$5,708	$4,301	173.3
2000	1,717	$4,820	$3,695	176.3
2001	2,070	$4,521	$3,507	178.4
2002	1,699	$3,712	$2,910	180.3
2003	1,092	$2,632	$2,111	184.5
2004	1,406	$3,029	$2,510	190.6
2005	1,289	$2,462	$2,117	197.8
2006	817	$1,490	$1,357	209.4
2007	983	$1,658	$1,582	219.5
2008	714	$1,416	$1,409	228.9
2009	1,080	$1,860	$1,860	230.0
Average	1,450.7	$3,668.0	$2,634.0	
SD	423.7	$1,299.3	$773.2	

Figure 106. Main Hawaiian Island Handline Tuna Landings, 1987-2009

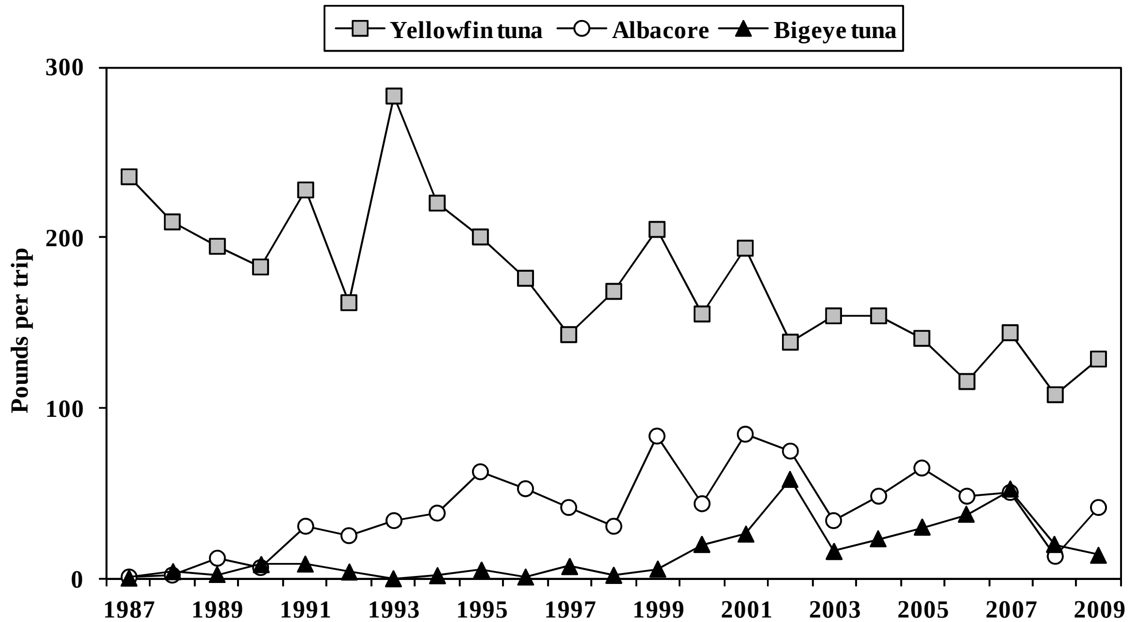


Interpretation: MHI handline tuna landings in 2009 were 978,000 pounds, 28% below the long-term average. The largest component of tuna landings by the MHI handline fishery was yellowfin tuna, followed by albacore and bigeye tuna. Yellowfin tuna landings by MHI handline fishery were 33% below the long-term average. Albacore landings was 15% below is long-term averages while bigeye tuna was up 9% its long-term average.

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

	MHI handline tuna landings (1000 lbs)					
Year	Yellowfin tuna	Albacore	Bigeye tuna	Skipjack tuna	Other tunas	Total
1987	1,734	12	6	25	5	1,782
1988	1,310	18	28	29	9	1,395
1989	1,266	78	19	20	11	1,393
1990	876	31	41	26	7	981
1991	1,154	157	45	19	6	1,380
1992	722	116	19	21	7	885
1993	1,283	154	2	14	5	1,458
1994	1,003	176	10	21	3	1,213
1995	1,207	380	33	17	6	1,642
1996	1,352	409	11	69	4	1,845
1997	986	287	52	56	3	1,384
1998	1,052	191	15	38	3	1,298
1999	1,559	642	46	52	2	2,302
2000	937	347	141	14	2	1,440
2001	1,078	605	226	30	4	1,942
2002	711	511	353	20	3	1,598
2003	746	176	74	16	4	1,015
2004	770	351	125	23	17	1,286
2005	662	370	142	21	5	1,201
2006	413	188	135	10	2	749
2007	518	208	188	15	3	931
2008	437	62	82	20	3	603
2009	649	211	88	23	6	978
Average	**975.0**	**246.9**	**81.8**	**26.0**	**5.2**	**1,351.0**
SD	**351.1**	**179.2**	**86.0**	**14.7**	**3.4**	**406.4**

Figure 107. Main Hawaiian Island Handline Tuna Landings per Day/Hour Fished, 1987-2009



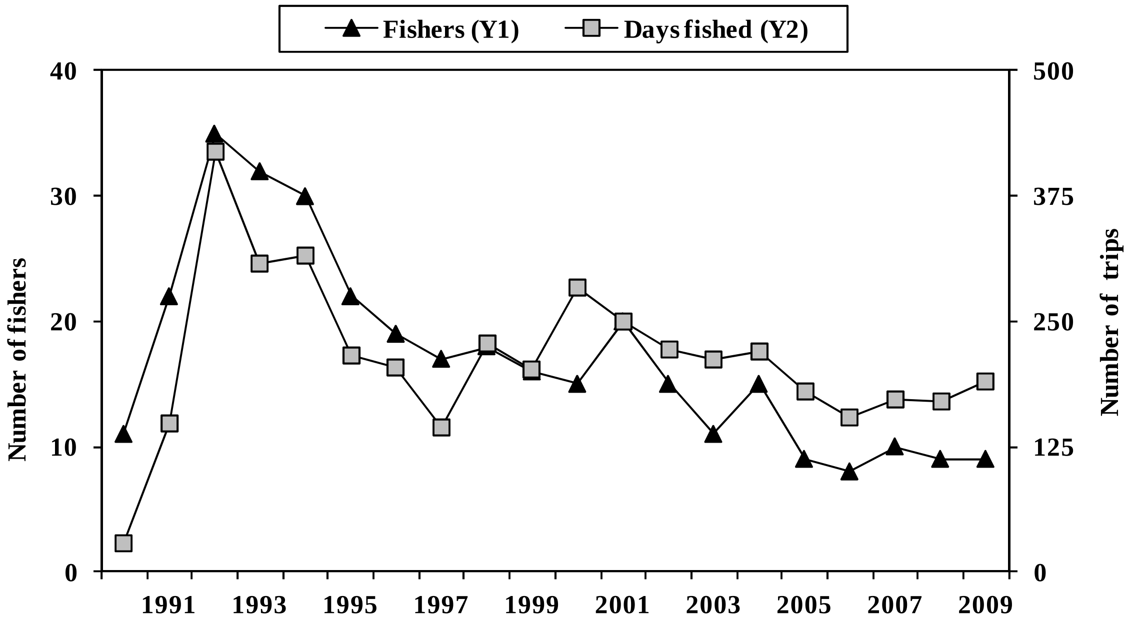
Interpretation: MHI handline CPUE (pounds per day fished) were below the long-term average in 2009. Yellowfin tuna CPUE, the dominant component of the handline landings, was 129 pounds per trip; 27% below the long-term average. Yellowfin tuna CPUE was on a decline after peaking in 1993. Albacore and bigeye tuna CPUE were close to their respective long-term averages.

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

	MHI handline landings per trip (pounds)			
Year	Yellowfin tuna	Albacore	Bigeye tuna	Total
1987	235.7	1.6	0.8	242.3
1988	208.7	2.9	4.5	222.1
1989	194.4	11.9	2.9	214.0
1990	182.8	6.5	8.6	204.8
1991	227.4	30.9	8.9	272.1
1992	161.8	26.0	4.3	198.3
1993	282.8	33.9	0.4	321.4
1994	220.5	38.7	2.2	266.7
1995	200.4	63.1	5.4	272.7
1996	176.6	53.4	1.4	241.0
1997	142.7	41.5	7.5	200.3
1998	168.0	30.5	2.4	207.4
1999	204.5	84.2	6.0	301.9
2000	155.0	44.3	20.3	222.4
2001	193.9	84.9	26.3	312.0
2002	139.2	74.9	58.0	276.9
2003	153.7	34.8	16.2	209.5
2004	153.8	48.3	23.6	234.3
2005	141.0	65.4	30.3	242.2
2006	115.5	48.3	37.8	205.2
2007	144.6	51.0	52.4	252.8
2008	108.5	13.5	20.3	148.0
2009	129.4	42.1	14.0	191.3
Average	**175.69**	**40.55**	**15.41**	**243.38**
SD	**42.39**	**24.05**	**16.32**	**38.86**

	MHI handline landings (pounds per hour fished)			
Year	Yellowfin tuna	Albacore	Bigeye tuna	Total
2003	21.5	4.9	2.3	29.3
2004	21.5	6.8	3.3	32.8
2005	20.2	9.4	4.4	34.8
2006	17.3	7.2	5.6	30.7
2007	22.6	8.0	8.2	39.4
2008	17.0	2.1	3.2	23.2
2009	19.6	6.4	2.1	28.9
Average	**19.96**	**6.40**	**4.16**	**31.30**
SD	**2.15**	**2.35**	**2.15**	**5.10**

Figure 108. Hawaii Number of Offshore Handline Fishers and Days Fished, 1990-2009



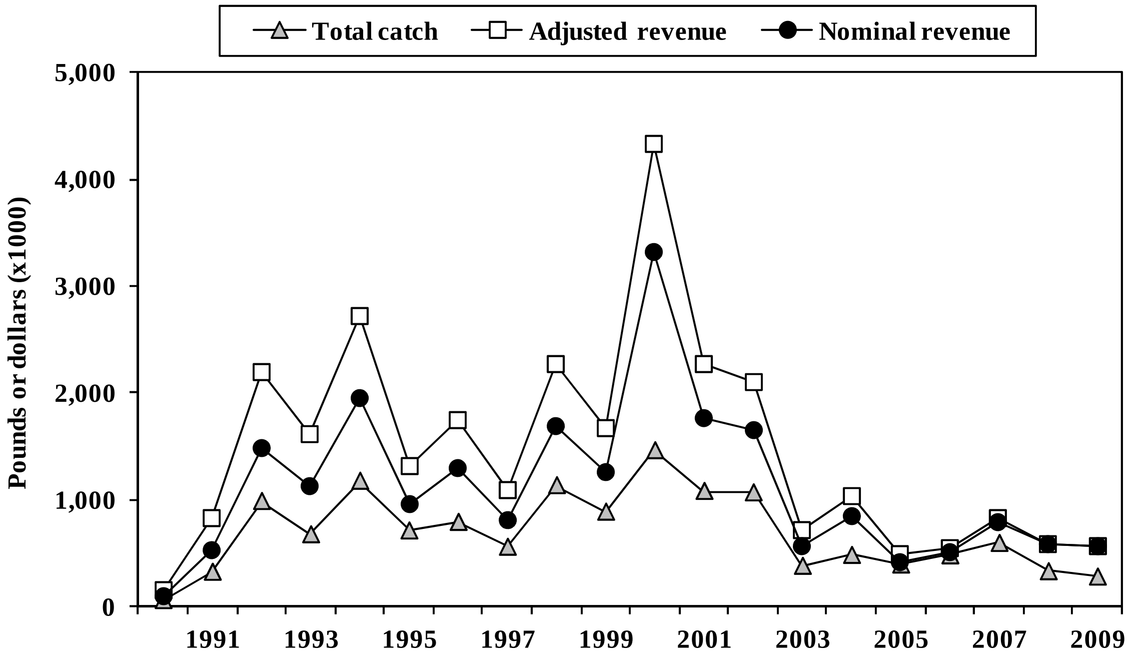
Interpretation: The offshore tuna handline fishery had 9 fishers that fished 190 days in 2009, the same and slightly more than the previous year, respectively but below their respective long-term averages. Both number of fishers and days fished peaked in 1992 and declined into the late 1990s. Offshore handline effort was relatively stable for the past 5 years.

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

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

Year	Fishers	Days fished
1990	11	29
1991	22	148
1992	35	420
1993	32	307
1994	30	316
1995	22	216
1996	19	204
1997	17	145
1998	18	228
1999	16	202
2000	15	284
2001	20	250
2002	15	223
2003	11	212
2004	15	220
2005	9	180
2006	8	155
2007	10	173
2008	9	170
2009	9	190
Average	**17.6**	**214.8**
SD	**7.9**	**81.6**

Figure 109. Hawaii Offshore Handline Landings and Revenue, 1990-2009

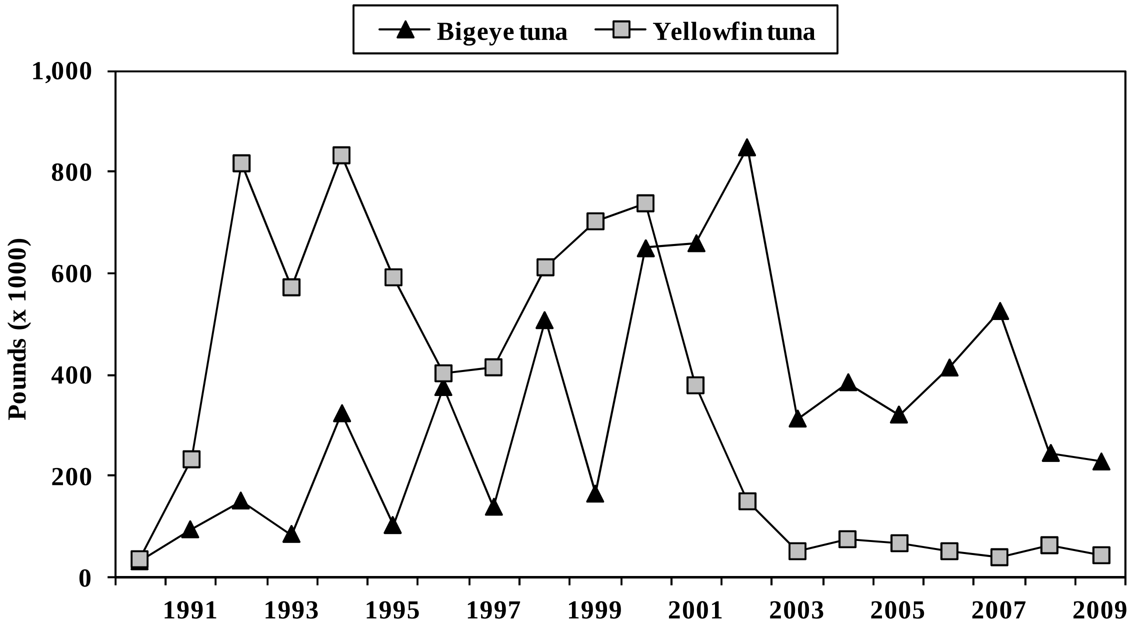


Interpretation: Total landings and revenue by the offshore handline fishery were 286,000 pounds worth an estimated $569,000 in 2009. Total landings and revenue by this fishery decreased slightly from the previous year and were below the long-term values by 60% and 62%, respectively in 2009. The recent trend for landings and revenue by the offshore handline fishery was one that showed a steep decline from 2000 to 2003 and remained low through 2009.

Source and Calculations: Total landings and nominal revenue for the offshore handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the offshore handline fishery. The adjusted revenue is calculated by dividing the nominal revenue by the respective year Honolulu CPI and then multiplying the result by the current year (2009) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1990	68	$162	$97	138.1
1991	331	$828	$533	148.0
1992	987	$2,190	$1,477	155.1
1993	679	$1,616	$1,125	160.1
1994	1,175	$2,722	$1,947	164.5
1995	714	$1,319	$964	168.1
1996	793	$1,754	$1,302	170.7
1997	563	$1,085	$811	171.9
1998	1,134	$2,275	$1,696	171.5
1999	888	$1,667	$1,256	173.3
2000	1,458	$4,329	$3,318	176.3
2001	1,080	$2,265	$1,757	178.4
2002	1,067	$2,098	$1,645	180.3
2003	386	$712	$571	184.5
2004	487	$1,026	$850	190.6
2005	398	$488	$420	197.8
2006	483	$552	$503	209.4
2007	598	$832	$794	219.5
2008	336	$583	$580	228.9
2009	286	$569	$569	230.0
Average	**717.0**	**$1,500.2**	**$1,139.3**	
SD	**362.8**	**$1,003.4**	**$739.9**	

Figure 110. Hawaii Offshore Handline Landings, 1990-2009



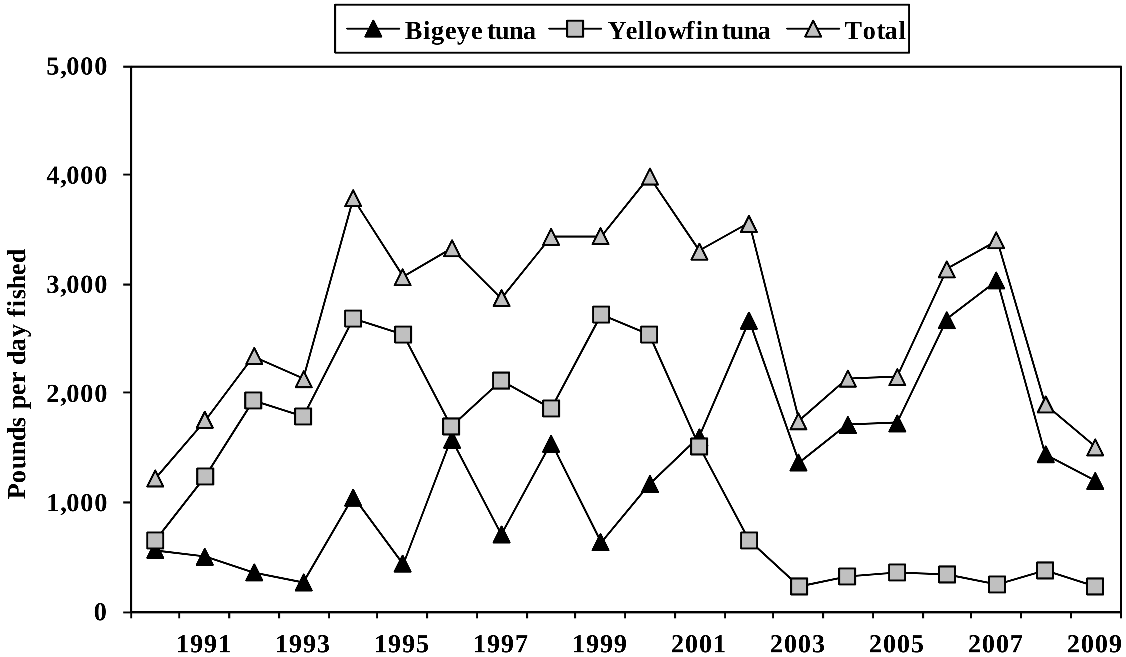
Interpretation: Bigeye tuna was the largest component of the offshore handline landings (80%) followed by yellowfin tuna (16%), and small landings of mahimahi. Yellowfin tuna was the largest component of the landings until 2001 when it was replaced by bigeye tuna. This may reflect better species identification by fishermen (small bigeye tuna and yellowfin tuna can be very difficult to distinguish. In general, bigeye tuna landings had wide inter-annual fluctuation in the 1990s, a steep decline in 2003, a gradual increasing trend up to 2007, and below average landings in 2008 and 2009.

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

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

	Offshore handline landings (1000 pounds)			
Year	Bigeye tuna	Yellowfin tuna	Mahimahi	Total
1990	31	35	0	68
1991	94	232	5	331
1992	151	816	21	987
1993	85	571	23	679
1994	324	834	18	1,175
1995	102	591	20	714
1996	375	401	17	793
1997	138	415	9	563
1998	508	613	13	1,134
1999	164	703	20	888
2000	650	739	54	1,458
2001	660	379	35	1,080
2002	850	151	26	1,067
2003	313	52	14	386
2004	385	75	14	487
2005	321	67	7	398
2006	414	52	8	483
2007	526	42	6	598
2008	245	65	9	336
2009	228	45	7	286
Average	**333.4**	**359.6**	**16.8**	**717.0**
SD	**226.7**	**295.4**	**12.4**	**362.8**

Figure 111. Hawaii Offshore Handline Landings per Day Fished, 1990-2009



Interpretation: Offshore handline CPUE was 1,505 pounds in 2009, below its long-term average. Bigeye tuna CPUE in 2009 was 9% below its long-term average. Yellowfin tuna and mahimahi CPUE was also below their long-term averages by 83% and 39%, respectively. In general, the trend for bigeye tuna CPUE was that of an increase while yellowfin tuna CPUE was a decrease.

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

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

	Offshore handline landings (pounds per day fished)			
Year	Bigeye tuna	Yellowfin tuna	Mahimahi	Total
1990	565	654	1	1,220
1991	500	1,234	24	1,758
1992	358	1,937	49	2,344
1993	266	1,790	73	2,130
1994	1,044	2,689	57	3,790
1995	439	2,538	87	3,065
1996	1,576	1,685	70	3,331
1997	706	2,119	48	2,874
1998	1,539	1,858	39	3,436
1999	636	2,725	79	3,443
2000	1,171	2,539	169	3,989
2001	1,598	1,502	130	3,300
2002	2,669	658	98	3,554
2003	1,367	231	61	1,744
2004	1,712	322	61	2,136
2005	1,726	363	39	2,149
2006	2,674	337	53	3,137
2007	3,039	240	32	3,404
2008	1,442	381	52	1,899
2009	1,198	236	39	1,505
Average	**1,317.2**	**1,358.0**	**64.3**	**2,710.4**
SD	**821.0**	**927.6**	**38.1**	**840.2**

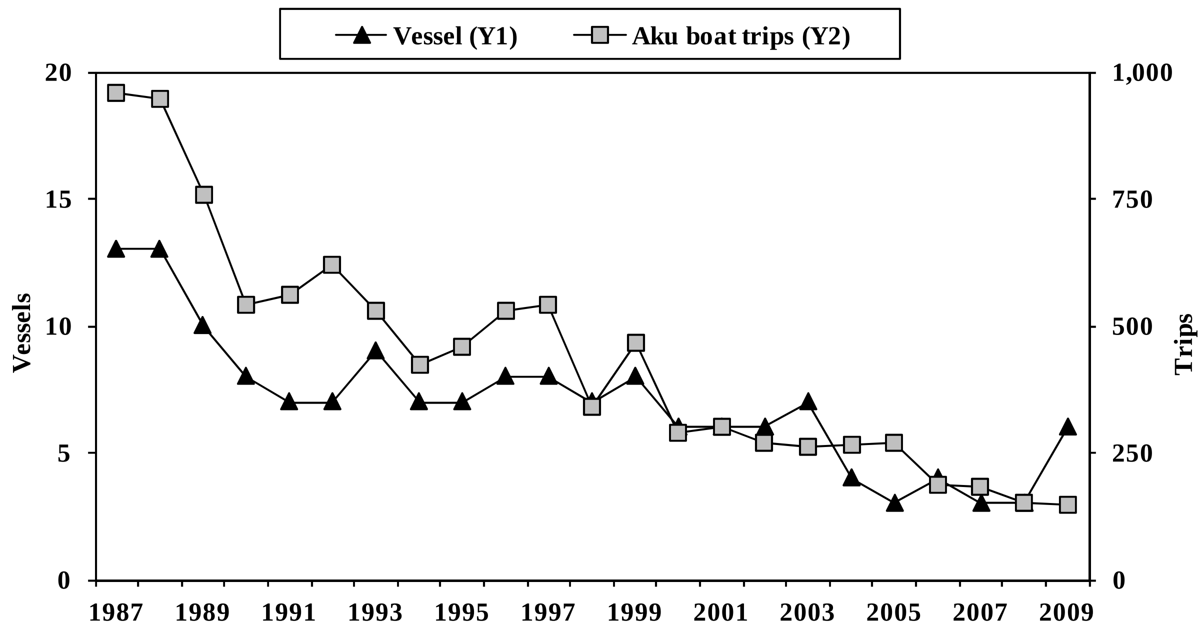
Table 26. Average Weight by Species for the Troll and Handline Landings, 1987-2009

	Tunas				Billfish			Other PMUS	
Year	Albacore	Bigeye tuna	Skipjack tuna	Yellowfin tuna	Blue marlin	Striped marlin	Swordfish	Mahimahi	Ono (wahoo)
1987	33	13	7	26	209	65	125	20	23
1988	57	33	7	27	178	64	115	18	24
1989	49	24	11	40	180	73	104	20	25
1990	52	25	6	35	246	71	93	19	24
1991	51	28	8	32	194	62	111	15	22
1992	52	24	6	26	213	69	73	13	25
1993	52	20	7	41	179	66	138	14	23
1994	50	22	8	35	228	66	94	14	26
1995	20	15	7	28	200	60	106	15	24
1996	41	21	11	40	192	65	87	16	22
1997	40	19	11	34	175	68	96	16	21
1998	21	21	6	28	224	64	82	18	25
1999	48	24	7	31	210	55	88	18	27
2000	48	28	11	48	238	61	177	15	25
2001	42	21	11	41	181	50	150	15	24
2002	38	30	10	42	224	42	152	16	26
2003	46	20	6	30	185	49	118	16	22
2004	43	36	6	27	207	60	142	18	23
2005	48	29	5	23	183	74	107	15	23
2006	47	27	8	29	210	69	128	16	23
2007	49	31	4	35	267	89	133	16	24
2008	51	35	6	26	205	67	158	15	26
2009	46	33	7	29	230	84	181	14	24
Average	**44.5**	**24.8**	**7.7**	**32.9**	**205.8**	**64.0**	**117.1**	**16.3**	**24.0**
SD	**9.5**	**6.1**	**2.2**	**6.7**	**24.6**	**9.7**	**27.6**	**1.9**	**1.6**

Interpretation: Except for mean weight for billfish, the average weight for fish landed by troll and handline gear in 2009 was about the same compared the previous year. The 2009 mean weights for blue marlin, striped marlin and swordfish was 24 pounds (+12%), 20 pounds (+31%), and 64 pounds (+56%) higher than their respective long-term average weight. Blue marlin had the biggest mean weight of all species landed by the troll and handline fishery at 230 pounds.

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

Figure 112. Hawaii Aku Boat (Pole and Line) Vessel and Trip Activity, 1987-2009

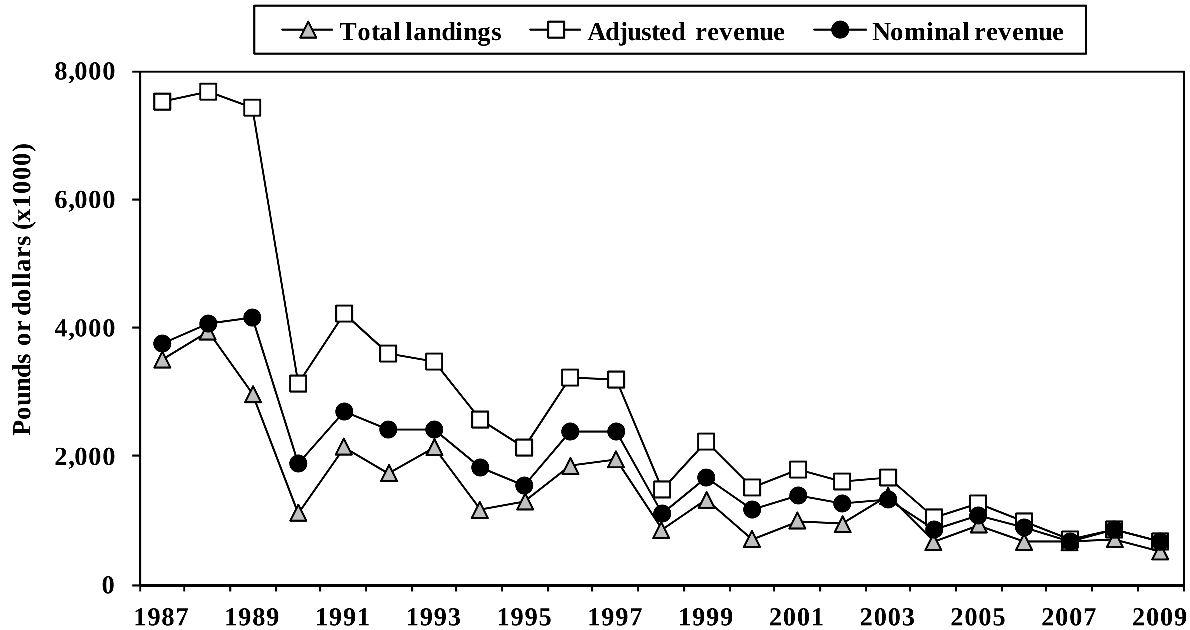


Interpretation: The vessel and trip activity of the aku boat fishery has been in decline over the 23-year period with six aku boat vessels fishing in 2009. The steep decline occurred in the 1980s and was attributed primarily to the closure of the tuna cannery. Attrition of vessels, many which were built in the 1940s, and poor skipjack tuna landings also contributed to the long-term decline in this fishery. The trip activity for the aku boat fishery in 2009 was a record low 147 trips.

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

Year	Vessels	Aku boat trips
1987	13	958
1988	13	945
1989	10	757
1990	8	541
1991	7	561
1992	7	621
1993	9	528
1994	7	425
1995	7	460
1996	8	530
1997	8	540
1998	7	341
1999	8	466
2000	6	290
2001	6	301
2002	6	268
2003	7	263
2004	4	265
2005	3	270
2006	4	187
2007	3	183
2008	3	152
2009	6	147
Average	**7.0**	**447.8**
SD	**2.7**	**228.1**

Figure 113 . Hawaii Aku Boat (Pole and Line) Landings and Revenue, 1987-2009

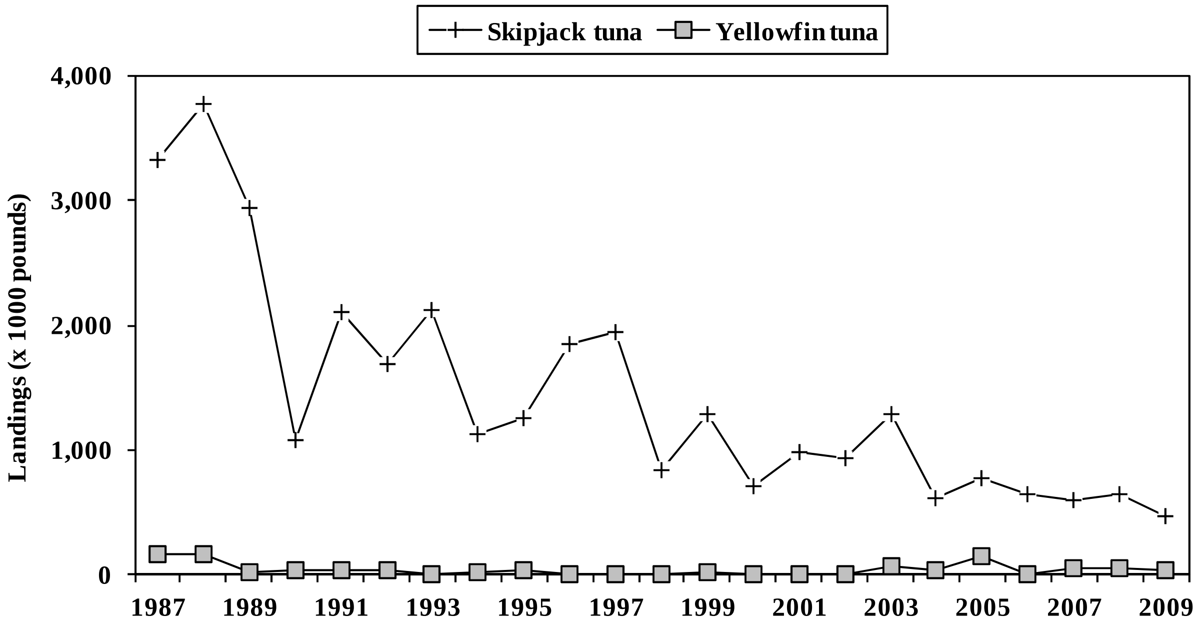


Interpretation: Aku boat landings were 511,000 pounds, worth an estimated $679,000 in 2009, down 67% and 76% from their respective long-term averages. The trends for total landings and revenue were similar to the number of aku boat vessels and trip activity. Aku boat landings and revenue peaked in 1988, then decreased sharply in 1990, and have continued to decline slowly since.

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

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	3,503	$7,509	$3,751	114.9
1988	3,940	$7,679	$4,063	121.7
1989	2,962	$7,409	$4,146	128.7
1990	1,116	$3,119	$1,873	138.1
1991	2,146	$4,205	$2,706	148.0
1992	1,735	$3,581	$2,415	155.1
1993	2,137	$3,469	$2,415	160.1
1994	1,159	$2,566	$1,835	164.5
1995	1,291	$2,121	$1,550	168.1
1996	1,844	$3,219	$2,389	170.7
1997	1,947	$3,202	$2,393	171.9
1998	845	$1,483	$1,106	171.5
1999	1,312	$2,222	$1,674	173.3
2000	708	$1,524	$1,168	176.3
2001	994	$1,805	$1,400	178.4
2002	936	$1,607	$1,260	180.3
2003	1,378	$1,663	$1,334	184.5
2004	656	$1,041	$863	190.6
2005	932	$1,251	$1,076	197.8
2006	661	$967	$880	209.4
2007	654	$703	$671	219.5
2008	704	$870	$866	228.9
2009	511	$679	$679	230.0
Average	**1,525.5**	**2,873.4**	**1,901.5**	
SD	**935.1**	**2,132.1**	**1,035.3**	

Figure 114 . Hawaii Aku Boat (Pole and Line) Fishery Landings, 1987-2009

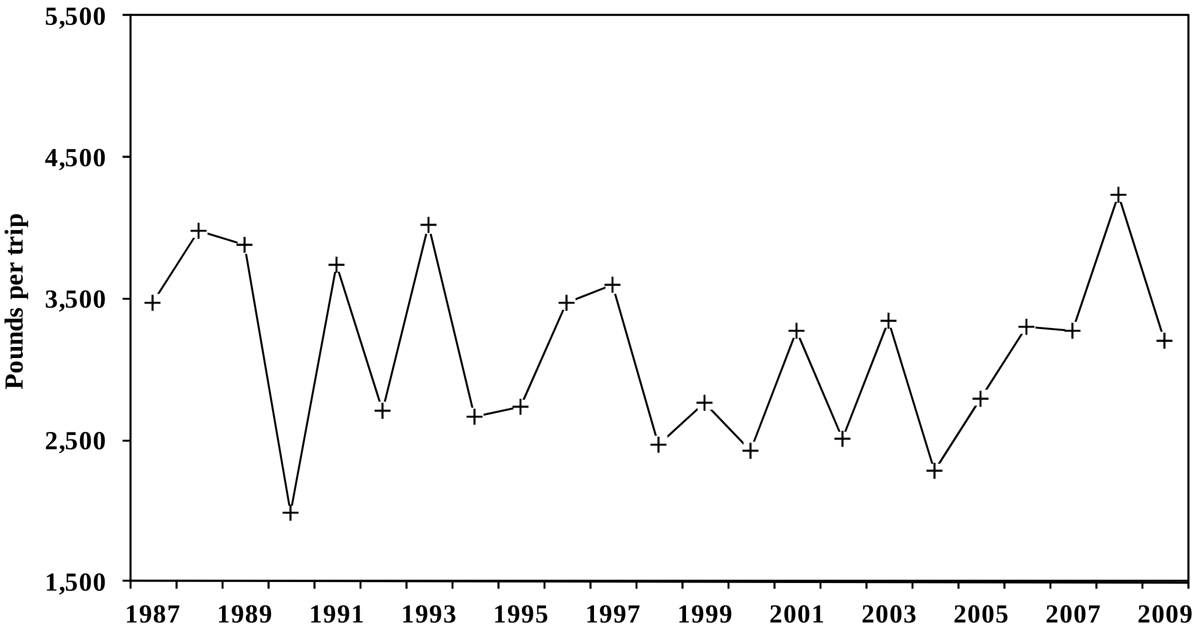


Interpretation: Total aku boat landings in 2009 were 511,000 pounds, 67% below the long-term average. The aku boat fishery landings consisted primarily of skipjack tuna. There were small landings of yellowfin tuna also. Skipjack tuna landings varied annually with an overall downward trend. Part of the reason for the decline in landings from this fishery was the closure of the tuna cannery in 1985. After the closure of the cannery, the aku boat fishery was left with only the fresh fish market.

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

Year	Skipjack tuna	Yellowfin tuna	Other tunas	Mahimahi	Total
1987	3,328	173	0	2	3,503
1988	3,768	168	0	4	3,940
1989	2,938	21	2	1	2,962
1990	1,073	39	4	0	1,116
1991	2,102	44	1	0	2,146
1992	1,682	36	4	14	1,735
1993	2,121	10	3	3	2,137
1994	1,133	19	6	0	1,159
1995	1,256	34	0	0	1,291
1996	1,842	2	0	0	1,844
1997	1,942	0	0	5	1,947
1998	842	3	0	0	845
1999	1,291	21	0	0	1,312
2000	704	2	1	1	708
2001	988	4	1	1	994
2002	927	6	2	1	936
2003	1,292	73	10	3	1,378
2004	615	38	1	2	656
2005	779	149	3	1	932
2006	648	6	7	0	661
2007	600	50	3	1	654
2008	645	50	8	1	704
2009	471	37	1	2	511
Average	**1,478.0**	**43.1**	**2.5**	**1.8**	**1,525.5**
SD	**908.4**	**52.8**	**2.9**	**3.0**	**935.1**

Figure 115 . Hawaii Aku Boat (Pole and Line) Fishery Total Landings per Trip, 1987-2009



Interpretation: The CPUE for skipjack tuna in the aku boat fishery was 3,204 pounds per trip in 2009, 2% higher than the long-term average. The aku boat skipjack tuna landings per trip varied substantially throughout the 23-year time period.

Source and Calculations: Aku boat CPUE was measured as pounds per trip. The aku boat fishery CPUE statistics were derived from the HDAR Commercial Aku Boat Report data and measured as landings (in pounds) per trip. Landings per trip was calculated by dividing the pounds by the total number of aku boat trips. The calculation for aku boat CPUE included zero landing trips.

	Aku boat CPUE (pounds per trip)	
Year	Skipjack tuna	Total catch
1987	3,474	3,657
1988	3,987	4,169
1989	3,881	3,913
1990	1,983	2,063
1991	3,746	3,826
1992	2,709	2,794
1993	4,017	4,047
1994	2,667	2,727
1995	2,731	2,806
1996	3,475	3,479
1997	3,596	3,606
1998	2,469	2,478
1999	2,770	2,815
2000	2,429	2,436
2001	3,274	3,291
2002	2,508	2,521
2003	3,346	3,445
2004	2,284	2,403
2005	2,795	3,351
2006	3,305	3,372
2007	3,278	3,514
2008	4,242	4,260
2009	3,204	3,459
Average	**3,134.8**	**3,226.0**
SD	**633.0**	**637.0**

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 where profit is made by selling a small portion of their catch to cover fishing expense. Usually fishermen selling their catch going “door to door” comprises 30% unreported commercial landings.

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.

Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet, other than charter boats, consists primarily of vessels less than 24 ft in length which usually have a limited 20-mile travel radius from Saipan.

In the past, charter vessels generally retained their catches, selling half or more to local markets. However in recent times, charter vessels rarely sell any of their landings. No logbook system is in effect.

The primary target and most marketable species for the pelagic fleet are skipjack tuna. In 2009, skipjack tuna landings comprised around 70% of the entire pelagic landings. Schools of skipjack tuna have historically been common in nearshore waters, providing an opportunity to catch numerous fish with a minimum of travel time and fuel costs. Skipjack is readily consumed by the local populace and several Korean restaurants, primarily as sashimi.

Yellowfin tuna and mahimahi are also easily marketable species but are seasonal. During their seasonal runs, these fish are usually found close to shore and provide easy targets for the local fishermen. In addition to the economic advantages of being near shore and their relative ease of capture, these species are widely accepted by all ethnic groups.

In late 2007, Crystal Seas became the first established longline fishing company in the CNMI to begin its operation out of the island of Rota. However, by 2009, Crystal Seas became USA

Islands Seafood and relocated its operation to Saipan. There are currently four licensed fishing vessels stationed in the CNMI. Federal log book data are being collected and submitted to NMFS.

2009 Area Recommendation

1. Request for NMFS to provide funding for a longline sampling program or observer on the vessels in CNMI.

Table 27. CNMI Consumer Price Indices (CPIs)

Year	CPI	CPI Adjusted Factor	Data Adjusted Factor
1983	140.90	2.31	80
1984	153.20	2.12	80
1985	159.30	2.04	80
1986	163.50	1.99	80
1987	170.70	1.91	80
1988	179.60	1.81	80
1989	190.20	1.71	80
1990	199.33	1.63	80
1991	214.93	1.51	80
1992	232.90	1.40	80
1993	243.18	1.34	80
1994	250.00	1.30	80
1995	254.48	1.28	80
1996	261.98	1.24	80
1997	264.95	1.23	80
1998	264.18	1.23	80
1999	267.80	1.21	80
2000	273.23	1.19	80
2001	271.01	1.20	80
2002	271.55	1.20	80
2003	268.92	1.21	80
2004	271.28	1.20	55
2005	271.90	1.20	55
2006	285.96	1.14	55
2007	301.72	1.08	65
2008	320.39	1.02	65
2009	325.20	1.00	55

Calculation: The Commonwealth of the Northern Mariana Islands' Consumer Price Index is computed by the CNMI Department of Commerce using the Laspeyres' formula.

Table 28. CNMI 2009 Commercial Pelagic Landings, Revenues and Price

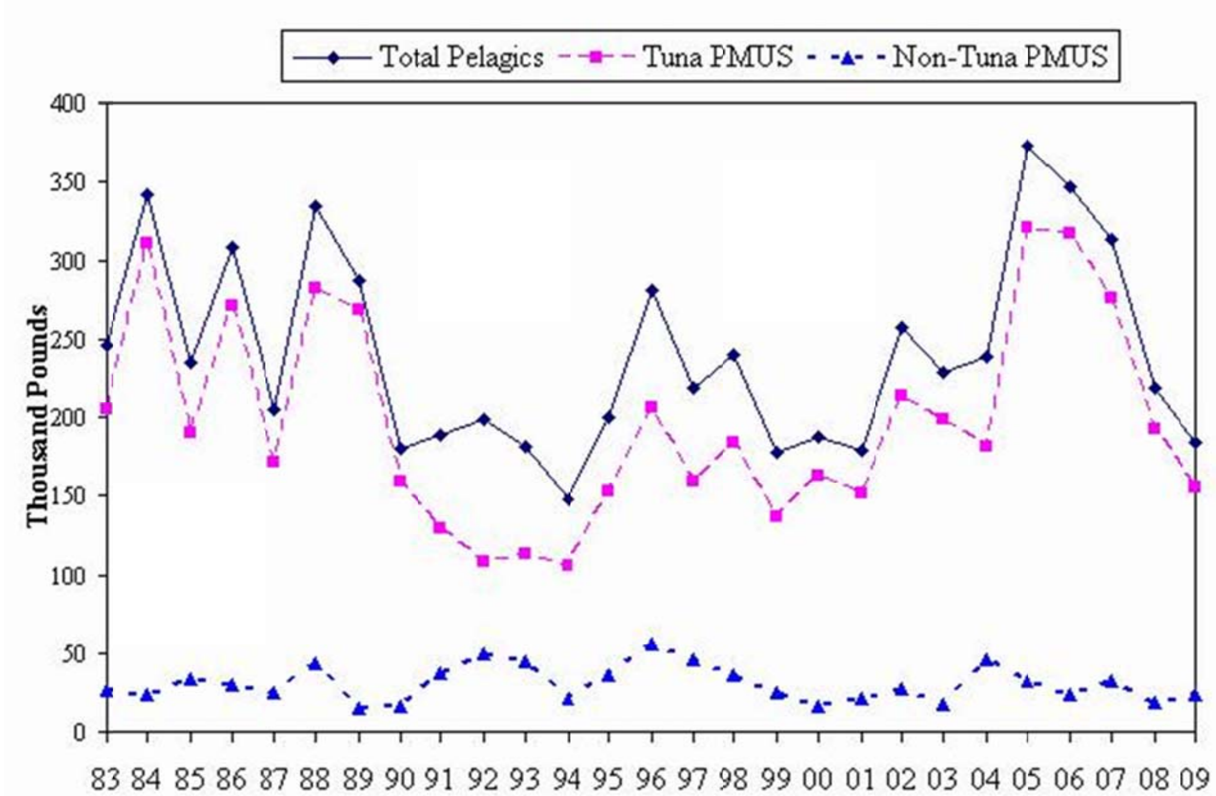
Species	Landing (Lbs)	Value ($)	Avg Price ($/Lb)
Skipjack Tuna	129,176	209,875	1.62
Yellowfin Tuna	25,113	49,435	1.97
Saba (kawakawa)	1,521	2,311	1.52
Tuna PMUS	**155,809**	**261,620**	**1.68**
Mahimahi	19,580	34,980	1.79
Wahoo	3,389	6,777	2.00
Blue Marlin	47	71	1.50
Sailfish	162	243	1.50
Sickle Pomfret	511	1,201	2.35
Non-tuna PMUS	**23,689**	**43,272**	**1.83**
Dogtooth Tuna	2,575	4,233	1.64
Rainbow Runner	1,759	3,476	1.98
Barracuda	24	35	1.50
Troll Fish (misc.)	125	251	2.00
Non-PMUS Pelagics	**4,483**	**7,995**	**1.78**
Total Pelagics	**183,981**	**312,887**	**1.70**

Interpretation: In 2009, skipjack tuna continued to dominate the pelagic landings, comprising around 70% of the (commercially-receipted) industry's pelagic catch. Though it is the majority of pelagic landings, skipjack landings decreased 24% in 2009 from the previous year’s landings. Yellowfin tuna and mahimahi ranked second and third in total landings in 2009, although mahi landings decreased 43% and yellowfin landings decreased 35%. Skipjack tunas are easily caught in nearshore 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 7% in 2009.

The highest average price of identified pelagic species was $2.35/lb for sickle pomfret, which increased 6% from 2008. The lowest priced species was blue marlin. The average price per pound for skipjack tuna, the species with the greatest landings, increased 4% from $1.55/lb in 2008 to $1.62/lb in 2009.

Blue marlin is rarely a target for commercial fishermen except during fishing tournaments and by charter boats. Should commercial fishermen catch blue marlin, rarely do they sell to vendors participating in the Commercial Purchase Database invoices system and therefore their data could not be included in this report.

Figure 116. CNMI 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.

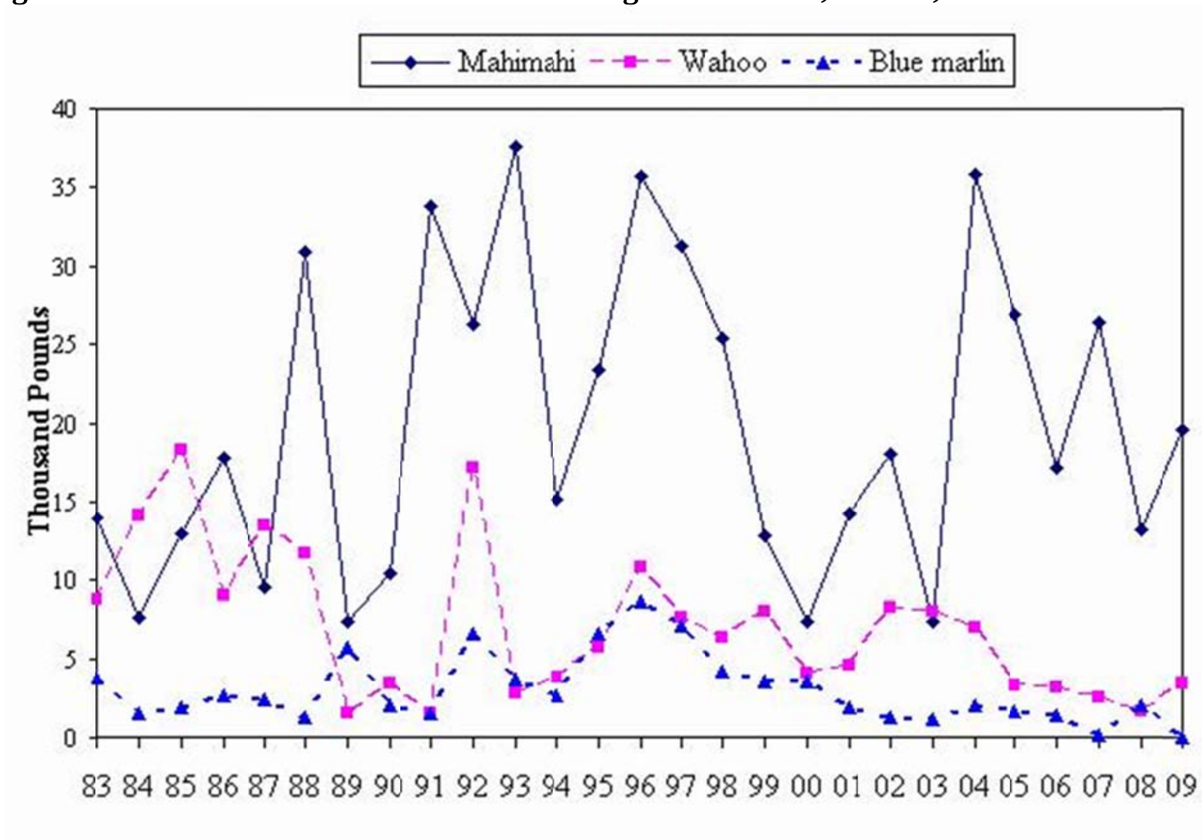
Interpretation: The 2009 total weight for pelagics decreased 16% from 2008 landings. The drop is partly due to the 24% decrease in skipjack landings. Total weight for pelagics landed in 2007 decreased slightly by 5% from 2006 but still above the 25 year mean. This decreased is a result of Tuna PMUS decreasing by 8%. Total weight of pelagics landed in 2006 decreased 7% from 2005 level which is still above the 24 year mean. Drop in total pelagic landings is mostly due to the decrease in landings by 28% in the Non-tuna PMUS and a 62% decrease in the Non-PMUS Pelagic species.

Source and Calculation: All pelagics, tuna and Non-Tuna PMUS landings were summed from the Commercial Purchase Data Base.

Total Commercial Landings (Lbs)

Year	All Pelagics	Tuna PMUS	Non-Tuna PMUS
1983	245,985	204,692	26,544
1984	341,136	310,424	23,244
1985	234,178	189,809	33,143
1986	307,459	271,279	29,626
1987	205,068	171,957	25,450
1988	334,523	281,872	43,805
1989	286,784	267,811	14,595
1990	180,450	158,430	15,936
1991	188,561	128,848	36,975
1992	199,228	108,314	50,159
1993	181,328	113,207	44,518
1994	147,329	105,942	21,657
1995	200,180	152,756	35,759
1996	281,277	206,247	55,712
1997	218,873	159,626	46,049
1998	240,263	184,450	35,979
1999	177,031	136,907	24,768
2000	187,295	162,747	15,551
2001	179,181	152,144	21,198
2002	256,982	213,565	27,876
2003	228,416	198,843	17,346
2004	239,007	181,331	45,737
2005	372,375	321,089	32,136
2006	346,885	316,446	23,080
2007	312,554	275,614	32,755
2008	219,187	192,598	18,454
2009	**183,981**	**155,809**	**23,689**
Average	240,575	197,139	30,435
Standard Deviation	61,847	64,786	11,420

Figure 117. CNMI Annual Commercial Landings: Mahimahi, Wahoo, and Blue Marlin



Interpretation: The 2009 mahimahi landings increased 48% from the 2008 landings. 2007 mahimahi landings increased significantly by 65%; it was the first sharp rise since 2004. In previous years, mahimahi landings continued to decline since increasing 376% in 2004, which is the highest recording in 22 years. In 2005, landings decreased 25%, which was still above the 23 year mean. This decline continued in 2006 to less than the 24 year mean. It is noteworthy that the CNMI 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 the 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 (11%) over the 2000 landings. Wahoo landings continued to increase in 2002 by 80%, then dropped slightly in 2003 and 2004. The 2005 landings decreased 52% and further declined in 2006, which is the lowest recording in the past 13 years. Wahoo landings continued to decline in 2007 by another 18% to well below the 25 year mean. 2008 landings decreased 33%; however, in 2009, landings increased significantly (103%) but well below the 27 year mean.

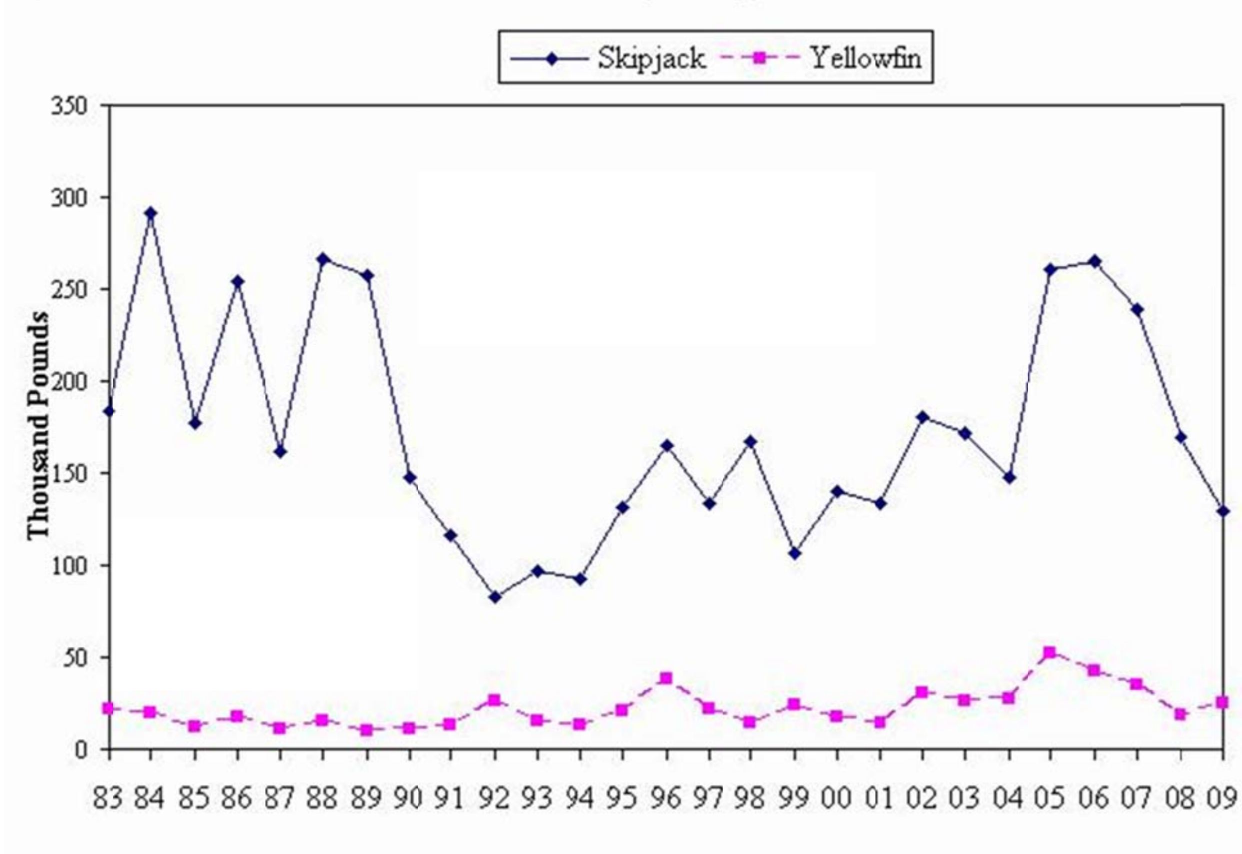
In 2004, recordings of blue marlin landings increased 77% from the 2003 figures, but 2005 landings decreased 20%. In 2006, blue marlin declined 12% from 2005. Data of blue marlin landings were rarely recorded in the Commercial Purchase Data Base for 2007. Blue marlin is rarely a target by the commercial fishermen except for charter boats and during fishing tournaments. If blue marlins are landed, they are often kept by the fishermen and therefore rarely ever recorded in the Commercial Purchase Data Base.

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

Total Commercial Landings (Lbs)

Year	Mahimahi	Wahoo	Blue Marlin
1983	13,939	8,760	3,787
1984	7,614	14,087	1,544
1985	12,955	18,251	1,860
1986	17,796	9,062	2,654
1987	9,502	13,404	2,460
1988	30,799	11,697	1,309
1989	7,320	1,571	5,704
1990	10,439	3,462	2,034
1991	33,756	1,521	1,568
1992	26,257	17,172	6,603
1993	37,545	2,779	3,687
1994	15,063	3,863	2,635
1995	23,321	5,722	6,619
1996	35,655	10,783	8,593
1997	31,277	7,580	7,068
1998	25,375	6,299	4,201
1999	12,882	8,063	3,541
2000	7,324	4,097	3,608
2001	14,229	4,550	1,924
2002	18,042	8,212	1,261
2003	7,357	7,950	1,130
2004	35,808	6,936	2,001
2005	26,891	3,349	1,595
2006	17,181	3,116	1,402
2007	26,410	2,504	76
2008	13,187	1,669	2,027
2009	**19,580**	**3,389**	**47**
Average	19,908	7,031	2,998
Standard Deviation	9,801	4,703	2,198

Figure 118. CNMI 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 Figure 3). Skipjack tuna landings declined after that, reaching record lows from 1990 through 1994. In 2005, skipjack landings showed a significant increase of 75%, well above the 23 year mean. The 2007 landings decreased 6% from 2006, and this decline continued in 2008 and 2009. In 2009, skipjack landings decreased by 24%. This decline in landings is a direct result of the current downward trend of the economic situation that CNMI is facing. Fishermen are not able to sale their landing due to low demand.

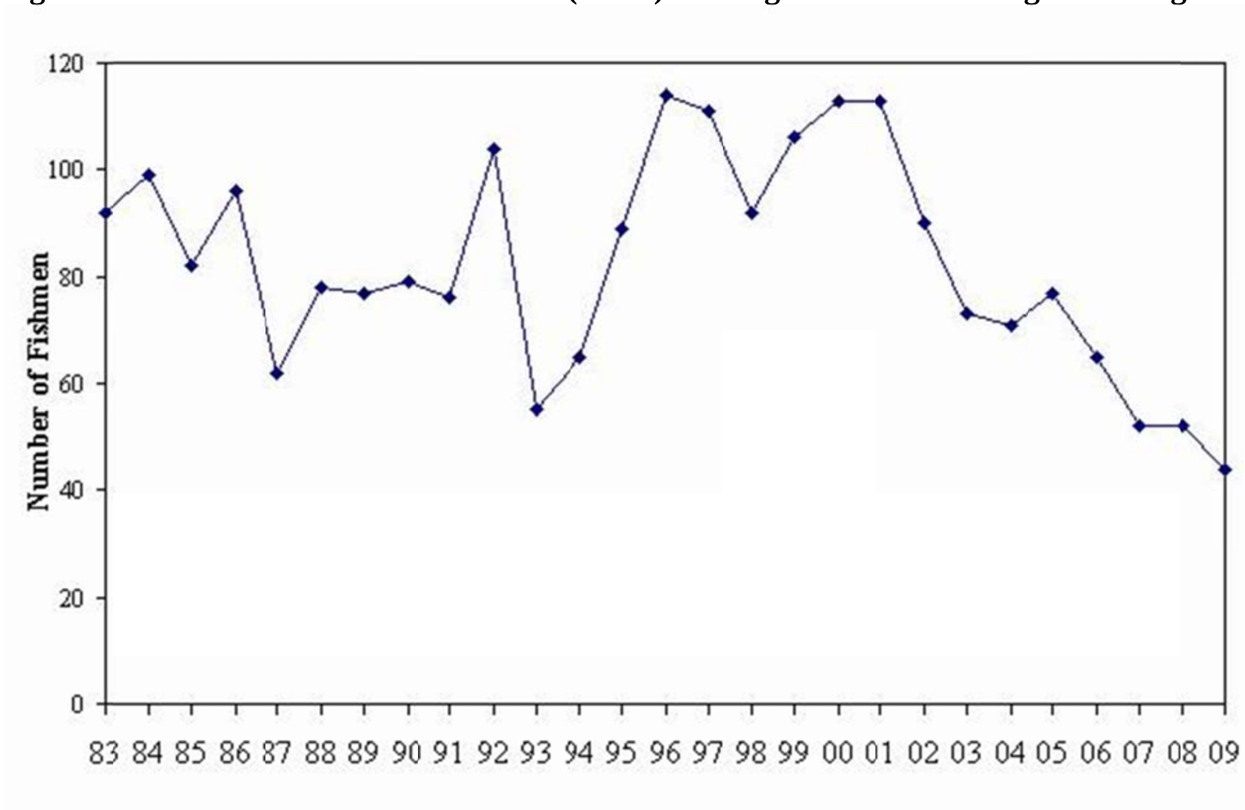
Although more highly prized than skipjack, yellowfin tuna are not as common and therefore not landed as often. The average fish size tends to be smaller compared to yellowfin tuna from other geographic areas. The 2006 yellowfin landings decreased by 19% from 2005, and 2007 and 2008 landings also decreased. In 2009, however, landings increased 34% compared to 2008 and were above the 27 year mean.

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

Total Commercial Landings (Lb)

Year	Skipjack	Yellowfin
1983	183,411	21,281
1984	290,843	19,580
1985	177,344	12,466
1986	254,362	16,917
1987	161,504	10,454
1988	266,497	15,375
1989	257,703	10,109
1990	147,962	10,468
1991	115,802	13,042
1992	82,280	25,687
1993	97,268	14,898
1994	92,212	13,445
1995	131,377	20,918
1996	165,037	38,043
1997	133,446	21,352
1998	167,114	14,570
1999	106,297	24,419
2000	140,389	17,673
2001	133,769	14,543
2002	179,966	30,017
2003	171,574	26,042
2004	148,328	27,548
2005	260,614	52,014
2006	265,753	41,996
2007	238,972	34,894
2008	170,059	18,695
2009	**129,176**	**25,113**
Average	172,928	21,910
Standard Deviation	60,364	10,350

Figure 119. Number of CNMI 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 "new" fishermen in 1992, 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.

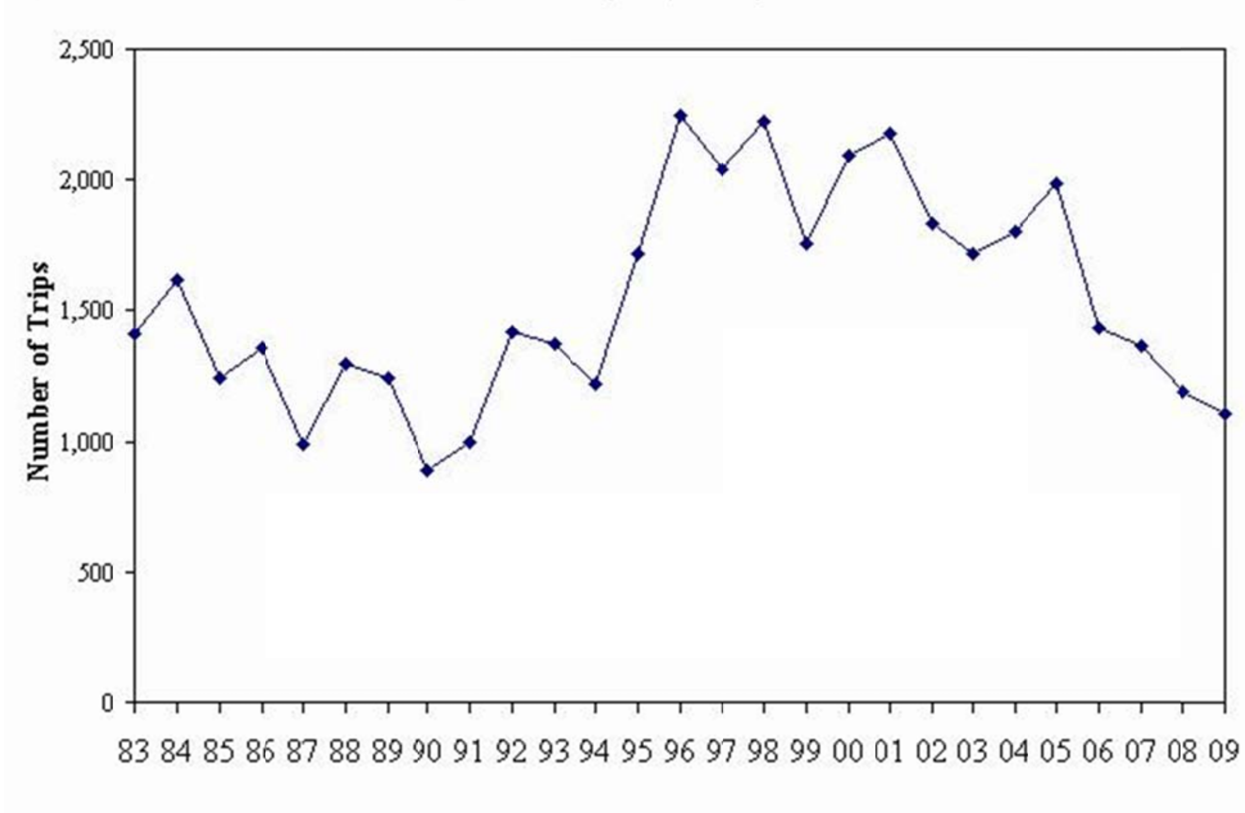
The number of fishermen making pelagic landings decreased 20% from 113 in 2001 to 90 in 2002. Data indicates a continued decline in 2003 and 2004. The decreases were partly due to vendors who own multiple fishing boats entering all their landings on a single receipt and, at times, combining monthly total 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. There was a slight increase of 4% in 2005, but the number of fishermen continued to decrease from 2006 thru 2009. This decrease is partly due to the increasing price of fuel, the continued decline in the average price per pound of skipjack tuna, and downward trend in the CNMI economy.

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

Fishermen Landing Any Pelagic Species

Year	Number of Fishermen
1983	92
1984	99
1985	82
1986	96
1987	62
1988	78
1989	77
1990	79
1991	76
1992	104
1993	55
1994	65
1995	89
1996	114
1997	111
1998	92
1999	106
2000	113
2001	113
2002	90
2003	73
2004	71
2005	77
2006	65
2007	52
2008	52
2009	**44**
Average	82
Standard Deviation	20

Figure 120. CNMI Number of Trips Catching Any Pelagic Fish



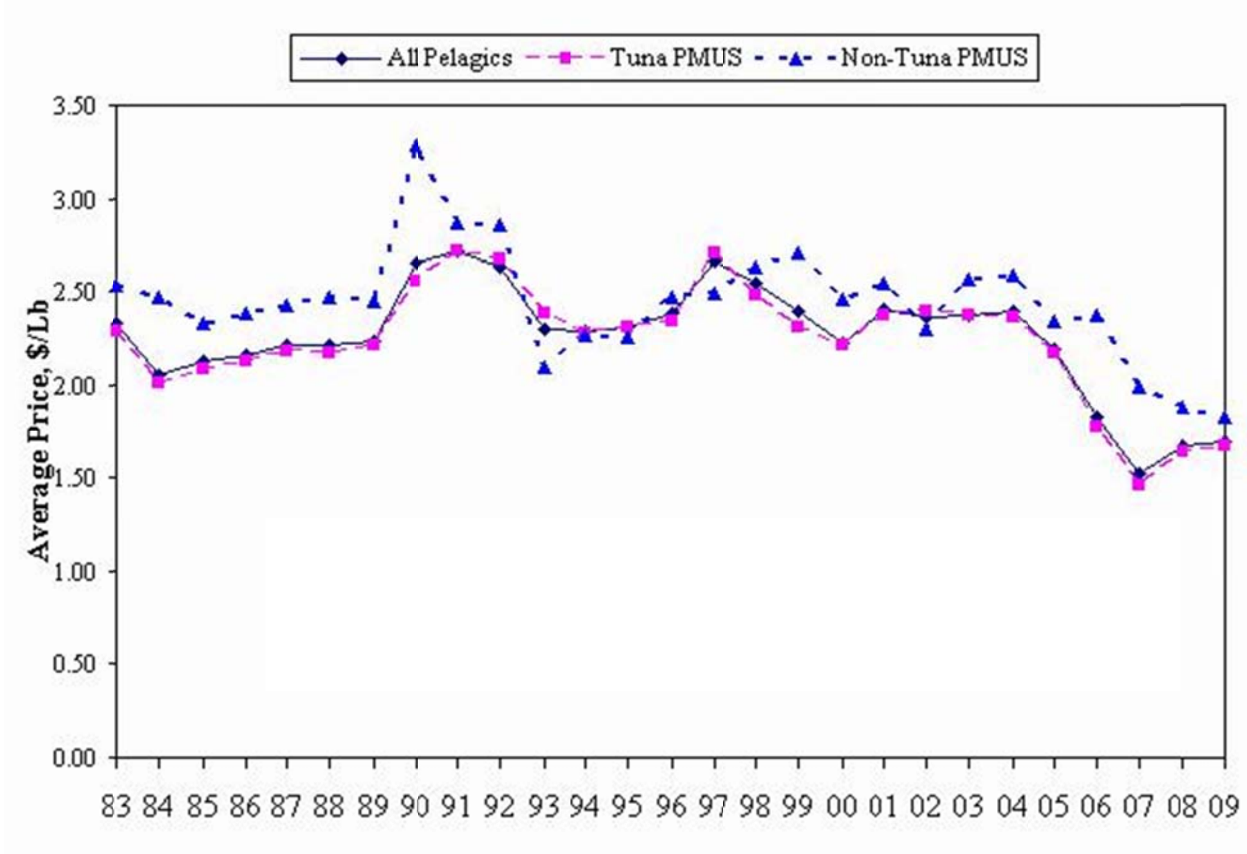
Interpretation: The number of pelagic trips were high from 1996 through 2001; the decrease in 1999 figures may be caused by the refusal of vendors to participate in the Ticket System. The number of pelagic trips decreased in 2002 from 2,179 to 1,835 and remained near that level for 2003 and 2004. There was a 10% increase in 2005 followed by a significant drop of 28% in 2006. The continued decline in the number of trips from 2005 to 2009 is related to the lack of market demand for pelagics. Typhoons hit the Marianas region frequently, which may have attributed to some decline in fishing trips from the chart above, as well as increasing price of fuel. Fuel cost is one of the main factors that currently affects the CNMI pelagic commercial fishery where the main method is trolling for skipjack tuna which, on average, is sold at a price of $1.28/lb.

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.

CNMI Numbers of Trips Catching Any Pelagic Fish

Year	Number of Trips
1983	1,408
1984	1,621
1985	1,240
1986	1,356
1987	992
1988	1,298
1989	1,242
1990	888
1991	999
1992	1,419
1993	1,372
1994	1,218
1995	1,721
1996	2,249
1997	2,042
1998	2,223
1999	1,759
2000	2,095
2001	2,178
2002	1,835
2003	1,715
2004	1,801
2005	1,990
2006	1,436
2007	1,366
2008	1,192
2009	**1,101**
Average	1,547
Standard Deviation	403

Figure 121. CNMI Average Inflation-Adjusted Price of All Pelagics, Tuna PMUS, and Non-Tuna PMUS



Interpretation: The inflation-adjusted average price of tuna was stable from 1983 until 1989, when an obvious rise was observed. The 1990-92 rise in price corresponds with the notable decrease in skipjack tuna landings (Fig. 3) during the same period of time. In 1994, commercially receipted tunas commanded a lower price than in recent years. However, considering the inflation-adjusted prices from 1983 to 1996, it would appear that tuna prices have, on the whole, kept pace with inflation. The average price of tuna has continued to decrease since 1997. The inflation-adjusted average price of tuna increased by 7% from 2000 to 2001 and increased less than 1% for 2002. However, since 2003, the inflation-adjusted average price for tuna has decreased. There was a decline of 2% in 2004, 8% in 2005, 17% in 2006 and 18% in 2007. In 2009, the inflation adjusted price increased slightly by 2%.

Decline in price per pound for skipjack tuna is a direct result from strong competition among fishermen. Fishermen would land large amounts of skipjack tuna, flooding markets and causing prices to drop as low as $.75 per pound. This saturation of the local markets directly affects not only the Inflation-Adjusted Average prices, but also the Inflation-Adjusted Revenues.

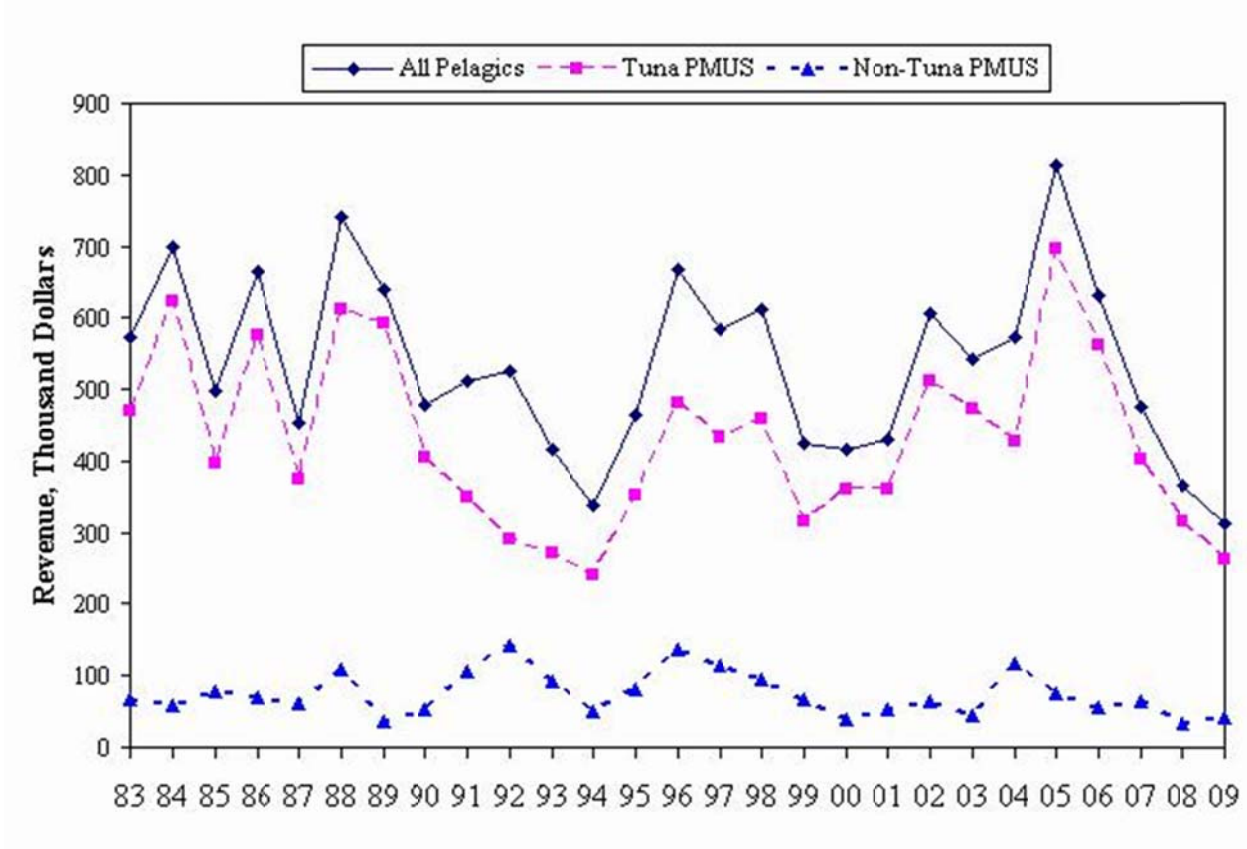
The average for the inflation-adjusted price of "Non-Tuna PMUS" increased to $2.14 (11%) in 2003 and remained at near that level for 2004. In 2005, there was a 9% decrease; the price has continually declined thru 2009 (1% in 2006, 18% in 2007, and 3% in 2009).

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 ($/Lbs)

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	1.01	2.33	0.99	2.29	1.09	2.53
1984	0.97	2.05	0.95	2.01	1.16	2.47
1985	1.04	2.13	1.02	2.08	1.14	2.33
1986	1.09	2.16	1.07	2.12	1.20	2.38
1987	1.16	2.21	1.14	2.17	1.27	2.43
1988	1.22	2.21	1.20	2.17	1.36	2.47
1989	1.30	2.23	1.29	2.21	1.43	2.45
1990	1.63	2.66	1.57	2.55	2.01	3.28
1991	1.80	2.71	1.80	2.72	1.90	2.87
1992	1.88	2.64	1.91	2.67	2.04	2.85
1993	1.72	2.30	1.78	2.38	1.56	2.09
1994	1.76	2.29	1.75	2.27	1.75	2.27
1995	1.81	2.31	1.80	2.30	1.76	2.25
1996	1.92	2.38	1.88	2.34	1.99	2.47
1997	2.17	2.67	2.20	2.71	2.03	2.49
1998	2.07	2.54	2.02	2.48	2.14	2.63
1999	1.98	2.40	1.91	2.31	2.24	2.71
2000	1.87	2.23	1.86	2.21	2.07	2.46
2001	2.00	2.40	1.97	2.37	2.12	2.55
2002	1.97	2.36	1.99	2.39	1.92	2.30
2003	1.96	2.37	1.96	2.37	2.12	2.56
2004	1.99	2.39	1.96	2.36	2.15	2.58
2005	1.82	2.19	1.80	2.16	1.95	2.34
2006	1.60	1.82	1.56	1.78	2.08	2.37
2007	1.41	1.52	1.35	1.46	1.84	1.98
2008	1.64	1.67	1.61	1.65	1.84	1.88
2009	**1.70**	**1.70**	**1.68**	**1.68**	**1.83**	**1.83**
Average	1.65	2.25	1.63	2.23	1.78	2.44
Standard Deviation	0.36	0.30	0.37	0.31	0.36	0.30

Figure 122. CNMI Annual Commercial Inflation-Adjusted Revenues for All Pelagics, Tuna PMUS, and Non-Tuna PMUS



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

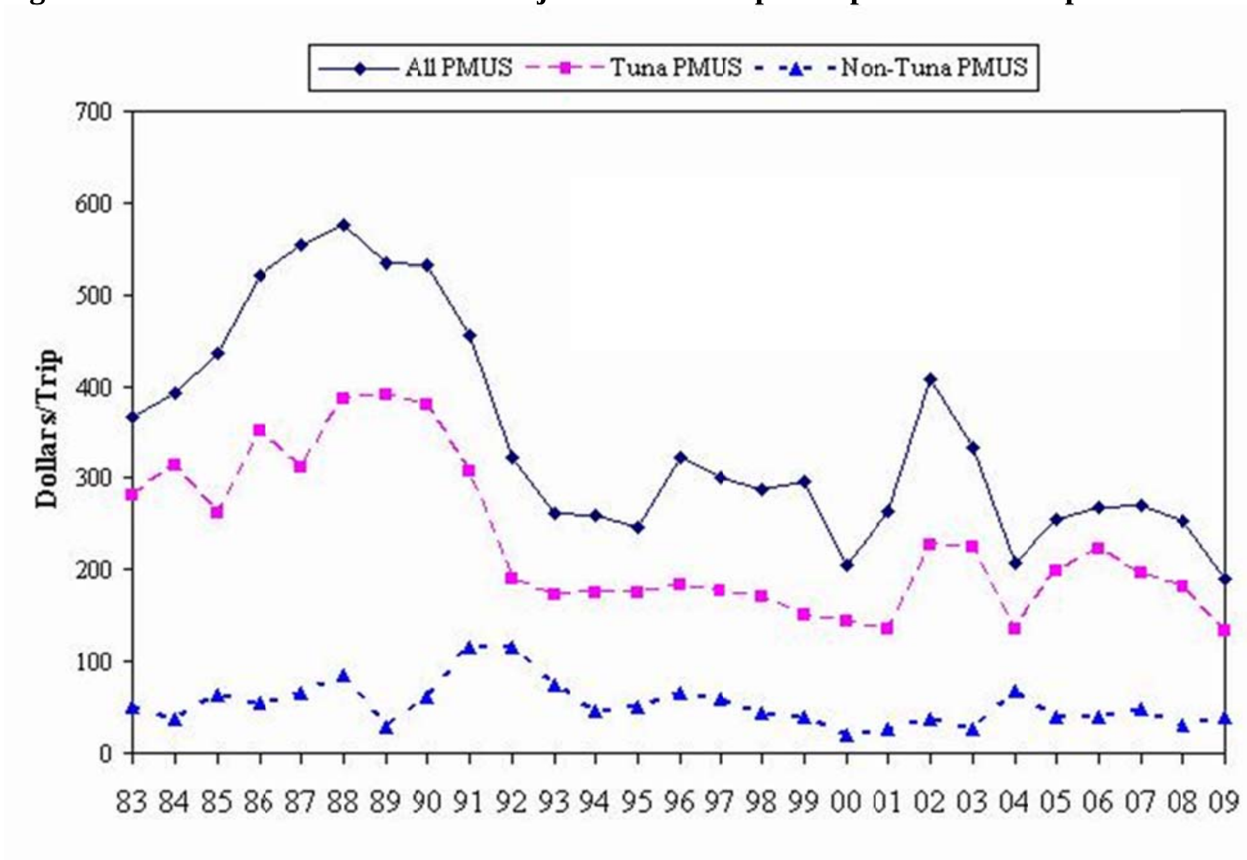
In 2003, the tunas' inflation-adjusted revenues decreased 8% from the 2002 figures and continued to decline in 2004. This is due to the decrease in landings of skipjack tuna, which in 2004, comprised only of 67% of the total pelagic landings compared to 2003 where it comprised 87% of the total pelagic landings. The Tunas' Inflation-Adjusted Revenues increased 38% in 2005, but dropped 19% in 2006, 26% in 2007, 23% in 2008, and 13% in 2009. According to vendors, these declines are due to the low demand for pelagic or troll species. In 2003, a drop of 31% occurred for the "Non-Tuna PMUS" inflation-adjusted revenues; however, 2004 data indicated an increase of 158% compared to 2003. This is due to the mahimahi landings, which increased by 387%. The Inflation Adjusted Revenues decreased by 36% in 2005, 27% in 2006, 25% in 2007, and 47% in 2008. However, 2009 revenues increased by 25%, partly due to the increase in yellowfin landings.

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 ($)

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	248,387	573,774	202,800	468,468	29,059	67,126
1984	330,254	700,138	294,077	623,443	27,044	57,333
1985	244,171	498,109	193,920	395,597	37,882	77,279
1986	333,766	664,194	289,681	576,465	35,488	70,621
1987	237,687	453,982	195,793	373,965	32,344	61,777
1988	409,075	740,426	338,348	612,410	59,701	108,059
1989	373,927	639,415	345,839	591,385	20,917	35,768
1990	293,993	479,209	248,144	404,475	32,102	52,326
1991	338,643	511,351	232,077	350,436	70,235	106,055
1992	374,977	524,968	206,950	289,730	102,133	142,986
1993	311,342	417,198	201,350	269,809	69,592	93,253
1994	259,470	337,311	185,381	240,995	37,818	49,163
1995	361,511	462,734	275,080	352,102	62,920	80,538
1996	539,628	669,139	388,691	481,977	110,939	137,564
1997	474,509	583,646	351,492	432,335	93,306	114,766
1998	496,652	610,882	372,142	457,735	77,011	94,724
1999	351,062	424,785	261,394	316,287	55,404	67,039
2000	350,468	417,057	302,473	359,943	32,186	38,301
2001	358,656	430,387	300,154	360,185	44,987	53,984
2002	506,302	607,562	425,961	511,153	53,468	64,162
2003	447,647	541,653	390,100	472,021	36,764	44,484
2004	476,543	571,852	356,110	427,332	98,417	118,100
2005	678,773	814,528	578,914	694,697	62,759	75,311
2006	554,373	631,985	492,762	561,749	48,026	54,750
2007	439,953	475,149	372,573	402,379	60,137	64,948
2008	359,427	366,616	310,855	317,072	33,954	34,633
2009	**312,887**	**312,887**	**261,620**	**261,620**	**43,272**	**43,272**
Average	387,559	535,590	310,173	429,843	54,365	74,382
Standard Deviation	106,864	125,121	95,694	121,202	24,808	30,456

Figure 123. CNMI Annual Inflation-Adjusted Revenue per Trip for PMUS Trips



Interpretation: The inflation-adjusted revenue per trip for "All Species" increased steadily from 2004 through 2007 (19% in 2005; 6% in 2006), but has since decreased in 2008 and 2009. Tuna PMUS inflation-adjusted revenue per trip dropped significantly to 117 $/Trip in 2004. In 2005, the Inflation Adjusted revenues for Tuna PMUS increased 47%, and increased another 13% in 2006. However, Tuna PMUS decreased by 13% in 2007and 8% in 2009. The decline in revenues is partly due to a drop in price per pound for Tuna and low market demand.

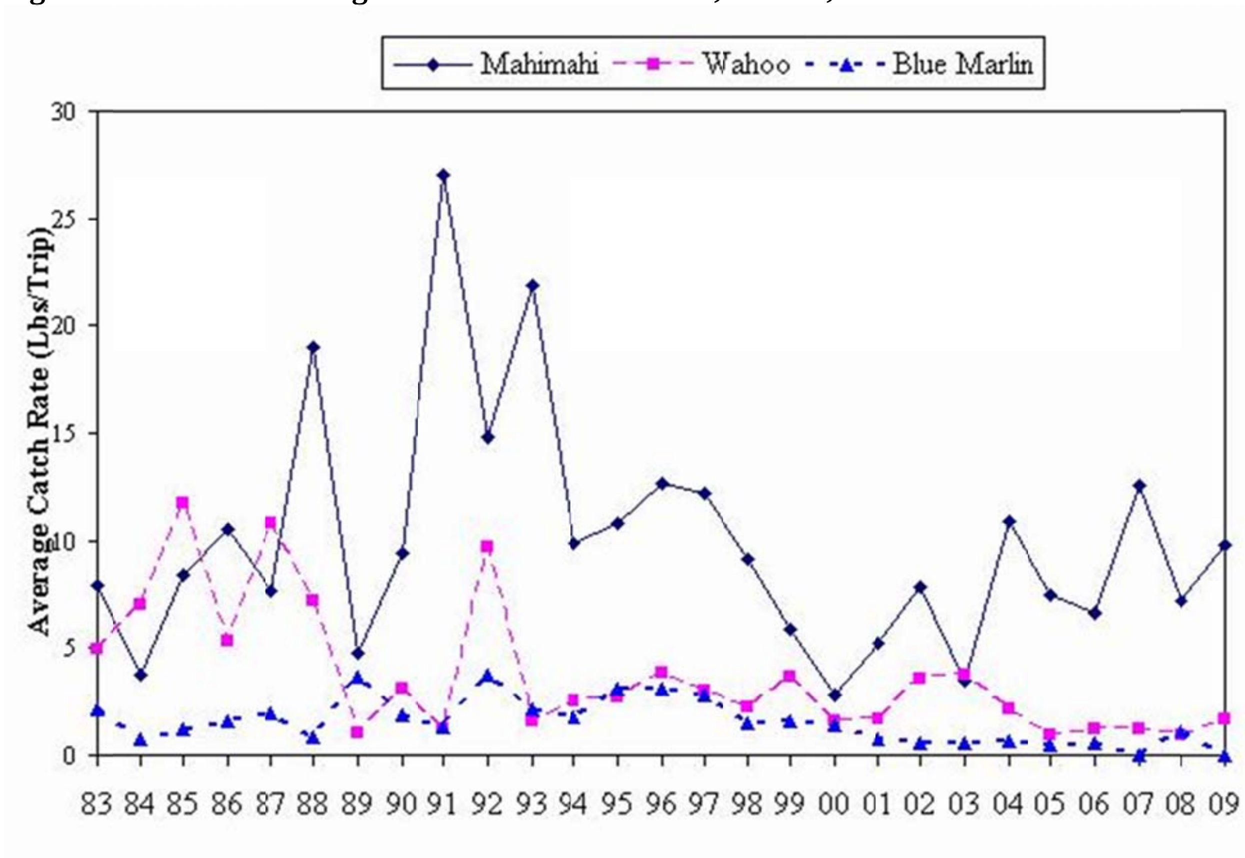
Non-tuna PMUS decreased 26% in 2003, however 2004 revenue increased significantly by 157% (57$/per trip). While 2005 revenues/trips decreased by 43%, revenues per trip have increased from 2006 through 2009 (4% in 2006, 35% in 2007, 31% in 2009).

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)

	All PMUS		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	159.00	367.29	122.00	281.82	22.00	50.82
1984	185.00	392.20	148.00	313.76	17.00	36.04
1985	214.00	436.56	128.00	261.12	31.00	63.24
1986	262.00	521.38	176.00	350.24	27.00	53.73
1987	290.00	553.90	163.00	311.33	34.00	64.94
1988	318.00	575.58	213.00	385.53	47.00	85.07
1989	312.00	533.52	228.00	389.88	17.00	29.07
1990	327.00	533.01	233.00	379.79	38.00	61.94
1991	302.00	456.02	204.00	308.04	77.00	116.27
1992	231.00	323.40	135.00	189.00	83.00	116.20
1993	195.00	261.30	128.00	171.52	55.00	73.70
1994	200.00	260.00	135.00	175.50	35.00	45.50
1995	193.00	247.04	136.00	174.08	39.00	49.92
1996	261.00	323.64	148.00	183.52	53.00	65.72
1997	245.00	301.35	143.00	175.89	47.00	57.81
1998	234.00	287.82	138.00	169.74	36.00	44.28
1999	246.00	297.66	125.00	151.25	33.00	39.93
2000	172.00	204.68	121.00	143.99	16.00	19.04
2001	219.00	262.80	113.00	135.60	21.00	25.20
2002	339.00	406.80	189.00	226.80	30.00	36.00
2003	275.00	332.75	185.00	223.85	22.00	26.62
2004	172.00	206.40	112.00	134.40	56.00	67.20
2005	213.00	255.60	165.00	198.00	32.00	38.40
2006	236.00	269.04	195.00	222.30	35.00	39.90
2007	251.00	271.08	182.00	196.56	45.00	48.60
2008	248.00	252.96	177.00	180.54	30.00	30.60
2009	**189.00**	**189.00**	**133.00**	**133.00**	**40.00**	**40.00**
Average	240.30	345.29	158.33	228.41	37.70	52.81
Standard Deviation	50.62	117.02	35.49	82.19	16.60	24.28

Figure 124. CNMI Trolling Catch Rate of Mahimahi, Wahoo, and Blue Marlin



Interpretation: The mahimahi catch rate dropped significantly to 3.37lbs/trip (57%) in 2003 to fall 67% below the twenty-year mean. It may be biological because it appears that the trolling catch rates of Guam and CNMI have fluctuated similarly over the last 22 years. In 2004, the mahimahi catch rate rebounded to 10.94 lbs/trip (218%). The 2005 catch rate declined 11% from 2004, but was still above the 24 year mean. Mahimahi catch rates declined 11% in 2006 but increased significantly in 2007 by 93%. In 2008, mahimahi catch rates declined by 43%, but increased in 2009 by 36% from 2008.

Prior to the 1989 record low, wahoo catch rates rivaled those for mahimahi. Wahoo catch rates have generally never regained those historical levels. The 2002 catch rate increased 114% from 2001, and again increased 4% for 2003. 2004 catch rates declined to 2.19 lbs/trip (41%) and this decline continued in 2005 by another 56%. In 2006, wahoo catch rates increased slightly by 28% from 2005, but dropped slightly (4%) in 2007 and again in 2008 (23%). However, wahoo catch rates increased significantly in 2009 by 86%.

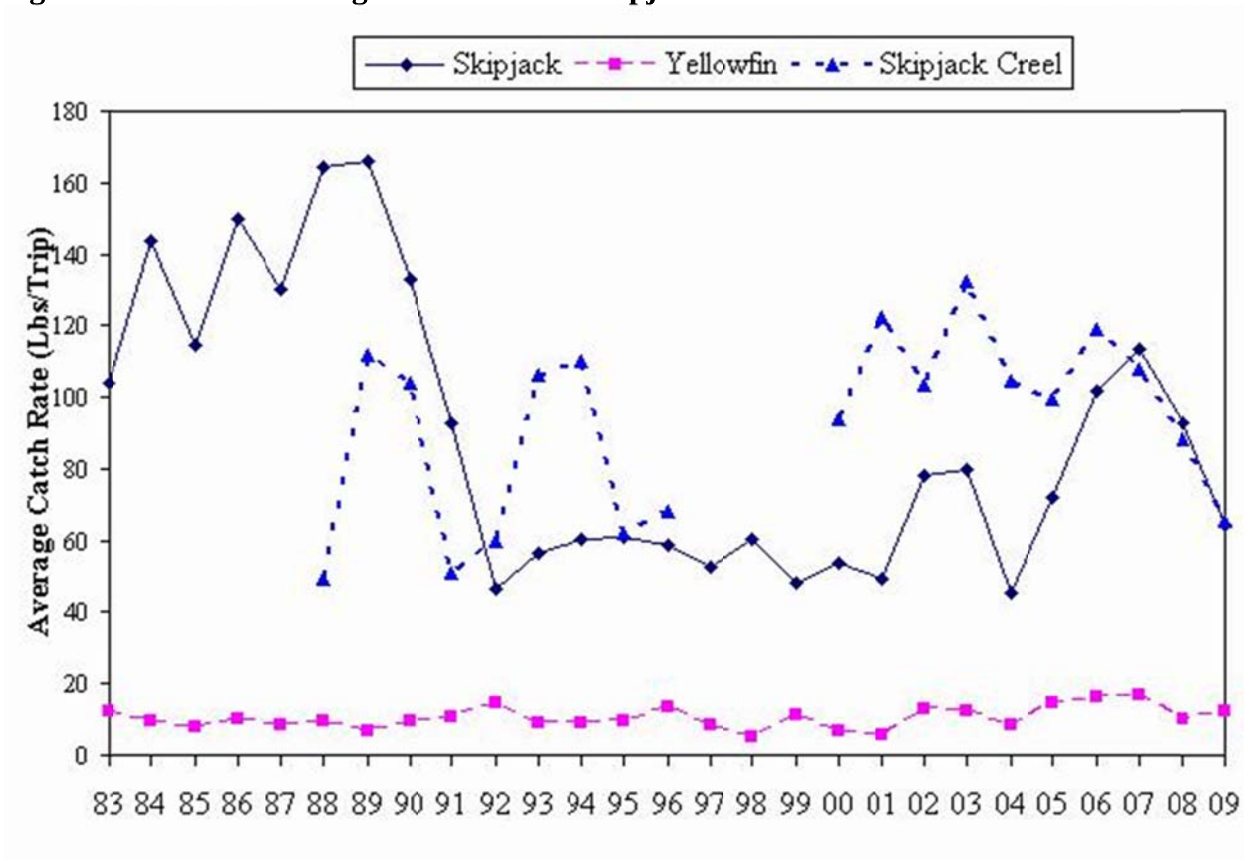
Blue marlins are not a marketable species and are rarely a target by fishermen except during fishing tournaments. When landed, it is rarely sold to vendors participating in the Commercial Purchase Data Collection Program; therefore it would not be recorded in the Commercial Purchase Data Base used to 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 (Lbs/Trip)

Year	Mahimahi	Wahoo	Blue Marlin
1983	7.92	4.98	2.15
1984	3.76	6.95	0.76
1985	8.36	11.77	1.20
1986	10.50	5.35	1.57
1987	7.66	10.81	1.98
1988	18.98	7.21	0.81
1989	4.71	1.01	3.67
1990	9.40	3.12	1.83
1991	27.03	1.22	1.26
1992	14.80	9.68	3.72
1993	21.89	1.62	2.15
1994	9.89	2.54	1.73
1995	10.84	2.66	3.08
1996	12.68	3.84	3.06
1997	12.25	2.97	2.77
1998	9.13	2.27	1.51
1999	5.86	3.67	1.61
2000	2.80	1.56	1.38
2001	5.23	1.67	0.71
2002	7.87	3.58	0.55
2003	3.43	3.71	0.53
2004	10.94	2.12	0.61
2005	7.43	0.93	0.44
2006	6.58	1.19	0.54
2007	12.57	1.19	0.04
2008	7.19	0.91	1.11
2009	**9.78**	**1.69**	**0.02**
Average	9.98	3.71	1.51
Standard Deviation	5.55	3.07	1.05

Figure 125. CNMI Trolling Catch Rates of Skipjack and Yellowfin Tuna



Interpretation: Catch rates for skipjack tuna decreased dramatically from 1990 to 1992. The 1992 through 1997 catch rates have appeared to stabilize around the six-year mean of 55.7 lbs/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 lbs/trip both before and after 1991, whereas the Commercial Purchase data indicate sustained high catch rates before, and low catch rates after 1991. The reason for this pattern remains obscure despite several attempts to clarify. The catch rate for 2003, based on the Commercial Purchase Data Base, was 80 lbs/trip, a 3% increase from 2002. The 2004 catch rate declined to 45 lbs/trip (44%), but 2005 catch rates increased to 72 lbs/trip (60%). This increase continued in 2006 and 2007 (42% (102 lbs/trip) and 11%, respectively). In 2008, catch rates decreased by 18% and continued downward another 30% in 2009. 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 fleet and a longline experiment with gear less than 1 mile long that was conducted by a fishing company. In 2003, yellowfin catch rates remain relatively stable at 12 lbs/trip despite bad weather that plagued the Marianas nearly the entire 2003. The 2004 yellowfin catch rates fell to 8 lbs/trip, but in increased to 14 lbs/trip in 2005, 16 lbs/trip in 2006 (14%), and 17 lbs/trip (6%) in 2007. In 2008, catch rates declined to 10 lbs/trip (41%), but increased again to 13 lbs/trip (13%) in 2009.

Source and Calculation: Data were summarized from the Commercial Purchase Data Base, which provides average pounds caught per trip. Annual catch rates for selected species were obtained by calculating the average weight per trip for each year. Trips were assumed to be one day in length and each commercial invoice represents one trip. Creel skipjack CPUE was calculated by dividing the sum of skipjack weight from all trolling trip interviews by the number of trolling trips interviewed.

Trolling Catch Rate (Lbs/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	94
2001	49	5	122
2002	78	13	104
2003	80	12	133
2004	45	8	104
2005	72	14	99
2006	102	16	119
2007	114	17	108
2008	93	10	88
2009	**65**	**13**	**65**
Average	89	10	93
Standard Deviation	39	3	26

Offshore Daytime Creel Survey Bycatch Summary
Based on the Interview Catch Data in Year 2000-2007
Method: Trolling

		Number Caught					Trip		
	Species	Released	Dead/Injd	Both	All	BC%	With BC	All	BC%
Non Charter							3	1,439	0.21
	Mahimahi	4		4	2,095	0.19			
	Yellowfin Tuna		1	1	1,499	0.07			
	Skipjack Tuna	1		1	32,083				
	Total			6	35,677	0.02			
	Compared With All Species			6	37,943	0.02			
Charter							0	141	0.00
	Compared With All Species			0	726	0.00			

Interpretation: With the assistance of NMFS staff, the implementation of an Offshore Day Time Creel Survey program began in 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 years 2000 to 2007 by both non-charter and charter boats indicates that less than 1%, or 6 out of 35,677, of the total pelagic species landed is released. The only three species reported as bycatch was mahimahi, yellowfin tuna, and skipjack tuna. Four of 2,095 (0.19%) mahimahi landed was released. One of 1,499 (0.08%) yellowfin tuna landed was released. There was one of 32,083 skipjack tuna recorded to be released. Charter boats had no bycatch reported.

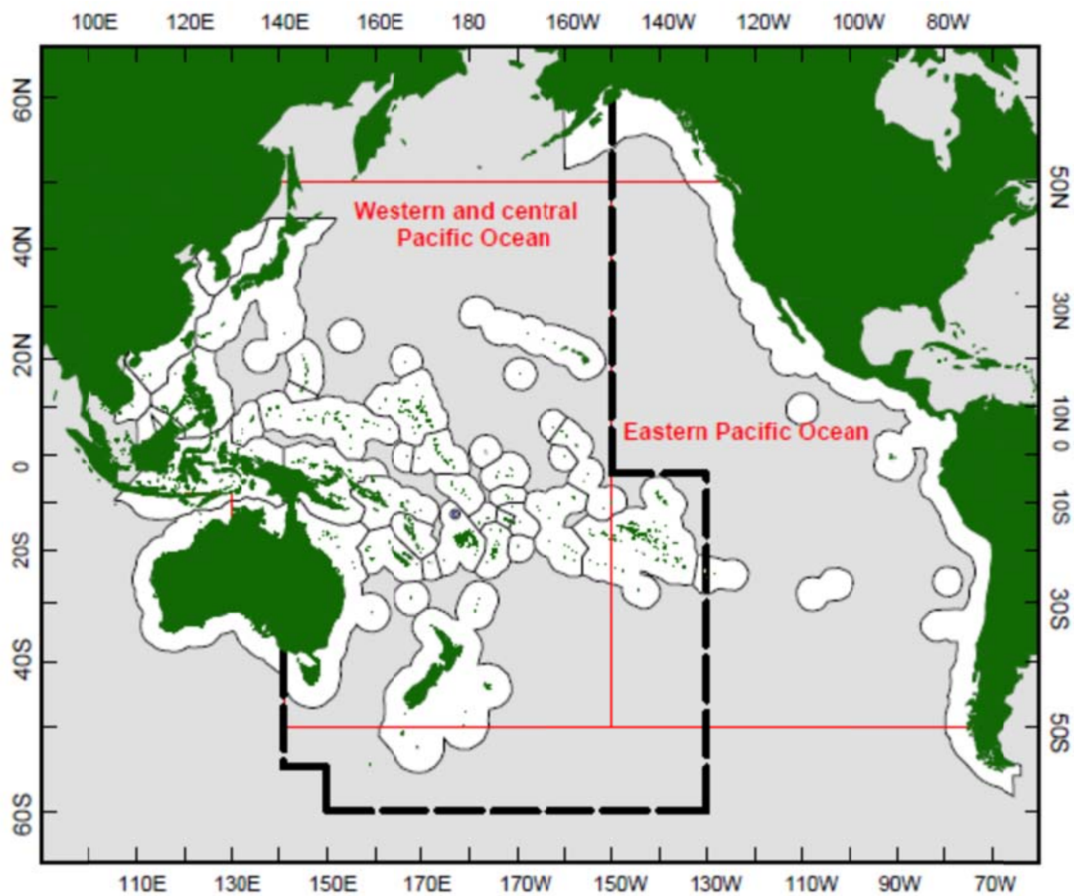
Bycatch in CNMI has been believed in the past to not exist, which is further supported by the results of the Offshore (Boat Based) Creel Survey. CNMI will continue sampling in order to monitor this issue, however it is a common practice by fishermen to keep all species caught regardless of size, species or condition.

Source: Offshore (Boat Based) Creel Survey Expansion Program.

E. International Pelagic Fisheries

The U.S. Pacific Islands Exclusive Economic Zones managed by the Council are surrounded by large and diverse fisheries targeting pelagic species. The International Module contains reported catches of pelagic species in the entire Pacific Ocean by fleets of Pacific Island nations and distant water fishing nations (DWFN) and information for a Stock Assessment and Fishery Evaluation (SAFE) report that includes the most recent assessment information in relation to status determination criteria. The spatial distribution of catch is illustrated in 2008 for the purse seine fishery and 2004 for longline and pole-and-line fisheries. Fishery trends in the entire Pacific Ocean are illustrated for the purse seine, longline and pole-and-line fisheries. A table lists the U.S. longline landings as submitted to the Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC).

Figure 126. The Western and Central Pacific Ocean (WCPO), the Eastern Pacific Ocean (EPO) and the WCPFC Convention Area (WCP–CA in dashed lines)



The 2009 purse-seine fishery in the WCPFC Convention Area (WCP-CA)
Source: WCPFC-SC6-2010 GN-WP-1

Vessels

The combined 2009 catch for purse seine fleets was the highest ever, and the combined effort is the second highest. 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; from 2006-2008, the Korean and FSM Arrangement fleets were the highest producers, but there has been a notable decline in the FSM Arrangement fleet catch and effort in 2009 due to a reduction in the number of vessels as some vessels reflagged to the US purse-seine fleet. The fleet sizes and effort by the Japanese and Korean purse seine fleets have been relatively stable for most of this time series. Several Chinese-Taipei vessels reflagged in 2002, dropping the fleet from 41 to 34 vessels, with fleet numbers stable since. The increase in annual catch by the FSM Arrangement fleet until 2005 corresponded to an increase in vessel numbers, and coincidently, mirrors the decline in US purse seine catch, vessel numbers and effort over this period. However, the US purse seine fleet commenced a significant rebuilding phase in late 2007, with vessel numbers more than doubling in comparison to recent years, but still below the fleet size in the early-mid 1990s. The increase in vessel numbers in the US purse seine fleet is reflected in the sharp increase in their catch and effort during 2009, which is now in line with the other major purse seine fleets. The total number of Pacific-island domestic vessels has been relatively stable for the past 5 years (71 vessels in 2009) after a period of sustained growth from 1990 to 2005.

Catch

The provisional 2009 purse seine catch of 1,894,500 mt was the sixth consecutive record catch for this fishery and 70,000 mt higher than the previous record in 2008. The 2009 purse seine skipjack catch (1,585,307 mt – 84% of the total catch) was clearly higher than both the 2008 catch (by 190,000 mt) and the record catch in 2007 (by 140,000 mt). The purse seine skipjack catch has now increased by nearly 700,000 mt (or 79%) since 2001 (890,605 mt), at an average of about 88,000 mt per year. The proportion of skipjack tuna in the total catch (84%) was the highest since 1996. The 2009 purse seine catch of yellowfin tuna (264,787 mt – 14%) was a significant reduction (124,000 mt) on the record catch taken in 2008 (386,293 mt) but still the fourth highest on record. The provisional catch estimate for bigeye tuna for 2009 (43,580 mt) was the second highest on record (only 900 mt (–2%) less than the 2008 record catch) but may be revised once all observer data for 2009 have been received and processed.

Fleet distribution

The purse seine catch distribution in tropical areas of the WCP–CA is strongly influenced by El Niño–Southern Oscillation Index (ENSO) events. During the first half of 2007, the WCP–CA was in an ENSO-neutral state, but then moved into a prolonged La Niña state, which persisted throughout 2008 and into 2009. This La Niña period gradually waned over the first half of 2009 and the second half of 2009 clearly moved into an El Niño period which appears to have intensified in early 2010. In line with this recent El Niño event, fishing activity during 2009 extended further eastwards compared to recent years (2007-2008) when the La Niña conditions generally restricted activities to waters of the PNG, FSM and Solomon Islands.

Table 29. Total Reported Purse Seine Catch (metric tonnes) of Skipjack, Yellowfin and Bigeye Tuna in the Pacific Ocean. Source: SPC.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	98,305	75,217	485,253	259,969	918,744
1971	120,642	75,918	493,805	224,877	915,242
1972	136,245	95,683	275,302	303,500	810,730
1973	148,301	101,194	377,781	338,393	965,669
1974	138,084	87,449	444,005	338,877	1,008,415
1975	106,915	113,566	423,494	340,003	983,978
1976	152,197	148,956	495,267	385,669	1,182,089
1977	103,460	162,037	499,105	380,904	1,145,506
1978	136,879	148,292	632,038	348,053	1,265,262
1979	95,831	133,905	555,802	381,566	1,167,104
1980	105,692	151,536	597,708	372,010	1,226,946
1981	106,668	121,690	564,260	404,449	1,197,067
1982	99,369	119,650	594,911	348,598	1,162,528
1983	79,841	124,590	745,659	356,840	1,306,930
1984	95,309	119,948	825,701	405,779	1,446,737
1985	90,875	141,104	655,626	485,483	1,373,088
1986	82,329	168,962	823,147	536,794	1,611,232
1987	73,602	180,616	754,346	589,777	1,598,341
1988	78,050	142,760	941,281	559,536	1,721,627
1989	79,450	150,231	922,389	613,302	1,765,372
1990	71,893	193,911	978,589	642,509	1,886,902
1991	67,990	180,418	1,206,133	638,093	2,092,634
1992	85,596	180,384	1,127,474	629,198	2,022,652
1993	87,367	159,696	1,027,241	618,562	1,892,866
1994	112,372	194,008	1,117,861	614,584	2,038,825
1995	103,987	184,900	1,211,789	594,742	2,095,418
1996	105,066	189,331	1,161,257	547,671	2,003,325
1997	127,146	227,274	1,147,467	683,513	2,185,400
1998	133,316	201,112	1,485,461	700,986	2,520,875
1999	153,915	200,222	1,474,711	664,245	2,493,093
2000	119,656	256,026	1,449,201	687,672	2,512,555
2001	147,935	234,758	1,285,641	822,049	2,490,383
2002	170,364	252,308	1,471,090	822,642	2,716,404
2003	157,344	224,723	1,584,115	824,500	2,790,682
2004	155,463	236,032	1,603,263	674,662	2,669,420
2005	121,998	227,146	1,755,830	747,103	2,852,077
2006	128,221	242,866	1,858,470	596,867	2,826,424
2007	148,824	211,596	1,881,206	627,043	2,868,669
2008	119,084	218,457	1,918,626	739,901	2,996,068
2009	139,683	215,916	2,014,827	671,666	3,042,092
Average	114,632	169,860	1,021,678	538,065	1,844,234
STD deviation	27,901	50,623	494,108	168,540	697,985

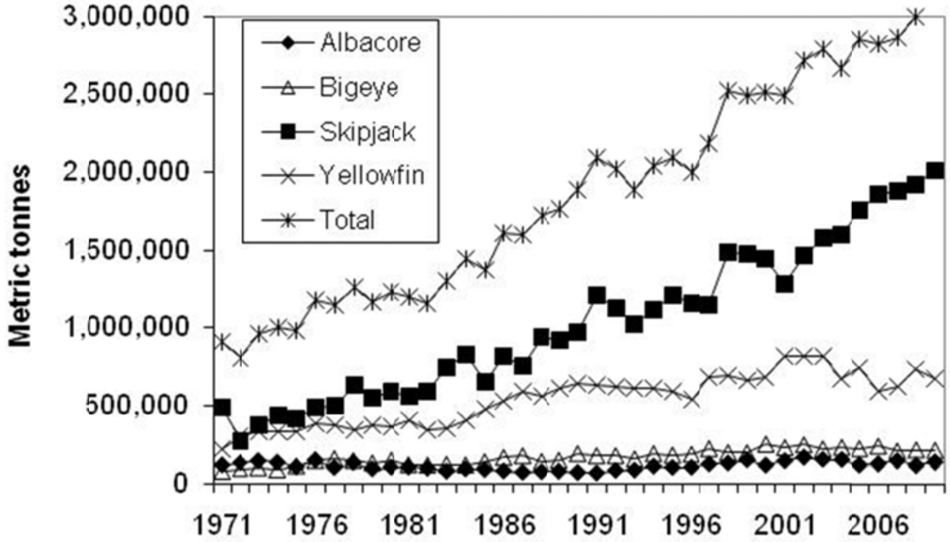


Figure 127. Total Purse Seine Catch of Skipjack and Yellowfin Tuna in the Pacific Ocean, 1968–2009. Source: SPC.

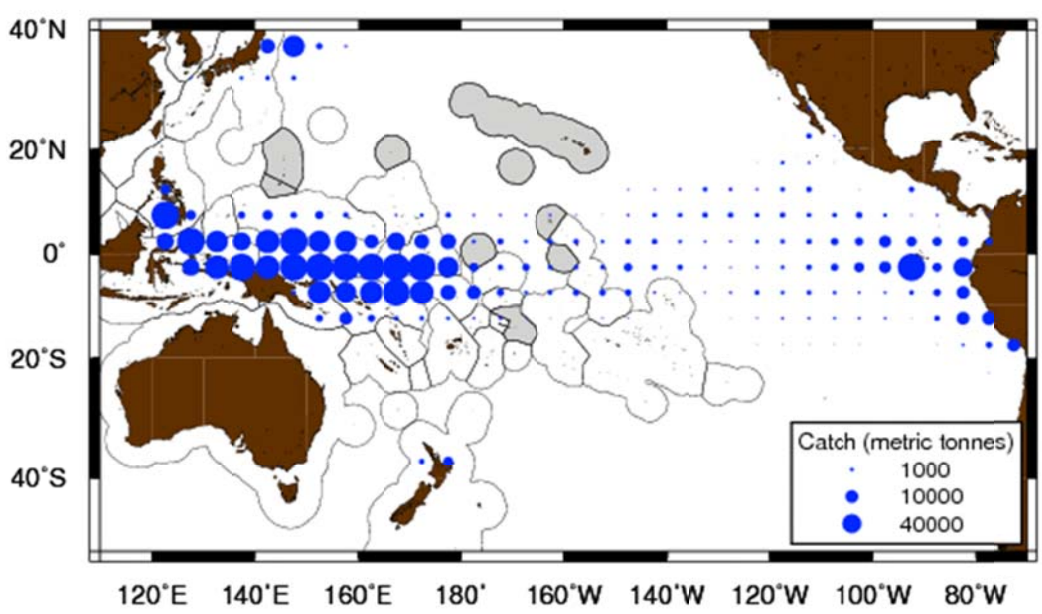


Figure 128. Distribution of Purse Seine Skipjack Catch in 2008. Source: SPC and I-ATTC.

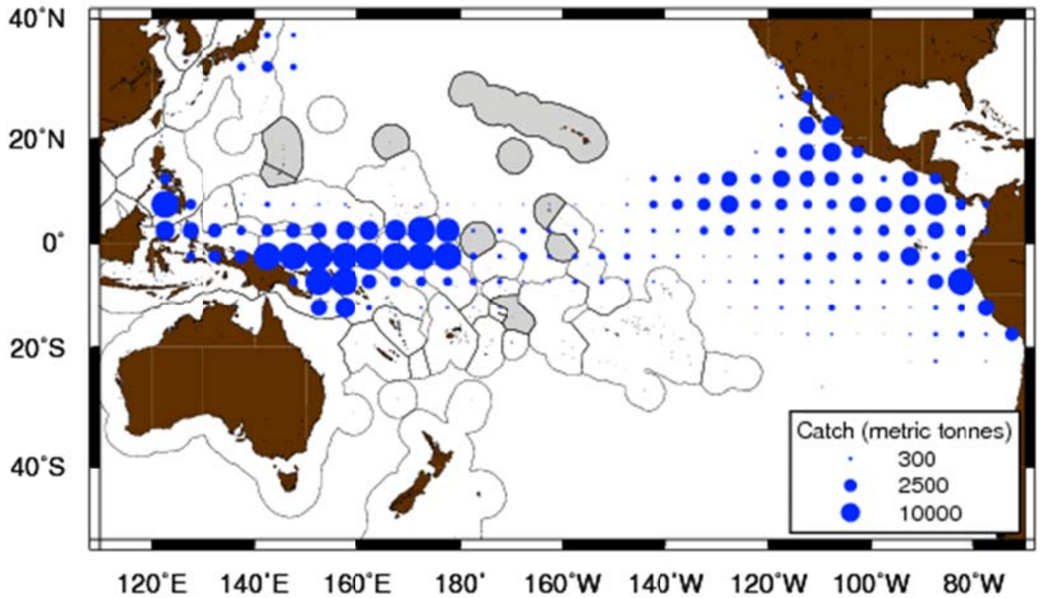


Figure 129. Distribution of Purse Seine Yellowfin Catch in 2008. Source: SPC and I-ATTC

The 2009 longline fishery in the WCP-CA. Source: WCPFC-SC6-2010 GN-WP-1

Vessels

The total number of vessels involved in the fishery has generally fluctuated between 3,500 and 6,000 for the last 30 years. The fishery involves two main types of operation –

- larger (typically >250 GRT) **distant-water** freezer vessels which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical (yellowfin, bigeye tuna) or subtropical (albacore tuna) species.
- smaller (typically <100 GRT) **offshore** vessels which are usually **domestically-based**, undertaking trips less than one month, with ice or chill capacity, and serving fresh or air-freight sashimi markets, or [albacore] canneries.

The following broad categories of longline fishery, based on type of operation, area fished and target species, are currently active in the WCP–CA:

- **South Pacific offshore albacore fishery** comprises Pacific-Islands domestic "offshore" vessels, such as those from American Samoa, Cook Islands, Fiji, French Polynesia, New Caledonia, Samoa, Solomon Islands, Tonga and Vanuatu; these fleets mainly operate in subtropical waters, with **albacore** the main species taken.
- **Tropical offshore bigeye/yellowfin-target fishery** includes "offshore" sashimi longliners from Chinese-Taipei, based in Micronesia, Guam, Philippines and Chinese-Taipei, mainland Chinese vessels based in Micronesia, and domestic fleets based in Indonesia, Micronesian countries, Philippines, PNG, the Solomon Islands and Vietnam.
- **Tropical distant-water bigeye/yellowfin-target fishery** comprises "distant-water" vessels from Japan, Korea, Chinese-Taipei, mainland China and Vanuatu. These vessels primarily operate in the eastern tropical waters of the WCP–CA , targeting bigeye and yellowfin tuna for the frozen sashimi market.

- **South Pacific distant-water albacore fishery** comprises "distant-water" vessels from Chinese-Taipei, mainland China and Vanuatu operating in the south Pacific, generally below 20°S, targeting albacore tuna destined for canneries.
- **Domestic fisheries in the sub-tropical and temperate WCP–CA** comprise vessels targeting different species within the same fleet depending on market, season and/or area. These fleets include the domestic fisheries of Australia, Japan, New Zealand and Hawaii. For example, the Hawaiian longline fleet has a component that targets swordfish and another that targets bigeye tuna.
- **South Pacific distant-water swordfish fishery** is a relatively new fishery and comprises "distant-water" vessels from Spain.
- **North Pacific distant-water albacore and swordfish fisheries** mainly comprise "distant-water" vessels from Japan (swordfish and albacore), Chinese-Taipei (albacore only) and Vanuatu (albacore only).

Catch

The provisional WCP–CA longline catch (223,792 mt) for 2009 was slightly below the average annual catch for the period 2000-2009 and around 10% (23,000 mt) lower than the highest on record attained in 2002 (256,582 mt). The WCP–CA albacore longline catch (87,080 mt – 39%) for 2009 was only 2,000 mt lower that the highest catch on record (89,883 mt in 2002). The provisional bigeye catch (65,606 mt – 29%) for 2009 was the lowest since 1996, but may be revised upwards when revised estimates are provided. The yellowfin catch for 2009 (69,158 mt – 31%) was similar to the average catch level for this species over the period 2000-2009. A significant change in the WCP–CA longline fishery over the past 10 years has been the growth of the Pacific Islands domestic albacore fishery, which has risen from taking 33% of the total south Pacific albacore longline catch in 1998 to accounting for around 50-60% of the catch in recent years. The combined national fleets making up the Pacific Islands domestic albacore fishery have numbered around 300 (mainly small "offshore") vessels in recent years.

The clear shift in effort by some albacore-targeting vessels in the Chinese-Taipei distant-water longline fleet to targeting bigeye in the eastern equatorial waters of the WCP–CA resulted in a reduced contribution to the albacore catch in recent years (which was compensated by the increase in Pacific Islands fleet albacore catches), 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 increased to 8,741 mt, and by 2004 it had increased to 16,888 mt. The bigeye catch by the Chinese-Taipei distant-water longline fleet has since declined to 8,863 mt (in 2009), related to a substantial drop in vessel numbers (142 vessels in 2003 reduced to 75 vessels in 2009). The Korean distant-water longline fleet has also experienced a large decline in bigeye and yellowfin catches in recent years, with a corresponding drop in vessel numbers – from 184 vessels active in 2002 reduced to 108 vessels in 2009 (41% decline), although their bigeye catch for the past two years (15,239 to 17,001 mt) were relatively high for this number of vessels. The Japanese distant-water and offshore longline fleets have also experienced a substantial decline in both bigeye catches (from 21,879 mt in 2000 to 7,699 mt in 2009) and vessel numbers (683 in 2000 to 165 in 2009).

Fleet distribution

Effort by the **large-vessel, distant-water fleets** of Japan, Korea and Chinese-Taipei account for most of the effort but there has been some reductions in vessel numbers in some fleets over the past decade. Effort is widespread as sectors of these fleets target bigeye and yellowfin for the frozen sashimi market in central and eastern tropical waters, and albacore in the more temperate waters for canning. Activity by the **foreign-offshore fleets** from Japan, mainland China and Chinese-Taipei are restricted to the tropical waters, targetting bigeye and yellowfin for the fresh sashimi market; these fleets have limited overlap with the distant-water fleets. The substantial "**offshore**" effort in the west of the region is primarily by the Indonesian and Chinese-Taipei **domestic fleets** targeting yellowfin and bigeye. The growth in **domestic fleets** in the South Pacific over recent years has been noted; the most significant examples are the increases in the Samoa, American Samoan, Fijian and French Polynesian fleets.

Table 30. Total Reported Longline Catch (metric tonnes) of PMUS in the Pacific Ocean. Source: SPC and I-ATTC (SAC-01-05), 2009 data are preliminary.

Year	Albacore	Yellowfin	Bigeye	Striped Marlin	Black Marlin	Blue Marlin	Swordfish	Total
1962	50,990	65,758	80,945	26,639	2,229	18,169	11,216	255,946
1963	44,566	72,158	109,157	29,733	2,342	18,341	11,414	287,712
1964	38,312	62,216	77,257	41,462	1,876	13,055	8,615	242,793
1965	39,420	61,107	59,008	34,712	2,375	10,068	9,665	216,355
1966	63,990	70,720	66,749	29,485	2,172	9,462	11,615	254,193
1967	73,468	45,005	68,669	32,841	1,825	8,804	12,041	242,652
1968	57,038	60,558	62,432	40,280	1,883	8,026	11,477	241,694
1969	43,459	66,701	84,442	26,463	2,073	9,118	14,358	246,613
1970	52,522	68,124	67,689	37,376	1,605	11,301	10,329	248,945
1971	51,773	64,940	66,602	33,168	2,127	6,727	9,410	234,746
1972	55,252	77,110	85,462	22,663	1,884	8,129	9,102	259,602
1973	63,607	73,515	91,062	20,333	1,935	8,313	9,604	268,369
1974	47,002	64,680	78,748	19,930	1,620	7,634	8,693	228,308
1975	37,142	79,056	99,356	16,308	1,845	5,797	9,434	248,938
1976	46,902	91,995	122,804	16,903	1,056	7,244	11,259	298,162
1977	55,402	105,035	140,335	9,623	936	7,244	10,892	329,467
1978	46,463	118,743	121,034	10,309	1,624	8,196	10,887	317,257
1979	40,794	116,538	112,621	16,658	1,950	8,658	11,162	308,380
1980	46,568	133,850	120,888	18,449	1,652	9,722	17,675	348,804
1981	51,395	101,124	94,980	21,430	2,067	10,875	22,507	304,378
1982	46,101	94,975	98,569	22,641	2,277	10,943	19,151	294,657
1983	40,383	94,557	101,455	14,917	1,916	8,615	20,666	282,509
1984	36,002	80,603	92,823	12,530	1,524	11,252	16,323	251,056
1985	41,787	87,164	117,651	13,164	1,234	9,744	18,698	289,441
1986	45,781	85,422	149,166	17,411	1,250	11,335	20,542	330,907
1987	37,323	93,003	159,478	20,728	1,814	12,580	25,285	350,210
1988	43,737	99,462	122,421	19,071	2,726	12,845	24,294	324,555
1989	32,221	82,555	124,136	13,763	1,510	10,437	16,527	281,150
1990	35,628	105,657	164,110	9,661	1,806	9,845	14,941	341,648
1991	41,093	87,068	151,439	10,553	2,047	10,601	17,413	320,214
1992	50,281	88,474	146,779	8,948	2,045	10,296	18,962	325,785
1993	61,129	88,040	128,864	10,715	1,646	11,377	18,923	320,694
1994	64,861	100,466	137,464	10,807	1,786	14,048	15,580	345,011
1995	62,214	99,230	114,723	11,934	1,332	13,675	13,956	317,064
1996	63,106	91,927	92,963	8,352	818	8,511	15,180	280,858
1997	74,989	91,698	111,020	9,956	1,510	9,808	15,850	314,832
1998	85,624	79,615	119,023	6,752	1,838	9,318	15,071	317,241
1999	77,971	69,850	101,490	5,600	1,597	8,876	14,404	279,787
2000	74,838	98,329	108,198	4,703	2,170	9,837	17,949	316,024
2001	84,926	101,965	131,660	4,599	1,583	11,180	18,007	353,921
2002	93,037	98,237	152,789	4,092	1,439	10,235	16,907	376,736
2003	87,084	99,477	129,207	6,345	944	14,510	19,574	357,141
2004	84,818	97,392	130,895	4,998	1,211	20,306	21,843	361,463
2005	84,900	80,921	112,195					
2006	94,870	81,696	115,075					
2007	87,125	68,501	103,181					
Average	57,346	85,766	109,283	17,605	1,746	10,583	15,056	295,726
STD deviation	18,013	17,598	27,457	10,341	417	3,031	4,529	42,064

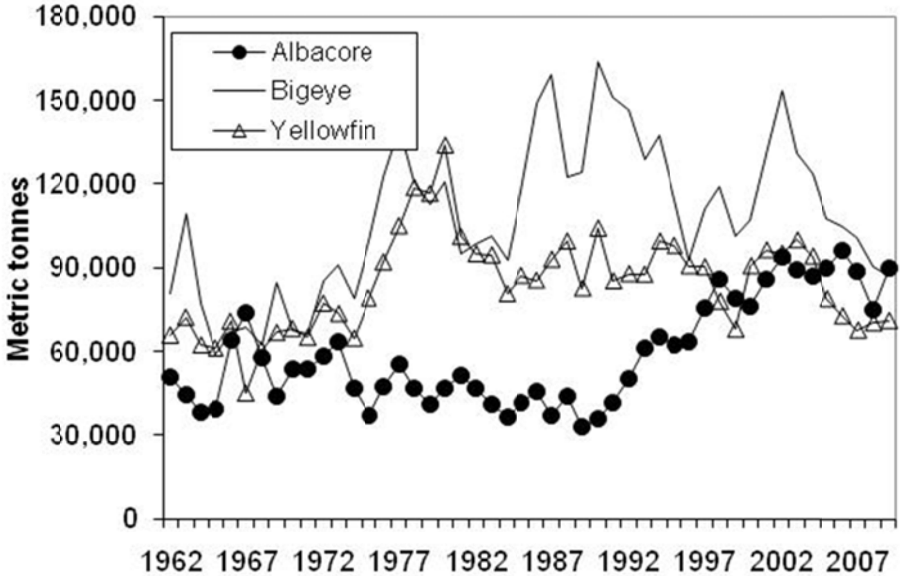


Figure 131. Reported Longline Tuna Catches in the Pacific Ocean. 2009 data are preliminary. Source: SPC.

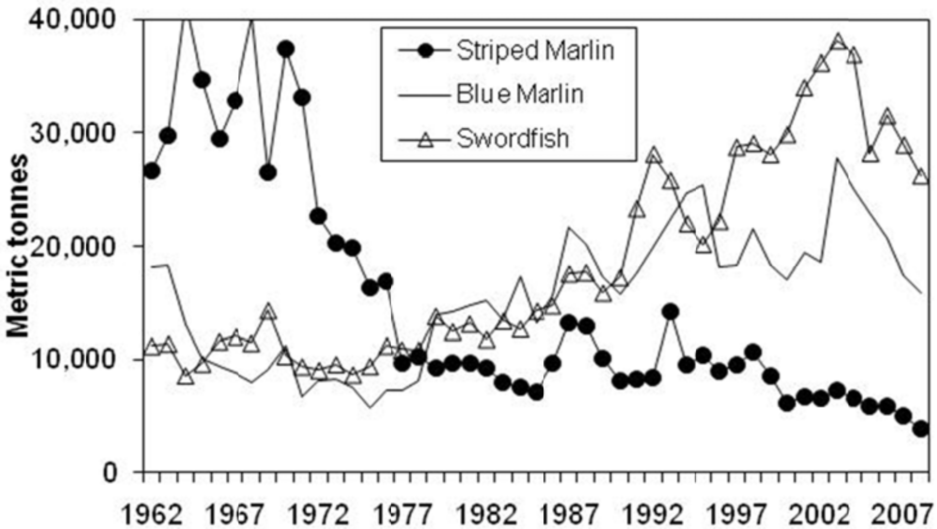


Figure 130. Reported Longline Billfish Catches in the Pacific Ocean. 2009 data are preliminary. Source: SPC and I-ATTC (SAC-01-05).

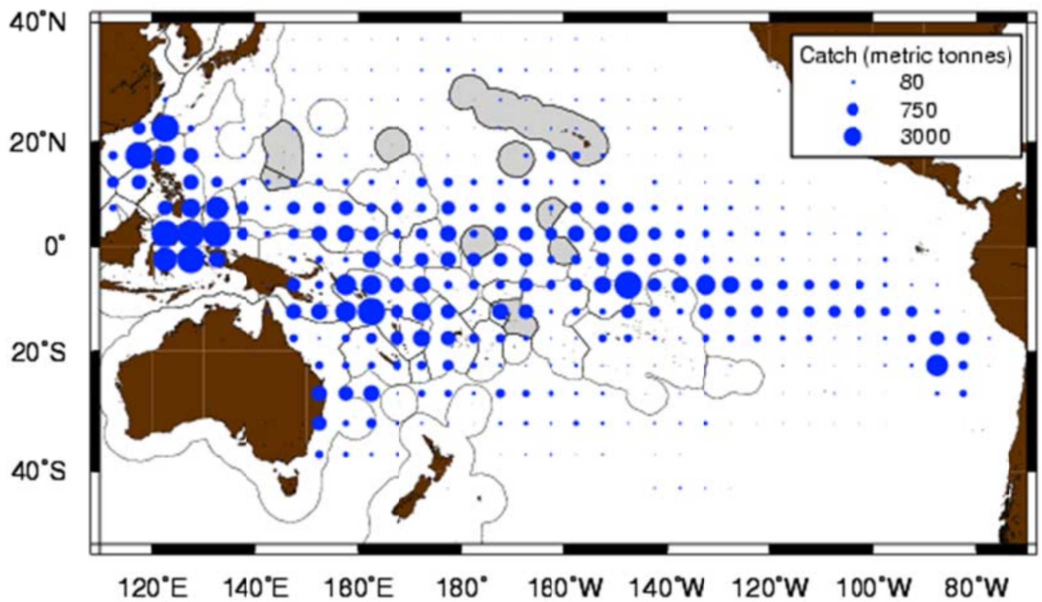


Figure 132. Distribution of Longline Catches of Yellowfin Tuna Reported in 2004. Source: SPC public domain data.

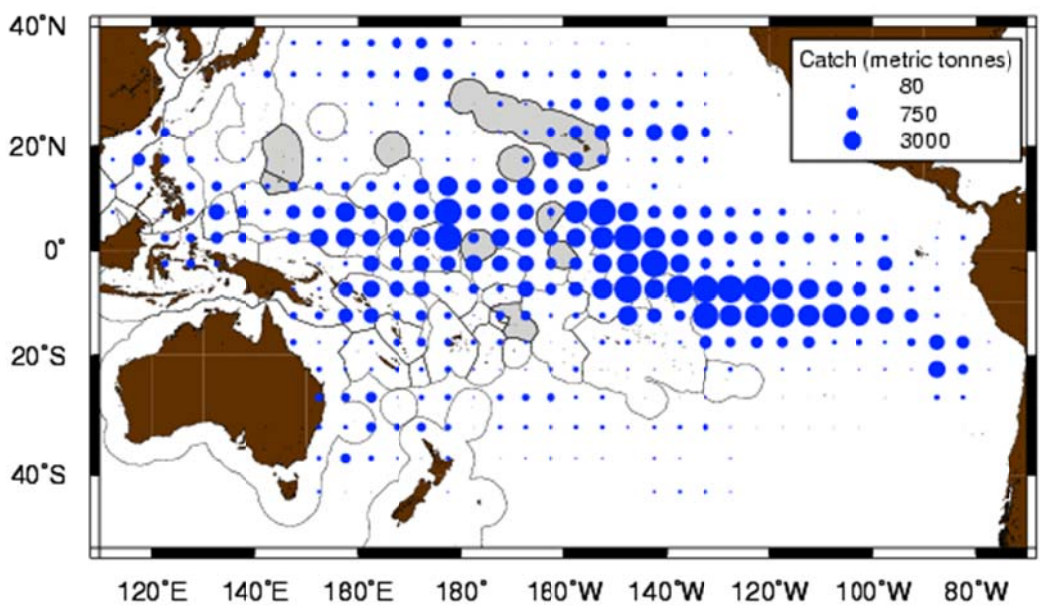


Figure 133. Distribution of Longline Catches of Bigeye Tuna Reported in 2004. Source: SPC public domain data.

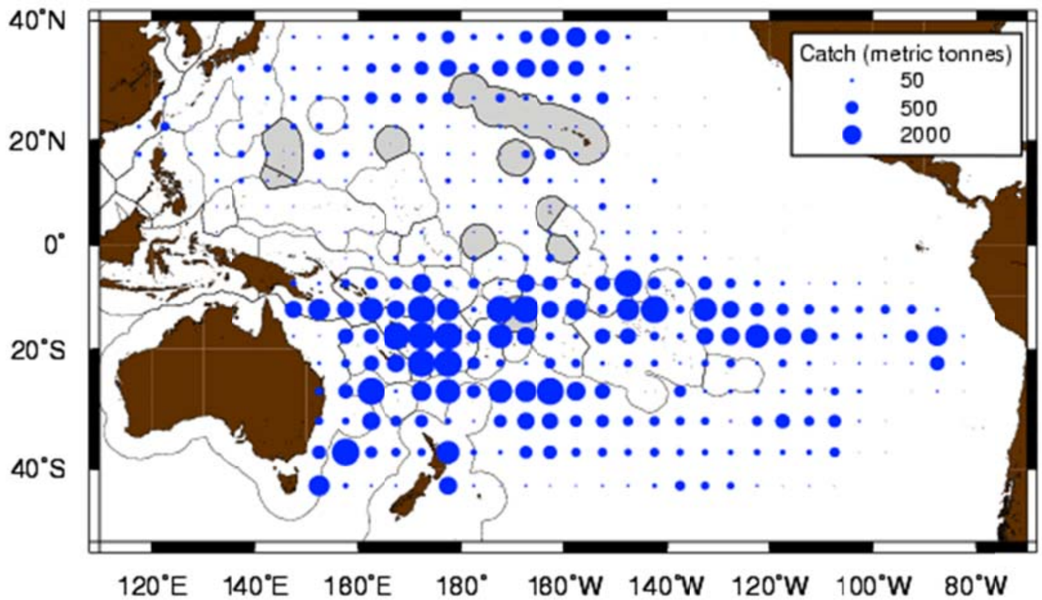


Figure 134. Distribution of Longline Catches of Albacore Tuna Reported in 2004. Source: SPC public domain data.

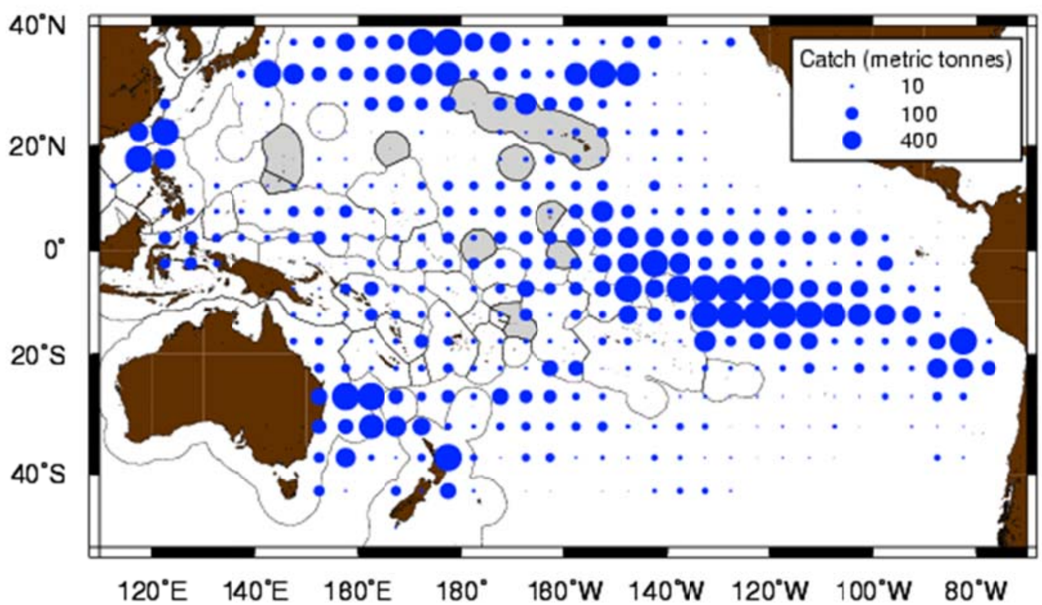


Figure 135. Distribution of Longline Catches of Swordfish Reported in 2004. Source: SPC public domain data.

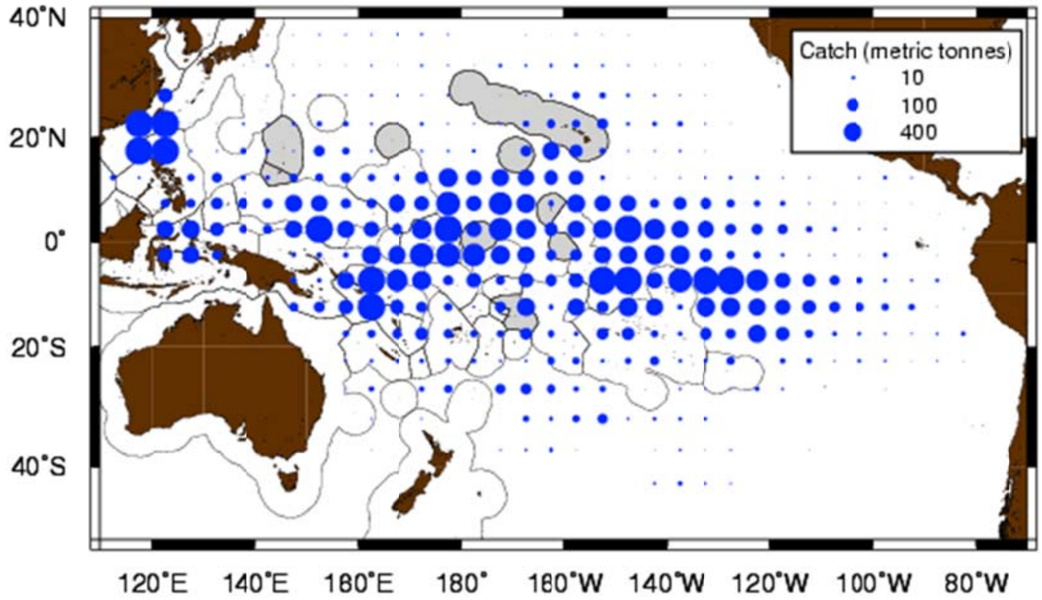


Figure 137. Distribution of Longline Catches of Blue Marlin Reported in 2004. Source: SPC public domain data.

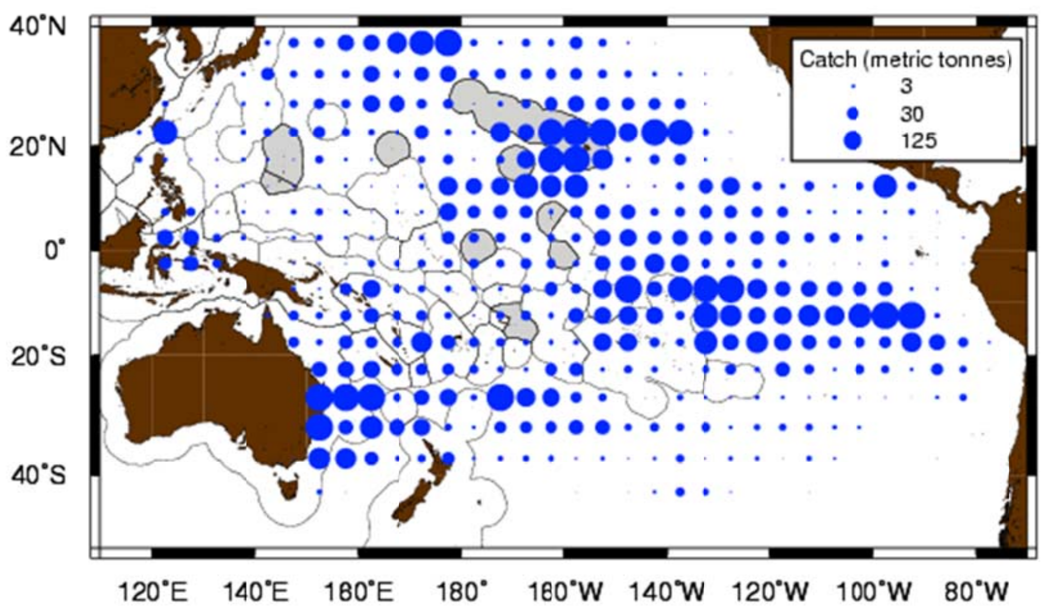


Figure 136. Distribution of Longline Catches of Striped Marlin Reported in 2004. Source: SPC public domain data.

The 2009 pole-and-line fishery in the WCP-CA. Source: WCPFC-SC6-2010 GN-WP-1

Vessels	The pole-and-line fleet was composed of approximately 500 vessels in the 2007 fishery which excludes vessels in the Indonesia domestic fishery.
Catch	The 2009 pole-and-line catch (165,814 mt) was the lowest annual catch for this fishery since the mid-1960s. Skipjack tends to account for the majority of the catch (~70-80% in recent years, but typically more than 85% of the total catch in tropical areas) and albacore (8–20% in recent years) is taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific. Yellowfin tuna (5–10%) and a small component of bigeye tuna (1–6%) make up the remainder of the catch. The Japanese distant-water and offshore (104,232 mt in 2009) fleets, and the Indonesian fleets (60,415 mt in 2007), account for most of the WCP–CA pole-and-line catch. The catches by the Japanese distant-water and offshore fleets in recent years have been the lowest for several decades and this is no doubt related to the continued reduction in vessel numbers (in 2009 reduced to only 96 vessels, the lowest on record). The Solomon Islands fleet recovered from low catch levels experienced in the early 2000s (only 2,773 mt in 2000 due to civil unrest) to reach a level of 10,448 mt in 2003, but this fleet ceased operating in 2009, with no apparent plan to resume activities in the short term.
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).

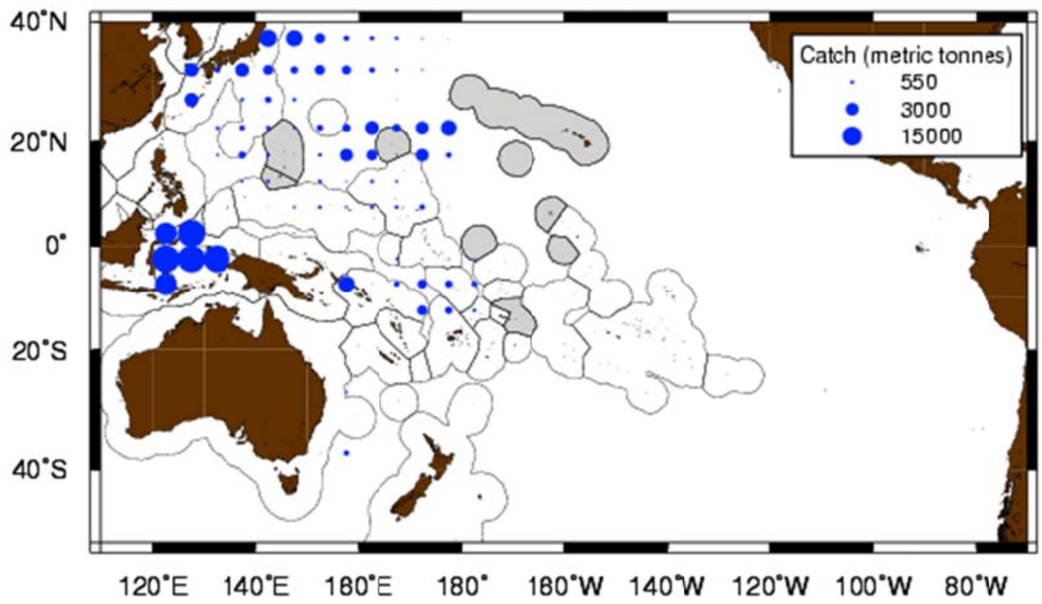


Figure 138. Distribution of Pole-and-Line Catch of Skipjack Reported in 2004.
Source: SPC public domain data.

Table 31. Total Reported Pole-and-Line Catch (metric tonnes) of Skipjack in the Pacific Ocean. Source: SPC.

Year	Skipjack
1970	379,074
1971	333,284
1972	172,827
1973	253,217
1974	289,202
1975	218,271
1976	276,582
1977	294,641
1978	331,401
1979	285,859
1980	333,457
1981	294,292
1982	262,244
1983	299,762
1984	379,474
1985	250,010
1986	336,695
1987	262,467
1988	301,031
1989	289,706
1990	224,592
1991	292,950
1992	251,717
1993	280,066
1994	227,921
1995	257,147
1996	211,408
1997	225,612
1998	244,447
1999	235,739
2000	216,458
2001	159,225
2002	150,933
2003	171,403
2004	154,161
2005	177,474
2006	155,484
2007	142,982
2008	144,064
2009	114,513
Average	247,045
STD deviatior	67,664

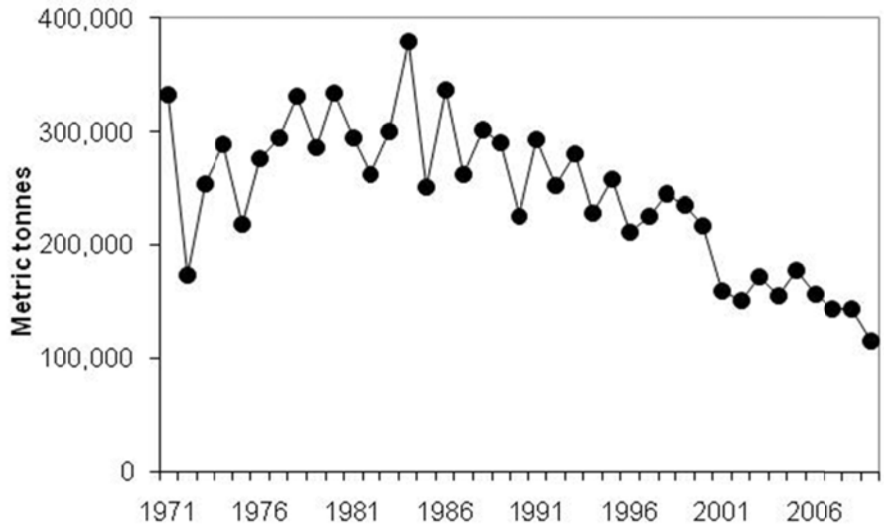


Figure 140. Reported Pole-and-Line Catch (metric tonnes) of Skipjack in the Pacific Ocean. Source: SPC.

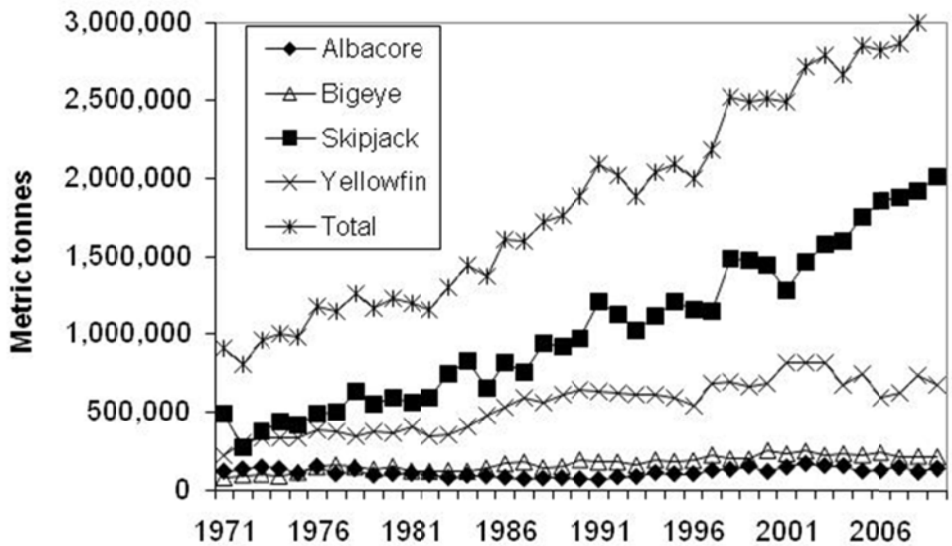


Figure 139. Estimated Total Annual Catch of Tuna Species in the Pacific Ocean. Source: SPC.

Table 32. Estimated Annual Catch (metric tonnes) of Tuna Species in the Pacific Ocean. Source: SPC.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	98,305	75,217	485,253	259,969	918,744
1971	120,642	75,918	493,805	224,877	915,242
1972	136,245	95,683	275,302	303,500	810,730
1973	148,301	101,194	377,781	338,393	965,669
1974	138,084	87,449	444,005	338,877	1,008,415
1975	106,915	113,566	423,494	340,003	983,978
1976	152,197	148,956	495,267	385,669	1,182,089
1977	103,460	162,037	499,105	380,904	1,145,506
1978	136,879	148,292	632,038	348,053	1,265,262
1979	95,831	133,905	555,802	381,566	1,167,104
1980	105,692	151,536	597,708	372,010	1,226,946
1981	106,668	121,690	564,260	404,449	1,197,067
1982	99,369	119,650	594,911	348,598	1,162,528
1983	79,841	124,590	745,659	356,840	1,306,930
1984	95,309	119,948	825,701	405,779	1,446,737
1985	90,875	141,104	655,626	485,483	1,373,088
1986	82,329	168,962	823,147	536,794	1,611,232
1987	73,602	180,616	754,346	589,777	1,598,341
1988	78,050	142,760	941,281	559,536	1,721,627
1989	79,450	150,231	922,389	613,302	1,765,372
1990	71,893	193,911	978,589	642,509	1,886,902
1991	67,990	180,418	1,206,133	638,093	2,092,634
1992	85,596	180,384	1,127,474	629,198	2,022,652
1993	87,367	159,696	1,027,241	618,562	1,892,866
1994	112,372	194,008	1,117,861	614,584	2,038,825
1995	103,987	184,900	1,211,789	594,742	2,095,418
1996	105,066	189,331	1,161,257	547,671	2,003,325
1997	127,146	227,274	1,147,467	683,513	2,185,400
1998	133,316	201,112	1,485,461	700,986	2,520,875
1999	153,915	200,222	1,474,711	664,245	2,493,093
2000	119,656	256,026	1,449,201	687,672	2,512,555
2001	147,935	234,758	1,285,641	822,049	2,490,383
2002	170,364	252,308	1,471,090	822,642	2,716,404
2003	157,344	224,723	1,584,115	824,500	2,790,682
2004	155,463	236,032	1,603,263	674,662	2,669,420
2005	121,998	227,146	1,755,830	747,103	2,852,077
2006	128,221	242,866	1,858,470	596,867	2,826,424
2007	148,824	211,596	1,881,206	627,043	2,868,669
2008	119,084	218,457	1,918,626	739,901	2,996,068
2009	139,683	215,916	2,014,827	671,666	3,042,092
Average	114,632	169,860	1,021,678	538,065	1,844,234
STD deviation	27,901	50,623	494,108	168,540	697,985

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 2010, the SC reviewed an assessment for bigeye and skipjack tuna. In addition, recent assessments are available for North Pacific blue shark (Tables 5 and 6). Stock status for the four tuna species are summarized from the SC species summary statements (http://www.wcpfc.int/node/2751 and http://www.wcpfc.int/node/2911), which also contains additional information on recent developments in the fishery, sizes of fish and trends in catch per unit effort (CPUE), recruitment, biomass and fishing mortality. In July 2010, the 10th meeting of the ISC reviewed assessments for North Pacific swordfish and Pacific bluefin tuna and summary statements from the meeting are available (http://isc.ac.affrc.go.jp/reports/isc/isc10_reports.html#Plenary).

Amendment 10 of the WPRFMC Pelagic FMP provided new specifications of overfishing criteria and control rules that trigger Council action based on the status of pelagic stocks. Amendment 10 defined Maximum Sustainable Yield (MSY) as a control rule that specifies the relationship of Fishing Mortality (*F*) to Biomass (*B*) and other indicators of productive capacity under a MSY harvest policy. Because fisheries must be managed to achieve optimum yield, not MSY, the MSY control rule is a benchmark control rule rather than an operational one. However, the MSY control rule is useful for specifying the "objective and measurable criteria for identifying when the fishery to which the plan applies is overfished" that are required under the MSA. The National Standard Guidelines (50 CFR 600.310) refer to these criteria as "status determination criteria" and state that they must include two limit reference points, or thresholds: one for *F* that identifies when overfishing is occurring and a second for *B* or its proxy that indicates when the stock is overfished (Figure 16). The status determination criterion for *F* is the maximum fishing mortality threshold (MFMT). Minimum stock size threshold (MSST) is the criterion for *B*. If fishing mortality exceeds the MFMT for a period of one year or more, overfishing is occurring. If stock biomass falls below MSST in a given year, the stock or stock complex is overfished. A Council must take remedial action in the form of a new FMP, an FMP amendment, or proposed regulations when it has been determined by the Secretary of Commerce that overfishing is occurring, a stock or stock complex is overfished, either of the two thresholds is being approached, or existing remedial action to end previously identified overfishing has not resulted in adequate progress.

Table 33. Schedule of Completed Stock Assessments for WPRFMC PMUS

Albacore Tuna (S. Pacific)	2009	Swordfish (N. Pacific)	2009
Albacore Tuna (N. Pacific)	2006	Wahoo	
Other tuna relatives (*Auxis* sp.)		Yellowfin Tuna (WCPO)	2009
(*allothunnus* sp., *Scomber* sp.)		Kawakawa	
Bigeye Tuna (WCPO)	2010	Bluefin Tuna (Pacific)	2008
Black Marlin		Common Thresher Shark	
Blue Marlin	2002	Pelagic Thresher Shark	
Mahimahi		Bigeye Thresher Shark	
Oilfishes		Shortfin Mako Shark	
Opah		Longfin Mako Shark	
Pomfrets		Blue Shark (N. Pacific)	2009
Sailfish		Silky Shark	
Shortbill Spearfish		Oceanic Whitetip Shark	
Skipjack Tuna (WCPO)	2010	Salmon Shark	
Striped Marlin (N. Pacific)	2007	Squid	

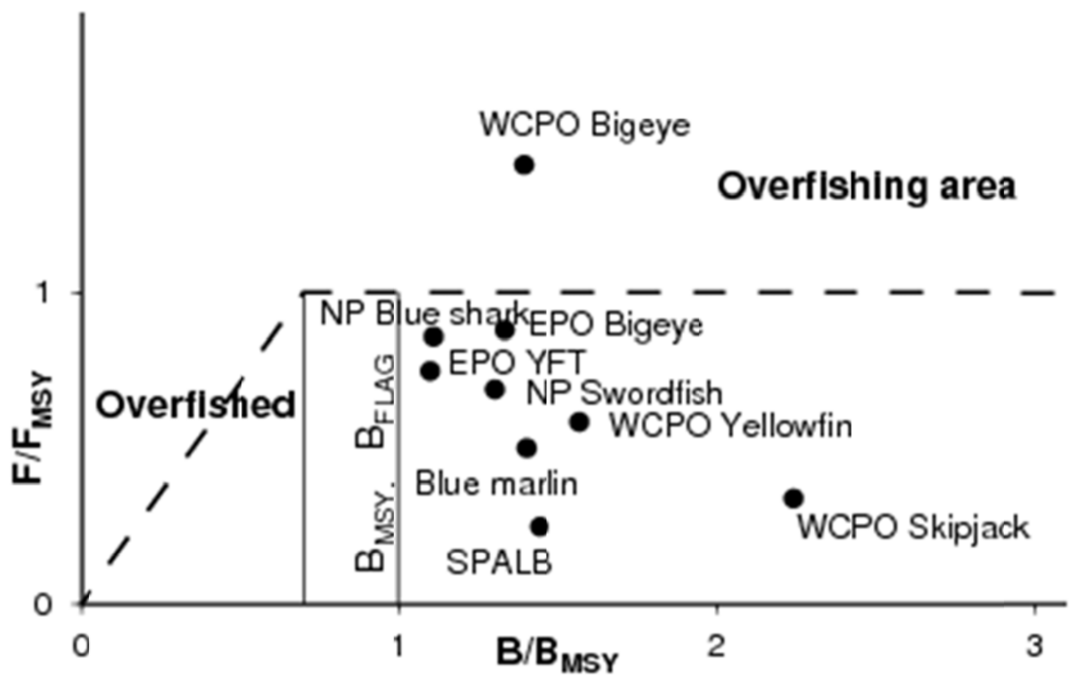


Figure 141. Specification of Fishing Mortality and Biomass Reference Points in the WPRFMC Pelagics FMP and Current Stock Status in the Western-Central (WCPO) and Eastern Pacific Ocean (EPO).

Skipjack tuna in the WCP-CA

Stock status: A stock assessment was undertaken for skipjack during 2010. The 2010 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 17, Table 6).

Management advice and implications: Catches in 2009 increased to a historical high of ~1.8 million mt. This is significantly above the estimated MSY of ~1.35 million mt. The assessment continues to show that the stock is currently only moderately exploited and fishing mortality levels are sustainable. Catch rate levels are likely to decline and catch should decrease as stock levels are fished down to MSY levels. Due to the rapid change of the fishing mortality and biomass indicators relative to MSY in recent years, increases of fishing effort should be monitored.

Fishing is having a significant impact on stock size especially in the western equatorial region and can be expected to affect catch rates. Additional purse seine effort will yield only modest gains in skipjack catches and may result in a corresponding increase in fishing mortality for bigeye and yellowfin tunas. The management of total effort in the WCPO should recognize this.

There is concern, yet to be substantiated, that high catches in the equatorial region could result in range contractions of the stock, thus reducing skipjack availability to higher latitude (e.g. Japan, Australia, New Zealand) fisheries.

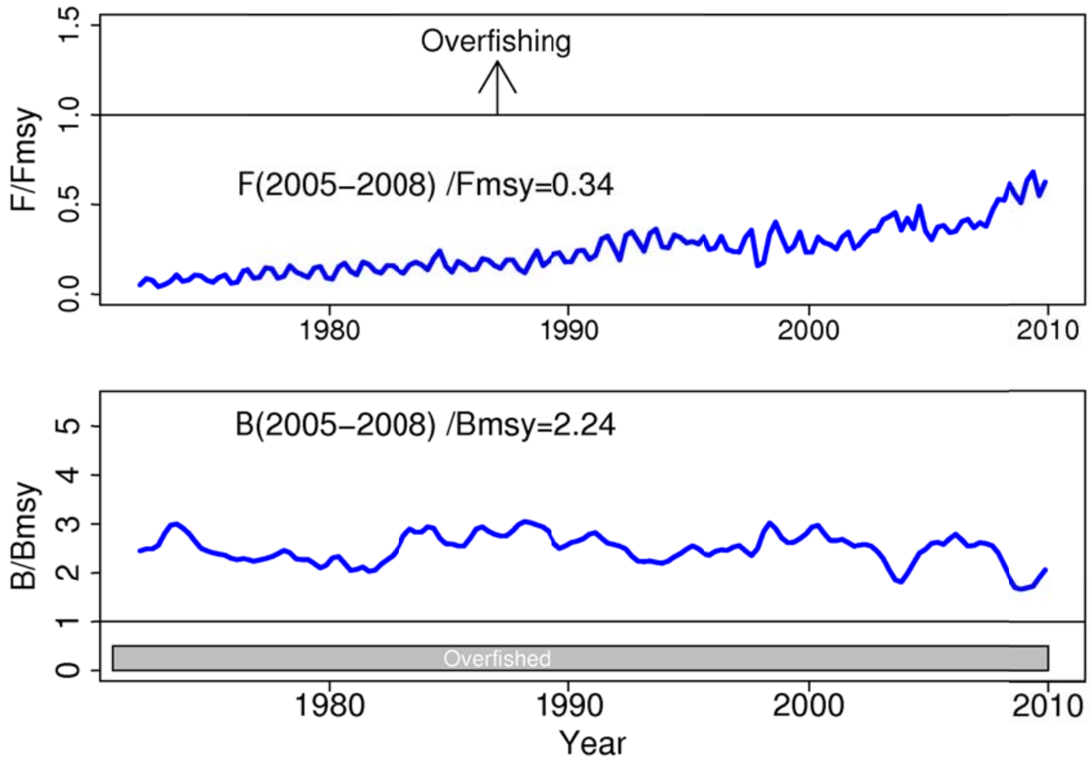


Figure 142. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for Skipjack Tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

Yellowfin tuna in the WCP-CA

Stock status: Three specific issues were raised in discussions about stock assessment results at the WCPFC Scientific Committee.

1) It was generally agreed that stock assessment results from the 2009 model are more optimistic than those in 2007, meaning that the general nature of advice required from SC5 may need to be different from previous years. However, a comparison of 2007 and 2009 stock assessments with similar steepness values indicate only a slight improvement.
2) In noting this generally more optimistic state, the SC also noted advice from the SA-SWG, that Region 3, which supports approximately 95% of the catch, has significantly higher fishery impacts than other regions. This means that the more optimistic status may be "buffered" by biomass in other regions. SPC-OFP reminded the meeting that spatial heterogeneity exists throughout the regions, and it is unlikely that mixing is rapid enough to transfer fishery impacts in the short term, if at all. For some CCMs, this highlighted the importance of having a specific recommendation for Region 3, noting that specific information was provided in the SA-SWG report.
3) It was also noted that this year, the SA-SWG provided advice on a range of model runs with different values of assigned steepness, each of which could be as feasible as the others. It would, therefore, be very difficult to provide the level of prescription in the recommendation that was provided in 2007, due to the sheer number of results that would need to be presented.

Management advice and implications: The range of estimates of $F_{current}/F_{MSY}$ ratios (0.41–0.85) in the 2009 assessment was lower than the base-case estimate (0.95) in the 2007 assessment. This change is largely due to the addition of fisheries data, assumptions of steepness, and because the period for computing the MSY-based reference points was advanced two years (from 2002–2005 to 2004–2007). Estimates of $F_{current}/F_{MSY}$ indicate that the entire WCPO yellowfin stock is not experiencing overfishing and the entire stock appears to be capable of producing MSY. Estimates of $SB_{current}/SB_{MSY}$ indicate that the WCPO yellowfin stock is not in an overfished state.

The SC noted a slightly improved status for the WCPO yellowfin stock compared with the 2007 stock assessment. However, the SC also noted that levels of fishing mortality, exploitation rates and depletion differ between regions, and that exploitation rates were highest in the western equatorial region, which accounts for ~95% of the total yellowfin tuna catch, and that the spawning biomass in this region is estimated to have declined to about 30% of the unexploited level. The SC reiterated SC3's advice that exploitation rates differ between regions, and that exploitation rates continue to be highest in the western equatorial region. The SC recommended that there be no increase in fishing mortality in the western equatorial region.

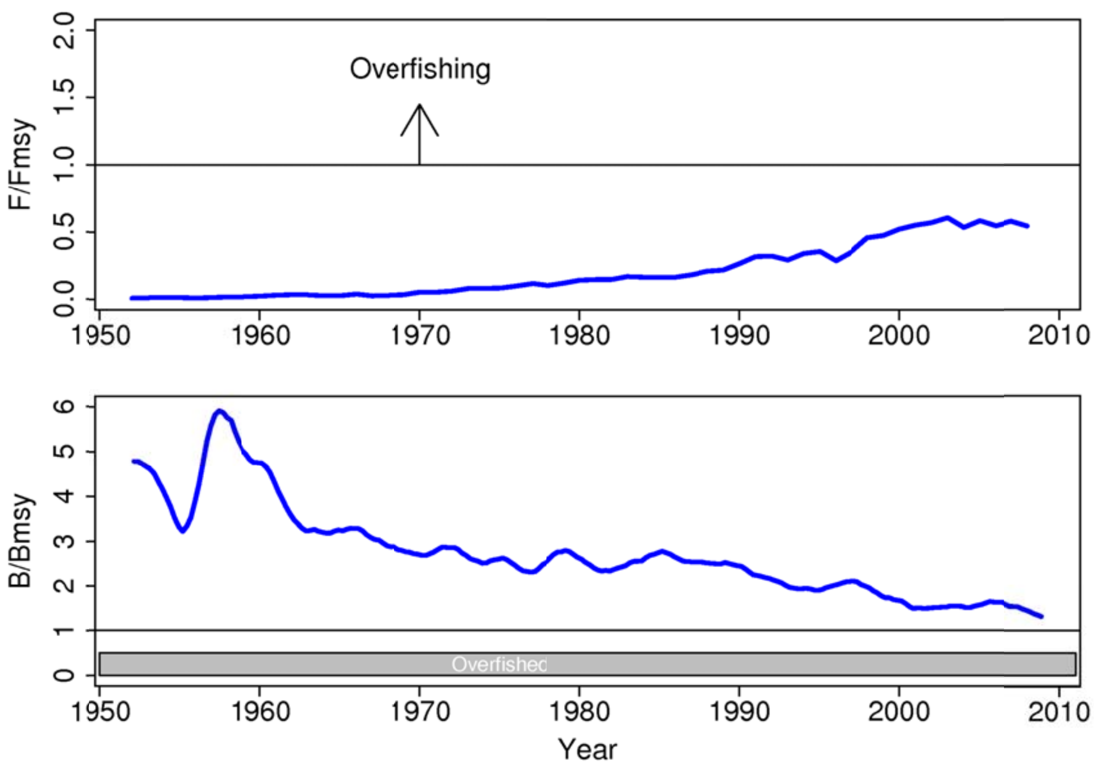


Figure 143. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for Yellowfin Tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point (MSST).

Bigeye Tuna in the WCP-CA

Stock status: SC6 selected run 3d which had a steepness estimated at 0.98 (hereafter referred to as the base model) to represent the stock status of bigeye tuna and considered run 4b to illustrate status assuming a lower value to steepness (0.75). For the base model, $Fcurrent/FMSY$ is estimated at 1.41 indicating that overfishing is occurring for the WCPO bigeye tuna stock and that in order to reduce fishing mortality to Fmsy a 29% reduction in fishing mortality is required from the 2005–2008 level. Considering historical levels of fishing mortality, a 31% reduction in fishing mortality from 2004 levels is required (consistent with the aim of CMM2008-01), and a 20% reduction from average 2001–2004 levels. Current stock status in the base model indicates the current total and spawning biomass are higher than the associated MSY levels ($Bcurrent/BMSY$=1.39 and $SBcurrent/SBMSY$=1.34). This indicates that that the WCPO bigeye stock is not in an overfished state if the spawning biomass reference period is 2005-2008. However, if the spawning biomass period is considered as 2009, then the spawning biomass is further reduced ($SBlatest/SBMSY$=1.17).

Management advice and implications: The WCPFC Scientific Committee recommended a minimum of a 29% reduction in fishing mortality from the average levels for 2005–2008 with the goal of returning the fishing mortality rate to Fmsy. Recommended reductions in fishing mortality change between stock assessments and between the time window in which MSY levels are calculated. The current recommendation is equivalent to a minimum 31% reduction in fishing mortality from the 2004 levels, and a minimum 20% reduction from average 2001–2004 levels. Current stock status indicates the current total and spawning biomass are higher than the associated MSY levels ($t/BMSY$=1.39 and $SBcurrent/SBMSY$=1.34).
The base model estimate of the Fcurrent /FMSY ratio in the 2010 assessment was 1.25 and lower than the estimate (1.53) in the run 14 of the 2009 assessment when estimated over the same MSY window (2001–2004), thus stock status is more optimistic in the 2010 assessment.

Interpretation of stock status with regard to MSY reference points and associated fishing mortality reductions are highly dependent on the steepness in the stock recruitment relationship. Steepness is difficult to estimate and therefore generally uncertain. The SC notes that the current stock status may be overly optimistic as estimated steepness (0.98) is essentially one (1) whereby recruitment is completely independent of spawning biomass. If steepness is substantially less than 1, then the interpretation of stock status is more pessimistic and greater reductions in fishing mortality will be required to obtain Fmsy suggesting that the stock may be in an overfished state.

Overfishing and the increase in catch of juvenile bigeye have resulted in a considerable reduction in the potential yield of the WCPO bigeye stock. The SC concludes that *MSY* levels would increase if the mortality of juvenile bigeye was reduced.

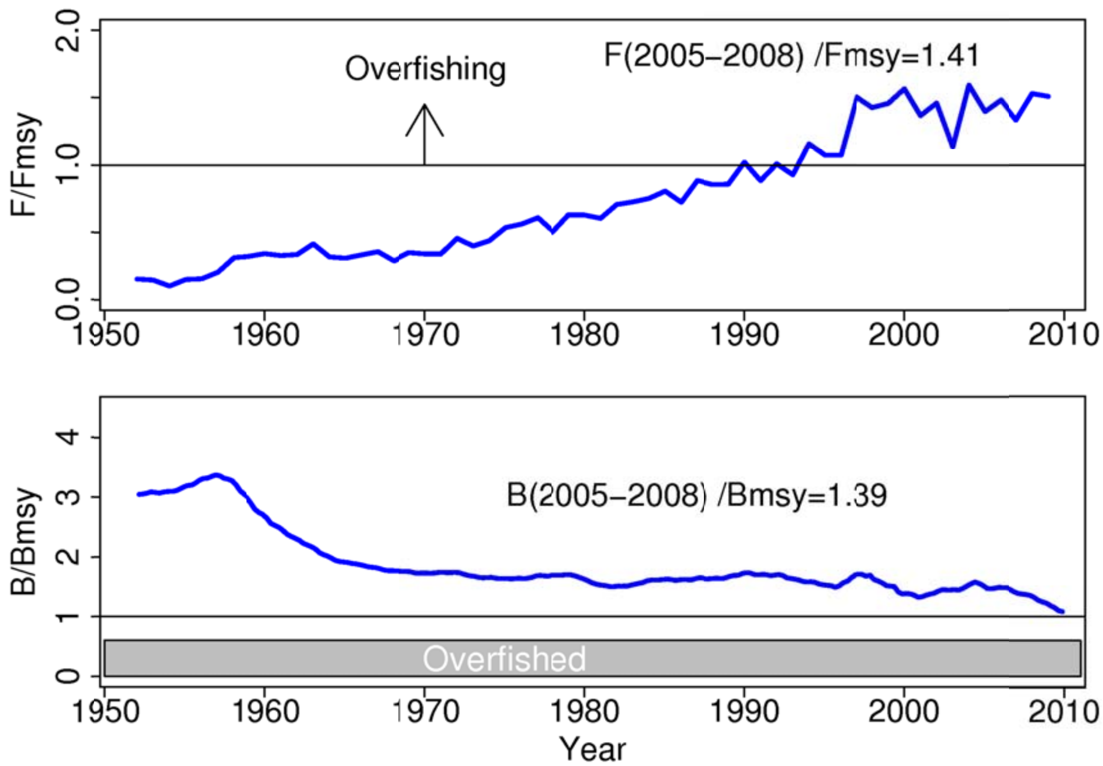


Figure 144. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for Bigeye Tuna in the WCP-CA. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

South Pacific Albacore

Stock status: The 2009 assessment results differ moderately from results from the 2008 assessment due to changes in relative abundance indices, splits in selectivity, assumed values of steepness and changes in growth modeling. These changes have resulted in a more realistic and credible model which fits the data better.

Management implications: The current assessment resulted in more realistic levels of stock size and *MSY* with a credible model with many sources of potential bias being removed. There is considerable uncertainty about the early trend in biomass, though the trend has a negligible effect on management advice. Estimates indicate that overfishing is not occurring and that the fishery is not in an overfished state. There is no indication that current levels of catch are not sustainable with regard to recruitment overfishing; however, current levels of fishing mortality may be affecting longline catch rates on adult albacore.

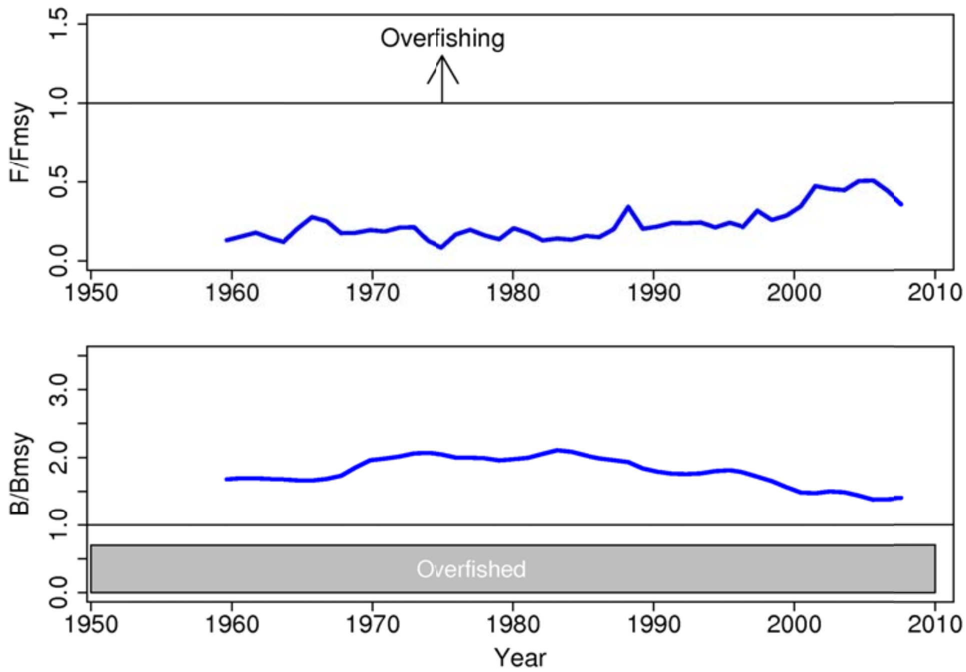


Figure 145. Ratios of F/F_{MSY} (top) and B/B_{MSY} (bottom) for South Pacific Albacore. The horizontal line at 1.0 in the F/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.

North Pacific Albacore

ISC members agreed that stock assessment results indicated that 2006 estimate of spawning stock biomass (SSB) is the second highest in history (roughly, 153,000 t). This high level of SSB is reflective of strong year classes in 1999, 2001 and 2003. On the other hand, it is also indicated that the current fishing mortality rate (F=0.75) is high relative to commonly used reference points. Projected levels of SSB are forecasted to decline from a high level of 166,000 t in 2007 to the equilibrium level of roughly 92,000 t by 2015, if the population is fished at the current F of 0.75, which is near the long-term average (1966−2005).

North Pacific Striped Marlin

Spawning biomass has declined from around 40,000 mt in the early 1970s to about 5,000 mt in the early 2000s. Spawning biomass in 2003 was estimated to be 14–15% of the 1970 level, depending on model scenario. Recruitment estimates also exhibited a long-term decline since the 1970s. Recent average recruitment (1996–2003) is roughly one-half of the long-term average (1965–2003) under both model scenarios. Stock projections from 2004 through 2009 based on re-sampling the distribution of recent average recruitment indicate that both spawning biomass and landings will continue to decline if the current fishing mortality rate (average of F2001−F2003) is maintained, regardless of model scenario. Fishing mortality has increased more than three-fold, from roughly F=0.20 in the early 1970s to over F=0.6 in the early 2000s. The current fishing mortality rate exceeds the F20% reference point by roughly 60% under both model scenarios. It was also noted that the current fishing mortality rate corresponds to maintaining only 9% of maximum spawning potential (F9%).

North Pacific Swordfish

The North Pacific WCPO and EPO SWO stocks were assessed by the ISC Billfish Working Group in 2009. Based on the 2009 stock assessment results, the exploitable biomass of the WCPO SWO stock was estimated to be about 75,000 t in 2006 (B2006), roughly 30% above BMSY. The exploitation rate on the WCPO stock in 2006 was estimated to be 14% with a total catch of roughly 9,900 t or roughly 69% of MSY (MSY=14,400 t). Based on the 2010 stock assessment update results for the EPO stock only, the exploitable biomass of the EPO SWO stock was estimated to be about 69,000 t in 2006, over 200% above BMSY. The ISC indicated that both the WCPO and EPO stocks of swordfish are healthy and above the level required to sustain recent catches.

Pacific Bluefin Tuna

Stock status: A summary of the 2010 assessment update is as follows:

1. A number of sensitivity runs were conducted in 2010 to investigate uncertainties in biological assumptions and fishery data. Results indicate that the assumption of adult M is particularly influential to the estimate of absolute spawning biomass and fishing mortality. Although absolute estimates from the stock assessment model were sensitive to different assumptions of M, relative measures were less sensitive.
2. The estimate of spawning biomass in 2008 (at the end of the 2007 fishing year) declined from 2006 and is estimated to be in the range of the 40-60 percentile of the historically observed spawning biomasses.
3. Average Fishing Mortality 2004-2006 (F2004-2006) had increased from F2002-2004 by 6% for age-0, approximately 30% for ages 1-4, and 6% for ages 5+.
4. 30-year projections predict that at F2004-2006 median spawning biomass is likely to decline to levels around the 25th percentile of historical spawning biomass with approximately 5% of the projections declining to or below the lowest previously observed spawning biomass. At F2002-2004 median spawning biomass is likely to decline in subsequent years but recover to levels near the median of the historically observed levels. In contrast to F2004-2006, F2002-2004 had no projections (0%) declining to the lowest observed spawning biomass. In both projections long-term average yield is expected to be lower than recent levels.

Management implications: ISC‘s plenary reached consensus on the management advice for Pacific bluefin tuna as follows: given the conclusions of the July 2010 PBFWG workshop, the current (2004–2006) level of F relative to potential biological reference points, and the increasing trend of F, it is important that the level of F is decreased below the 2002–2004 levels, particularly on juvenile age classes.

Table 34. 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}=0.34	No	No	B/B_{MSY}=2.24	No	No	Hoyle et al. 2010	>0.5 yr^{-1}	0.5 B_{MSY}
Yellowfin Tuna (WCPO)	F/F_{MSY}=0.58	No	No	B/B_{MSY}=1.57	No	No	Langley et al. 2009	0.8-1.6 yr^{-1}	0.5 B_{MSY}
Albacore Tuna (S. Pacific)	F/F_{MSY}=0.25	No	No	B/B_{MSY}=1.40	No	No	Hoyle and Davies 2009	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}=1.41	Yes	Not applicable	B/B_{MSY}=1.39	No	No	Harley et al. 2010	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)	F/F_{MSY}=0.54	No	Unknown	B/B_{MSY}=1.60	No	Unknown	ISC 2009	0.3 yr^{-1}	0.7 B_{MSY}
Blue Shark (N. Pacific)[2]	F/F_{MSY}=0.86	No	Unknown	B/B_{MSY}=1.11	No	Unknown	Kleiber et al. 2009	0.2 yr^{-1}	0.8 B_{MSY}
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 run - A

Table 35. U.S. Longline Landings of Reported to WCPFC and IATTC in 2010

U.S. and Territorial longline catch (mt) by species in the WCPFC Statistical Area, 2005-2009.

	U.S. in North Pacific Ocean					A Samoa in NP	American Samoa					Total				
	2009	2008	2007	2006	2005	2009	2009	2008	2007	2006	2005	2009	2008	2007	2006	2005
Vessels	127	129	129	127	125	9	26	28	29	28	36	151	155	156	154	156
Species																
Albacore, North Pacific	168	298	243	256	287	3	0	0				171	298	243	256	287
Albacore, South Pacific	0	0				0	3,915	3,550	5,183	4,078	2,936	3,915	3,550	5,183	4,078	2,936
Bigeye tuna	3,709	4,649	5,381	4,381	4,462	153	167	132	218	181	134	4,029	4,781	5,599	4,562	4,596
Pacific bluefin tuna	1	0	0	1	0	0	1	1	2	0	0	2	1	2	1	0
Skipjack tuna	116	117	91	93	90	5	146	165	162	190	142	266	282	253	283	233
Yellowfin tuna	431	836	833	937	698	15	374	333	640	513	526	820	1,169	1,473	1,450	1,224
Other tuna	0	0	0	0	0	0	0	0	0	3	3	0	0	0	4	4
TOTAL TUNA	4,424	5,900	6,549	5,668	5,538	176	4,603	4,180	6,205	4,967	3,741	9,203	10,081	12,753	10,635	9,279
Black marlin	0	0	1	0	1	0	0	0	0	0	0	1	0	1	1	1
Blue marlin	340	333	255	409	326	7	42	34	38	25	23	389	367	293	433	350
Sailfish	9	10	10	9	6	0	2	1	1	6	2	12	11	11	15	8
Spearfish	98	210	141	160	201	2	3	1	1	2	2	103	211	142	162	203
Striped marlin, North Pacific	235	411	267	609	493	5	0	0				240	411	267	609	493
Striped marlin, South Pacific	0	0				0	4	1	1	4	3	4	1	1	4	3
Other marlins	0	2	1	4	2	0	0	0	0	0	0	0	2	1	4	2
Swordfish, North Pacific	1,285	1,301	1,428	1,149	1,475	5	0	0				1,290	1,301	1,428	1,149	1,475
Swordfish, South Pacific	0	0				0	12	7	13	38	8	12	7	13	38	8
TOTAL BILLFISH	1,968	2,267	2,103	2,340	2,504	20	63	43	54	75	38	2,051	2,310	2,156	2,415	2,542
Blue shark	9	7	6	10	25	0	1	1	1	1	0	9	7	7	10	25
Mako shark	103	109	119	94	96	1	0	0	0	1	0	104	109	120	95	96
Thresher	29	39	42	33	33	0	0	0	0	0	0	29	39	42	33	33
Other sharks	6	4	7	12	3	0	0	0	1	0	0	6	4	7	12	4
TOTAL SHARKS	146	159	174	149	157	1	1	1	2	1	0	148	160	176	151	157
Mahimahi	253	323	376	316	421	7	17	12	14	26	28	276	335	390	342	449
Moonfish	487	412	451	477	407	22	3	2	3	4	5	512	415	454	482	412
Oilfish	193	178	180	173	155	7	3	0	0	1	0	203	178	180	175	156
Pomfret	207	224	234	250	269	10	1	0	0	0	1	218	224	235	251	270
Wahoo	118	194	169	231	201	4	134	133	197	274	219	257	326	366	505	420
Other fish	8	14	10	14	14	0	0	0	0	0	0	8	14	10	14	14
TOTAL OTHER	1,266	1,345	1,420	1,462	1,467	50	157	148	215	306	254	1,474	1,493	1,635	1,768	1,721
GEAR TOTAL	7,804	9,671	10,246	9,619	9,666	247	4,824	4,372	6,475	5,349	4,033	12,875	14,043	16,720	14,968	13,700

U.S. longline catch (mt) by species in the Pacific Ocean north of the Equator, 2005-2009.

	U.S.				
	2009	2008	2007	2006	2005
Vessels	128	130	130	128	126
Species					
Albacore, North Pacific	203	353	250	270	296
Albacore, South Pacific	0	0			
Bigeye tuna	4,546	5,927	5,798	4,466	4,999
Pacific bluefin tuna	1	0	0	1	1
Skipjack tuna	136	121	93	94	91
Yellowfin tuna	495	869	844	958	712
Other tuna	0	0	0	0	0
TOTAL TUNA	5,381	7,269	6,986	5,789	6,099
Black marlin	1	0	1	0	1
Blue marlin	362	348	262	409	337
Sailfish	10	11	10	9	6
Spearfish	113	226	148	161	207
Striped marlin, North Pacific	259	426	276	611	511
Striped marlin, South Pacific	0	0			
Other marlins	0	2	1	4	2
Swordfish, North Pacific	1,788	1,980	1,735	1,211	1,622
Swordfish, South Pacific	0	0			
TOTAL BILLFISH	2,532	2,994	2,433	2,405	2,686
Blue shark	9	7	8	10	25
Mako shark	120	131	128	97	105
Thresher	30	42	44	35	34
Other sharks	6	4	7	12	3
TOTAL SHARKS	166	184	188	154	168
Mahimahi	327	374	438	322	442
Moonfish	885	615	573	492	499
Oilfish	222	203	190	175	164
Pomfret	255	279	259	254	287
Wahoo	134	206	174	232	208
Other fish	8	14	10	14	14
TOTAL OTHER	1,832	1,690	1,642	1,489	1,615
GEAR TOTAL	9,911	12,137	11,249	9,837	10,568

U.S. longline catch (mt) by species in the Eastern Pacific Ocean, 2005-2009.

	U.S.				
	2009	2008	2007	2006	2005
Vessels	102	119	85	25	75
Species					
Albacore, North Pacific	31	55	7	14	9
Albacore, South Pacific	0	0			
Bigeye tuna	684	1,277	417	85	537
Pacific bluefin tuna	0	0	0	0	0
Skipjack tuna	16	4	1	1	1
Yellowfin tuna	49	33	11	21	14
Other tuna	0	0	0	0	0
TOTAL TUNA	780	1,369	437	121	562
Black marlin	0	0	0	0	0
Blue marlin	14	15	7	0	11
Sailfish	1	1	0	0	0
Spearfish	13	16	7	1	5
Striped marlin, North Pacific	18	16	9	2	18
Striped marlin, South Pacific	0	0			
Other marlins	0	0	0	0	0
Swordfish, North Pacific	498	679	307	62	147
Swordfish, South Pacific	0	0			
TOTAL BILLFISH	545	727	331	66	182
Blue shark	1	0	3	0	0
Mako shark	17	22	9	2	10
Thresher	1	3	2	2	0
Other sharks	0	0	0	0	0
TOTAL SHARKS	19	25	14	4	11
Mahimahi	67	51	62	6	21
Moonfish	376	202	122	14	93
Oilfish	22	25	10	2	9
Pomfret	37	55	25	4	18
Wahoo	12	12	4	2	7
Other fish	0	0	0	0	0
TOTAL OTHER	516	345	223	27	148
GEAR TOTAL	1,859	2,466	1,004	218	901

U.S. longline catch is the sum of the Hawaii-based and California-based fisheries. American Samoa catch is presented separately.

U.S. longline catch estimates originate from the PIFSC enhanced (with eight estimates) logbook 5x5 degree summary database, and from the SWFSC for California

Literature cited

Boggs, C., Dalzell, P., Essington, T., Labelle, M., Mason, D., Skillman, R., and J. Wetherall. 2000. Recommended overfishing definitions and control rules for the western Pacific regional fishery management council's pelagic fishery management plan. Administrative Report H-00-05, Honolulu Laboratory, SWFSC, NMFS, NOAA.

Harley S., Hoyle S., Williams P., Hampton J., Kleiber P. 2010. Stock assessment of bigeye tuna in the western and central Pacific Ocean. WCPFC-SC6-2010/SA-WP-04, Nuku'alofa, Tonga, 10-19 August 2010.

Hoyle, S. and N. Davies. 2009. Stock assessment of albacore tuna in the South Pacific Ocean. WCPFC-SC5-2009/SA-06, Port Vila, Vanuatu, 10−21 August 2009.

Hoyle, S., Kleiber, P., Davies, D., Harley, S., Hampton, J. 2010. Stock assessment of skipjack tuna in the western and central Pacific Ocean. . WCPFC-SC6-2010/SA-WP-10, Nuku'alofa, Tonga, 10-19 August 2010.

ISC Billfish Working Group. 2009. International Scientific Committee for Tuna and Tuna-Like Species [ISC] Plenary. Annex 7. Report of the Billfish Working Group Workshop (19-26 May2009; Busan, Korea), 74 p.

Kleiber, P., Hampton, J., Hinton, M., and Y. Uozumi. 2002. Update on blue marlin stock assessment. WP BBRG–10, SCTB 15, Honolulu, Hawaii, 22–27 July 2002.

Kleiber, P., Clarke, S., Bigelow, K., Nakano, H., McAllister, M. and Y. Takeuchi. 2009. North Pacific Blue Shark Stock Assessment. NOAA Tech. Memo. NMFS PIFSC−17. 74 p.

Langley, A., Harley, S., Hoyle, S., Davies, N., Hampton, J. and P. Kleiber. 2009. Stock assessment of yellowfin tuna in the western and central Pacific Ocean. WCPFC-SC5-2009/SA-03, Port Vila, Vanuatu, 10−21 August 2009.

F. Marine Recreational Pelagic Fisheries in the Western Pacific

Introduction

Fishing, either for subsistence or recreation, continues to be an extremely important activity throughout 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); in even 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 1999). All fishing was greatly constrained during WWII 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 fiberglass technology to Hawaii and the further refinement of marine inboard and outboard engines (

Figure 146). 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 from 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).

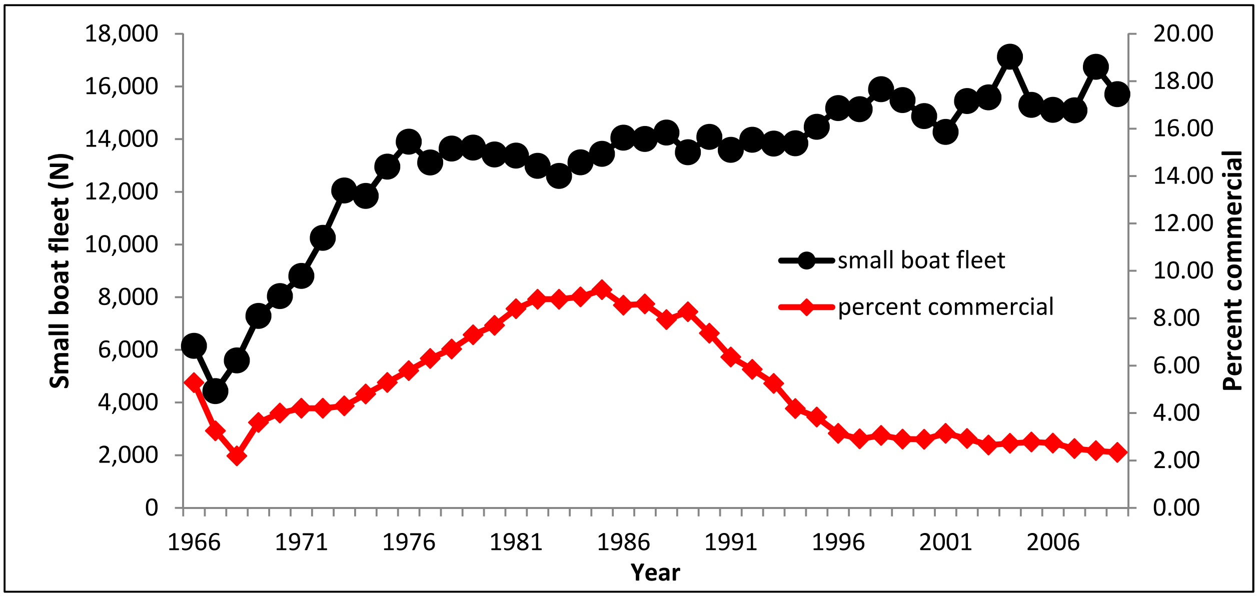


Figure 146. Annual number of small vessel fleet registrations in Hawaii, 1966-2009. Figure shows total fleet size, and percentage of vessels being registered for commercial fishing (Source: Hawaii Division of Boating and Ocean Resources)

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 2-3 years (Gerry Davis, Guam DAWR pers. comm.). There was also a Guam Boating Association comprising mostly fishermen, with several hundred members. This organization functioned as a fishing club for about 10 years and then disbanded. Some school groups and the boy scouts have formed fishing clubs focused on rod and reel fishing, and there is still one spear-fishing club that has only a handful of members, but appears to be still be active. There are also some limited fishing tournaments on Guam, including a fishing derby for children organized by the local Aquatic and Wildlife Resources Division.

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.

A recent innovation in the Mariana Islands is the publication of a free quarterly magazine, Mariana Fishing Magazine, which covers recreational fishing in both Guam and the CNMI.

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, whaoo 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 36. The data for Guam, CNMI, 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.

The recreational catch for Hawaii is generated from the Hawaii Marine Recreational Fisheries Statistical Survey, which is a collaborative effort between the State of Hawaii’s Division of Aquatic Resources and the National Marine Fisheries Service (NMFS) Office of Science and Technology. This survey is part of the NMFS Marine Fisheries Recreational Statistical Survey

(MRFSS) which is being modified following a review by the National Academy of Science in 2006, under the auspices of the Marine Recreational Improvement Program (MRIP).

Table 36. Estimated Recreational Pelagic Fish Catches in the Four Principal Island Groups of the Western Pacific Region in 2009

Location	Year	Total catch (lbs)	Unsold catch (lb)	Nominal recreational catch (lb)	Rec. catch as a % of total catch	Rec. fishing trips
American Samoa	2009	10,640,460	2,827	2,732	0.03	44
Guam	2009	622,840	329,340	303,391	48.70	3,764
Hawaii	2009	44,676,500	NA	17,138,048	38.40	361,563
NMI	2009	404,633	91,082	85,423	21.11	4,212

Charter vessel sportsfishing

Tables 2-6 present summaries of the charter vessel sportsfishing in the Western Pacific. Charter fishing in Hawaii is more focused on catching blue marlin, which in 2004 comprised about 50% of the total annual charter vessel catch by weight, but in 2008 only comprised about a quarter of the charter vessel catch and was superseded by yellowfin. Although commercial troll vessels also take blue marlin, these only comprise about ten percent of their catch, with the majority of the target species being yellowfin, mahimahi, and wahoo (Table 37). 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 9.3% of the troll catch, and 30% and 20% of the Guam blue marlin and wahoo catch, respectively. (See Guam module in this volume).

Charter fishing in CNMI 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 sportsfishing as the local infrastructure for this is limited (Tulafono 2001).

Table 37. Estimated Catches by Pelagic Charter Fishing Vessels in Guam, Hawaii and CNMI in 2009

Location	Catch (lbs)	Effort (trips)	Principal species
Guam	50,945	1,891	Wahoo, Skipjack, Mahimahi, Blue marlin
Hawaii	515,894	8,640	Yellowfin, Blue marlin, Mahimahi, Wahoo

CNMI	4,691	94	Wahoo, Skipjack, Mahimahi, Blue marlin

Charter vessel fishing in the Western Pacific Region has elements of both recreational and commercial fishing. The primary motivation for charter patrons is recreational fishing, with the possibility of catching large game fish such as blue marlin. The charter vessel skipper and crew receive compensation in the form of the patron's fee, but are also able to dispose of fish on local markets, as is the case in Hawaii. The catch composition of charter vessel catch versus conventional commercial trolling in Hawaii reflects the different targeting in the two fisheries. Blue marlins are the dominant feature of charter vessels in Hawaii, while in Guam (Tables 37 & 38), composition of the charter catch is being broadly similar to the mix of species in the commercial troll catches

Table 38. Comparison of Species Composition of Landings Made by Hawaii Pelagic Charter Vessels Versus Commercial Troll Vessels, 2009

	Charter vessels		Commercial vessels	
Species	**Landings (lb)**	**Percent**	**Landings (lb)**	**Percent**
Yellowfin tuna	155,793	30.20%	770,737	33.40%
Mahimahi	123,496	23.94%	506,319	21.94%
Wahoo	43,584	8.45%	384,724	16.67%
Skipjack	33,458	6.49%	253,945	11.01%
Blue marlin	131,515	25.49%	222,276	9.63%
Bigeye tuna	6,851	1.33%	103,736	4.50%
Striped marlin	7,294	1.41%	13,554	0.59%
S.N. spearfish	5,679	1.10%	5,565	0.24%
Other	8,224	1.59%	46,458	2.01%
Total	515,894	100.00%	2,307,314	100.00%

Table 39. Comparison of Species Composition of Landings Made by Guam Pelagic Charter Vessels Versus Commercial Troll Vessels, 2009

	Charter		Commercial	
Species	**Landings (lb)**	**Percent**	**Landings (lb)**	**Percent**
Mahimahi	22,588	41.79%	124,061	18.63%
Blue Marlin	12,194	22.56%	20,411	3.07%
Wahoo	9,035	16.72%	121,698	18.28%
Skipjack Tuna	8,381	15.51%	322,682	48.46%
Yellowfin Tuna	1,214	2.25%	49,065	7.37%
Others	637	1.18%	27,925	4.19%
Total	54,049	100.00%	665,842	100.00%

In Hawaii there is considerable variation in charter vessel catches between the various islands (Table 40), with the largest charter vessel fishery based on the island of Hawaii. In 2008, charter vessel catches on the island of Hawaii accounted for nearly 40% of the total charter vessel landings within the state, with Oahu, Kauai, and Maui County charter vessels forming the remaining charter vessel catch.

Table 40. Charter Vessel Catches in Hawaii by Island, 2009

Island	Catch	Percent	Trips	Percent	CPUE (lb/trip)
Hawaii	169,151	32.79%	4,052	46.90%	41.75
Kauai	75,520	14.64%	1,284	14.86%	58.82
Maui County*	48,617	9.42%	1,230	14.24%	39.53
Oahu	222,605	43.15%	2,074	24.00%	107.33
Total	**515,894**	**100.00%**	**8,640**	**100.00%**	**59.71**

* DAR confidentiality protocols prevent reporting 2007 charter vessel activity for Molokai and Lanai separately; these are aggregated with data for Maui, reported collectively as Maui County

Most charter vessel fishing on the island of Hawaii is conducted from Kona's small boat harbor at Honokohau, and about one third of the charter vessel catch comprises blue marlin (Table 41). Blue marlin used to amount to about two-thirds of the catch, but this number has fallen considerably with the spread of a stronger catch and release ethic for billfish by charter vessel operators at Honokohau. Elsewhere, yellowfin and mahimahi dominate charter vessel landings, with blue marlin comprising between 12% and 24% of catches. Other important species in the charter vessel catches, depending on location, are wahoo, spearfish and skipjack.

Table 41. Composition of Charter Vessel Catches in the Main Hawaiian Islands, 2009

Hawaii	Landings (lb)	Percent	Kauai	Landings (lb)	Percent
Blue marlin	61,829	36.55%	Yellowfin tuna	27,534	36.46%
Yellowfin tuna	45,937	27.16%	Skipjack	17,061	22.59%
Mahimahi	26,036	15.39%	Mahimahi	12,459	16.50%
Wahoo	17,196	10.17%	Blue marlin	9,384	12.43%
Bigeye tuna	4,930	2.91%	Wahoo	6,788	8.99%
Spearfish	4,216	2.49%	Striped marlin	713	0.94%
Skipjack	4,064	2.40%	Kahala	490	0.65%
Striped marlin	2,874	1.70%	Kawakawa	379	0.50%
Other	2,070	1.22%	Other	713	0.94%
Total	169,151	100.00%		75,520	100.00%

Maui	Landings (lb)	Percent	Oahu	Landings (lb)	Percent
Mahimahi	19,983	8.98%	Yellowfin tuna	77,473	34.80%
Blue marlin	10,084	4.53%	Mahimahi	65,017	29.21%
Wahoo	9,320	4.19%	Blue marlin	50,218	22.56%
Yellowfin tuna	4,850	2.18%	Skipjack	12,168	5.47%
Bigeye tuna	1,147	0.52%	Wahoo	10,280	4.62%
Striped marlin	847	0.38%	Striped marlin	2,860	1.28%
Kawakawa	211	0.09%	Spearfish	1,253	0.56%
Spearfish	210	0.09%	Kawakawa	1,133	0.51%
Skipjack	166	0.07%	Bigeye tuna	774	0.35%
Other	1,799	0.81%	Other	1,429	0.64%
Total	48,617	100.00%	**Total**	**222,605**	100.00%

Recreational Fishing Data Collection in Hawaii

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.

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 but took until 2003 until annual results were first reported from this initiative.

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 42 provides summaries of the recreational boat and shoreline fish catch between 2003 and 2008 for pelagic and other species of fish.

Table 42. Recreational Fish Catches in Hawaii between 2003 and 2008. Source: HMFRS

Year	(Fish type)	Boat –based (lbs)	Shore-based (lbs)	Total
2003	Pelagic	14,905,992	422,434	15,328,426
	Others	517,119	1,429,637	1,946,756
	Total	15,423,111	1,852,071	17,275,182
2004	Pelagic	12,210,684	120,780	12,331,464
	Others	1,193,998	1,148,203	2,342,202
	Total	13,404,683	1,268,983	14,673,666
2005	Pelagic	12,804,980	229,060	13,034,040
	Others	795,859	1,015,650	1,811,509
	Total	13,600,839	1,244,710	14,845,549
2006	Pelagic	11,830,852	258,802	12,089,653

Year	(Fish type)	Boat –based (lbs)	Shore-based (lbs)	Total
	Others	856,243	1,519,289	2,375,533
	Total	12,687,095	1,778,091	14,465,186
2007	Pelagic	13,956,647	114,831	14,071,478
	Others	404,284	346,457	750,741
	Total	14,360,931	461,288	14,822,219
2008	Pelagic	21,802,390	56,937	21,859,327
	Others	231,584	773,611	1,005,195
	Total	22,033,974	830,548	22,864,522
2009	Pelagic	17,071,412	66,635	17,138,048
	Others	272,841	369,993	642,834
	Total	17,344,253	436,629	17,780,882

Figures 147-149 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 2009, while Figure 150 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 147) followed by yellowfin tuna, mahimahi and wahoo. In terms of weight, however, yellowfin tuna dominates recreational pelagic fish catches (Figure 148).

Although blue marlin numbers in the catch are small compared to other species, the much greater average weight (Figure 148) means that it can comprise a significant fraction of the recreational catch by weight. Average weights for most species tended to be relatively similar between years for mahimahi, skipjack and wahoo, but may vary considerable between years for blue marlin, striped marlin and yellowfin tuna. This is also reflected in the nominal catch rate (lbs/trip) in Figure 149, where yellowfin catch rate was much higher in 2003 than in 2004 and 2005, and increased to a new maximum in 2008. 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.

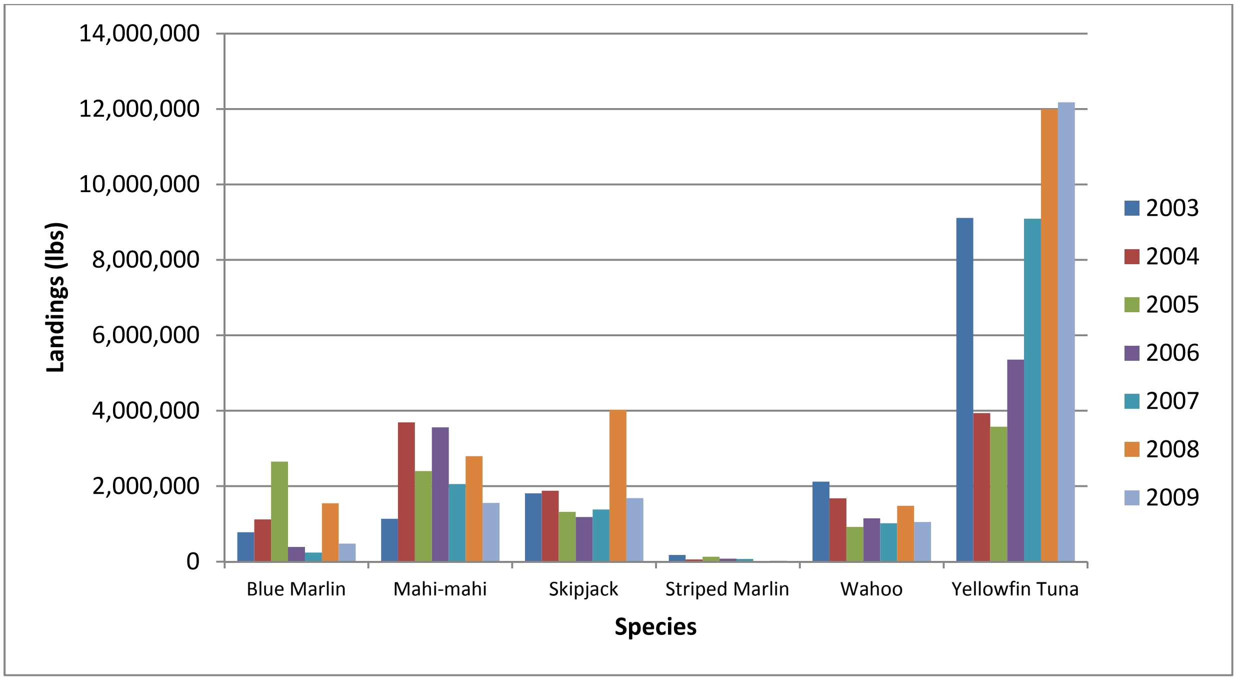


Figure 147. Annual recreational fishery landings by weight of six major pelagic fish species in Hawaii between 2003 and 2008

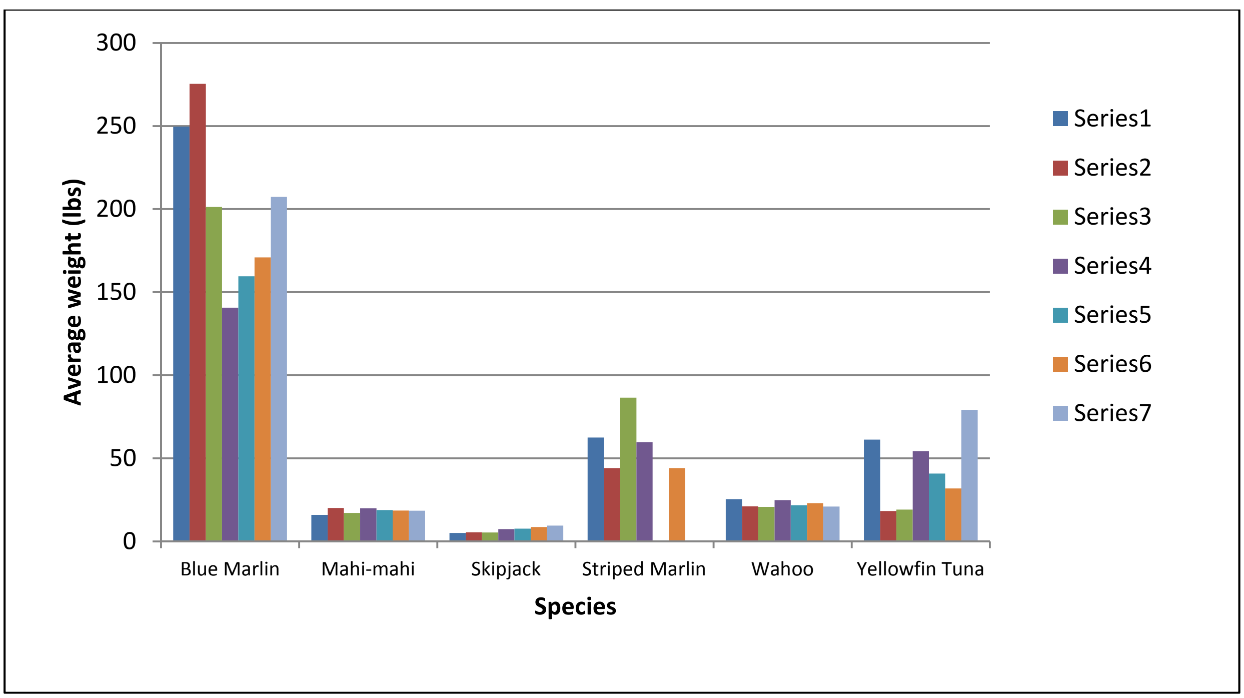


Figure 148. Average weight of six major pelagic fish species caught by recreational fishing in Hawaii between 2003 and 2008

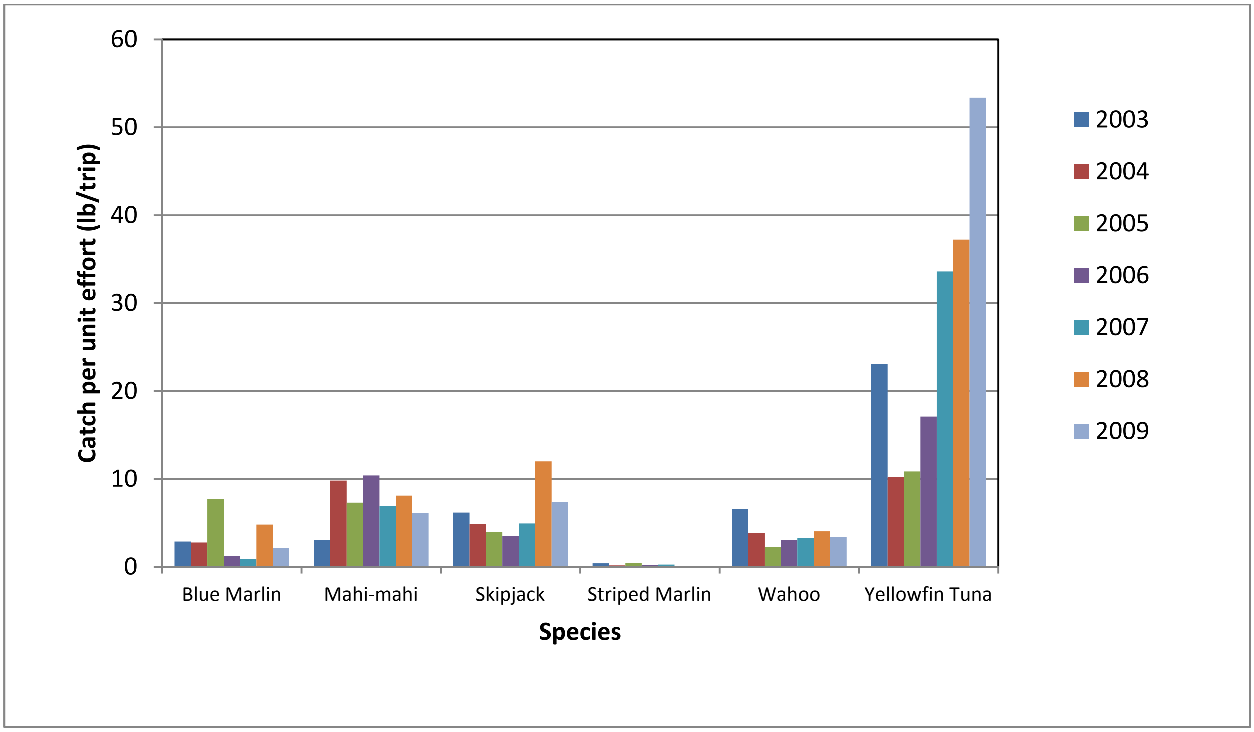


Figure 149. Annual recreational catch per unit effort (lbs per trip) for six major pelagic species in Hawaii between 2003 and 2008

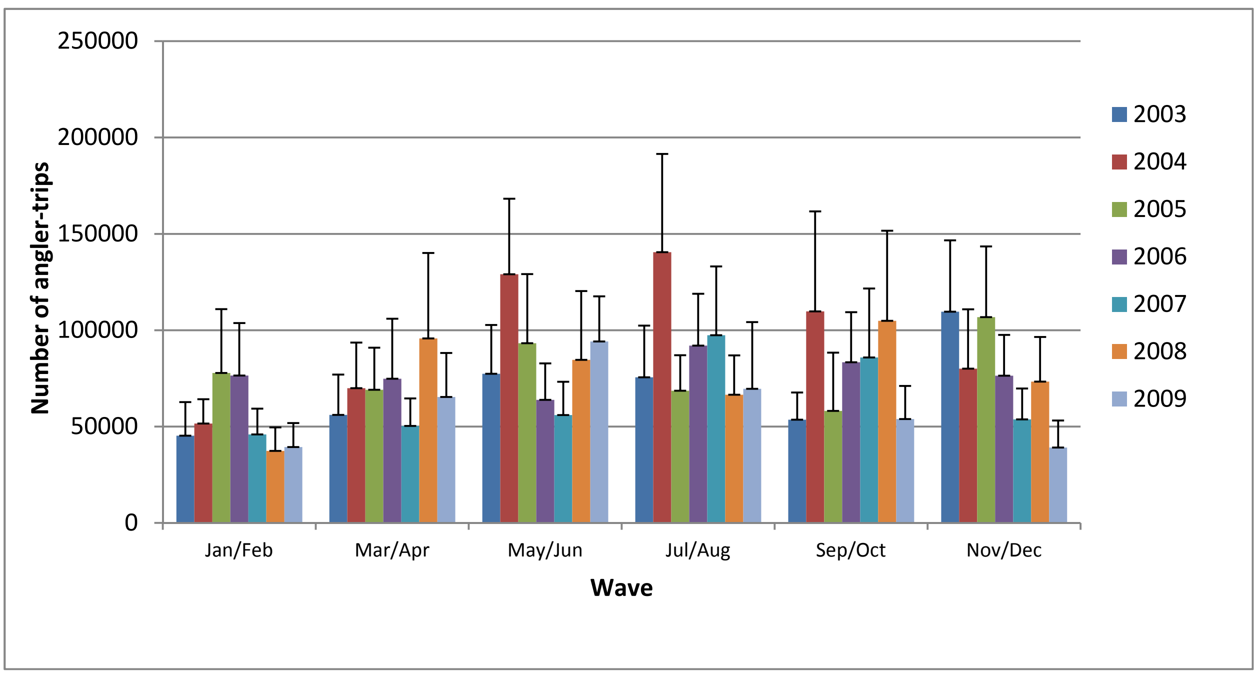


Figure 150. Annual private vessel recreational fishing effort in Hawaii between 2003 and 2008

References

Literature cited

Brock, V.E. Report of the Director, Division of Fish and Game. Report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii. Honolulu.

Dalzell, P., T. Adams,& N. Polunin, 1996. Coastal fisheries in the South Pacific. Oceanography and Marine Biology Annual Review 33, 395-531.

Dalzell, P. & W. Paty, 1996. The importance and uniqueness of fisheries in the Western Pacific Region. Paper presented at the 91st Western Pacific Fishery Council Meeting, 18-21 November 1996, Honolulu, 10 p.

Glazier, E.W. 1999. Social aspects of Hawaii's small vessel troll fishery. Phase II of the Social Aspects of Pacific Pelagic Fisheries Program, Univ. Hawaii, JIMAR, 287 pp.

Tulafono, R. 2001. Gamefishing and tournaments in American Samoa. In, Proceedings of the 1998 Pacific Island Gamefish Symposium: Facing the Challenges of Resource Conservation, Sustainable Development, and the Sportfishing Ethic, 29 July-1 August, 1998, Kailua-Kona, Hawaii, Western Pacific Regional Fishery Management Council.

G. U.S. West Coast Pelagic Fisheries Production

The following tables include time series for pelagic fisheries production along the US West Coast between 1986 and 2008 (1988-2008 for time series by State). All data comes from the Pacific Fisheries Information Network website at http://www.psmfc.org/pacfin/woc.html.

Table 43. Annual West Coast Highly Migratory Species Landings (mt) by Species

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Big-eye Thresher	Pelagic Thresher	Shortfin Mako	Blue shark
1986	5,243	21,517	1,361	29	4,731	2,530	974	<.05	48	312	2
1987	3,160	23,201	5,724	50	823	1,803	562	2	20	403	2
1988	4,908	19,520	8,863	6	804	1,636	500	1	9	322	3
1989	2,214	17,615	4,505	1	1,019	1,357	504	<.05	17	255	6
1990	3,030	8,509	2,256	2	925	1,236	357	1	31	373	20
1991	1,676	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	4,885	3,350	2,586	7	1,087	1,546	292	<.05	22	142	1
1993	6,151	3,795	4,539	26	559	1,771	275	1	44	122	0
1994	10,686	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	6,528	3,038	7,037	49	714	1,161	270	5	31	95	5
1996	14,173	3,347	5,455	62	4,688	1,191	319	1	20	96	1
1997	11,292	4,774	6,070	82	2,251	1,448	319	35	32	132	1
1998	13,785	5,799	5,846	53	1,949	1,378	326	2	11	98	3
1999	9,629	1,353	3,759	105	179	1,992	320	10	5	6	0
2000	9041	1148	780	87	312	2652	295	5	3	80	1
2001	11,183	655	58	53	196	2195	373	2	2	46	2
2002	10,028	544	236	10	11	1697	315	0	0	82	42
2003	16,643	465	349	35	36	2126	294	5	4	69	<1
2004	14,469	488	307	22	38	1185	115	5	2	54	<1
2005	9,083	285	522	0	206	294	178	10	<1	33	<1
2006	12,749	77	48	0	<1	539	159	4	<1	46	<1
2007	11,586	104	5	0	45	550	204	5	2	45	10
2008	11,131	65	3	28	<1	531	148	7	0	35	<1
2009	12,307	45	5	0	415	407	106	7	0	30	2

Table 44. Annual Value ($) of West Coast Highly Migratory Landings by Species

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
1986	8,895,672	25,475,289	1,367,387	129,108	6,618,473	18,256,026	2,412,160	277	95,181	611,399	1,886
1987	7,085,992	33,183,108	5,982,568	244,701	2,902,340	15,405,478	1,638,772	2,560	30,721	989,632	2,566
1988	12,280,116	34,161,742	12,618,821	33,772	4,445,064	13,007,930	1,310,935	1,097	13,328	868,676	2,923
1989	4,873,362	24,112,994	5,086,365	3,004	1,684,134	10,579,050	1,202,991	191	31,313	707,408	4,631
1990	6,911,021	10,485,225	2,361,619	10,928	1,433,788	8,811,042	786,534	2,067	42,599	909,368	15,834
1991	3,349,988	4,721,908	3,130,649	50,650	137,612	7,497,271	1,145,001	0	28,944	491,477	892
1992	13,214,373	4,412,452	1,606,563	51,444	1,360,230	8,709,765	521,922	693	17,108	266,344	2,056
1993	13,001,721	6,440,417	3,498,178	238,527	841,129	10,062,551	520,120	509	32,498	248,651	681
1994	22,293,343	4,947,988	1,916,462	336,130	1,834,094	10,504,630	632,555	46	37,579	270,088	17,572
1995	12,377,227	3,260,929	5,125,387	268,465	1,129,006	7,013,279	510,733	9,389	26,730	177,076	2,994
1996	28,583,043	3,388,536	4,185,411	273,321	4,238,678	6,363,798	634,493	1,635	18,591	174,621	616
1997	20,529,493	5,254,042	5,639,463	370,331	2,896,450	6,297,358	609,285	64,543	35,781	232,737	287
1998	19,068,271	5,976,102	5,322,183	277,238	3,058,769	6,052,792	574,795	2,635	9,513	173,349	6,094
1999	17,515,551	1,468,743	2,748,208	639,668	961,423	8,309,539	616,407	18,424	5,876	109,767	83
2000	17,154,639	1,294,388	483,242	579,384	577,095	11,772,245	587,702	2,738	4,636	132,970	909
2001	20,687,195	465,558	33,633	320,855	473,821	8,696,689	595,542	2,767	8,428	75,780	1,501
2002	14,291,939	588,677	128,425	87,304	43,512	6,320,439	517,715	N.A.	N.A.	124,522	18,598
2003	24,424,823	450,925	159,961	262,768	75,396	7,797,738	476,067	2,907	3,463	113,689	714
2004	27,345,860	447,555	109,254	147,696	53,613	4,824,309	196,360	2,500	4,060	97,280	972
2005	21,002,429	316,368	292,121	0	136,848	1,872,431	271,451	588	6,234	57,758	1,610
2006	23,759,098	175,646	40,384	0	3,790	2,695,302	299,709	271	4,509	79,313	632
2007	21,663,546	149,568	4,361	0	58,106	3,131,178	337,770	2,903	4,334	78,569	1,984
2008	28,853,123	125,508	3,675	205,536	3,340	2,372,762	280,885	0	5,459	67,255	177
2009	27,584,153	166,620	5,332	0	443,095	1,929,884	197,718	0	5,453	54,463	2,361

[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 45. Pacific Coast Commercial Landings of Highly Migratory Species by State, 1986-2008

	Landings (mt)										
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
Washington											
1987	529	N.A.	0	N.A.	0	0	65	N.A.	N.A.	N.A.	<.05
1988	1,900	N.A.	0	N.A.	0	2	6	N.A.	N.A.	N.A.	<.05
1989	855	N.A.	0	N.A.	0	0	3	N.A.	N.A.	N.A.	0
1990	1,225	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1991	428	N.A.	<.05	N.A.	0	0	<.05	N.A.	N.A.	N.A.	<.05
1992	1,864	N.A.	<.05	N.A.	0	0	1	N.A.	N.A.	N.A.	<.05
1993	2,167	N.A.	0	N.A.	0	1	<.05	N.A.	N.A.	N.A.	<.05
1994	5,377	N.A.	0	N.A.	0	0	<.05	N.A.	N.A.	N.A.	0
1995	3,413	N.A.	0	N.A.	0	<.05	5	N.A.	N.A.	N.A.	<.05
1996	4,969	N.A.	0	N.A.	0	0	4	N.A.	N.A.	N.A.	<.05
1997	3,775	N.A.	0	N.A.	0	0	2	N.A.	N.A.	N.A.	<.05
1998	6,517	N.A.	0	N.A.	0	0	6	N.A.	N.A.	N.A.	<.05
1999	2,074	N.A.	0	N.A.	12	4	65	N.A.	N.A.	N.A.	0
2000	3,185	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	<0.5
2001	4,152	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2002	5,358	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2003	0	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2004	8,310	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2005	4,900	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2006	8,677	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2007	5,980	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2008	6,725	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2009	7,339	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Oregon											
1987	1,038	0	0	N.A.	<.05	0	92	N.A.	N.A.	0	0
1988	1,799	0	0	N.A.	0	0	81	N.A.	N.A.	0	0
1989	490	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	0
1990	943	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1991	571	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1992	1,764	0	0	N.A.	0	0	1	N.A.	N.A.	0	<.05
1993	2,157	0	0	N.A.	0	0	<.05	N.A.	N.A.	0	<.05
1994	2,131	0	0	N.A.	0	0	0	N.A.	N.A.	0	<.05
1995	2,283	<.05	<.05	N.A.	<.05	3	1	N.A.	N.A.	0	<.05
1996	4,059	<.05	0	N.A.	<.05	16	<.05	N.A.	N.A.	0	1
1997	4,158	<.05	<.05	N.A.	1	6	<.05	N.A.	N.A.	0	<.05
1998	4,808	0	0	N.A.	3	35	<.05	N.A.	N.A.	1	2
1999	2,064	<.05	0	N.A.	6	6	1	N.A.	N.A.	<.05	<.05
2000	3,972	0	0	N.A.	0	0	0	N.A.	N.A.	0	1
2001	4,058	0	0	N.A.	0	0	0	N.A.	N.A.	0	2
2002	1,979	0	0	N.A.	0	0	0	N.A.	N.A.	0	<0.5
2003	4,139	0	0	N.A.	0	0	0	N.A.	N.A.	0	<1
2004	4,807	0	0	N.A.	0	0	0	N.A.	N.A.	0	<0.5
2005	3,704	0	0	N.A.	0	0	0	N.A.	N.A.	0	<1
2006	3,864	0	0	N.A.	0	0	<1	N.A.	N.A.	0	<1
2007	4,781	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	<1
2008	4,026	N.A.	N.A.	N.A.	N.A.	N.A.	<1	N.A.	N.A.	N.A.	<1
2009	4,573	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0
California											
1987	1,592	23,201	5,724	50	823	1,803	405	2	20	403	2
1988	1,209	19,520	8,863	6	804	1,634	414	1	9	322	3
1989	870	17,615	4,505	1	1,019	1,357	501	<.05	17	255	6
1990	862	8,509	2,256	2	925	1,236	356	1	31	373	20
1991	677	4,178	3,407	7	104	1,029	584	0	32	219	1
1992	1,257	3,350	2,586	7	1,087	1,546	291	<.05	22	142	1
1993	1,827	3,795	4,539	26	559	1,770	275	1	44	122	<.05
1994	3,177	5,056	2,111	47	916	1,700	330	<.05	37	128	12
1995	832	3,038	7,037	49	714	1,159	264	5	31	95	5
1996	5,146	3,347	5,455	62	4,687	1,175	316	1	20	96	<.05
1997	3,358	4,774	6,070	82	2,250	1,442	317	35	32	132	<.05
1998	2,459	5,799	5,846	53	1,946	1,343	319	2	11	97	1

	Landings (mt)										
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
1999	5,491	1,353	3,759	105	161	1,982	253	10	5	62	<.05
2000	1,884	1,148	780	87	312	2,612	250	3	5	80	<0.5
2001	2,972	642	57	53	196	2,194	360	2	2	46	0
2002	2,692	544	236	10	9.7	1,697	315	N.A.	N.A.	82	41
2003	1,711	465	349	35	36	2,126	294	4	5	68	0
2004	1,352	488	307	22	38	1,185	114	2	5	53	0
2005	478	285	522	0	206	294	178	<1	9	33	0
2006	208	77	48	0	<1	539	159	<1	4	46	0
2007	858	104	5	N.A.	45	550	203	2	5	45	N.A.
2008	379	65	3	22	<1	531	147	0	7	35	N.A.
2009	394	45	5	0	415	407	106	0	7	30	0

Table 46. Pacific Coast real Commercial Ex-Vessel Revenues (1999)[1] from Highly Migratory Species by State

	Revenues ($)										
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
Washington											
1988	4,666,429	N.A.	0	N.A.	0	13,526	31,385	N.A.	N.A.	N.A.	65
1989	1,730,680	N.A.	0	N.A.	0	0	10,541	N.A.	N.A.	N.A.	0
1990	2,693,806	N.A.	0	N.A.	0	0	33	N.A.	N.A.	N.A.	0
1991	818,179	N.A.	17	N.A.	0	0	287	N.A.	N.A.	N.A.	52
1992	5,014,569	N.A.	82	N.A.	0	0	655	N.A.	N.A.	N.A.	39
1993	4,603,209	N.A.	0	N.A.	0	5,907	953	N.A.	N.A.	N.A.	34
1994	10,609,267	N.A.	0	N.A.	0	0	102	N.A.	N.A.	N.A.	0
1995	6,429,656	N.A.	0	N.A.	0	328	16,541	N.A.	N.A.	N.A.	16
1996	9,515,982	N.A.	0	N.A.	0	0	11,619	N.A.	N.A.	N.A.	44
1997	7,000,641	N.A.	0	N.A.	0	0	10,922	N.A.	N.A.	N.A.	10
1998	8,962,842	N.A.	0	N.A.	0	0	19,243	N.A.	N.A.	N.A.	71
1999	3,637,282	N.A.	0	N.A.	27,772	9,445	144,232	N.A.	N.A.	N.A.	0
2000	5,837,871	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	9
2001	7,951,774	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2002	7,441,030	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2003	0	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2004	15,891,469	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2005	11,009,583	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2006	15,176,684	N.A.	0	N.A.	0	0	0	N.A.	N.A.	N.A.	0
2007	10,481,053	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2008	17,225,272	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2009	16,425,993	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Oregon											
1988	4,444,898	0	0	N.A.	0	0	180,477	N.A.	N.A.	0	0
1989	1,142,060	0	0	N.A.	0	0	19	N.A.	N.A.	0	0
1990	2,167,028	0	0	N.A.	0	0	664	N.A.	N.A.	0	69
1991	1,166,314	0	0	N.A.	0	0	0	N.A.	N.A.	0	73
1992	4,554,091	0	0	N.A.	0	0	1,228	N.A.	N.A.	0	99
1993	4,350,334	0	0	N.A.	0	0	498	N.A.	N.A.	0	130
1994	4,103,617	0	0	N.A.	0	0	0	N.A.	N.A.	0	93
1995	4,332,302	336	9	N.A.	454	25,141	1,681	N.A.	N.A.	0	192
1996	7,801,152	9	0	N.A.	1,203	125,422	234	N.A.	N.A.	0	438
1997	7,567,729	536	424	N.A.	3,332	51,790	199	N.A.	N.A.	0	209
1998	6,665,217	0	0	N.A.	15,783	263,820	114	N.A.	N.A.	2,726	5,628
1999	3,782,057	198	0	N.A.	38,117	46,955	2,588	N.A.	N.A.	787	48
2000	7,487,569	0	0	N.A.	0	0	1,190	N.A.	N.A.	0	529
2001	7,544,089	0	0	N.A.	0	0	0	N.A.	N.A.	0	1,211
2002	2,951,707	0	0	N.A.	0	0	0	N.A.	N.A.	0	244
2003	6,125,406	0	0	N.A.	0	0	0	N.A.	N.A.	0	677
2004	9,006,482	0	0	N.A.	0	0	0	N.A.	N.A.	0	871
2005	8,890,821	0	0	N.A.	0	0	0	N.A.	N.A.	0	1,391
2006	8,046,824	0	0	N.A.	0	0	693	N.A.	N.A.	0	374
2007	9,467,854	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	520
2008	10,666,183	N.A.	N.A.	N.A.	N.A.	N.A.	168	N.A.	N.A.	N.A.	177
2009	10,190,661	N.A.	N.A.	N.A.	69	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
California											
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

	Revenues ($)										
Year	**Albacore**	**Yellowfin**	**Skipjack**	**Bigeye**	**Bluefin**	**Swordfish**	**Common Thresher**	**Pelagic Thresher**	**Bigeye Thresher**	**Shortfin Mako**	**Blue Shark**
1996	11,265,909	3,388,527	4,185,411	273,321	4,237,475	6,238,375	622,640	1,635	18,591	174,621	135
1997	5,961,123	5,253,506	5,639,039	370,331	2,893,118	6,245,568	598,164	64,543	35,781	232,737	67
1998	3,440,213	5,976,102	5,322,183	277,238	3,042,986	5,788,972	555,437	2,635	9,513	170,623	395
1999	10,102,663	1,468,544	2,748,208	639,668	895,534	8,253,140	469,587	18,424	5,876	108,980	35
2000	3,829,200	1,294,388	483,242	579,384	576,439	11,770,080	485,073	2,736	4,636	136,698	294
2001	5,191,333	445,861	32,878	320,753	472,785	8,695,855	584,636	2,767	8,428	75,572	0
2002	3,899,203	588,677	128,245	87,304	33,148	6,320,439	517,427	N.A.	N.A.	124,522	18,351
2003	2,600,649	450,925	159,961	262,768	73,863	7,796,022	475,014	2,907	3,463	113,502	0
2004	2,447,909	447,555	109,254	147,696	53,483	4,824,134	195,373	2,500	4,060	97,141	0
2005	1,102,025	316,368	292,121	0	136,848	1,872,431	270,449	588	6,234	57,577	0
2006	535,590	175,646	40,346	0	3,790	2,695,302	298,843	271	4,509	79,144	0
2007	1,714,639	149,568	4,361	N.A.	58,106	3,131,178	337,145	2,903	4,334	78,569	N.A.
2008	961,669	125,508	3,675	159,240	3,340	2,371,562	280,717	0	5,459	67,054	N.A.
2009	967,499	166,620	5,332	0	443,026	1,929,884	197,718	0	5,453	54,373	0

Appendix 1

Pelagic Plan Team Members

Pelagics

Mr. Keith Bigelow (CHAIR)	NMFS Pacific Islands Fisheries Science Center
Dr. Christofer Boggs	NMFS Pacific Islands Fisheries Science Center
Mr. Michael Fujimoto	Hawaii Division of Aquatic Resources
Mr. Russell Ito	NMFS Pacific Islands Fisheries Science Center
Dr. Pierre Kleiber	NMFS Pacific Islands Fisheries Science Center
Mr. Brent Tibbats	Guam Division of Aquatic & Wildlife Resources
Mr. Ray Roberto	CNMI Division of Fish & Wildlife
Dr. Kevin Weng	PFRP University of Hawaii
Mr. Paul Bartram	Akala Products Inc.
Mr. Nonu Tuisamoa	American Samoa Dept. of Marine & Wildlife Resources
Brett Weidoff	NMFS Pacific Islands Regional Office
Tom Graham	NMFS Pacific Islands Regional Office

Ex-officio Members of All Plan Teams

Mr. David Hamm	WPacFIN NMFS Pacific Islands Fisheries Science Center
Mr. Michael Quach	WPacFIN NMFS Pacific Islands Fisheries Science Center
Mr. Reginald Kokubun	HI Division of Aquatic Resources (HI only)
Mr. Justin Hospital	NMFS Pacific Islands Fisheries Science Center

Appendix 2

Glossary of Terms and List of Acronyms

Glossary of Terms

TERM	**DEFINITION**
Alia	Samoan fishing catamaran, about 30 feet long, constructed of aluminum or wood with fiberglass. Used for various fisheries including trolling, longline, and bottomfishing
Bycatch	Fish caught in a fishery but discarded or released, except in a recreational fisheries catch and release program.
Commercial	Commercial fishing, where the catch is intended to be sold, bartered, or traded**.**
Guam	A U.S. territory in the Marianas Archipelago. South of and adjacent to the Commonwealth of Northern Marianas Islands.
Hawaii	U.S. state. See MHI, NWHI. Composed of the islands, atolls and reefs of the Hawaiian Archipelago from Hawai'i to Kure Atoll, except Midway Islands. Capitol - Honolulu.
Ika-shibi	Hawaiian term for night tuna handline fishing method. Fishing for tuna using baited handlines at night with a nightlight and chumming to attract squid and tuna.
Incidental Catch	Fish caught that are retained in whole or part, though not necessarily the targeted species. Examples include monchong, opah and sharks.
Interaction	Catch of protected species, which is required to be released. Examples: Hawaiian monk seals, marine turtles and albatrosses.
Logbook	Journal kept by fishing vessels for each fishing trip; records catch data, including bycatch and incidental catch. Required in the federally regulated longline and crustacean fisheries in the Hawaiian EEZ**.**
Longline	Fishing method utilizing a horizontal mainline stretching from several hundred yards to many miles in length, suspended for the surface by floats, to which droppers with baited hooks are attached.
Longliner	Fishing vessel specifically adapted to use the longline fishing method.
Palu-ahi	Hawaiian term for day tuna handline fishing. Fishing for tuna using baited handlines and chumming with cut bait in a chum bag or wrapped around a stone. Also, drop-stone, make-dog, etc.
Pelagic	The pelagic habitat is the upper layer of the water column from the surface to the thermocline. The pelagic species include all commercially targeted highly migratory species such as tuns, billfish and some incidental-catch species such as sharks, as well as coastal pelagic species such as akule and opelu.
Pole-and-Line	Fishing for tuna using poles and fixed leaders with barbless lures and chumming with live baitfish. Poles can be operated manually or mechanically. Also, fishing vessels called baitboats or aku-boats (Hawaii).
Protected	Refers to species which are protected by federal legislation such as the Endangered Species Act, Marine Mammal Protection Act, and Migratory Bird Treaty Act. Examples: Black-footed and Laysan albatrosses, marine turtles, dolphins.
Purse seine	Fishing for tuna by surrounding schools of fish with a very large net and trapping them by closing the bottom of the net.

Recreational Recreational fishing for sport or pleasure, where the catch is not sold, bartered or traded.

Sanctuary Protected area. Commercial/recreational fishing may be restricted.

Secretary When capitalized and used in reference to fisheries within the U.S. EEZs, it refers to the U. S. Secretary of Commerce.

Small pelagics Species such as akule (big-eye scad - *Selar* spp.) And opelu (mackerel scad - *Decapterus* spp). These fish occur mainly in shallow inshore waters but may also be found in deeper offshore waters. Not part of the PMUS.

Trolling Fishing by towing lines with lures or live-bait from a moving vessel.

List of Acronyms

Acronym	Meaning
AP	Advisory Panel. Appointed industry/government/educational representatives functioning in an advisory capacity to the Council.
AS	American Samoa. Includes the islands of Tutuila, Manua, Rose and Swains Atolls.
ASDPW	Department of Public Works, American Samoa. Also, DPW.
CNMI	Commonwealth of the Northern Mariana Islands. Also, Northern Mariana Islands, Northern Marianas, and NMI. Includes the islands of Saipan, Tinian, Rota, and many others in the Marianas Archipelago.
CPUE	Catch-Per-Unit-Effort. A standard fisheries index usually expressed as numbers of fish caught per unit of gear per unit of time, eg., number of fish per hook per line-hour or number of fish per 1,000 hooks. The term catch rate is sometimes used when data are insufficiently detailed to calculate an accurate CPUE.
DAWR	Division of Aquatic & Wildlife Resources, Territory of Guam.
DBEDT	Department of Business, Economic Development & Tourism, State of Hawaii.
DFW	Division of Fish & Wildlife, Northern Mariana Islands.
DLNR	Department of Land & Natural Resources, State of Hawaii. Parent agency for Division of Aquatic Resources (HDAR).
DMWR	Department of Marine & Wildlife Resources, American Samoa. Also, MWR.
EEZ	Exclusive Economic Zone, refers to the sovereign waters of a nation, recognized internationally under the United Nations Convention on the Law of the Sea as extending out 200 nautical miles from shore. Within the U.S., the EEZ typically is between three and 200 nautical miles from shore.
ESA	Endangered Species Act. An Act of Congress passed in 1966 that establishes a federal program to protect species of animals whose survival is threatened by habitat destruction, overutilization, disease etc.
FAD	Fish Aggregating Device; a raft or pontoon, usually tethered, and under which, pelagic fish will concentrate.
FDCC	Fishery Data Coordinating Committee, WPRFMC.
FFA	Forum Fisheries Agency. An agency of the South Pacific Forum, which comprises the independent island states of the South Pacific, Australia and New Zealand. The FFA formed to negotiated access agreements between FFA member countries and distant water fishing nations such as Japan and the USA.

FMP	Fishery Management Plan.
HDAR	Hawaii Division of Aquatic Resources. Also, DAR.
HIMB	Hawaii Institute of Marine Biology, University of Hawaii.
HURL	Hawaii Undersea Research Lab.
JIMAR	Joint Institute of Marine and Atmospheric Research, University of Hawaii.
IATTC	Inter-American Tropical Tuna Commission.
MFCMA	Magnuson Fishery Conservation and Management Act of 1976. Also, Magnuson-Stevens Fishery Conservation and Management Act of 1996. Sustainable Fisheries Act. (Also, MSA)
MHI	Main Hawaiian Islands (comprising the islands of Hawai'i, Mau'i, Lana'i, Moloka'i, Kaho'olawe, O'ahu, Kauai', Ni'ihau and Ka'ula).
MSY	Maximum Sustainable Yield.
NMFS	National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce. Also NOAA Fisheries.
NOAA	National Oceanic and Atmospheric Administration, Department of Commerce.
NWHI	Northwestern Hawaiian Islands. All islands in the Hawaiian Archipelago, other than the Main Hawaiian Islands (MHI).
OFP	Oceanic Fisheries Program of the South Pacific Commission.
OY	Optimum Yield.
PIRO	Pacific Islands Regional Office, National Marine Fisheries Service. Also, NMFS PIRO.
PFRP	Pacific Pelagic Fisheries Research Program, JIMAR, University of Hawaii. Also PPFRP.
PMUS	Pacific Pelagic Management Unit Species. Also, PPMUS. Species managed under the Pelagics FMP.
PT or PPT	Pelagic Plan Team. Advisory body to the Council composed of scientists and fishermen who monitor and manage the fisheries under the jurisdiction of the Pelagics FMP.
SAFE	Stock Assessment and Fishery Evaluation, NMFS.
SPC	South Pacific Commission. A technical assistance organization comprising the independent island states of the tropical Pacific Ocean, dependant territories and the metropolitan countries of Australia, New Zealand, USA, France and Britain.
SPR	Spawning Potential Ratio. A term for a method to measure the effects of fishing pressure on a stock by expressing the spawning potential of the fished biomass as a percentage of the unfished virgin spawning biomass. Stocks are deemed to be overfished when the SPR<20%.
SSC	Scientific & Statistical Committee, an advisory body to the Council comprising experts in fisheries, marine biology, oceanography, etc.
USCG	U.S. Coast Guard, 14th District, Department of Transportation.
USFWS	U.S. Fish & Wildlife Service, Department of Interior. Also, FWS.
VMS	Vessel Monitoring System. A satellite based system for locating and tracking fishing vessels. Fishing vessels carry a transponder which can be located by overhead satellites. Two-way communication is also possible via most VMS systems.
WPacFIN	Western Pacific Fishery Information Network, NMFS.

WPRFMC Also, the Council. Western Pacific Regional Fishery Management Council. One of eight nationwide fishery management bodies created by the Magnuson Fisheries Conservation and Management Act pf 1976 to develop and manage domestic fisheries in the U.S. EEZ. Composed of American Samoa, Guam, Hawaii, and Commonwealth of Northern Mariana Islands.